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SOLUBILITY DATA SERIES

Volume 57

ETHENE

SOLUBILITY DATA SERIES

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INTRODUCTION TO THE SOLUBILITY DATA SERIES

SOLUBILITY OF GASES IN LIQUIDS

NATURE OF THE PROJECT

The Solubility Data project (SDP) has as its aim a comprehensive review of published data for solubilities of gases, liquids and solids in liquids or solids. Data of suitable precision are compiled for each publication on data sheets in a uniform format. The data for each system are evaluated and, where data from independent sources agree sufficiently, recommended values are proposed. The evaluation sheets, recommended values, and compiled data sheets are published on consecutive pages.

COMPILATIONS AND EVALUATIONS

The formats for the compilations and critical evaluations have been standardized for all volumes. A description of these formats follows.

Compilations

The format used for the compilations is, for the most part, self-explanatory. Normally, a compilation sheet is divided into boxes, with detailed contents described below.

Components: Each component is listed according to IUPAC name, formula, and Chemical Abstracts (CA) Registry Number. The Chemical Abstracts name is also included if this differs from the IUPAC name, as are trivial names if appropriate. IUPAC and common names are cross-referenced to Chemical Abstracts names in the System Index.

The formula is given either in terms of the IUPAC or Hill (1) system and the choice of formula is governed by what is usual for most current users: i.e., IUPAC for inorganic compounds, and Hill system for organic compounds. Components are ordered on a given compilation sheet according to:

- (a) saturating components;
- (b) non-saturating components according to chemical families; within carbon compounds, according to increasing carbon number;
- (c) solvents according to chemical families; within carbon compounds, according to increasing carbon number.

In each class, ordering follows the 18-column IUPAC periodic table. The same order is followed in arranging the compilation sheets within a given volume.

Original Measurements: References are abbreviated in the forms given by Chemical Abstracts Service Source Index (CASSI). Names originally in other than Roman alphabets are given as transliterated by Chemical Abstracts. In the case of multiple entries (for example, translations) an asterisk indicates the publication used for compilation of the data.

Variables: Ranges of temperature, pressure, etc. are indicated here.

Prepared by: The names of all compilers are given here.

Experimental Values: Components are described as (1), (2), etc., as defined in the "Components" box. Data are reported in the units used in the original publication, with the exception that modern names for units and quantities are used; e.g., mass per cent for weight per cent; mol dm³ for molar; etc. Usually, only one type of value (e.g., mass per cent) is found in the original paper, and the compiler has added the mole fractions from calculations based on 1989 atomic weights (2) and referenced sources of densities, where necessary. Temperatures are expressed as $t/^{\circ}$ C, $t/^{\circ}$ F or T/K as in the original; if necessary, conversions to T/K are made, sometimes in the compilations, and always in the critical evaluation. However, the author's units are expressed according to IUPAC recommendations (3) as far as possible.

Errors in calculations, fitting equations, etc. are noted, and where possible corrected. Material inserted by the compiler is identified by the word "compiler" or by the compiler's name in parentheses or in a footnote. Details of smoothing equations (with limits) are included if they are present in the original publication and if the temperature or pressure ranges are wide enough to justify this procedure and if the compiler finds that the equations are consistent with the data.

The precision of the original data is preserved when derived quantities are calculated, if necessary by the inclusion of one additional significant figure. In some cases, compilers note that numerical data have been obtained from published graphs using digitizing techniques. In these cases, the precision of the data can be determined by the quality of the original graph and the limitations of the digitizing technique.

Method: The apparatus and procedure are mentioned briefly. Abbreviations used in Chemical Abstracts are often used here to save space, reference being made to sources of further detail if these are cited in the original paper. Several reviews on experimental methods of determining gas solubilities are given in (4-10).

Source and Purity of Materials: For each component, referred to as (1), (2), etc., the following information (in this order and in abbreviated form) is provided if available in the original paper: source and specified method of preparation; properties; degree of purity. The solubility is usually more sensitive to impurities in the gaseous component than in the liquid component. However, the most important source of impurities is traces of unwanted gas dissolved in the liquid. Inadequate preliminary degassing of the absorbing liquid is probably the most often overlooked serious source of error in gas solubility measurements.

Estimated Error: If estimated errors were omitted by the original authors, and if relevant information is available, the compilers have attempted to estimate errors (identified by "compiler" or the compiler's name in parentheses or in a footnote) from the internal consistency of data and type of apparatus used. Methods used by the compilers for estimating and reporting errors are based on Ku and Eisenhart (11).

Comments and/or Additional Data: Compilations may include this section, in which short comments relevant to the general nature of the work or additional experimental and thermodynamic data are included which are judged by the compiler to be of value to the reader.

References: The format for these follows the format for the Original Measurements box, except that final page numbers are omitted. References (usually cited in the original paper) are given where relevant to interpretation of the compiled data, or where cross-reference can be made to other compilations.

Evaluations

The evaluator's task is to assess the reliability and quality of the data, to estimate errors where necessary, and to recommend "best" values. The evaluation takes the form of a summary in which all the data supplied by the compiler have been critically reviewed. There are only three boxes on a typical evaluation sheet, and these are described below.

Components: The format is the same as on the Compilation sheets.

Evaluator: Name and affiliation of the evaluator(s); date up to which the literature was checked.

Critical Evaluation:

(a) Critical text. The evaluator checks that the compiled data are correct, assesses their reliability and quality, estimates errors where necessary, and recommends numerical values based on all the published data (including theses, reports and patents) for each given system. Thus, the evaluator reviews the merits or shortcomings of the various data. Only published data are considered. Documented rejection of some published data may occur at this stage, and the corresponding compilations may be removed.

The solubilities in comparatively few systems are known with sufficient accuracy to enable a set of recommended values to be presented, either for measurements near atmospheric pressure or at high pressures. Although many systems have been studied by at least two independent groups of workers, the range of pressures or temperatures is often sufficiently different to make meaningful comparison impossible.

Occasionally, it is not clear why two groups of workers obtained very different but internally consistent sets of results at the same temperature and pressure, although both sets were obtained by reliable methods. In such cases, a decisive assessment may not be possible. In some cases, two or more sets of data have been classified as tentative even though the sets are mutually inconsistent.

Many high pressure solubility data have been published in a smoothed form. Such data are particularly difficult to evaluate, and unless specifically discussed by the authors, the estimated error on such values can be regarded only as an "informed guess".

As well, many high pressure solubility data have been obtained in a more general study of high pressure vapor-liquid equilibrium. In such cases a note is included to indicate that additional vapor-liquid equilibrium data are given in the source. Since the evaluation is for the compiled data, it is possible that the solubility data are given a classification which is better than that which would be given for the complete vapor-liquid data (or vice versa). As an example, it is difficult to determine coexisting liquid and vapor compositions near the critical point of a mixture using some common experimental techniques which yield accurate high pressure solubility data. As another example, conventional methods of analysis may give results with an expected error which would be regarded as sufficiently small for vapor-liquid equilibrium data but an order of magnitude too large for acceptable high pressure gas-liquid solubility.

Sometimes it is possible to judge the reliability of data for a particular gas-liquid system by testing whether the data are consistent with the behavior of homologous gases or liquids.

(b) Fitting equations. If the use of a smoothing equation is justifiable the evaluator may provide an equation representing the solubility as a function of the variables reported on all the compilation sheets, stating the limits within which it should be used.

(c) Graphical summary. In addition to (b) above, graphical summaries are often given.

(d) Recommended values. Data are recommended if the results of at least two independent groups are available and they are in good agreement, and if the evaluator has no doubt as to the adequacy and reliability of the applied experimental and computational procedures. Data are reported as tentative if only one set of measurements is available, or if the evaluator considers some aspect of the computational or experimental method as mildly undesirable but estimates that it should cause only minor errors. Data are considered as doubtful if the evaluator considers some aspect of the computational or experimental method as undesirable but still considers the data to have some value where the order of magnitude of the solubility is needed. Data determined by an inadequate method or under ill-defined conditions are rejected. However, references to these data are included in the evaluation together with a comment by the evaluator as to the reason for their rejection.

(e) References. All pertinent references are given here, including all those publications appearing in the accompanying compilation sheets and those which, by virtue of their poor precision, have been rejected and not compiled.

(f) Units. While the original data may be reported in the units used by the investigators, the final recommended values are reported in SI units (3) when the data can be accurately converted.

QUANTITIES AND UNITS USED IN COMPILATION AND EVALUATION OF SOLUBILITY DATA

Mixtures, Solutions and Solubilities

A mixture (12) describes a gaseous, liquid or solid phase containing more than one substance, where the substances are all treated in the same way.

A solution (12) describes a liquid or solid phase containing more than one substance, when for convenience one of the substances, which is called the *solvent*, and may itself be a mixture, is treated differently than the other substances, which are called *solutes*. If the sum of the mole fractions of the solutes is small compared to unity, the solution is called a *dilute solution*.

The solubility of a solute 1 (solid, liquid or gas) is the analytical composition of a saturated solution, expressed in terms of the proportion of the designated solute in a designated solvent (13).

"Saturated" implies equilibrium with respect to the processes of dissolution and vaporization; the equilibrium may be stable or metastable. The solubility of a substance in metastable equilibrium is usually greater than that of the same substance in stable equilibrium. (Strictly speaking, it is the activity of the substance in metastable equilibrium that is greater.)

Either point of view, mixture or solution, may be taken in describing solubility. The two points of view find their expression in the reference states used for definition of activities, activity coefficients and osmotic coefficients. Note that the composition of a saturated mixture (or solution) can be described in terms of any suitable set of thermodynamic components.

For gases, the solubility is quoted, where possible, as mole fraction of the saturating gaseous component in the liquid phase at 1 bar partial pressure of gas. The distinction between vapor-liquid equilibria and the solubility of gases in liquids is arbitrary. It is generally accepted that the equilibrium at 300 K between a typical gas such as argon and a liquid such as water is gas liquid solubility whereas the equilibrium between hexane and cyclohexane at 350 K is an example of vapor-liquid equilibrium.

Physicochemical Quantities and Units

Solubilities of gases have been the subject of research for a long time, and have been

expressed in a great many ways, as described below. In each case, specification of the temperature and either partial or total pressure of the saturating gaseous component is necessary. The nomenclature and units follow, where possible, ref. (3)

A note on nomenclature. In the IUPAC Green Book (3), the solute is component B and the solvent is component A. In compilations and evaluations, the first-named component (component 1) is the solute, and the second (component 2 for a two-component system) is the solvent. The reader should bear these distinctions in nomenclature in mind when comparing equations given here with those in the Green Book.

1. Mole fraction of substance 1, x_1 or x(1):

$$x_1 = n_1 / \sum_{s=1}^{c} n_s$$
 [1]

where n_s is the amount of substance of s, and c is the number of distinct substances present (often the number of thermodynamic components in the system). Mole per cent of substance 1 is $100 x_1$.

2. Ionic mole fractions of salt i, x_{i+} , x_{i} . For a mixture of s binary salts i, each of which ionizes completely into v_{s+} cations and v_{s-} anions, with $v_s = v_{s+} + v_s$, and a mixture of p non-electrolytes j, of which some may be solvent components, a generalization of the definition in (14) gives:

$$x_{i+} = \frac{v_{i+}x_i}{1 + \sum_{i=1}^{s} (v_i - 1)x_s}, \quad x_{i-} = \frac{v_{i-}x_{i+}}{v_{i+}}, \quad i = 1...s$$
[2]

$$x_{j}' = \frac{x_{j}}{1 + \sum_{i=1}^{s} (v_{i} - 1)x_{i}}, \quad j = (s+1)...p$$
[3]

The sum of these mole fractions is unity, so that, with c = s + p,

$$\sum_{i=1}^{s} (x_{i+} + x_{i-}) + \sum_{i=s+1}^{c} x_i' = 1$$
 [4]

General conversions to other units in multicomponent systems are complicated. For a threecomponent system containing non-electrolyte 1, electrolyte 2 and solvent 3,

$$x_{1} = \frac{v_{2*}x_{1}'}{v_{2*} - (v_{2} - 1)x_{2*}} \quad x_{2} = \frac{x_{2*}}{v_{2*} - (v_{2} - 1)x_{2*}}$$
[5]

These relations are used in solubility equations for salts, and for tabulation of salt effects on solubilities of gases (see below).

3. Mass fraction of substance 1, w_1 or w(1):

$$w_1 = g_1 / \sum_{s=1}^{c} g_s$$
 [6]

where g_s is the mass of substance s. Mass per cent of substance 1 is 100 w_1 . The equivalent terms weight fraction, weight per cent and g(1)/100 g solution are no longer used.

4. Molality of solute 1 in a solvent 2, m_1 :

$$m_1 = n_1 / n_2 M_2$$

SI base units: mol kg⁻¹. Here, M_2 is the molar mass of the solvent. The equivalent term weight solubility, C_{w^2} is no longer used.

5. Amount concentration of solute 1 in a solution of volume V, c_1 :

$$c_1 = [\text{formula of solute}] = n_1/V$$
 [8]

SI base units: mol m^{-3} . The symbol c_1 is preferred to [formula of solute], but both are used. The old terms *molarity*, *molar* and *moles per unit volume* are no longer used.

6. Mass concentration of solute 1 in a solution of volume V, ρ_1 or γ_1 :

$$\rho_1 = g_1 / V \tag{9}$$

SI base units: kg m⁻³.

7. Mole ratio, $r_{n,12}$ (dimensionless)

$$r_{n,12} = n_1/n_2$$
 [10]

Mass ratio, symbol $r_{g,12}$, may be defined analogously.

8. Ionic strength, I_m (molality basis), or I_c (concentration basis):

$$I_m = \frac{1}{2} \sum_i m_i z_i^2$$

$$I_c = \frac{1}{2} \sum_i c_i z_i^2$$
[11]

where z_i is the charge number of ion i. While these quantities are not used generally to express solubilities, they are used to express the compositions of non-saturating components. For a single salt i with ions of charges z_+ , z_+ ,

$$I_{m} = |z_{+}z_{-}|vm_{i}, \quad I_{c} = |z_{+}z_{-}|vc_{i}$$
[12]

Mole and mass fractions are appropriate to either the mixture or the solution point of view. The other quantities are appropriate to the solution point of view only. Conversions between some pairs of these quantities can be carried out using the equations given in Table 1 at the end of this Introduction. Other useful quantities will be defined in the prefaces to individual volumes or on specific data sheets.

In addition to these well-defined SI-based units, other units have been used to express the solubilities of gases. Units and nomenclature follow (4, 5, 7, 16), as modified by IUPAC recommendations (3). The equations describing Bunsen, Kuenen, Ostwald and absorption coefficients, as well as Henry's law constants, hold for ideal gases and perfect solutions only. Corrections for non-ideality should be made where possible. The corrections are less than 1 % for most gases near atmospheric pressure (5).

In much published data, the reference pressure is 1 atm = 0.101325 MPa rather than 1 bar = 0.1 MPa.

9. Bunsen coefficient, α (dimensionless):

The volume of saturating gas, V_1 , reduced to $T^\circ = 273.15$ K, $p^\circ = 1$ bar, which is absorbed by unit volume V_2^{*} of pure solvent at the temperature of measurement and partial pressure $p^\circ = 1$ bar. If the gas is ideal, Henry's law (see below) holds, and the liquid is incompressible, then 13

[4

[7]

$$\alpha = \frac{V_1^o}{V_2^*} = \left(\frac{V_1}{V_2^*}\right) \left(\frac{T^o}{T}\right)$$
[13]

10. Kuenen coefficient, S:

The volume of saturating gas, V(g), reduced to $T^{\circ} = 273.15$ K, $p^{\circ} = 1$ bar, which is dissolved by unit mass of pure solvent at the temperature of measurement and partial pressure 1 bar. Thus,

$$S = \frac{V_1 T^{\circ}}{g_2 T} = \frac{\alpha V_{m,2}}{M_2}$$
 [14]

SI base units: $m^3 kg^{-1}$. Here, M_2 is the molar mass of the solvent. The Kuenen coefficient is proportional to the molality of the dissolved gas.

11. Ostwald coefficient, L (dimensionless) (16):

The volume of saturating gas, V_1 , absorbed by a volume V_2^* of pure solvent at the temperature and pressure of the measurement. Thus,

$$L = \frac{V_1}{V_2^*} = \left(\frac{\alpha T}{T^o}\right) \left(\frac{p^o}{p}\right)$$
[15]

The Ostwald coefficient is equal to the ratio of the amount concentrations in the gas and in the liquid.

12. Absorption coefficient, β (dimensionless):

The most common of several definitions of absorption coefficient is the volume of gas, reduced to $T^{\circ} = 273.15$ K, $p^{\circ} = 1$ bar absorbed per unit volume of pure solvent at a total pressure of 1 bar. The absorption and Bunsen coefficients are therefore very similar, and are connected by

$$\beta = \alpha (1 - p_2 / p^{\circ})$$
^[16]

where p_2 is the partial pressure of the vapor of the solvent.

13. Henry's Law constant, K_{II}:

$$K_{H} = \frac{\lim_{x_{1} \to 0} \left(\frac{p_{1}}{x_{1}}\right)$$
[17]

SI base units: Pa. Unfortunately, the definition is used often at finite mole fractions, even though this is a limiting law. The following have also been defined as Henry's Law constants:

$$K_{2} = p_{1}/c_{1}$$

$$K_{c} = c_{1}^{s}/c_{1}$$
[18]

2.

where superscript g refers to the gas phase. K_2 has SI base units Pa m³ mol⁻¹, and K_c is dimensionless. The Henry's law constant has also been called the Henry coefficient and the Henry coefficient. Henry's law can be used, with great caution, to convert data from the experimental pressure to 1 bar if the mole fraction of the gas in the liquid is small, and the difference in pressures is small.

The relations between the mole fraction solubility and the various quantities given above are as follows. Note again that these relations hold for ideal gaseous and perfect solution phases only.

$$x_{1} = \frac{1}{1 + \frac{RT^{o}}{p_{1}^{o}V_{m,2}^{*}\alpha}} = \frac{1}{1 + \frac{RT^{o}}{p_{1}^{o}M_{2}S}}$$

$$= \frac{1}{1 + \frac{RT}{p_{1}V_{m,2}^{*}L}} = \frac{1}{1 + \frac{RT^{o}}{p^{o}V_{m,2}^{*}\beta}}$$
[19]

14. Salt Effects on the Solubility of Gases (17)

These are often reported as Sechenov (Setchenow, Setschenow) salt effect parameters k_{syz} which are defined in various ways. The general semi-empirical Sechenov equation is

$$\log(z_1^{0}/z_1) = k_{syz} y$$
 [20]

where solubility is expressed in quantities z, with superscript o designating pure solvent, and salt composition is expressed in quantities y. The quantities c_2 , m_2 , x_2' , I_m and I_c are used for y, and the quantities c_1 , m_1 , x_{1+} , α , S and L for z, giving 30 definitions of k_{syz} . Here, components 1 and 2 are the gaseous solute and electrolyte, respectively. The ratios of z-values are the same for $z = c_1$, α and L and for m_1 and S, respectively, leaving 15 distinct definitions. If z is the same, the definitions of k_{syz} are related simply through 10 equations between pairs of c_2 , m_2 , x_2' , I_m and I_c . Some relations among the definitions, in terms of k_{sxc} , k_{smm} and k_{sxx} , are:

$$k_{scc} = k_{sca} = k_{scL} = \frac{m_2}{c_2} k_{smc} = \frac{x_2'}{c_2} k_{sxc} = \frac{I_c}{c_2} k_{sI_cc}$$

$$k_{smm} = \frac{x_2'}{m_2} k_{sxm} = k_{smS} = \frac{c_2}{m_2} k_{scm} = \frac{I_m}{m_2} k_{sI_mm}$$

$$k_{sxx} = \frac{c_2}{x_2'} k_{scx} = \frac{m_2}{x_2'} k_{smx} = \frac{I_m}{x_2'} k_{sI_mx} = \frac{I_c}{x_2'} k_{sI_cx}$$
[21]

These relations hold when a single salt is present; note that the relations between ionic strength and either molality or concentration are simple. If more than one salt is present, the ionic strength is the only practical quantity to be used for y.

Conversions between pairs of k_{scc} , k_{smm} and k_{sxx} are more complicated, and can be found using eqn [5] and Table 1 at the end of this Introduction. For example,

$$k_{sxx} = f(m) \left(\frac{k_{smm}}{v_{2+}} + \frac{1}{m_2} \log \frac{f(m)}{f(m^{\circ})} \right)$$
 [22]

where

$$f(m) = 1 + (m_1 + v_2 m_2) M_3 \qquad f(m^o) = 1 + m_1^o M_3 \qquad [23]$$

Errors in the salt effect parameters, as defined above, can be large. If the relative standard deviation in measurement of solubility is $s(c_1)/c_1$, then the relative standard deviation in k_{scc} is

$$\frac{s(k_{scc})}{k_{scc}} = \frac{\sqrt{2}}{c_2 k_{scc} \ln 10} \frac{s(c_1)}{c_1}$$
[24]

) -

For example, for $k_{scc} = 0.1$ and $c_2 = 0.01$ mol dm⁻³, $s(k_{scc})/k_{scc}$ is 30 % when $s(c_1)/c_1 = 0.05$ % and 1200 % when $s(c_1)/c_1 = 2$ %. At $c_2 = 1$ mol dm⁻³, the corresponding errors are 0.3 and 12 %, respectively.

If the solubility of a gas is greater than about x = 0.01 at partial pressure 1 bar, then several other factors must be taken into account, such as the density of the solution or the partial molar volume of the dissolved gas. In addition, corrections should be made for non-ideality of the gas. See (18) for details.

In addition, the following definitions concerning density are useful in conversions between concentrations and other quantities.

15. *Density*, ρ or γ :

$$\rho = g/V \qquad [25] \qquad \bigcirc 7$$

SI base units: kg m⁻³. Here g is the total mass of the system.

16. Relative density, $d = \rho / \rho^{\circ}$: the ratio of the density of a mixture at temperature *t*, pressure *p* to the density of a reference substance at temperature *t'*, pressure *p'*. For liquid solutions, the reference substance is often water at 4° C, 1 bar. (In some cases 1 atm is used instead of 1 bar.) The term *specific gravity* is no longer used.

Thermodynamics of Solubility (18)

Thermodynamic analysis of solubility phenomena provides a rational basis for the construction of functions to represent solubility data, and thus aids in evaluation, and sometimes enables thermodynamic quantities to be extracted. Both these aims are often difficult to achieve because of a lack of experimental or theoretical activity coefficients. Where thermodynamic quantities can be found, they are not evaluated critically, since this task would involve examination of a large body of data that is not directly relevant to solubility. Where possible, procedures for evaluation are based on established thermodynamic methods. Specific procedures used in a particular volume will be described in the Preface to that volume.

Only one thermodynamic result is mentioned here: the temperature dependence of solubility. Sometimes it is possible to fit the mole fraction solubility at various temperatures using the equation

$$\ln x_1 = A + B(K/T) + C\ln(T/K) + D(T/K)$$
[26] \int_{d}

where A, B, C and D are constants to be determined from least-squares fitting of the data. Sometimes, to avoid singular matrices of the least-squares normal equations, T is scaled; e.g., T is replaced by T/100.

If the gas and the solution of the dissolved gas are ideal, the coefficients can be used to find standard thermodynamic functions for transfer of the gas from the vapor to the liquid phase at the standard pressure (1 bar) and infinitely-dilute dissolved gas, as follows.

$$\Delta G_{m,1}^{o}/R = -A(T/K) - B - C(T/K)\ln(T/K) - D(T/K)^{2}$$
[27]

$$\Delta S_{m,1}^{o}/R = A + C \ln(T/K) + C + 2D(T/K)$$
[28] 5 c

$$\Delta H_m^o / R = -B + C(T/K) + D(T/K)^2$$
[29] $\left(\frac{3}{2} \right)$

$$\Delta C_{m,p}^{o}/R = C + 2D(T/K)$$
[30] $\int \mathcal{J}_{m,p}$

Alternatively (but equivalently), the standard state of infinitely-dilute dissolved gas can be described as a hypothetical ideal dissolved gas at mole fraction $x_1 = 1$, p = 1 bar.

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January, 1994

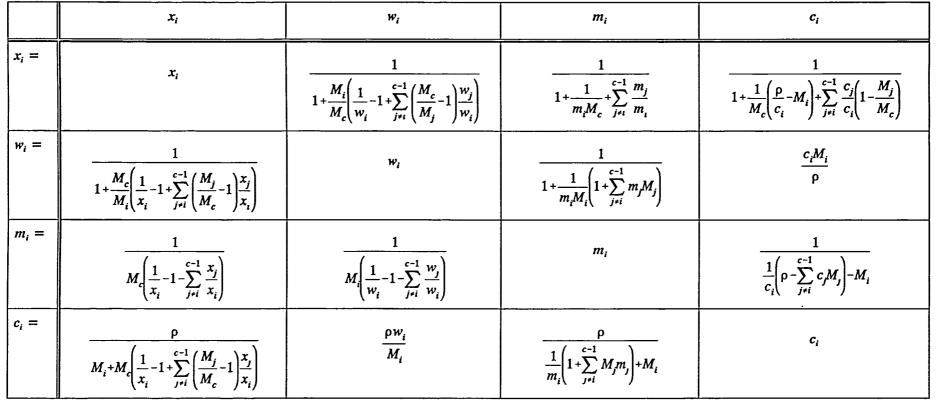


Table 1. Interconversions between Quantities Used as Measures of Solubility c-component Systems Containing c - 1 Solutes i and Single Solvent c

 ρ - density of solution; M_i - molar masses of i. For relations for 2-component systems, set summations to 0.

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PREFACE

Ethene is a chemical produced in large volumes both as a monomer for polymerization to produce poly(ethylene) as well as a reagent to produce a host of chemical intermediates. What is surprising is that in spite of the great commercial utilization of ethene, the published solubility data are, for the most part, scanty; only in a very few instances are the solubilities corroborated by two or more groups of researchers for any one solvent.

Ethene solubilities have been collected from technical publications up to the end of 1991 with the help of a number of IUPAC members from around the world; these data have since been compiled and critically evaluated in this *Solubility of Ethene volume*. It is anticipated that use will be made of these data in the development and operation of processes for the production and separation of ethene and products derived from it.

Certain phase equilibrium data involving high concentrations of ethene in the dense phase have been excluded from this volume. The exclusions are those at extremely low temperatures, generally termed vapor-liquid equilibria, as well as those at pressures above the critical pressure for ethene, termed the supercritical equilibrium region. The criteria for these fore-mentioned equilibria are considered to be outside the scope of this volume. Instead, this volume deals exclusively with the regular solubilities of the gas in pure solvents and mixed solvent solutions.

The physical and solution properties of ethene can be compared with those of ethane. Because of its lower molecular weight and lower normal boiling point, ethene is often less soluble in simple, non-polar solvents than ethane. On the other hand, because of its unsaturation or its higher chemical activity, ethene is often more soluble in polar and/or associating solvents than is ethane. Further, the molar volume of ethene gas differs from that of an ideal gas; the extent of the deviation is customarily expressed in terms of its second virial coefficient. Using the second virial coefficients from Dymond and Smith (1) an equation expressing the ethene molar volume as a function of temperature (from T = 240 K to T = 450 K) was developed.

For the second virial coefficient:

$$B = -3.083 (10^7) (T/K)^{-2.162}$$
(1)

For molar volume:

$$V = 0.5 C + 0.5 [C^2 + 4BC]^{0.5}$$
(2)

In the above equations B,C and V are in cm^3/mol and C = RT/P.

The magnitude of the deviation from ideality is relatively small, ranging from 1.0% at 240 K to 0.1% at 450 K, but not negligible. As much as possible in this volume, where published solubilities are reported on a volumetric basis for the gas, the true gas molar volumes are used in converting the gas volumes to the number of moles of dissolved gas.

In the critical evaluations of the solubilities, two equations are used to describe the mole fraction solubilities as a function of the saturation temperature at constant gas partial pressure, and as a function of the gas partial pressure at constant temperature:

$$\log x = A + B (T/K)^{-1} + C \log (T/K)$$
(3)

$$\log x = D + E \log(p/MPa) + F(p/MPa)$$
(4)

In the above equations A-F are constants. For the simplest relation between solubility and temperature the constant C is equal to zero; however, in certain cases, the empirical correction term gives an improved representation of the solubility data. Similarly, if Henry's law applies, the first three terms of equation (4) represent another form of Henry's law and the constant D is related to Henry's constant while the constant E is equal to 1. For data which are not exactly described by Henry's law, the constant E varies somewhat from 1 and the constant F allows for some curvature of the log $x - \log p$ relation. A graph of log x versus log p is useful for solubilities obtained over a range of pressures because at the higher pressures the scale is compressed, but at lower pressures the scale is expanded while the linear relation between log x and log p is still maintained if Henry's law is obeyed. Therefore, it is possible to extrapolate high pressure solubility data to lower pressures and sometimes to 0.1013 MPa for comparison with solubilities obtained at this lower, atmospheric pressure. In some cases, this procedure serves as a consistency check for solubility data. A combined equation, a summation of equations (3) and (4), is also used to represent certain solubility data as a function of both temperature and gas partial pressure. The constants are evaluated by simple regression, or, if necessary by multivariate regression.

As the title page shows, this volume is the product of the efforts of a number of people: contributors, members of the Editorial Board past and present, and other members of the IUPAC Commission V8. I wish to acknowledge their combined contributions in their various capacities and to thank them for it. Finally, I wish to thank Francine Pétrin, and my wife, Bev, who did much of the word processing for the data sheets and critical evaluations.

> Walter Hayduk Ottawa, Canada June 1994.

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EVALUATOR:

1.	Ethene;	C ₂ H ₄ ;	[74-85-1]

2. Water; H₂O; [7732-18-5]

Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 USA

April, 1994

CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubility in Water for Pressures Less Than

0.2 MPa

COMPONENTS:

Considering the importance of ethene industrially (mostly as a feedstock) it is surprising that there have been so few studies of its solubility in water. In fact, most of the measurements were made only at one temperature, with only Ref. 3,4, and 9 at more than one temperature. The best of the earlier data and those which cover the widest temperature range (287-346 K) are those of Morrison and Billett (3). The data of Wu et al. (10) and Orcutt and Seevers (2) are in reasonable accord with (3). An initial least squares fitting of the 14 points in (3) showed that the value at 294.25 K was significantly deviant. The remaining 13 points were fit to yield:

 $\ln x_1 = -66.9156 + 92.2101/\tau + 24.3792 \ln \tau$ (1)

In the above equation $\tau = T/100$ K and x_1 is for a gas partial pressure of 101.3 kPa. The standard deviation in $\ln x_1$ was 0.0036 and the standard deviation in x_1 was 2.5 E-7 for an average standard deviation of 0.39%. The compiler of the Morrison and Billett paper estimated the precision of the solubility measurements to be 2%. This is obviously the best of the older data.

Tentative values of solubility based on Eq. (1) expressed as Henry coefficient, $H_{1,2}$ (T, $P_{5,2}$), mole fraction at 101.325 kPa partial pressure of gas, x_1 , and the Ostwald coefficient at infinite dilution, $L_{1,2}^{\infty}$, are given in Table 1.

This table also gives tentative values of changes in the cited thermodynamic functions on solution. The mole fraction was simply calculated as $101,325/H_{1,2}$ (T, P_{S,2}) since (11) shows that this results in an error of less than 0.15%. The thermodynamic functions were calculated in a straightforward manner (12).

Table 1: Tentative values for the solubility of ethene in water for a gas

		L [∞] _{1,2}	$\Delta H_1^0/$	$\Delta S_1^0 /$
			kJ mol-1	J mol-1 H
0.6800	14.71	0.1863	-20.29	-146.3
0.7909	12.64	0.1630	-19.27	-142.7
0.9082	11.01	0.1444	-18.26	-139.1
	9.70	0.1293	-17.25	-135.7
	8,65	0.1171	-16.23	-132.2
	7.79	0.1071	-15.22	-128.9
	7.08	0.0988	-14.21	-125.5
	6.50	0.0921	-13.19	-122.3
	6.02	0.0865	-12.18	-119.1
1.777	5.63	0.0818	-11,17	-115.9
	0.7909 0.9082 1.031 1.156 1.284 1.412 1.537 1.660	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

partial pressure of 0.1013 MPa

2			
COMPON	ien fs :	EVALUATOR:	
1	Ethene; C ₂ H ₄ ; [74-85-1] Water; H ₂ O; [7732-18-5]	Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 USA	
		April, 1994	
CRITIC	CAL EVALUATION:		
Ref	erences		
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8.	. Clever, H.L.; Baker, E.R.; Hale, W.R.; J. Chem. Eng. Data <u>1970</u> , 15, 411- 413.		
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11.	11. Rettich, T.R.; Battino, R.: Wilhelm, E.; <i>J. Soln. Chem.</i> <u>1984</u> , <i>13</i> , 335-348.		
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3 **COMPONENTS:** ORIGINAL MEASUREMENTS: Clever, H. L.; Baker, E. R.; Hale, W. R. (1) Ethene; C₂H₄; [74-85-1] (2) Water; H₂O; [7732-18-5] J. Chem. Eng. Data 1970, 15, 411-3. VARIABLES: PREPARED BY: T/K = 303.15 $p_t/kPa = 101.3$ H. L. Clever EXPERIMENTAL VALUES: Temperature Bunsen Ostwald Mol Molality Henry's Constant 10⁻⁶K_H/kPa Coefficient Coefficient Fraction $10^{3}m_{1}/m_{0}$ mol kg⁻¹ t/°C $L/cm^3 cm^{-3}$ $10^{5}x_{7}$ T/Kα/ cm^3 (STP) cm^{-3} atm⁻¹ 30.0 303.15 0.0982 0.1090 7.98 4.43 1.27 ^a All values except the Bunsen coefficient were calculated by the compiler. Values for 1 atm (101.3 kPa) assuming Henry's law. The ethene molar volume at STP, $V_1/cm \mod^{-1} = 22,246$. Henry's constant, $K_H/kPa = (p_1/kPa)/x_1$ AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS: The apparatus and method were (1) Ethene. Matheson Co., Inc. Stated to be 99.5 % minimum similar to those described by purity. Markham and Kobe (ref 1). (2) Water. Distilled. The water was degassed by refluxing under partial vacuum, and transfered to the solubility apparatus without contact with atmospheric gases. The solubility of ethene at a total pres-sure of one atm (101.3 kPa) was measured by observing the volume of gas absorbed by 88.5 cm³ of water at ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta \alpha / \alpha = \pm 0.01$ **REFERENCES**: 1. Markham, A. E.; Kobe, K. A. J. Am. Chem. Soc. 1941, 63, 449.

ORIGINAL MEASUREMENTS:
Wu, Z.; Zeck, S.; Langhorst, R.;
Knapp, H.
Proc. Int. Conf. Coal Cas and Air,
Beijing, China , <u>1985</u> , 1, 209–229.
PREPARED BY:
W. Hayduk
J
Ostwald Coefficient ² Mole Fraction L/cm^3 gas (cm ³ solvent) ⁻¹ $10^5 x_1$
0.118 8.63
tial pressure of 101.325 kPa.
first author for the gas and liquid a pressure of 1 bar were 0.0000824 mole fraction.
/ INFORMATION
SOURCE AND PURITY OF MATERIALS:
 Ethene purity was 99.9 vol. percent. Water was bidistilled and had a conductivity of 2 micromhos/cm.
ESTIMATED ERROR: $\frac{\delta P/k Pa = \pm 0.05}{\delta T/K = \pm 0.01}$ $\frac{\delta L/L = \pm 0.01}{\delta L/L}$
REFERENCES: 1. Zeck, S. Doctoral Dissertation , Tech. Univ. Berlin, FRG, <u>1985</u> .

OMPONENTS:	· · · · · · · · · · · · · · · · · · ·	ORIGINAL MEASUREMENTS:	
	; C,H,; [74-85-1]	Narasimhan, S.; Nat	arajan, G.S.;
	H ₂ O; [7732-18-5]	Nageshwar, G.D.	-
	2	Indian J. Technol.	1981. 19.
		298-299.	
ARIABLES: T	/K = 293.15-303.15	PREPARED BY:	
1	Pa = 101.325	W. Hayduk	
<i>Г/</i> К	ra = 101.525		
XPERIMENTAL	VALUES:		
t/C T/K	Ethene Solubilit s/g(10 ⁶ g water)	χ_1 ¹ Ethene ¹ Henr ¹ Mole Fraction, 10 ⁵ ω_1 H/atr	y's Constant (mole fraction)
20 293.	15 143	9.40	10640
25 298.	15 119	7.89	12670
30 303.	15 104	6.97	14340
based on It was co	tion, x_1 , is for a partial partial p	communication with Dr. Nageshw	a and H is
based on It was co	tion, x_1 , is for a p the ethene partial p nfirmed by private (partial pressure of 101.325 kF pressure. communication with Dr. Nageshw	a and H is
based on It was co	tion, x_1 , is for a p the ethene partial p nfirmed by private of total pressure of o	partial pressure of 101.325 kF pressure. communication with Dr. Nageshw	a and H is
based on It was co was for a ETHOD APPARA	tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE:	partial pressure of 101.325 kF pressure. communication with Dr. Nageshw one atmosphere. NUXILIARY INFORMATION SOURCE AND PURITY OF MATE	Pa and H is
based on It was co was for a ETHOD APPARA The solver burette.	tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE: nt was held in a jac Constant temperatur	Auxiliary INFORMATION SOURCE AND PURITY OF MATE Lethene prepared dehydration of e	Pa and H is Par that S RIALS: by catalytic thanol over
based on It was co was for a ETHOD APPARA The solve; burette. water was jacket. (tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE: nt was held in a jac Constant temperatur circulated through Gas was bubbled thro	Auxiliary INFORMATION Source AND PURITY OF MATE Auxiliary INFORMATION Source AND PURITY OF MATE I. Ethene prepared dehydration of e activated alumin and analyzed by	Pa and H is Par that s RIALS: by catalytic thanol over a at 350-400°C chromatography.
based on It was co was for a ETHOD APPARA The solver burette. water was jacket. (the solver dissolved mined by a stop titra yielded th electromet	tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE: nt was held in a jac Constant temperatur circulated through Gas was bubbled thro nt until saturated. gas content was det an electrometric dea ation technique whic	A partial pressure of 101.325 kF pressure. communication with Dr. Nageshw one atmosphere. WXILIARY INFORMATION WXILIARY INFORMATION SOURCE AND PURITY OF MATE 1. Ethene prepared dehydration of e activated alumin and analyzed by The er- d- h The sed	Pa and H is Par that s RIALS: by catalytic thanol over a at 350-400°C chromatography.
based on It was co was for a was for a ETHOD APPARA The solver burette. water was jacket. (the solver dissolved mined by a stop titra yielded th electromet	tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE: Int was held in a jac Constant temperatur circulated through Gas was bubbled thro it until saturated. gas content was det an electrometric dea ation technique whic te bromine number.	A partial pressure of 101.325 kF pressure. communication with Dr. Nageshw one atmosphere. WXILIARY INFORMATION WXILIARY INFORMATION SOURCE AND PURITY OF MATE 1. Ethene prepared dehydration of e activated alumin and analyzed by The er- d- h The sed	Pa and H is Par that s RIALS: by catalytic thanol over a at 350-400°C chromatography.
based on It was co was for a was for a ETHOD APPARA The solver burette. water was jacket. (the solver dissolved mined by a stop titra yielded th electromet	tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE: Int was held in a jac Constant temperatur circulated through Gas was bubbled thro it until saturated. gas content was det an electrometric dea ation technique whic te bromine number.	A partial pressure of 101.325 kF pressure. communication with Dr. Nageshw one atmosphere. WXILIARY INFORMATION Keted e the ugh The er- d- h The sed e 1.	Pa and H is Par that s RIALS: by catalytic thanol over a at 350-400°C chromatography. not specified.
based on It was co was for a Was for a A ternod APPARA The solver burette. water was jacket. (the solver dissolved mined by a stop titra yielded th electromet	tion, x ₁ , is for a p the ethene partial p nfirmed by private of total pressure of o TUS/PROCEDURE: Int was held in a jac Constant temperatur circulated through Gas was bubbled thro it until saturated. gas content was det an electrometric dea ation technique whic te bromine number.	AVAILABLE STIMATED ERROR:	<pre>Pa and H is Par that s Par t</pre>

6 ^{\$}	
COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Yano, T.; Kidaka, T. Miyamoto, H.;
2. Water; H ₂ O; [7732-18-5]	Murakami, T.
	Proc. Soc. Chem. Engrs, Japan (Osaka),
	<u>Oct. 14</u> , <u>1968</u> , 89-90.
VARIABLES: $T/K = 298.15$	PREPARED BY:
P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	
EALENTEDITAL VALUES.	
	² Henry's
Mole Fraction Ethene,10 ⁵ x_1 Fo t/C ¹ T/K P =101.325 kPa ² P_1 =101.	² Ostwald Coefficient Constant r: L/cm ³ gas cm ⁻³ H/atm
25.0 298.15 8.76 9	.04 0.122 11060
¹ Calculated by compiler.	
that the reported solubility was for therefore, the solubility for a part culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa.	ial pressure of 101.325 kPa was cal-
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A glass apparatus was employed in	1. Source and purity not given.
which the uptake of gas by a known	
volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu- tion cell.	2. Treatment not specified.
	ESTIMATED ERROR:
	$\delta x_1 / x_1 = \pm 0.03$ (Compiler)
	REFERENCES:

	6 7
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₂ ; [74-85-1]	McAuliffe, C.
2. Water; H ₂ O; [7732-18-5]	J. Phys. Chem. <u>1966</u> , 70, 1267-1275.
VARIABLES: $T/K = 298.15 \pm 1.5$ P/kPa = 101.325	PREPARED BY: W. Hayduk
EXPERIMENTAL VALUES:	· · · · · · · · · · · · · · · · · · ·
Ethene Solubility t/C T/K s/g gas (10 ⁶ g water) ⁻	¹ Mole Fraction, ¹ Henry s Constant $10^{5}x_{1}$ H/atm(mole fraction)
25.0 298.15 131 ± 10	8.41 11890
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A bottle was three-fourths filled with distilled water. A gas pressure of 1 atm was maintained over the water from a rubber balloon reservoir in the line from the gas cylinder. The bottle was vigorously shaken for 5-10 min to establish equilibrium. The equilibrated solution was allowed to stand at least 30 min prior to analysis for separation of gas bubbles. Samples of aqueous solutions of 50 µl were injected into a U-tube desorber containing firebrick and Ascarite drying agent, heated to 100°C and through which helium carrier gas from a	1. Ethene minimum purity 99.0%. 2. Distilled water. ESTIMATED ERROR: $\delta s/s = \pm 8$ % (Compiler) $\delta T/K = \pm 1.5$
gas chromatograph was allowed to flow. The GC analyzer used a hydrogen flame ionization detector.	REFERENCES :

COMPONENTS :			
	ORIGINAL MEASU	IREMENTS:	
1. Ethene; C ₂ H ₄ ; [74-85-1]	Truchard,	A.M.; Harris, H.G.;	
2. Water; H ₂ O; [7732-18-5]	Himmelbla	Himmelblau, D.M.	
	J. Phys. Ci	hem. <u>1961</u> , 65, 575-576.	
VARIABLES: <i>T</i> /K = 273.153	PREPARED BY:		
<i>P/</i> kPa = 101.325	W. H	ayduk	
EXPERIMENTAL VALUES:	I		
	y's Constant	¹ Mole Fraction	
¹ T/K H/atr	(mole fraction) ¹	Ethane, $(10^4)x_1$	
273.15	5280	1.894	
•	WIXILIARY INFORMATION		
METHOD / APPARATUS / PROCEDURE :	MUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:		RITY OF MATERIALS:	
Two calibrated glass spheres,	SOURCE AND PU	source and purity not	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a merc	SOURCE AND PU one l. Ethene sed given.	source and purity not	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a merc manometer were used. Approxi 200 cm ³ of solvent was placed	source AND PU sone sed cury mately in Source AND PU 1. Ethene given. given. 2. Water	source and purity not	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a merc manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we	source AND PU sed cury mately i in ere	source and purity not	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma	source AND PU sed cury mately in pre bly of	source and purity not	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth	SOURCE AND PU sed sury mately in ere oly of iller ene	source and purity not	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a merce manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t	SOURCE AND PU sed ury mately in tin tre bly of there ttain- co	source and purity not treatment not specified.	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t reach equilibrium by stirring The pressures were read and	SOURCE AND PU sed cury mately in ere bly of iller hene ttain- co y. ESTIMATED ERR	source and purity not treatment not specified. OR:	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t reach equilibrium by stirring The pressures were read and material balances made to det mine the solubility. Solubil	SOURCE AND PU sed sury mately in ere oly of iller hene ttain- co so so so so so so so so so so so so so	source and purity not treatment not specified. OR:	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t reach equilibrium by stirring The pressures were read and material balances made to det mine the solubility. Solubil were measured for equilibrium	SOURCE AND PU sed sury mately in pre bly of there ttain- to f. ESTIMATED ERR $\delta T/K = =$	osource and purity not treatment not specified. OR: ± 0.02	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t reach equilibrium by stirring The pressures were read and material balances made to det mine the solubility. Solubil were measured for equilibrium pressures between 50 and 1300 mm of mercury pressure and	Source AND PU sed sury mately in pre bly of there ttain- to f. ESTIMATED ERR $\delta T/K = 3$ REFERENCES:	osource and purity not treatment not specified. OR: ± 0.02	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t reach equilibrium by stirring The pressures were read and material balances made to det mine the solubility. Solubil were measured for equilibrium pressures between 50 and 1300	Source AND PU sed sury mately in pre bly of there ttain- to f. ESTIMATED ERR $\delta T/K = 3$ REFERENCES:	osource and purity not treatment not specified. OR: ± 0.02	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed to reach equilibrium by stirring The pressures were read and material balances made to det mine the solubility. Solubil were measured for equilibrium pressures between 50 and 1300 mm of mercury pressure and Henry's law was found to appl	Source AND PU sed sury mately in pre bly of there ttain- to f. ESTIMATED ERR $\delta T/K = 3$ REFERENCES:	osource and purity not treatment not specified. OR: ± 0.02	
Two calibrated glass spheres, larger than the other, immers in a bath connected to a mero manometer were used. Approxi 200 cm ³ of solvent was placed the larger sphere and both we thoroughly evacuated. A supp ethene was charged to the sma flask to 2 atm pressure. Eth was admitted to the flask cor ing the solvent and allowed t reach equilibrium by stirring The pressures were read and material balances made to det mine the solubility. Solubil were measured for equilibrium pressures between 50 and 1300 mm of mercury pressure and Henry's law was found to appl	Source AND PU sed sury mately in pre bly of there ttain- to f. ESTIMATED ERR $\delta T/K = 3$ REFERENCES:	osource and purity not treatment not specified. OR: ± 0.02	

P 9 COMPONENTS: ORIGINAL MEASUREMENTS: 1. Ethene; C, H,; [74-85-1] Taft, R.W.; Purlee, E.L.; Riesz, P. 2. Water; H, O; [7732-18-5] J. Amer. Chem. Soc. 1955, 22, 899-902. VARIABLES: PREPARED BY: T/K = 293.15 - 303.15W. Hayduk P/kPa = 101.325**EXPERIMENTAL VALUES:** Inverse of Henry's
Constant,10³h/ ²Ethene Mole
moles (1 atm)⁻¹ Fraction,10⁵x₁ ¹Henry's Constant t/C $^{1}T/K$ H/atm (mole fraction)-1 20.00 293.15 5.17 9.330 10718 25.00 298.15 4.66 8.419 11878 30.00 303.15 4.11 7.437 13447 ¹Calculated by compiler. ²Mole fraction solubility calculated by compiler for a partial pressure of 101.325 kPa. AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS: A 200 cm³ glass flask was 1. Ethene was from Matheson, connected to a pressure-measuring purity 99.5%. manometer by means of a horizontally -mounted spiral tube. The 2. Water was distilled. spiral tube permitted the flask to be shaken with an amplitude of up to 2 cm for equilibration. The solvent (80-125 cm³) was deaerated in the flask. The change in pressure of a known volume of gas was measured from which the solubility was determined. The total volume of the apparatus was ESTIMATED ERROR: initially determined by weighing the apparatus filled with distilled $\delta T/K = \pm 0.02$ water. The "distribution $\delta h/h = \pm 0.01$ constant", h, was determined for pressures below 101.325 kPa. **REFERENCES:** Method described in reference 1. 1. Levy, J.B.; Taft, R.W.; Aaron, D.; Hammett, L.P. J, Amer. Chem.Soc. 1951,73, 3792.

10	9			
COMPONENTS:		ORIGIN	AL MEASUREMENTS	:]
1. Ethene; (C ₂ H ₄ ; [74-85-1]	Моз	rrison, T.J.;	Billett, F.
2. Water; H ₂ O; [7732-18-5]		J.	Chem. Soc. <u>19</u>	9 <u>52</u> , 3819-3822.
	= 286.9 - 346.0	PREPAR	ED BY: W. Haydu	k
P/kPa	a = 101.3			
EXPERIMENTAL VALU	JES:			
t/°C T	'/K ¹ Solubility, s/ cm ³ (STP) kg ⁻¹	2 Mole Fraction $10^5 x_1$	² Ostwald Coefficient L/cm ³ cm ⁻³	² Bunsen Coefficient α/ cm ³ (STP) cm ⁻³
20.5 293 21.1 294 25.0 296 30.3 303 35.2 306 40.0 313 44.6 317 49.0 322 54.9 326 60.2 333 65.0 336 72.9 346 ¹ Original data of 101.3 kPa.	$\begin{array}{llllllllllllllllllllllllllllllllllll$	(ref. 1) D0/T + 23	is as follows .70 log ₁₀ T ;	: T/K
	AUXILIARY	INFORMATIC		
METHOD/APPARATUS/	PROCEDURE :	SOURCE	AND PURITY OF	MATERIALS:
degassing syste spiral and a ga measuring the solvent was all absorption spir which was satur vapor, at a too atmosphere. The absorbed was mu attached buret	consisted of a solvent em, an absorption as burette for gas volume. Degassed lowed to flow down the ral containing the gas rated with solvent tal pressure of one he volume of gas easured by means of th te system. The volume s also accumulated in	us Ac 2. Wa ad	ing phosphori	ot determined. No
	ils were previously		TED ERROR: $\delta T/K = \pm 0$	0.02
			$\delta s/s = \pm 0$).02 (Compiler)
		REFERE	NCES:	
			Morrison, T.J. J. Chem. Soc.	
			lorrison, T.J. J. Chem. Soc.	

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Orcutt, F.S.; Seevers, M.H.
2. Water; H ₂ O; [7732-18-5]	J. Biol. Chem. <u>1937</u> , 117, 501-507.
VADTADI EC.	
VARIABLES: $T/K = 298.15$	PREPARED BY: W. Hayduk
<i>P</i> /kPa = 101.325	W. Nayduk
EXPERIMENTAL VALUES:	
Bunsen ^{'1} Ostwald Coefficient Coefficie α/ cm ³ gas(STP) L/ cm ³ ga t/°C T/K cm ⁻³ solvent cm ³ solve	ent
25 298.15 0.108 0.118	8.771 11400
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The liquid is saturated by ordinary tonometer methods. It is then transferred to a manometric extraction chamber (which was previously evacuated) by a modified Ostwald pipette as described in reference 1. The gas is then extracted and by comparing the manometer reading after extraction to the reading obtained using a "blank" determination, the volume of gas	 Ethene source and purity not specified. Water is deaerated by bubbling with ethene.
is determined.	ESTIMATED ERROR:
	$\delta \alpha / \alpha \approx \pm 0.02$ (Compiler)
	REFERENCES:
	1. Van Slyke, D.D.; Neill, J.M.
	J. Biol. Chem. <u>1924</u> ,61 , 523.

2	
OMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₂ ; [74-85-1]	Grollman, A.
2. Water; H ₂ O; [7732-18-5]	J. Biol. Chem. <u>1929</u> , 82, 317-325.
ARIABLES: T/K = 298.15 (25.0°C)	PREPARED BY:
<i>p</i> /kPa = 73.3-133.3	W. Hayduk
XPERIMENTAL VALUES:	
Ethene Partial Pressure Ostw p/mm mercury ${}^{1}p/kPa$ L/cm^{3}	ald Coefficient $\frac{2}{10}$ Mole fraction, gas(cm ³ solvent) $10^5 x_1$
550 73.33 600 80.0	0.112 0.113
650 86.7	0.113
700 93.3 750 100.0	0.112 0.113
800 106.7 850 113.3	0.113 0.113
900 112.0	0.114
950 126.7 1000 133.3	0.113 0.113
Average:	0.1129 8.39
² Mole fraction solubility for a gas based on the average value for the compiler. AUXILIAR	
ETHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A glass bubbling-type of saturator immersed in a constant temperature bath was used. A known volume of saturated solution was transferred over mercury into a Van Slyke desorption apparatus. Gas removed in three evacuations was transferred to a sample tube where the volume was determined and a sample of the gas was analyzed. Solubilities were determined at several pressures below atmospheric and above	SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Water distilled.
atmospheric and expressed as	ESTIMATED ERROR:
Ostwald coefficients.	$\delta T/K = \pm 0.05$
	$\delta L / L = \pm 4$ % (Compiler)
	REFERENCES:
	•

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Grollman, A.
2. Water; H ₂ O; [7732-18-5]	J. Biol. Chem. <u>1929</u> , 82, 317–325.
-	
VARIABLES: <i>T</i> /K = 310.65 (37.5°C)	PREPARED BY:
'P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	
Bunsen Coefficient ¹ Ostw	ald Coefficient
β/cm^3 gas NTP $t/C T/K cm^3$ solvent (L/cm^{3} gas ² Solubility cm ³ solvent) ⁻¹ Mole fraction, $10^{5}x_{1}$
37.5 310.65 0.078	0.0887 6.34
¹ Calculated by compiler.	
² Calculated by compiler using a gas m 310.65 K and a pressure of 101.325 k	olar volume at a temperature of Pa of 25360 cm³/mole.
	INFORMATION
METHOD/APPARATUS/PROCEDURE: A glass bubbling-type of saturator immersed in a constant temperature	SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given.
bath was used. The gas was presaturated with water vapor. A	2. Water distilled.
known volume of saturated solution was transferred over mercury into	
a Van Slyke desorption apparatus. Gas removed in three evacuations	
was transferred to a sample tube where the volume was determined	
and a sample of the gas was analyzed. The solubilities were	
expressed as the Bunsen	ESTIMATED ERROR:
coefficients.	$\delta\beta/\beta = \pm 0.04$ (Compiler)
	$\delta T/K = \pm 0.05$
	REFERENCES:
3	

,

COMPONENTS:	EVALUATOR:
 Ethene; C₂H₄; [74-85-1] Water; H₂O; [7732-18-5] 	Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, Ontario Canada K1N 6N5 June 1994

CRITICAL EVALUATION:

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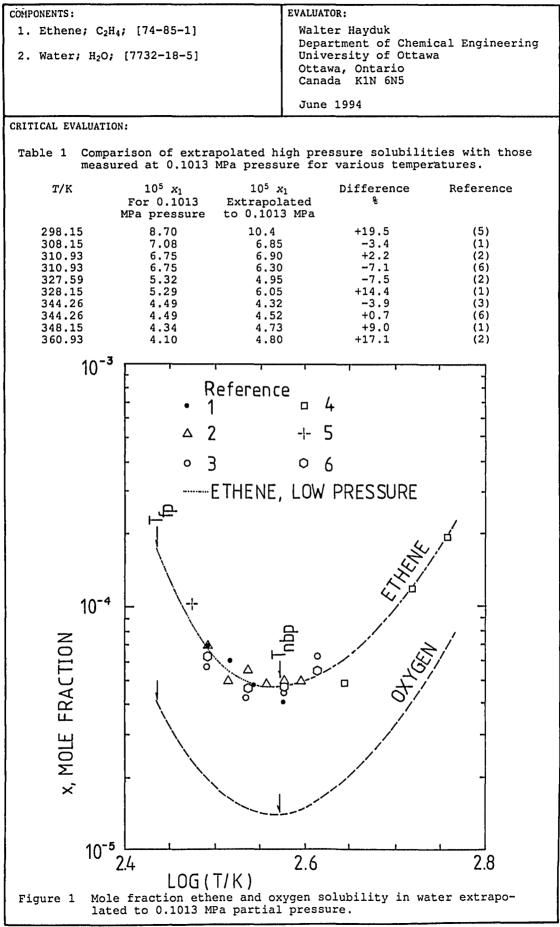
Critical Evaluation of Ethene Solubility in Water for Pressures greater than 0.2 MPa (2 atm)

Ethene solubilities in water at elevated pressures have been reported in 6 publications (1-6) for temperatures ranging from 298 K to 573 K and pressures to 86 MPa. Data for the solubilities of mixtures of ethane and ethene in water at elevated pressures have also been reported (6). Since the solubility measurements were made at widely differing pressures and temperatures, ethene partial pressure data were needed for a meaningful evaluation. These partial pressures were calculated based on the gas phase compositions where reported or they were evaluated from the vapour pressure of water assuming Raoult's law applies for water. Both approaches gave very similar results.

Values of log x versus log p were plotted for each set of data. A linear relationship usually suggests a satisfactory consistency in the data but such a test is not rigorous and, in general, deviations from linearity are to be expected at high pressures. These plots were used to extrapolate the solubilities to obtain a value at a partial pressure of 0.1013 MPa. The procedure for the extrapolation was to give preference to the data for the lowest pressures available, and to extrapolate these values to a pressure of 0.1013 MPa assuming a direct relationship between log x and log p. It appears likely that Henry's law will be best obeyed at the lowest pressures and if it is, as data are extrapolated to low pressures, the slope of the log $x - \log p$ line will be equal to one. It is noted that at elevated pressures the log $x - \log p$ line is often somewhat curved and the slope is often less than one.

Solubilities which have been extrapolated to an effective gas partial pressure of 0.1013 MPa are compared with those actually measured at a partial pressure of 0.1013 MPa where possible, in Table 1 and Figure 1. The source of the oxygen solubilities in water for Figure 1 is the Solubility Data Series volume on Oxygen (7). From Figure 1 it is evident that all the six sources of data when extrapolated using Henry's law are relatively consistent, agreeing with one another, agreeing with the low pressure solubilities of ethene in water, and having a similar temperature effect on solubility as that for oxygen dissolving in water. Although certain individual extrapolated values show deviations of as much as 20% from a line representing the data, such deviations are probably mostly the result of extrapolations over large pressure ranges, rather than of errors in the experimental results themselves. The data of Anthony and McKetta (6) and Davis and McKetta (2) appear to be the most consistent of the data. It is apparent that the solubility of ethene in water has a minimum, as does the solubility of oxygen in water, at a temperature near the normal boiling temperature of water (T_{nbp}) . It is also apparent that the high pressure solubilities for ethene in water are accurate only to about \pm 5%. It is clear, therefore, that experimental work of higher accuracy and for a larger range of pressures and for higher temperatures is required to fully define the solubility relationship for ethene in water.

The data of Bradbury et al. (1), Davis and McKetta (2), Anthony and McKetta (3,6), Sanchez and Lentz (4) and Sokolov and Konshin (5) are all classified as tentative.



COMPONENTS: 1. Ethene; C ₂ H ₄ ; [74-85-1]	EVALUATOR: Walter Hayduk
2. Water; H ₂ O; [7732-18-5]	Department of Chemical Engineering University of Ottawa
	Ottawa, Ontario Canada K1N 6N5
	June 1994

CRITICAL EVALUATION:

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Ethane; $C_{2}H_{6}$; [74-84-0] and Ethene; $C_{2}H_{4}$; [74-85-1] Gas mixtures.

This system has been investigated by Anthony and McKetta (6). It is of interest that Henry's law is obeyed for both gas components even up to the high pressures utilized in this work. From these solubilities it is possible to estimate solubilities for lower pressures. These results are entirely consistent with those involving only two components. No comparable data are available for comparison.

The results of Anthony and McKetta (6) are classified as tentative.

References

- Bradbury, E.J.; McNulty, D.; Savage, R.L.; McSweeny, E.E.; Ind. Eng. Chem., <u>1952</u>, 44, 211-212.
- 2. Davis, J.E.; McKetta, J.J.; J. Chem. Eng. Data, 1960, 5, 374-375.
- 3. Anthony, R.G.; McKetta, J.J., J. Chem. Eng. Data, <u>1967</u>, 12, 17-20.
- 4. Sanchez, M.; Lentz, H.; High Temp. High Press., 1973, 5, 689-699.
- 5. Sokolov, Yu. P.; Konshin, A.I.; Zh. Prikl. Khim., 1990, 63, 710-713.
- 6. Anthony, R.G.; McKetta, J.J.; J. Chem. Eng. Data, 1967, 12, 21-28.
- Battino, R. Oxygen and Ozone, *IUPAC Solubility Data Series*, Vol. 7, Pergamon Press, Oxford, <u>1981</u>.

						14	17	
COMPONENTS:					ORIGINAL MEASUREMENTS:			
1. Eth	iene; C,	H ₄ ; [74-	85-1]			Yu. P.; Konshin,	A.I.	
	_				7h Prikl	. Khim. 1990, 6	3 .	
2. Ha	2. Water; H ₂ O; [7732-18-5]					~ /		
					710-713.			
VARIABLES	÷ /	K = 298. a = 0.20			PREPARED BY:	W. Hayduk		
EXPERIME	ENTAL VAL	JES:				·		
			C,	-1.1hi1i+	.,		³ Henry's	
$t/^{\circ}C T/K P/MPa C_{1}/mM^{1}x_{1}, mol$			² Distribution	Constant				
t/°C	т / к	P /MPa	C ₁ /mM	¹ <i>x</i> ₁ , mol	fraction	Constant, K _d	H/MPa (mol fraction) ⁻¹	
25.0	298.15	0.20	11.6	0.	000210	0.143	950 <u>+</u> 50	
2010		0.31	18.0	0.	000325	<u>+</u> 0.005		
		0.51 0.71	29.6 41.8		000535 000755			
		0.91 1.11	52.8 64.4		000954 001164			
						<u>.</u>		
			AL	JXILIARY 1	NFORMATION			
METHOD/A	PPARATUS/	PROCEDURE	:		SOURCE AND	PURITY OF MATERIALS:		
The solubilities were measured using a stirred reactor with a magnetic drive having a volume of 250 cm ³ and equipped with a pressure gauge and a surrounding jacket for temperature control. Gas and sample handling systems were attached. A volume of 100-200 cm ³ of deaerated solvent was charged to the reactor and equilibrated. A small liquid sample chamber was used to confine a known volume of saturated solution.		3						
evapor Helium increa	rated ir n carrie ase the	nto a muc er gas wa pressure	ompletely h larger s used to of the 0.12 MPa	vessel. o vapor-	ESTIMATED EF δæ/	RROR: /x = <u>+</u> 5% (Compil	ler)	
sample	gas mixture to about 0.12 MPa. sample was then analyzed by gas chromatography. Details are in 1.	as		ov, Yu. A.; Konsl vikl. Khim. <u>1987</u> ,				
						·	-	

			,	5				
8			/	`				
COMPONENTS:				ORIGINAL M	EASUREMENTS:			
1. Et	thene; C_2	H ₄ ; [74-	85-1]			, M.; Lent	z, H.	
2. Wa	ter; H ₂ O	: [7732-	18-51		High To	emn - High	Press. 1973, 5 ,	
		/ (1/02	10 01		•	•	11000. 1010/07	
			689-699	•				
VARIABI	ES: T /	K = 439.	15 - 573.	.15	PREPARED B	Y:		
	P /MP	a = 10.0	- 94.5			W. Hayd	uk	
EXPERIN	MENTAL VALU	ES:				·		
$t/^{\circ}C^{-1}T/K$ bar ^{1}MPa in Gas			Fraction	Ethene Liquid, x_1	¹ Partial Pressu:			
τ/ C	<i>T</i> /K	bar	¹ MPa	in Gas	, y ₁ in	Liquid, <i>x</i> 1	Ethene, p_1 /MPa	1
166	439.15	100	10	0.86	ס	0.004	8.60	
		150	15	0.89	0	0.005	13.35	
		635 945	63.5 94.5	0.95		0.010 0.008 f	60.90 86.00	
		-						
250	523.15	190 240	19.0 24.0	0.63		0.014	11.97 16.51	
		375	37.5	0.76	-	0.026	28.73	
		570	57.0	0.75	D	0.034	42.75	
		730	73.0	0.81	D	0.040	59.13	
300	573.15	240	24.0	0.51	6	0.024	12.38	
		380 550	38.0 55.0	0.59		0.036 0.047	22.69 30.25	
Smoot		es as ob	nal paper tained by er.		olation a	nd interpo	lation are also	
			Al	UXILIARY 3	INFORMATION	1		
	/APPARATUS/		•		SOURCE AND	PURITY OF M	ATTERTALS:	
The apparatus consisted of a high pressure piston pump,				1. Ethene purity was specified to be 99.99%.				
Bourd	ion pressu	ure gaug	es, a lary tube		2. Water was double distilled.			
equil	ibrium ce	ell 4.7	mm in		2. Mate	i was uoub	re districa.	
			bular sto					
			as well a e sensing					
eleme	nt, samp	ling pro	bes and v	alves.				
The a	pparatus	was mou	nted in a	ι				
			chamber. charged w					
known	quantity	y of sol	ventby		ESTIMATED			
rotating it to a horizontal position. The quantity of gas was			$\delta T/K =$	<u>+</u> 0.5				
deter	mined by	materia	l balance	and	$\delta x_{1}/x_{2}$	= <u>+</u> 0.05	or <u>+</u> 5% (Compile)	c)
the P tube.	V relatio	on in th	e gas sup	ply	<u>├</u>			
LUDE.					REFERENCES	5:		
					L			

					1	6 1	
COMPONENTS:			ORIGINAL ME	ASUREMENTS :			
l. Ethene; C ₂ H		Anthony	, R.G.; McKe	tta,	J.J.		
2. Water; H ₂ O;	[7732-18-5]		J. Chem	. Eng. Data	<u>1967</u>	<i>, 13</i> , 17-20	
VARIABLES: $T/K = 3$	310.9-410.9		PREPARED BY	· · · · · · · · · · · · · · · · · · ·			
·	3.43-34.40		Ψ.	Hayduk			
EXPERIMENTAL VALUES		•	1	Molo Proch	ion M	ole Fractio	
<i>t/</i> F(¹ <i>T/</i> K)	Total Pressur P/psia ¹ P/MP	e Part a p/M	ial Pressu Pa p ₁ /MPa	ire Ethene	in	Water in Vapor, 10 ³ y	
99.9(310.87)	497.23.421000.26.891012.26.97	6 6.	422 3.42 890 6.88 972 6.90	36 2.85	4	2.363 1.485 1.416	
100.0(310.93)	1483.2 10.23	10.	22 10.2	1 3.38	8	1.495	
100.1(310.98)	513.23.531000.26.891002.26.912075.214.313067.221.154029.727.784724.232.57	6 6. 0 6. 14. 21. 27.	532 3.53 890 6.84 903 6.85 30 14.25 14 21.15 78 27.75 57 32.55	36 3.13 39 2.85 3.68 3.68 1 3.72 4 3.85	4 4 5 0 5	2.374 1.532 1.542 1.533 1.579 1.622 1.545	
159.9(344.21)	2007.7 13.84 2887.2 19.91		81 13.7 87 19.8			5.086 4.971	
160.0(344.26)	517.7 3.56 1505.2 10.35		537 3.5 32 10.2			10.955 5.374	
¹ Calculated by o pressure of wa	ter and p ₁ from	the co	ssure p is mposition	of the vapor	y_1 .	the vapor	
METHOD ADDADATUS ADD					DTALCA		
METHOD/APPARATUS/PROCEDURE: The high pressure apparatus is			SOURCE AND PURITY OF MATERIALS: 1. Ethene was Phillips pure grade.				
described in re- consisted of a mounted in a t ped for mixing measurement. (Meeco Model W water vapor co	eference l. It high pressure hermostat and e	cell quip- r the	2. Wate	er was distil erated.		-	
an absolute max	alyzed by means nometer and Ors o maintain equi	at					

			16				
20							
COMPONENTS:			ORIGINAL	L MEASURE	IENTS:		
1. Ethene; $C_2 H_1$; [74-85-1]		Anthony, R.G.; McKetta, J.J.				
2. Water; H ₂ O;	[7732-18-5]		J. C.	hem. Eng	. Data <u>196</u>	<u>7</u> , 12, 17-20.	
VARIABLES: $T/K = 3$	310,9-410,9		PREPARE	D BY:			
	3.43-34.40			W. Hay	duk		
<i>F/MPa</i> = .	1.43-34.40						
EXPERIMENTAL VALUES	continu						
<i>t</i> /F(¹ <i>T</i> /K)	Total Press P/psia P/	1,2 sure Part 'MPa p/M	ial Pre Pa p ₁ /	ssure	le Fraction Ethene in Liquid, 10 ³ x ₁	Mole Fraction Water in Vapor, $10^3 y_1$	
160.0(344.26)	3064.7 21. 4079.7 28.			.02	3.576 3.826	5.124	
160.1(344.32)	1074.7 7. 4289.7 29. 4989.2 34.	58 29.	54 29	.363 .43 .22	2.319 3.945 4.124	6.325 5.110 5.115	
219.9(377.54)	1526.2 10. 2102.2 14. 4099.7 28.	49 14.	38 14	.34 .28 .89	3.010 3.368 4.589	17.26 14.86 13.24	
220.0(377.59)	1018.2 7.	020 6.	904 6	.860	2.240	22.79	
220.1(377.65)	534.2 3.	683 3.	565 3	.546	1.329	37.37	
220.2(377.71)	3144.7 21.	68 21.	56 21	.38	3.937	13.71	
279.7(410.76)	616.7 4.	252 3.	911 3	.844	1.540	95.98	
¹ Calculated by o pressure of wat	compiler. ² Pater and p_1 fr	rtial pre com the co	ssure p mpositi	o is cal on of t	he vapor y_1 .	on the vapor	
		AUXILIARY	INFORMA	TION			
METHOD/APPARATUS/PR	OCEDURE:		SOURCE	AND PURIT	Y OF MATERIALS	3:	
The high pressu			1. E	thene w	as Phillips	pure grade.	
described in re consisted of a mounted in a th ped for mixing measurement. A (Meeco Model W) water vapor con phase. The wat sampled and and an absolute mar	high pressure and pressure water analy was used for thent of the alyzed by mea hometer and 0	e cell equip- yzer or the vapor uns of Drsat		later wa leaerate	s distilled d.	and	
gas burette. brium in the ce a volume of men into the cell e saturated solut hydrocarbon was pressure in the at constant ter the gas volume determined. Th of the liquid s method was stat described in re	ell during sa cury was in- equal to that ion withdraw s desorbed at orsat gas h operature, ar and pressure he minimum ac sampling and ted to be ± 5	mpling, ected of the n. The low ourette d then was couracy analysis	$\begin{array}{c} & \delta \\ \\ \delta \\ \\ REFEREN \\ 1. \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	$/x_1 = \pm$ NCES: Nehe, A. T. Chem. Nehe, A.	0.1 <i>& P/ P</i> 5% (Referenc 	ce 2) J.J. . <u>961</u> ,6, 167. J.J.	

					16		2	
COMPONENTS :	·····			ORI	GINAL MEASU	REMENTS:		
1. Ethene; C,H,	; [74-85-	1]		Anthony, R.G.; McKetta, J.J.				
2. Water; H ₀ ;	•			J.	Chem. En	g. Data <u>1967</u> ,	12, 17-20,	
	[,,52 10	5]				<u>, , , , , , , , , , , , , , , , , , , </u>	, , , 200	
VARIABLES: T/K = :	310.9-410.	9		PRE	PARED BY:		· · · · · · · · · · · · · · · · · · ·	
	3.43-34.40				W. Ha	yduk		
EXPERIMENTAL VALUES	:cont	inued		I		·		
t/F(¹ T/K)	Total Pr P/psia	essure	Parti p/MI	lal Pa	Pressure	ole Fraction Ethene in Liquid, 10 ³ x ₁		
279.8(410.82)	529.7 1032.2 3874.7		6.3		6.684	1.329 2.475 5.631	10.18 60.77 29.83	
279.9(410.87)	1556.2 4005.2				10.25 26.77	3.375 5.602	44.43 30.47	
280.0(410.93)	1339.2 3002.2		8.8 20.3		8.784 20.02	4.728	48.66 32.93	
280.1(410.98)	2018.2	13.91	13.5	57	13.38	4.019	38.25	
280.2(411.04)	1499.2	10.34	9.9	996	9.799	3.264	51.98	
pressure of wat								
		AUX	ILIARY	INF	ORMATION			
METHOD/APPARATUS/PF	ROCEDURE :			SOL	IRCE AND PUR	RITY OF MATERIALS	:	
The high press	ure appara	tus is			l. Ethene	was Phillips	pure grade.	
described in r consisted of a mounted in a t ped for mixing measurement. (Meeco Model W water vapor co phase. The wa sampled and an an absolute mag	high pres hermostat and press A water ar) was used ntent of t ter phase alyzed by nometer ar	sure ce and equ sure alyzer for th the vapo was means o ad Orsat	ip- e r f		2. Water v deaerat	vas distilled ed.	and	
gas burette. brium in the ca a volume of me into the cell saturated solu hydrocarbon wa pressure in th at constant te the gas volume	ell during rcury was equal to t tion withd s desorbed e Orsat ga mperature,	y sampli injecte hat of drawn. d at low as buret and th	ng, d the The te en	RE	$\delta_{x_1} / x_1 =$ FERENCES:	PR: 0.1 δP/P ±5% (Referenc .H.; McKetta,	e 2)	
determined. T. of the liquid method was sta described in r.	he minimun sampling a ted to be	n accura and anal ±5% as	cy ysis		J. Chem 2. Wehe, H	A.H.; MCKetta, A.H.; MCKetta, <i>Chem.</i> <u>1961</u> , <i>33</i>	<u>961</u> , 6, 167. J.J.	

22	1,6								
COMPONENTS:				ORI	GINAL MEAS	UREMENTS:			
1. Ethene; C_2H_4	[74-85	-1]		Anthony, R.G.; McKetta, J.J.					
2. Water; H ₂ O;	7732-18	-5]		J	. Chem.	Eng. Data	<u>1967</u> ,	, 12, l	7-20.
VARIABLES: $T/K = 31$	0.9-410	.9		PREPARED BY:					
P/MPa = 1	<i>P</i> /MPa = 1.38-34.47					layduk			
EXPERIMENTAL VALUES:		1	, 2	L		Mole Fract	ion Ma	ole Fra	ction
<i>t</i> /F (¹ <i>T</i> /K)	Total P P/psia	-	Part			Ethene i	n V	Water i	.n
100 (310.93)	200 400 500 1000 2000 2500 3500 4000 4500 5000	1.379 2.758 3.447 6.895 10.34 13.79 17.24 20.68 24.13 27.58 31.03 34.47	2. 3. 10. 13. 17. 20. 24. 27. 31.	441 888 34 78 23 68 12 57	2.750 3.439 6.883 10.33 13.77 17.21 20.65 24.09 27.54 30.98	1.557 1.875		5.126 2.824 2.400 1.661 1.519 1.535 1.555 1.555 1.555 1.555 1.559 1.561 1.563	
160 (344.26)	400	1.379 2.758 3.447 6.895	2. 3.	725	2.721 3.409	1.112		25.22 13.42 11.18 6.675	5
¹ Calculated by co ² Partial pressure from the compos: The data above a	ep is c ltion of	the vapo	or y_1 as 1	ist	-	-			
METHOD /APPARATUS / PROC				SOURCE AND PURITY OF MATERIALS: 1. Ethene was Phillips pure grade.					
The high pressure apparatus is described in reference 1. It consisted of a high pressure cell mounted in a thermostat and equip- ped for mixing and pressure measurement. A water analyzer (Meeco Model W) was used for the water vapor content of the vapor phase. The water phase was sampled and analyzed by means of an absolute manometer and Orsat gas burette. To maintain equili-					2. Water deaera	was distil ated.		-	ι α ຍ .
brium in the cell during sampling, a volume of mercury was injected into the cell equal to that of the saturated solution withdrawn. The hydrocarbon was desorbed at low				ES		ROR: ± 0.1 & A ± 5% (Refe			001
pressure in the at constant temp the gas volume a determined. The of the liquid sa method was state	perature and pres minimu ampling	, and the sure was m accurae and anal	en cy		J. Che 2. Wehe,	A.H.; McKe m. Eng. Da A.H.; McKe	ta <u>190</u> tta,	<u>61</u> , <i>6</i> , J.J.	167.
described in ref					Anal.	Chem. <u>1961</u>	, 33,	291.	

10							23
COMPONENTS:				ORIC	INAL MEASU	UREMENTS :	
l. Ethene; C_2H_4	; [74-85-	-1]		A	nthony,	R.G.; McKetta	, J.J.
2. Water; H ₂ O;	[7732-18	-5]		J.	Chem. E	Eng. Data <u>1967</u>	<u>,</u> 12, 17-20.
VARIABLES: $T/K = 3$	10.9-410	. 9		PREI	ARED BY:		
P/MPa = 1					W. H	ayduk ,	
EXPERIMENTAL VALUES	con		-	.	<u></u>		
t/F ($^{1}T/K$)	Total P: P/psia	-	,2 Part: p/MI	ial Pa	Pressure	Ethene in	Mole Fraction Water in Vapor,10 ³ y ₁
160 (344.26)	4500	10.34 13.79 17.24 20.68 24.13 27.58 31.03 34.47	10.1 13.1 17.2 20.6 24.1 27.5 30.9 34.4	76 20 55 10 55 99	17.15 20.58 24.01	2.858 3.159 3.369 3.545 3.702 3.840 3.961 4.085	5.452 5.037 4.909 4.910 4.909 4.900 4.900 4.900 4.900
220 (377.59)	400	2.758 3.447 6.895	2.6 3.2 6.7	541 331 778 23 57	3.312		86.36 47.69 39.20 22.60 17.59 15.47 14.37
² Partial pressur from the compos The data above	ition of	the vapo hed data	or y ₁ as 1:	iste			•
METHOD/APPARATUS/PR	OCEDURE :			sou	RCE AND PU	RITY OF MATERIAL	.S :
The high pressu described in re- consisted of a mounted in a th ped for mixing measurement. A (Meeco Model W) water vapor cor phase. The wat sampled and and an absolute mar	tre appar aference high pre hermostat and pres water a was use tent of cer phase lyzed by cometer a	 It ssure ce and equ sure nalyzer d for the the vapo was means o nd Orsat 	ip- e r f	1	. Ethene	was Phillips was distilled	pure grade.
gas burette. The brium in the cell a volume of mer- into the cell est saturated soluth hydrocarbon was pressure in the at constant ten the gas volume determined. The of the liquid so method was statt described in res	ell durin cury was equal to ion with a desorbe orsat g perature and pres ae minimu ampling ced to be	g sampli injecte that of drawn. d at low as buret , and th sure was m accura and anal ±5% as	ng, d the The te en cy ysis	REI 1	$\delta x_1 / x_1 =$ ERENCES: Wehe, J. Che Wehe,	<pre>ROR: ± 0.1 δ P/P ± 5% (Referen A.H.; McKetta m. Eng. Data A.H.; McKetta Chem. 1961, 3</pre>	ce 2) , J.J. <u>1961</u> , 6, 167. , J.J.

24	1 ^						
COMPONENTS :				ORI	GINAL MEASU	REMENTS :	
1. Ethene; $C_2 H_4$;	; [74-85-	·1]		Anthony, R.G.; McKetta, J.J.			
2. Water; H ₂ O;	[7732-18-	•5]		J	. Chem. E	ng. Data <u>1967</u> ,	<i>12</i> , 17-20.
VARIABLES: T/K = 3	10.9-410	9		PRE	PARED BY:		
<i>P/MPa =</i> 1	.38-34.47	7			W. H	ayduk	
EXPERIMENTAL VALUES:	cont		, 2			Mole Fraction M	ole Fraction
<i>t</i> /F (¹ <i>T</i> /K)	Total Pr P/psia	essure	Part	ial Pa	Pressure		Water in
220 (377.59)	3000 3500 4000 4500 5000	20.68 24.13 27.58 31.03 34.47	20. 24. 27. 30. 34.	02 46 91	23.81	3.872 4.107 4.333 4.545 4.751	13.83 13.50 13.32 13.18 13.10
280 (410.93)	200 400 500 1500 2000 2500 3000 3500 4000 4500 5000	34.47	2. 3. 6. 10. 13. 16. 20. 23. 27. 30. 34.	45 90 34 79 24 69 13	2.399 3.078 6.481 9.867 13.26 16.63 20.01 23.38 26.75 30.11 33.47	0.545 1.079 1.320 2.455 3.352 3.970 4.435 4.836 5.105 5.535 5.852 6.180	252.53 130.20 107.00 60.03 45.89 38.62 34.93 32.59 31.01 29.94 29.58 29.08
² Partial pressure from the compos The data above a	ition of	the vapo hed data	as 1	ist	ed in the	_	ter and p ₁
		AUXI	LIARY		ORMATION		
METHOD/APPARATUS/PRO The high pressu described in re consisted of a mounted in a the ped for mixing measurement. A (Meeco Model W) water vapor com phase. The wate sampled and ana an absolute man- gas burette. The brium in the ce	re appara ference i high pres ermostat and press water an was used tent of d er phase lyzed by ometer an o mainta:	l. It ssure cel and equi sure halyzer d for the the vapor was means of nd Orsat in equili	ip- 2 5 1-		l. Ethene 2. Water deaera		pure grade. and
a volume of mer- into the cell es saturated solut hydrocarbon was pressure in the at constant tem the gas volume determined. The of the liquid so method was state described in res	cury was qual to d ion with desorbed Orsat ga perature and press e minimur ampling a ed to be	injected that of t lrawn. T d at low as burett , and the sure was n accurac and analy ± 5% as	the The te en	RE	FERENCES: 1. Wehe, J. Che 2. Wehe,	 δ P/P 5% (Referenc A.H.; McKetta, m. Eng. Data 1 A.H.; McKetta, Chem. 1961, 33 	J.J. <u>961</u> ,6,167. J.J.

					17			
					:			
MPONEN'	rs :			ORIGINAL MEASUREMENTS:				
1. Et	hene; $C_2 H_4$;	[74-85-1]		Davis, J.E.; McKetta, J.J.				
2. Wa	ter; H ₂ O; [7732-18-5]		J. Chem. Eng. Data <u>1960</u> , 5 , 374-375.				
ARIABLE	S: $T/K = 310$	0.9-394.3		PREPARED BY:				
P/MPa = 0.12-3.74, (1.16-36.9 atm)			.9 atm)	W. Hayduk				
XPERIME	NTAL VALUES:	<u></u>		· · · · · · · · · · · · · · · · · · ·				
		Total P	ressure					
t/F	¹ T /K	P/psia	¹ P/MPa	Partial Pressure ¹ p ₁ /MPa	Ethene Mole Fráction, 10 ⁴ ¤ ₁			
100	310.93	47 89 145 197 257 340 461 481 497	0.3241 0.6136 0.999 1.358 1.772 2.344 3.179 3.316 3.427	6 0.6071	2.3 4.1 6.1 7.71 10.2 13.8 17.8 18.0 18.6			
130	327.59	32 91 147 291 355 409 452 521	0.2200 0.6274 1.014 2.006 2.448 2.820 3.116 3.592		0.91 2.82 4.71 9.23 11.0 12.9 14.2 15.5			
	lated by co 's law is n				continued			
	· <u>·······</u> ····························		AUXILIARY	INFORMATION				
ETHOD/A	PPARATUS/PROC	EDURE:		SOURCE AND PURITY OF MAT	ERIALS:			
which ethyl 45 mi The c 15 mi separ was s fed i A 50 evacu After in th measu The v into mercu opera drair	sampled and into an anal cm ³ sample lated, jacker c equilibriu he flask the bred by a me vapor was co a second fl lry. A second thom was ob hing the mer	as charged er and rock int temperat tot at rest f for phase e water solu the sample ytical trai was fed int eted flask. im was estable pressure w ercury manom ompletely di ask by usin ond strippin tained by	with ed for ure. or tion was n. o an olished as seter. splaced g g sche	 Ethene analyzed with nitrogen t impurity. Water was distidegassed. ESTIMATED ERROR: δx₁/x₁ = ± 2% at δx /x = ± 4% at 	as 99.2% pure he major lled and high pressures			

		,7					
26							
COMPONEN	TS:	·····································		ORIGINAL MEASUREMENTS:			
1. Et	hene; C ₂ H ₄ ;	[74-85-1]		Davis, J.E.; McKetta, J.J.			
2. Wa	ter; H ₂ O; [7732-18-5]		J. Chem. Eng. Data <u>1</u>	<u>960</u> , ⁵ , 374-375.		
VARIABLE	T = T = 31	0.9-394.3		PREPARED BY:			
<i>P</i> /MPa	= 0.12-3.7	4, (1.16-36.	9 atm)	W. Hayduk			
EXPERIME	NTAL VALUES:	continued					
		<u>Total</u> Pr	essure				
t/F	¹ <i>T</i> /K`	P/psia	1 <i>P/</i> MPa	Partial Pressure ${}^{1}p_{1}$ /MPa			
160	344.26	17	0.117		0.27		

0.5102

0.7860

1.448

2.296

2.379 3.385

3.475

0.5171

1.276

1.510

1.993

2.282

2.841

3.489

74

114

184

210

333

345

491

504

75

185

219

289

331

412

506

.

0.4776

0.7533

1.415

2.263

2.346 3.353 3.442

0.4527

1.211

1.445

1.928

2.218

2.776

3.424

¹Calculated by compiler.

360.93

190

Henry's law is not obeyed.

continued...

1.90

2.85

5.19

5.27

8.23

9.00

2.00

5.29

7.94

9.06

11.4

13.7

12.2

12.5

AUXILIARY	INFORMATION
	ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 4$ % at the lowest pressure (compiler) REFERENCES:

OMPONEN					· 7 2		
	TS:			ORIGINAL MEASUREMENTS:			
1. Ethene; C ₂ H ₄ ; [74-85-1]				Davis, J.E.; McKetta, J.J.			
2. Wa	ter; H,O; [7732-18-5]		J. Chem. Eng. Data <u>1960</u> , 5, 374-375.			
	. 2						
ARIABLE	S: T/K = 31	0.9-394.3		PREPARED BY:			
		4, (1.16-36.	.9 atm)	W. Hayduk	,		
XPERIME	NTAL VALUES:	continued		······	· · · · · · · · · · · · · · · · · · ·		
	-						
	•	<u>Total Pr</u>		Partial Pressure			
t/F	1 <i>T</i> /K	P/psia	¹₽/MPa	$^{1}p_{1}$ /MPa	Fraction, 10^4x_1		
220	377.59	59 130 198 229 269 416 527	0.406 0.896 1.365 1.579 1.855 2.868 3.634	3 0.7797 1.249 1.462 1.738 2.752	1.28 3.61 5.41 6.47 7.49 12.0 14.9		
250	394.26	116 195 276 354 367 543	0.799 1.344 1.903 2.441 2.530 3.744	1.140 1.698 2.236 2.326	2.68 5.14 8.10 10.3 10.3 15.6		
Card	lated by co	mpiler.					
	lated by co	-	AUXILIARY	INFORMATION			
Henry	's law is n	ot obeyed.	AUXILIARY		TERIALS :		
Henry METHOD/A A roc which ethyl 45 mi The c 15 mi separ was s fed i A 50	APPARATUS/PROC cking autocl the cell w lene and wat in at consta cell was kep in to allow sation. The sampled and into an anal	EDURE: ave was used vas charged w er and rocked int temperature of ar rest for for phase e water solut the sample w ytical train was fed into	d in with ed for ure. or tion was n.	INFORMATION SOURCE AND PURITY OF MA 1. Ethene analyze with nitrogen impurity. 2. Water was dist degassed.	ed as 99.2% pure the major		

rs:			ORIGINAL MEASUREMENTS:			
hene; $C_2 H_1;$	[74-85-1]		Davis, J.E.; McKett	a, J.J.		
2. Water; H ₂ O; [7732-18-5]			J. Chem. Eng. Data <u>1960</u> , 5 , 374-375.			
S: T/K = 31	0.9-394.3		PREPARED BY:			
<i>P</i> /kPa = 101.3, 344.6			м. наудик			
NTAL VALUES:						
<u> </u>	Total P	ressure	¹ Partial Pressure	Ethene Mole		
¹ <i>T</i> /K	P/psia	¹ P/kPa	n∕kPa	Fraction, 10 ⁴ x		
310.93	14.7			0.64 0.42		
344.26	14.7	101.325	68.67	0.42 0.37 0.18		
				2.30		
327.93	50	344.65	329.35	1.65		
344.26 360.93	50 50	344.65 344.65	311.99 280.20	1.35 1.30		
377.59	50 50	344.65	227.98	1.10 0.70		
		e at highe	er pressures.			
	<u></u>		-			
			INFORMATION			
the cell w ene and wat n at consta	EDURE: ave was use as charged er and rock nt temperat	AUXILIARY d in with ed for ure.	-	as 99.2% pure ne major		
king autocl the cell w ene and wat n at consta ell was kep n to allow ation. The ampled and nto an anal cm ³ sample ated, jacke	EDURE: ave was use as charged er and rock nt temperat t at rest f for phase water solu the sample ytical trai was fed int ted flask.	AUXILIARY d in with ed for ure. or tion was n. o an	INFORMATION SOURCE AND PURITY OF MATH 1. Ethene analyzed with nitrogen th impurity.	as 99.2% pure ne major		
king autocl the cell w ene and wat n at consta ell was kep n to allow ation. The ampled and nto an anal cm ³ sample ated, jacke equilibriu e flask the	EDURE: ave was use as charged er and rock nt temperat t at rest f for phase water solu the sample ytical trai was fed int ted flask. m was estab pressure w	AUXILIARY d in with ed for ure. or tion was n. o an lished as	INFORMATION SOURCE AND PURITY OF MATH 1. Ethene analyzed with nitrogen th impurity. 2. Water was disti	as 99.2% pure ne major		
king autocl the cell w ene and wat n at consta ell was kep n to allow ation. The ampled and nto an anal cm ³ sample ated, jacke equilibriu e flask the red by a me apor was co a second fl	EDURE: ave was use as charged er and rock nt temperat t at rest f for phase water solu the sample ytical trai was fed int ted flask. m was estab pressure w rcury manom mpletely di ask by usin nd strippin	AUXILIARY d in with ed for ure. or tion was n. o an lished as eter. splaced g	INFORMATION SOURCE AND PURITY OF MATH 1. Ethene analyzed with nitrogen th impurity. 2. Water was disti degassed.	as 99.2% pure ne major Lled and		
	ter; H_2O ; [S: T/K = 31 P/kPa = 10 NTAL VALUES: 1T/K 310.93 327.59 344.26 360.93 310.93 327.93 344.26 360.93 310.93 327.59 344.26 360.93 317.59 344.26 360.93 377.59 394.26 lated by co <i>smoothed</i> d	ter; H_2O ; $[7732-18-5]$ S: $T/K = 310.9-394.3$ P/kPa = 101.3, $344.6NTAL VALUES:Total P1T/K P/psia310.93 14.7327.59 14.7344.26 14.7344.26 14.7360.93 14.7310.93 50327.93 50344.26 50360.93 50377.59 50394.26 50lated by compiler.smoothed data have be$	ter; H ₂ O; [7732-18-5] S: $T/K = 310.9-394.3$ P/kPa = 101.3, 344.6 NTAL VALUES: $\frac{Total Pressure}{^{1}T/K}$ $P/psia$ $^{1}P/kPa$ 310.93 14.7 $101.322327.59$ 14.7 $101.322344.26$ 14.7 $101.322344.26$ 14.7 $101.322360.93$ 14.7 $101.322360.93$ 14.7 $101.322310.93$ 50 $344.65327.93$ 50 $344.65327.93$ 50 $344.65344.26$ 50 $344.65344.26$ 50 $344.65344.26$ 50 $344.65344.26$ 50 $344.65394.65394.65$ 50 $344.65394.65394.65$ 50 $344.65394.65394.65$ 50 $344.65394.65394.65$ 50 $344.65394.65$	ter; H ₂ O; [7732-18-5] J. Chem. Eng. Data <u>19</u> IS: T/K = 310.9-394.3 P/kPa = 101.3, 344.6 NTAL VALUES: PREPARED BY: W. Hayduk Prepared BY: W. Hayduk Prepared BY: W. Hayduk Partial Pressure I/T/K P/psia $IP/kPaI/KPaI/P/KPaI/$		

			/	/ フ 2 !
OMPONENTS :	······································	ORIGINAL MEA	SUREMENTS :	
1. Ethene; C ₂ H ₄ ;	[74-85-1]	Bradbury	y, E.J.; McNul	ty, D.;
2. Water; H ₂ O; [7732-18-5]	Savage,	R.L.; McSween	ey, E.E.
, , , , ,	•		-	44, 211-212.
		ina, Eng.	chem. <u>1952</u> ,	44, 211-212.
VARIABLES: T/K = 30	8.15-379.15	PREPARED BY:		
<i>P</i> /MPa ⊨ 0.46-53	.1, (4.55-524 at	m) V.	Hayduk ,	
EXPERIMENTAL VALUES:		L		
		hene Partial essure, p ₁ /MPa 		ty Ethene le Fraction, x ₁
8 20 35 35 69	.0 19.7 .0 22.3 .0 23.9 .0 26.9 .0 27.6 .0 29.7 .0 30.1 .0 32.2 .0 35.4 .0 39.7 	0.835 0.896 2.06 3.54 3.60 6.99 6.99 14.9 19.7 22.3 23.9 26.8 27.6 29.7 30.1 32.2 35.4 39.7	0.084 0.093 0.197 0.307 0.321 0.460 0.475 0.542 0.593 0.607 0.621 0.637 0.647 0.651 0.654 0.665 0.668 0.696	0.000539 0.000597 0.00126 0.00197 0.00206 0.00295 0.00304 0.00347 0.00379 0.00388 0.00397 0.00407 0.00414 0.00416 0.00418 0.00425 0.00425 0.00427 0.00445 the vapor continued
	A11X11	IARY INFORMATION		···· ··· ··· ··· ··· ··· ···
METHOD/APPARATUS/PROC A rocking autocla a temperature con tester and buret measuring the vol solvent was used provided pressure Ethylene was com storage reservoin the autoclave the valve. After equ autoclave a satur depressured to at and 298.15 K. Vo liquid were obtat were made for the in the water and the gas. The Sol reported as a mat	EDURE: ave equipped with ntroller, pressur te system for lumes of gas and . A mercury pump e as required. pressed in a r and supplied to rough a needle uilibration in th rated sample was tmospheric pressu lumes of gas and ined. Correction e residual ethenc non-ideality of lubility is	SOURCE AND F 1. Ethen Compa 2. Water boile ne ESTIMATED E	$\frac{\delta P/P}{\delta s/s} = \pm$	hemical 5% purity. d, and ion. 0.1 0.25%

0							
COMPONE			or 13		ORIGINAL ME		
1. E	thene; C	2 ¹¹ 4; [74	-85-1]		Bradbur	y, E.J.; McNul	lty, D.;
2. W	ater; H ₂	0; [7732	-18-5]		Savage,	R.L.; McSween	ney, E.E.
					Ind. Eng	•. Chem. <u>1952</u>	, 44, 211-212.
VARIABI	.ES: T/K	= 308.15	-379.15		PREPARED BY	•	
P/M	Pa = 0.4	6-53.1,	(4.55-52	4 atm)	W .	Hayduk	
EXPERIN	ENTAL VAL		ontinued				
t/C	<i>T/</i> K		'ressure 'P/MPa	² Ethene Pressu	Partial re, p ₁ /MPa	Solubil: s/g(100g) ⁻¹ Mo	ity Ethene ole Fraction, x ₁
35	308.15	448.0 510.0	.45.4 51.7		5.4 L.7	0.720 0.740	0.00460 0.00473
55	328.15	7.9 14.8 28.9	$\begin{array}{c} 0.481 \\ 0.800 \\ 1.50 \\ 2.93 \\ 5.61 \\ 11.3 \\ 17.1 \\ 22.2 \\ 34.9 \\ 40.9 \\ 40.9 \\ 49.6 \\ 53.1 \end{array}$	1 1 2 3 3 4 4 4 4	0.466 0.785 1.48 2.91 5.60 1.3 7.1 2.2 4.8 0.9 4.9 9.6 3.1	0.043 0.063 0.111 0.209 0.339 0.460 0.527 0.563 0.622 0.660 0.688 0.695 0.713	$\begin{array}{c} 0.000276\\ 0.000404\\ 0.000712\\ 0.00134\\ 0.00217\\ 0.00295\\ 0.00337\\ 0.00360\\ 0.00398\\ 0.00422\\ 0.00440\\ 0.00444\\ 0.00456\end{array}$
75	348.15		0.461		D.422	0.032	0.000205
	ne parti sure of		sure was	calculat	ed by comp	iler based on	the vapor continued
				AUXILIARY	INFORMATION		
A ro a te test meas solv prov Ethy stor valv auto depr and liqu were the	mperatur er and b uring th ent was ided pre lene was age rese autoclav e. Afte clave a essured 298.15 K id were made fo	toclave e contro urette s e volume used. A ssure as compres r voir ar e throug r equili saturate to atmos . Volume obtained r the re and nor e Solubi	equipped oller, pr system fo s of gas a mercury s require sed in a d suppli ch a need bration ed sample spheric p es of gas corre esidual e n-idealit	essure r and pump d. ed to le in the was ressure and ctions thene	 Ethe Comp Wate 	$\frac{\delta T / K}{\delta P / P} = \frac{\delta B / B}{\delta B / B} = \frac{\delta T / K}{\delta B / B}$	Chemical .5% purity. ed, and tion. <u>± 0.1</u> ± 0.25%
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<u></u>					

					ODTOTIVAL NO		3
COMPONE 1. E	thene; C	.H.: [74	-85-11		ORIGINAL MEASUREMENTS: Bradbury, E.J.; McNulty, D.;		
2. Water; H,O; [7732-18-5]					Savage, R.L.; McSweeney, E.E.		
2. water; n_20 ; [7752-16-5]							•
					Ind. Eng.	Chem. <u>1952</u>	, 44, 211-212.
VARIABI	LES: T/K	= 308.1	5-379.15		PREPARED BY		· · · · · · · · · · · · · · · · · · ·
Р/ М	Pa = 0.4	6-53.1,	(4.55-52	4 atm)	w.	Hayduk	
EXPERIM	ENTAL VAL			271.1	D	0 1 1 1	·
<i>t</i> /C	<i>T/</i> K		Pressure ¹ P/MPa		Partial re, p ₁ /MPa		ity Ethene ole Fraction,x ₁
75	348.15	15.7 28.6 55.8 111.0 121.0 122.0 174.0 228.0 310.0 382.0 440.0 518.0	1.59 2.90 5.65 11.2 12.3 12.4 17.6 23.1 31.4 38.7 44.6 52.5	1 1 1 2 3 3 8 4	L.55 2.86 5.62 L.2 2.2 2.3 7.6 3.1 L.4 3.7 4.5 2.4	0.099 0.178 0.302 0.455 0.467 0.472 0.527 0.566 0.628 0.667 0.700 0.728	$\begin{array}{c} 0.000635\\ 0.00114\\ 0.00194\\ 0.00291\\ 0.00299\\ 0.00302\\ 0.00337\\ 0.00362\\ 0.00402\\ 0.004426\\ 0.00448\\ 0.00465\end{array}$
104 101 104 106 102 102	379,15	27.7 75.0 149.0 256.0 362.0 433.0	2.81 7.60 15.1 25.9 36.7 43.9	1 2 3	2.69 7.49 5.0 5.8 5.6 3.8	0.160 0.410 0.536 0.632 0.678 0.707	0.00103 0.00263 0.00343 0.00404 0.00434 0.00452
² Ethe	ulated b ne parti sure of	al press		calculate	ed by comp	iler based on	the vapor
				AUXILIARY	INFORMATION		
A ro a te test meas solv prov Ethy stor the valv auto depr and liqu were the	mperatur er and b uring th ent was ided pre lene was age rese autoclav e. Afte clave a essured 298.15 K id were made fo	toclave e contro urette e volume used. a ssure as rvoir a e throu r equil: saturate to atmos obtaine r the r and non e Solub	equipped oller, pr system fo es of gas A mercury s require ssed in a nd suppli gh a need lbration ed sample spheric p es of gas d. Corre esidual e n-idealit	essure or and pump d. ded to le in the e was oressure and ections ethene	1. Ethe Comp 2. Wate	$\frac{\delta P}{\delta P} = \frac{\delta B}{\delta s} = \frac{\delta B}{\delta s}$	Chemical .5% purity. ed, and tion. ± 0.1 ± 0.25%

	1	
ſ	1	

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_4$; [74-85-1]	Anthony, R.G.; McKetta, J.J.
2. Ethane; C_2H_6 ; [74-84-0]	J. Chem. Eng. Data <u>1967</u> , 12,
3. Water; H ₂ O; [7732-18-5]	21-28.
VARIABLES: $T/K = 310.9 - 410.9$ P/MPa = 3.47 - 34.60 y_1 /mole fraction = 0 - 1	PREPARED BY: W. Hayduk

				<u>ase Mole Fr</u>			raction
Temp.		ssure_	Hydrocarbon	Dry Basis	Water in	Ethane	Ethene
°F, (¹ K)	psia	'MPa	Ethane, y_2'	Ethene, y_1	Gas, $10^3 y_3$	10 ³ x ₂	$10^{3} x_{1}^{1}$
100 <u>+</u> 0.1		3.469	0.2741	0.7251	2.320	0.1993	1.2756
(310.93	503.2	3.469	0.4033	0.5967	2.139	0.2520	1.0820
<u>+</u> 0.06)	504.2	3.476	0.4517	0.5483	2.159	0.2905	0.9493
	503.7	3.429	0.8154	0.1845	1.817	0.5616	0.3692
	995.7	6.865	0.7308	0.2692	0.7846	0.589	0.8030
	1000.7	6.900	0.9205	0.0792	0.6778	0.761	0.2007
	1000.7	6.900	0.2387	0.7613	1.264	0.238	2.162
220 + 0.3	503.9	3.474	0.2201	0.7799	39.19	0.0980	0.9790
(377,59	503.2	3.469	0.2115	0.7885	37.75	0.0920	0.9090
<u>+</u> 0.17)	500.7	3.452	0.3284	0.6716	40.58	0.1289	0.7982
-	501.7	3.459	0.5122	0.4878	38.89	0.2194	0.5666
	504.7	3.480	0.8921	0.1079	37.59	0.3723	0.1269
	1002.2	6.910	0.6066	0.3934	20.49	0.425	0.9597
	1005.2	6.931	0.8357	0.1643	20.32	0.5783	0.3698
	1499.2	10.337	0.4925	0.5075	15.15	0.4396	1.4684
	1004.2	6.924	0.6068	0.3932	20.17	0.3593	0.9107
	1491.2	10.281	0.6525	0.3475	14.77	0.5653	0.9977
	1008.7	6.995	0.1481	0.8519	22.07	0.1122	1.852
	1499.2	10.337	0.1943	0.8057	16.44	0.1901	2.3379
¹ Calculat	ed by Co	ompiler.	,				
				beyed for h	oth gas comp	onents f	or the
			to 4000 psi			ntinued.	

METHOD/APPARATUS/PROCEDURE:

The apparatus consisted of a high pressure cell mounted in a thermostat and equipped for mixing and pressure measurement. A water analyzer was used for the water vapor content of the vapor phase. The water phase was sampled and analyzed by means of an absolute manometer and an Orsat gas burette. To maintain equilibrium in the cell during sampling, a volume of mercury was injected into the cell equal to that of the saturated solution withdrawn. The hydrocarbon was desorbed at low pressure in the gas burette at constant temperature, and then the gas volume and pressure was determined. The gas was also analyzed.

Details are given in Ref. 1 and 2.

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SOURCE AND PURITY OF MATERIALS:
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- 1. Ethene minimum purity 99.3%.
- 2. Ethane minimum purity 99.1%.
- 3. Water was distilled and deaerated.

ESTIMATED ERROR: $\delta T / K = \pm 0.1$ $\delta P / P = \pm 0.2$ $\delta x / x = \pm 5$ (Authors) $\delta y / y = \pm 2$ = 5 %

REFERENCES :

1. Wehe, A.H.; McKetta, J.J. J. Chem. Eng. Data <u>1961</u>, 6, 167.

2. Wehe, A.H.; McKetta, J.J.

Anal. Chem. <u>1961</u>, ³³, 291.

			,	6			3:	
COMPONENTS:			. <u>.</u>	ORIGINAL M	EASUREMENTS :			
1. Ethene:	; C ₂ H ₄ ;	[74-85-	-1]	Anthony	Anthony, R.G.; McKetta, J.J.			
2. Ethane	; C ₂ H ₆ ;	[74-84-	-0]	J. Chem	. Eng. Data	1967 , 1	2,	
3. Water;	н,0;[]	7732-18-	-5]	21-28.			1	
	2							
VARIABLES:	T/K =	310.9 -	410.9	PREPARED B	Y:			
y_1 / mc	/MPa = ole frac	3.47 -	34.60 0 - 1		W. Hayduk	•		
EXPERIMENTAL	VALUES:			_1	· · · · · · · · · · · · · · · · · · ·			
		•••	continued			Tilmid	Phase	
			Gas Ph	ase Mole Fi	raction		raction	
Temp.		ssure	Hydrocarbon	Dry Basis	Water in	Ethane		
°F, (^f K)	psia	¹ MPa	Ethane, y_2	Ethene, y_1	Gas, $10^3 y_3$	10 ³ # 2	10 ³ <i>x</i> 1	
100 + 0.1	1080.2	7.448	0,9906	0.0094	0.7017	0.8810	0.0030	
(310.93	1503.2		0.9460	0.0540	0.6809	0.7531	0.2452	
<u>+</u> 0.06)	1486.2		0.8676	0.2324	0.7886	0.7663	0.4087	
	1521.2	10.488	0.6560	0.3440	0.9710	0.5472	1.1368	
	1505.2	13.749	0.2423 0.2570	0.7577 0.7430	1.383 1.201	0.2517 0.2550	2.417	
	1513.2		0.2701	0.7299	1.215	0.2463	2.417	
	1992.2	13.736	0.2639	0.7361	1.154	0.2932	2.5018	
	1992.2		0.4227	0.5773	0.8641	0.4275	1.9589	
	1975.2 3001.7		0.8491 0.8324	0.1509 0.1676	0.6238 0.644	0.7694 1.099	0.5006 0.6561	
160 + 0.2	2010.2	13.860	0.7958	0.2042	3.171	0.676	0.6556	
(344.26	1519.2		0.7860	0.2140	3.429	0.651	0.6098	
<u>+</u> 0.11)	2010.2		0.7830	0.2170	5.108	0.5644	0.4624	
	502.2	3.463 13.894	0.7740 0.5472	0.2260 0.4528	10.24 3.820	0.3508 0.468	0.2671 1.4237	
	1504.2		0.5268	0.4732	4.393	0.437	1.2906	
	997.7	6.879	0.5350	0.4650	5.727	0.3645	1.105	
	502.2	3.463	0.5281	0.4719	0.916	0.2386	0.6212	
		13.784	0.2975	0.7025 0.6897	3.832 4.937	0.271	2.1715 2.3429	
	995.7	10.440 6.865	0.3103 0.3011	0.6989	6.050	0.474 0.2353	1.5887	
	504.8	3.480	0.6917	0.3083	10.55	0.1494	0.9686	
	1494.2		0.6781	0.3219	3.992	0.547	0.8966	
	1990.2		0.8950	0.1050	2.641	0.788	0.2930	
	1514.2 995.7		0.8996 0.8933	0.1004 0.1067	3.390 4.709	0.710 0.698	0.2809	
	298.2	2.056	0.8851	0.1149	10.13	0.331	0.1144	
279.5 (410.65)	504.7	3.480	0.2830	0.7170	109.4	0.1274	0.9286	
280 <u>+</u> 0.1		6.958	0.7560	0.2440	57.76	0.6166	0.6304	
(410-93	503.7	3.473	0.7370	0.2630	108.01	0.3485	0.3275	
<u>+</u> 0.06)	1500.2	10.343 6.910	0.5447 0.5617	0.4553 0.4383	43.44 58.66	0.6923 0.4530	1.4217 1.0230	
	1002.2	3.531	0.5490	0.4510	105.50	0.4530	0.5422	
		10.316	0.2732	0.7268	38.19	0.2889	2.3140	
	1009.2	6.958	0.2651	0.7349	61.45	0.2405	1.7225	
	1494.2		0.7540 0.7496	0.2460 0.2504	40.75 33.14	0.8060 0.8862	0.8261 0.9168	
	1770.2	13./03	0.1.1.20	0.004	JJ + 14	0.0002	0.2100	

¹Calculated by Compiler.

continued...

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COMPONENTS:				ORIGINAL M	EASUREMENTS :		
	· · · · · ·	74-95-	.1 1	Anthony, R.G.; McKetta, J.J.			
1. Ethene	-						
2. Ethane; $C_2 H_6$; [74-84-0]			J. Chem	. Eng. Data	<u>1967</u> , 1	2,	
3. Water;	H ₂ 0; [77]	32-18-	-5]	21-28.			
ARIABLES:	T/K = 31		410.0	PREPARED B	Y:		
	T/K = 3 P/MPa = 3 ple fract:	.47 -	34.60		W. Hayduk	· · ·	
XPERIMENTAL	VALUES:						
		•••	continued			Liquid	
Temp.	Pressi	170	Gas Pha Hydrocarbon	<u>ase Mole Fr</u> Dry Basis	Water in	Mole F Ethane	raction Ethene
°F, (¹ K)	psia	MPa	Ethane, y_2	Ethene, y_1'	$Gas, 10^3 y_3$		
100 ± 0.1			0.5488	0.4512	1.131	0.6492	1.9548
(310.93 + 0.06)	4004.7 23		0.5588 0.5655	0.4412 0.4345	1.180 1.175	0.5823 0.5748	1.7366
<u> </u>	5004.7 34	4.506	0.7414	0.2586	0.778	0.8257	1.0773
	4004.7 27		0.7485	0.2515	0.718	0.7635	1.0084
	3001.5 20		0.7441 0.3731	0.2559 0.6269	0.849 1.141	0.7061 0.4198	0.9739
	4002.2 2	7.594	0.3653	0.6347	1.162	0.4133	2.4916
	3014.7 20 5004.7 34		0.3636	0.6364 0.7304	1.293 1.312	0.3804 0.3236	2.3585
	3999.7 27		0.2696 0.2687	0.7313	1.383	0.2927	3.0453
	3007.2 20		0.2729	0.7261	1.299	0.2588	2.7411
160 + 0.2			0.2711	0.7289	3.976	0.3126	2.981
(344.26 + 0.11)	4010.7 2		0.2658 0.2697	0.7342 0.7303	4.079 4.174	0.2900 0.2781	2.7889
	5000.7 34	4.479	0.6779	0.3221	2.752	0.7477	1.155
	4004.7 34		0.6922	0.3078	2.736	0.7003	1.1637
	3008.7 20		0.7011 0.8162	0.2989 0.1838	3.004 2.643	0.6413 0.8778	1.0637
	4002.7 23	7.598	0.8144	0.1856	2.580	0.8188	0.6822
	3007.7 20 5000.0 34		0.8185 0.9169	0.1815 0.0831	2.623 2.442	0.7336 0.9484	0.6163
	4009.7 2		0.9186	0.0814	2.325	0.9120	0.3120
	3004.7 20	0.717	0.9225	0.0775	2.518	0.8529	0.2771
219.9	4015.7 27		0.7270	0.2730	6.937	0.9076	1.2314
<u>+</u> 0.1 (377.54	3004.7 20 2012.2 13		0.7247 0.7245	0.2753 0.2755	10.16 12.90	0.8025 0.7052	1.0655
<u>+</u> 0.06)	4009.7 23	7.646	0.4401	0.5599	9.377	0.5428	2.4124
	3012.7 20		0.4392	0.5608	11.65	0.5067	2.1783
	2010.2 13		0.4374 0.2637	0.5626 0.7363	13.28 11.22	0.4499 0.3586	1.856 3.1954
	3008.7 20	0.744	0.2608	0.7392	12.44	0.3384	2.9466
	2012.2 13		0.2587	0.7413	14.10 7.568	0.2545 1.093	2.4448
	3010.7 20		0.9053 0.9112	0.0947 0.0888	9.297	1.093	0.3680
	2011.2 13		0.9040	0.0960	11.10	0.9072	0.2998
280 ± 0.1			0.8325	0.1675	22.29	1.237	0.7372
(410.93 + 0.06)	2009.2 13		0.8477 0.8336	0.1523 0.1664	27.31 34.88	1.0313 0.8897	0.5967
	2993.7 20	0.641	0.5762	0.4238	27.17	0.8337	2.0783
	2000.2 13	3.791	0.5628	0.4372	32.11	0.7022	1.6548
	1506.7 10 3002.2 20		0.5608 0.3753	0.4392 0.6247	41.20 29.43	0.5970 0.5504	1.3830
	1999.2 13	3.784	0.3662	0.6338	35.84	0.4523	2.3747
	1504.7 10	.375	0.3606	0.6393	44.13	0.3820	1.9190

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¹Calculated by Compiler.

COMPONENTS:	EVALUATOR:
(1) Ethene; C ₂ H ₄ ; [74-85-1]	H. Lawrence Clever
(2) Electrolyte	Department of Chemistry Emory University
(3) Water; H ₂ O; [7732-18-5]	Atlanta, GA USA
	August 1992

CRITICAL EVALUATION:

AN EVALUATION OF THE SOLUBILITY OF ETHENE IN AQUEOUS ELECTROLYTE SOLUTIONS.

The solubility of a gas in an aqueous electrolyte solution often approximates the behavior pointed out by Sechenov over 100 years ago. It obeys the equation, $(1/c_2)\log(S^0/S) = k_{scc}$, where S^0 , S represent the solubility of the gas in pure water and in the aqueous electrolyte solution, respectively, c_2 is the concentration of the electrolyte, and k_{scc} , the Sechenov salt effect parameter when both the gas and electrolyte concentrations are in volume units.

Other gas and electrolyte measures lead to slightly different values of the salt effect parameter. The commonly used forms are:

 $\begin{aligned} &k_{scc}/L \ \text{mol}^{-1} = (1/(c_2/\text{mol} \ \text{L}^{-1})) \ \log \ (c_1^{9}/\text{mol} \ \text{L}^{-1})/(c_1/\text{mol} \ \text{L}^{-1}) \\ &k_{smm}/\text{kg} \ \text{mol}^{-1} = (1/(m_2/\text{mol} \ \text{kg}^{-1})) \ \log \ (m_1^{9}/\text{mol} \ \text{kg}^{-1})/(m_1/\text{mol} \ \text{kg}^{-1}) \\ &k_{scx}/L \ \text{mol}^{-1} = (1/(c_2/\text{mol} \ \text{L}^{-1})) \ \log \ (x_1^{9}/x_1) \end{aligned}$

 $k_{cmx}/kg \text{ mol}^{-1} = (1/(m_2/mol kg^{-1})) \log (x_1^2/x_1)$

where subscript 1 represents the non-electrolyte gas and subscript 2 the electrolyte.

The gas solubility ratio in pure water and electrolyte solution, c_1^0/c_1 will be numerically the same using the Bunsen coefficient ratio, α^0/α , or the Ostwald coefficient ratio, L^0/L , as well as the mol L^{-1} ratio. The molality ratio, m_1^0/m_1 , is the same as the Kuenen coefficient ratio, S^0/S , or the solvomolaity ratio, A^0/A . The mole fraction ratio, x^0/x , is the same as the inverse Henry's constant ratio, H/H^0 , when the Henry's constant is of the form, $(H/kPa) = (p_1/kPa)/x_1$. The gas mol fractions are usually calculated treating each electrolyte ion as an entity. A more detailed description of these units and the interconversions among them is in Solubility Series volume 10, NITROGEN, pp. xxix - xliii.

A useful graphical test of salt effect data of either a particular worker or to compare different workers data is to put the Sechenov equation in the form:

 $\log s = \log s^{\circ} - k_s c_2$

and plot log s vs. c_2 , the linear slope will be the negative of the salt effect parameter in what ever set of units is used for s and c_2 . Several such figures follow in this evaluation.

Two groups of workers have measured the solubility of ethene in several of the same aqueous electrolyte solutions. Unfortunately the two report values of the solubility of ethene in water at 298 K which differ by 2.6 percent. The difference makes for some difficulty in comparing their results by a plot of log L vs. c_2 as we have used here. There are data on 18 single electrolyte systems and 8 systems containing mixtures of two or three electrolytes. In general the data for ethene solubility in aqueous electrolyte solutions show better consistency than the data

for less soluble gases reviewed in previous Solubility Series volumes.

Many workers use electrolyte ionic strength instead of volume concentration, and the salt effect parameter is given in electrolyte ionic strength. There are valid reasons to do this; however, we have used the electrolyte volume concentration in all of the single electrolyte solutions evaluations. The conversion to ionic strength basis requires dividing our result by the small whole number of one for 1-1 electrolytes, three for 1-2 and 2-1 electrolytes, four for 2-2 electrolytes and six for 1-3 and 3-1 electrolytes. The solubilities in the mixed electrolyte solutions are plotted as a function of ionic strength. The salt effect parameters in ionic strength are symbolized $k_{sl(c)c}$ and $k_{sl(m)m}$ for ionic strength in volume concentration and molality units, respectively.

The systems containing a single electrolyte are given in the order of the standard arrangement for inorganic compounds used by the U. S. National Institute of Science and Technology. The number before each system is the standard order number for the electrolyte cation.

I. Systems with a single electrolyte component.

There are problems with ethene that one does not see with less reactive or inert gases. Ethene may form complexes with some cations, e.g. silver, and the reaction of ethene with water may be catalyzed by certain cations, e.g. mercury. With the exception of silver nitrate we do not believe this to be a problem with the systems and temperatures reviewed here.

2(1) Ethene + Hydrochloric acid [7647-01-0] + Water

Yano, Suetaka, Umehara and Horiuchi (7) measured the solubility of ethene in water and four concentrations of HCl up to 1.520 mol L⁻¹. Their data (fig 1A) shows a slope of -0.046 with a standard deviation of the slope of 0.003. Thus, we take as the tentative salt effect parameter, $k_{\rm sco} =$ 0.046 L mol⁻¹.

2(2) Ethene + Perchloric acid [7601-90-3] + Water

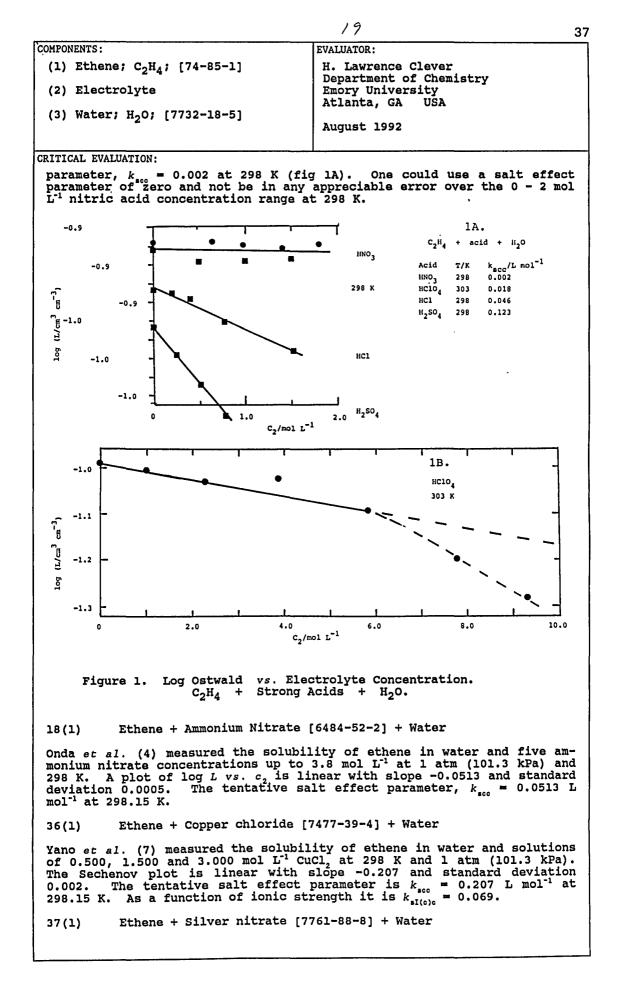
Purlee and Taft (3) measured the solubility of ethene in water and six perchloric acid solutions up to 9.36 mol L^{-1} at 303 K. We have converted their Henry's constants to Ostwald coefficients and the results are in figure 1B. There is little doubt the acid salts out more at concentrations greater than 6.0 mol L^{-1} perchloric acid than at lower concentrations. The slope of -0.018 fits the data well up to 6.0 mol L^{-1} if one treats the value at 3.90 mol L^{-1} as an error. The tentative value is $k_{\rm scc} = 0.018$ at 303.15 K.

2(3) Ethene + Sulfuric acid [7664-93-9] + Water

Yano *et al.* (7) measured the solubility of ethene in water and in sulfuric acid solutions of 0.258, 0.516 and 0.786 mol L^{-1} sulfuric acid at 298.15 K. The data are plotted in figure 1A. The slope of -0.123 with standard deviation of the slope of 0.002 gives the tentative salt effect parameter, $k_{acc} = 0.123$. In ionic strength this would be $k_{affect} = 0.041$.

2(4) Ethene + nitric acid [7697-37-2] + Water

Both Yano, Suetaka, Umehara and Horiuchi (7) and Onda, Sada, Kobayashi, Kito and Ito (5) have studied this system at 298.15 K and 1 atm up to 1.81 mol L^{-1} nitric acid. Although their solubility values differ by only 2 - 3 percent, statistically their data do not accord well. The Onda *et al.* data has a slope of -0.003 with a standard deviation of 0.002, the Yano *et al.* data has a slope of -0.004 with a standard deviation of 0.004, and the combined data set has a slope of -0.002 with a standard deviation of 0.005. We choose as the tentative salt effect



Clever, Baker and Hale (6) measured the solubility of ethene in dilute silver nitrate solution at 303.15 K and 95.75 kPa partial pressure. The system appears to strongly salt in because of formation of a silver-ethene complex. No salt effect parameter was calculated. Instead the authors estimated the aqueous solution concentration of free ethene from the solubility in potassium nitrate solutions of the same concentration, and assumed the remainder of the ethene in solution was in the form of the silver complex. The data treatment gives an equilibrium constant, $K_{\rm man} = 76 \ {\rm L} \ {\rm mol}^{-1}$ for the reaction ${\rm Ag}^{+}({\rm ag}) + {\rm C}_{2}{\rm H}_{4}({\rm ag}) \Longrightarrow ({\rm C}_{2}{\rm H}_{4}){\rm Ag}^{+}({\rm ag})$.

76(1) Ethene + Lanthanum chloride [10099-58-8] + Water

Morrison and Billett (2) measured the solubility of ethene in water and in 1.0 mol kg^{-1} LaCl₃ solutions at temperatures of 285.75, 303.15, 322.45 and 344.85 K. They did not report the solubility in the lanthanum chloride solution, but gave the salt effect parameters. They are:

T/K	285.75	303.15	322.55	344.85
$k_{\rm m}/{\rm kg~mol^{-1}}$	0.336	0.300	0.315	0.285
$k_{\rm amm}/{\rm kg \ mol^{-1}}$ $k_{\rm sI(m)m}$	0.056	0.050	0.053	0.048

One would expect a steady decrease in the salt effect parameter as temperature increases, thus one must question the values at 303.15 and 322.55 K which show the opposite trend. The results are classed as tentative, but use with caution.

96(1) Ethene + Barium chloride [14832-99-6] + Water

Onda *et al.* (4) measured the solubility of ethene in water and at nine concentrations of BaCl₂ up to 1.741 mol L⁻¹ at 298.15 K and 1 atm (101.3 kPa) partial pressure. The Sechenov plot is linear with slope -0.273 and standard deviation 0.003. The tentative salt effect parameter is $k_{\rm acc} = 0.273$ L mol⁻¹ and in ionic strength $k_{\rm allche} = 0.091$.

98(1) Ethene + Lithium chloride [7447-41-8] + Water

Morrison and Billett (2) measured the solubility of ethene in pure water and in 1 molal LiCl solutions at four temperatures. They report the solubility in water and the salt effect parameter in molal units. Yano et al. (7) report the ethene solubility at concentrations of 0.500, 1.000 and 1.500 mol L^{-1} LiCl at 298.15 K. The Sechenov plot of their data is linear with slope -0.119 and standard deviation 0.006. The Morrison and Billett results were converted by the evaluator to volume units and are compared with the Yano et al. results below.

T/K	285.75	298.15	303.15	322.55	344.85
$k_{\rm mol}/{\rm L} {\rm mol}^{-1}$	0.114	0.119	0.099	0.093	0.092
$k_{\rm m}/{\rm kg~mol^{-1}}$	0.104	0.108	0.089	0.082	0.083
$k_{acc} / L mol^{-1}$ $k_{acc} / kg mol^{-1}$ $k_{acc} / kg mol^{-1}$	0.119	0.123	0.104	0.097	0.098

The two groups did not report any results at a common temperature. Their results do not lie on a smooth curve as a function of temperature. The Yano *et al.* value is based on more measurements so might be considered more reliable, but their data do scatter as shown by a standard deviation that is 5 per cent of the slope.

99(1) Ethene + Sodium chloride [7647-18-5] + Water

Onda et al. (4) measured the solubility of ethene in pure water and in seven NaCl solutions ranging up to 4.224 mol L^{-1} at 298.15 K, Yano et al. (7) measured the solubility in water and in three NaCl solutions up to 1.500 mol L^{-1} at 298.15 K and Morrison and Billett (2) measured the solubility in water and in 1 molal NaCl at temperatures of 285.75, 303.15, 322.55 and 344.85 K. The Sechenov plot of the Onda et al. data was linear with slope -0.139 and standard deviation 0.001, the Yano et al. data was linear and of slope 0.154 and standard deviation 0.003, the combined data set was linear with slope 0.137 and standard deviation 0.003. The evaluator has arbitrarily chosen the Onda et al. slope to represent the salt effect parameter (fig 2). The Morrison and Billett values were converted to volume units and are compared in the table below. Other representations of the salt effect parameter are also compared.

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39 COMPONENTS: EVALUATOR: (1) Ethene; C₂H₄; [74-85-1] H. Lawrence Clever Department of Chemistry (2) Electrolyte Emory University USA Atlanta, GA (3) Water; H₂O; [7732-18-5] August 1992 CRITICAL EVALUATION: 285.75 298.15 303.15 322.55 344.85 T/K $k_{\rm sco}$ /L mol⁻¹ $k_{\rm sum}$ /kg mol⁻¹ 0.150 0.123 0.139 0.138 0.114 0.140 0.127 0.114 0.101 kamx /kg mol-1 0.155 0.142 0.129 0.116 The agreement among the data sets is reasonable and the salt effect parameters are classed as tentative. -0.8 C_2H_4 + NaCl + H₂O -0.9 Onda, Sada, Kobayahi, Kito, Ito, 1970 Yano, Suetaka, Umehara, Horiuchi, 1974 285.8 K Morrison, Billett, 1952 Values except 298.2 K -1.0 k_{scc}/L mol⁻¹. T/K 298.2 K 285.8 298.2 303.2 322.6 0.150 0.139 0.138 -1.1 303.2 0.123 344.9 0.114 с<mark>н</mark>_1 -1.2 322.6 K (L/CB³ 344.9 K ş -1.3 -1.4 -1.5 3.0 4.0 2.0 0 1.0 C2/mol L⁻¹ NaCl Concentration at Several Tempera-Log Ostwald vs. Figure 2. tures. The Morrison and Billett (2) lines are based on only two points, the solubility in water and in one mol L⁻¹ NaCl (The compiler converted the author's molality value). Ethene + Sodium bromide [7647-15-6] + Water 99(2) Yano *et al.* (7) measured the solubility of ethene in water and at 0.500, 1.000 and 1.500 mol L^{-1} NaBr at 298.15 K and 1 atm (101.3 kPa) partial pressure. The Sechenov plot is linear with a slope of -0.132 and standard deviation Of 0.002. The tentative salt effect parameter is k_{acc} $= 0.132 \text{ Lmol}^{-1}$

Ethene + Sodium sulfite [7757-83-7] + Water 99(3)

Two groups report data on this system. Onda *et al.* (4) report the solubility of ethene in water and five solutions up to 0.818 mol L^{-1} Na₂SO₃ at 298.15 K and 1 atm (101.3 kPa) partial pressure. The Sechenov plot is linear with slope -0.353 and standard deviation 0.013. Yano *et al.* (7) report the ethene solubility in water and three solutions up to 1.500 mol L^{-1} Na₂SO₃. The Sechenov plot is linear with slope -0.416 and standard deviation 0.002. The combined data sets have a slope of -0.416 and a standard deviation 0.002. We have made the arbitrary decision to average the slopes of the two groups giving a weight of one to the slope of larger standard deviation and a weight of two to the other slope. Thus, the tentative salt effect parameter becomes $k_{givener} = 0.395$ L mol⁻¹. In terms of ionic strength this would be $k_{gi(c)e} = 0.132$.

99(4) Ethene + Sodium sulfate [7732-18-5] + Water

Onda *et al.* (4) measured the solubility in water and five solutions up to 1.139 mol L⁻¹ Na₂SO₄ at 298.15 K and 1 atm (101.3 kPa) partial pressure ethene. The Sechenov plot is linear with slope -0.394 and a standard deviation of 0.004. The tentative salt effect parameter is $k_{sco} = 0.394$ L mol⁻¹ and in ionic strength its $k_{sl(c)c} = 0.132$.

100(1) Ethene + Potassium chloride [7747-40-7] + Water

Yano *et al.* (7) measured the solubility of ethene in water and in 0.500, 1.000 and 1.500 mol L^{-1} KCl at 298.15 K at 1 atm (101.3 kPa) partial pressure. The Sechenov plot is linear with slope -0.136 and standard deviation 0.001. The tentative salt effect parameter is $k_{\rm scc} = 0.136$ L mol⁻¹.

100(2) Ethene + Potassium bromide [7758-02-3] + Water

Yano *et al.* (7) measured the solubility of ethene in water and in 0.500, 1.000 and 1.500 mol L^{-1} KBr at 298.15 K at 1 atm (101.3 kPa) partial pressure. The Sechenov plot is linear with slope -0.118 and standard deviation 0.002. The tentative salt effect parameter is $k_{\rm scc} = 0.118$ L mol⁻¹.

100(3) Ethene + Potassium iodide [7681-11-0] + Water

Morrison and Billett (2) measured the solubility of ethene in water and in 1 mol kg⁻¹ KI at four temperatures. They report only the solubility in water and the salt effect parameter k_{m} . The evaluator has converted the author's parameter to volume and mole fraction units. The results are summarized below. The 298.15 K values were interpolated from the author's data by the evaluator.

T/K	285.75	298.15	303.15	322.25	344.85
$k_{\rm mol}/{\rm L} {\rm mol}^{-1}$	0.093	0.088	0.085	0.072	0.060
$k_{m}^{m}/kg \text{ mol}^{-1}$	0.070	0.064	0.061	0.050	0.036
$k_{acc} / L \text{ mol}^{-1}$ $k_{acm} / kg \text{ mol}^{-1}$ $k_{amr} / kg \text{ mol}^{-1}$	0.085	0.079	0.076	0.065	0.051

The values are classed as tentative.

100(4) Ethene + Potassium nitrate [7757-79-1] + Water

Clever, Baker and Hale (6) measured the solubility of ethene in water and aqueous KNO₃ at six concentrations up to 1.080 mol L^{-1} . Four of the measurements were made at concentrations of 0.115 mol L^{-1} or less. They show a much larger than normal salting out. Similar claims for unusual salt effects at low salt concentrations have been made by others, see SDS Oxygen volume (v. 10) salt effect evaluation for several examples. So far none of these claims have been substantiated. The unusual effect may be true, but for the present we suspect some systematic error. A small error in the solubility can cause a large error in the salt effect parameter at low salt concentrations. The solubility in water and in the 1.080 mol L^{-1} KNO₃ solution give a salt effect parameter of 0.133. It is a doubtful value.

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II. Systems with multi-electrolyte components

These systems have been studied as a function of total ionic strength. In most of the systems a constant mole ratio between or among the electrolytes components is maintained at each total ionic strength. The evaluator has used the single electrolyte "ionic strength" salt effect

COMPONENTS:	EVALUATOR:
(1) Ethene; C ₂ H ₄ ; [74-85-1]	H. Lawrence Clever Department of Chemistry
(2) Electrolyte	Emory University Atlanta, GA 30322
(3) Water; H ₂ O; [7732-18-5]	August 1992

CRITICAL EVALUATION:

parameters to predict the mixed electrolyte parameter. The sum of the fraction of ionic strength from each electrolyte times its ionic strength salt effect parameter is the predicted salt effect parameter for the mixed electrolyte.

Ethene + Nitric acid [7697-37-2] + Sodium chloride [7647-14-5] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in four solutions containing a NaCl/HNO₃ ionic strength ratio of 0.615/0.385. A Sechenov plot of log L vs. I (I = ionic strength, mol L^{-1}) is linear and of slope -0.083 and standard deviation 0.003 (fig 3, line 2). The predicted salt effect parameter is (0.615)(0.139) + (0.385)(0.002) = 0.086 which is within a standard deviation of the observed constant. The data are classed as tentative.

Ethene + Ammonium Nitrate [6484-52-2] + Sodium chloride [7647-14-5] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in four solutions containing NaCl/NH₄NO₃ at an ionic strength ratio of 0.482/0.518. A Sechenov plot of log L vs. I (I = ionic strength, molality) is linear and of slope -0.090 and standard deviation 0.0009 (fig 3, line 3). The predicted salt effect parameter is (0.482)(0.139) + (0.518)(0.051) = 0.094 which is within 5 percent of the observed constant. The data are classed as tentative.

Ethene + Ammonium nitrate [6484-52-2] + Barium chloride [14832-99-6] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in four solutions containing $BaCl_2/NH_4NO_3$ at an ionic strength ratio of 0.540/0.460. A Sechenov plot of log L vs. I (I = ionic strength, mol L⁻¹) is linear and of slope -0.078 and standard deviation 0.005 (fig 3, line 1). The predicted salt effect parameter is (0.540)(0.091) + (0.460)(0.051) = 0.072 which is just over one standard deviation of the observed constant. The data are classed as tentative.

Ethene + Ammonium nitrate [6484-52-2] + Barium chloride [14832-99-6] + Sodium chloride [7647-14-5] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in four solutions containing $NH_4NO_3/BaCl_2/NaCl$ at an ionic strength ratio of 0.333/0.333/0.333. A Sechenov plot of log L vs. I (I = ionic strength, mol L⁻¹) is linear and of slope -0.089 and standard deviation 0.002 (fig 3, line 5). The predicted salt effect parameter is (0.333)(0.051) + (0.333)(0.091) + (0.333)(0.139) = 0.094 which is 5.6 percent larger than the observed constant. The data are classed as tentative.

Ethene + Sulfuric acid [7664-93-9] + Sodium sulfate [7757-82-6] + Water

Kobe and Kenton (1) report one measurement of the solubility of ethene in a mixture of 0.90 molal H_2SO_4 and 1.76 molal Na_2SO_4 . The solution has a total ionic strength of 7.98 in molal units. The evaluator used an accepted solubility in water to calculate an ionic strength salt effect parameter, $k_{sI(m)m} = 0.088$. The value is classed tentative.

Ethene + Ammonium nitrate [6484-52-2] + Sodium sulfate [7757-82-6] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in seven solutions containing NH_4NO_3/Na_2SO_4 at an ionic strength ratio of 0.613/0.387. A Sechenov plot of log L vs. I (I = ionic

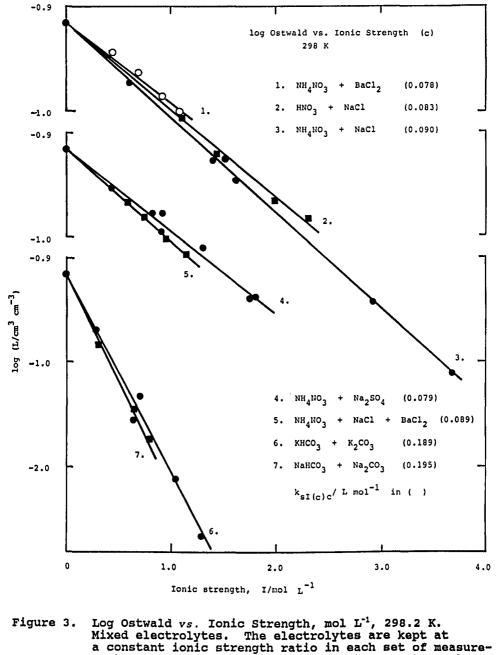
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strength, mol L^{-1} is linear and of slope -0.079 and standard deviation 0.004 (fig 3, line 4). The predicted salt effect parameter is (0.613)(0.051) + (0.387)(0.132) = 0.082 which is within one standard deviation of the observed constant. The data are classed as tentative.

Ethene + Sodium hydrogen carbonate [144-55-8] + Sodium carbonate [497-19-8] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in three solutions containing $NaHCO_3/Na_2CO_3$ at an ionic strength ratio of 0.822/0.178. A Sechenov plot of log L vs. I (I = ionic strength, mol L⁻¹) is linear and of slope -0.195 and standard deviation 0.008 (fig 3, line 7). The single electrolyte salt effect parameters are not available to predict the constant. The result is classed as tentative.



a constant ionic strength ratio in each set of measurments. In most cases the salt effect parameter calculated from the individual electrolyte parameters is within a standard deviation of the experimental parameter for the mixed electrolyte.

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COMPONENTS:	EVALUATOR:
(1) Ethene; C ₂ H ₄ ; [74-85-1]	H. Lawrence Clever Department of Chemistry
(2) Electrolyte	Emory University Atlanta, GA 30322
(3) Water; H ₂ O; [7732-18-5]	August 1992

CRITICAL EVALUATION:

Ethene + Potassium hydrogen carbonate [298-14-6] + Potassium carbonate [584-08-7] + Water

Onda, Sada, Kobayashi, Kito and Ito (5) measured the solubility of ethene in water and in five solutions containing $KHCO_3/K_2CO_3$ at an ionic strength ratio of 0.834/0.166. A Sechenov plot of log L vs. I (I = ionic strength, mol L^{-1}) is linear and of slope -0.189 and standard deviation 0.011 (fig 3, line 6). The single electrolyte salt effect parameters are not available to predict the constant. The result is classed as tentative.

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- Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A. Kagaku Kogaku <u>1974</u>, 38, 320-23.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A.
 Hydrochloric acid, nitric acid or sulfuric acid 	Kagaku Kogaku,
3. Water; H ₂ O; [7732-18-5]	<u>1974</u> , 38, 320-323.
VARIABLES:	PREPARED BY:
T/K = 298.15	C. L. Young
P/kPa = 101.3 EXPERIMENTAL VALUES:	<u></u>
EXPERIMENTAL VALUES:	
Concentration of electrolyte /mol L ⁻¹	Solubility of ethene /mmol L ⁻¹
Hydrochloric acid; HCl; [7647-01-0)]
0.000 0.200	4.83 4.79
0.400 0.770	4.72 4.46
1.520	4.15
Nitric acid; HNO ₃ ; [7697-37-2]	
0.500 1.061	4.72 4.72
1.520	4.75
Sulfuric acid; H ₂ SO ₄ ; [7664-93-9]	
0.258	4.51 4.19
0.516 0.786	3.87
AUXILIARY I	NFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred	1. High purity sample, purity better than 99.5 mole per cent.
absorption chamber. Pressure within absorption chamber adjusted	2. Special grade.
to be as near atmospheric pressure as possible. Details in source	3. Distilled.
and ref. 1.	
	ESTIMATED ERROR:
	Solubility = ±2% (Compiler)
	REFERENCES:
	 Yano, T.; Suetaka, T.; Umehara, T.
	Nippon Kagaku Kaishi
	<u>1972</u> , <i>11</i> , 2194.

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COMPONENTS :	ORIGINAL MEASUREMENTS:	
<pre>1. Ethene, (Ethylene); C₂H₄; [74-85-1]</pre>	Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K.	
2. Nitric acid; HNO3; [7697-37-2]	J. Chem. Eng. Jpn. <u>1970</u> , 3, 137-142.	
3. Water; H ₂ O; [7732-18-5]		
VARIABLES: 200 15	PREPARED BY:	
T/K = 298.15	C.L. Young	
<i>P/</i> kPa = 101.3		
EXPERIMENTAL VALUES:		
T/K Concentration I of nitric acid / mol 1 ⁻¹	onic Strength [*] Bunsen coefficient, [*] / mol l ⁻¹ α	
298.15 0.646	0.646 0.1114	
0.657	0.657 0.1113	
0.979	0.979 0.1103	
1.408 1.810	1.408 0.1096 1.810 0.1105	
* quoted in origin	hal paper.	
Pressure = 1 at	nosphere = $1.01325 \times 10^5 Pa$.	
AUXILIARY	INFORMATION	
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
Concentrated solution prepared by weighing, less concentrated solutions	 Commercial sample, purity 99.6 mole per cent. 	
prepared by subsequent dilution. Concentration of acid estimated by	2. Analytical grade sample.	
titration. Equilibrium established between a measured volume of gas	3. No details given.	
and a measured amount of gas-free		
liquid in a cell fitted with a magnetic stirrer. Amount of gas		
absorbed estimated from change in volume of gas. Details in source		
and ref. (1).	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.2; \delta \alpha = \pm 2 \Im.$	
	(estimated by compiler).	
	DETERPENCIO	
	REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, Y.	
	\mathbf{I} $\mathbf{A} \mathbf{L} \mathbf{U}_{\mathbf{J}} \mathbf{D}_{\mathbf{J}} \mathbf{J} \mathbf{L} \mathbf{U}_{\mathbf{J}} \mathbf{I}_{\mathbf{J}}$	
	J. Chem. Eng. Jpn. <u>1970</u> , 3, 18.	
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	1	

46	25		
COMPONENTS:	OMPONENTS:		ORIGINAL MEASUREMENTS:
1. Ethen	e; C ₂ H ₄ ; [74-85-1]	Purlee, E.L.; Taft, R.W.
2. Perch	loric acid	; HClO ₄ ;	J. Amer. Chem. Soc. <u>1956</u> , 78,
	-90-3]		5811-5812.
3. Water	; H ₂ O; [77	32-18-5]	
VARIABLES:	T/K = 303.		PREPARED BY:
P/kPa = 101.325 $M_{y}/moles/1 = 0-9.36$			W. Hayduk
EXPERIMENTA	L VALUES.		l
		Perchloric acid	
t/C	T/K	in Water <i>W/</i> mass% <i>M₂/mol</i>	dm^{-3} Inverse of Henry's Constant $10^3 h / mol$ (1 atm) ⁻¹
30.0	303.15	0.0 0.	0 4.11
		9.75 1.	027 3.97
		20.80 2.	34 3.74
		32.01 3.	90 3.79
		43.60 5.	85 3.24
		53.73 7.	80 2.54
		60.71 9.	36 2.10
	. <u></u>	AUXILIARY	INFORMATION
METHOD/APPA	RATUS / PROCED	URE:	SOURCE AND PURITY OF MATERIALS:
	n ³ glass fl		1. Ethene was from Matheson,
manomete	er by means	essure-measuring s of a horizon-	purity 99.5%.
spiral t		ted the flask to	2. Perchloric acid was from Baker and was the CP grade.
to 2 cm	for equili		
in the f	lask. The	n³) was deaerated e change in	
		n volume of gas which the solu-	
	was determi of the appa	ned. The total ratus was	ESTIMATED ERROR.
initial	ly determin	ed by weighing ed with distilled	ESTIMATED ERROR: $\delta T / K = \pm 0.01$
water.	The "distr		$\delta h / h = \pm 0.02$
pressure	es below 10	1.325 kPa. .n reference 1.	REFERENCES :
	resetined 1	.n terefence I.	1. Levy, J.B.; Taft, R.W.; Aaron, D.; Hammett, L.P.
1			J. Amer. Chem. Soc. <u>1951</u> ,73,
			3792.

COMPONENTS :	ORIGINAL MEASUREMENTS:	4
(1) Ethene or ethylene; C_2H_4 ;	Morrison, T. J.; B	
[74-85-1] 2 4 (2) Lanthanum chloride; LaCl ₃ ;	J. Chem. Soc. <u>1952</u>	, 3819 - 3822.
<pre>[10099-58-8] (3) Water; H₂O; [7732-18-5]</pre>		
••		
VARIABLES: T/K: 285.75 - 344.85 P/kPa: 101.325 (l atm)	PREPARED BY: H. L. C	lever
EXPERIMENTAL VALUES:	- A	
Temperature	Salt Effect Param	
$\frac{t/^{\circ}C}{T/K} \frac{1}{T/K} \frac{1}{T/K} \frac{1}{c} \log(S^{\circ})$		
12.6285.750.00350.11230.0303.150.00330.100	0.336 0.300	0.359 0.323
49.4 322.55 0.0031 0.105.		0.338
71.7 344.85 0.0029 0.095	0.285	0.308
¹ For the 1-3 electrolyte the compi- m ₂ /mol kg ⁻¹ in the salt effect par	ler changed to m = c rameter.	:/3 for
Note that the first salt effect para	meter above uses the	rameter using the e author's notation would be better
Note that the first salt effect parameter with c in gram equivalents per kg wa represented as $m_2((1/3)LaCl_3)/mol kg$ would have been better if the author parameter in terms of moles of LaCl ₃	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mo had expressed the s	e author's notation would be better ol kg ⁻¹ , that is, i salt effect
Note that the first salt effect parameters with c in gram equivalents per kg warepresented as $m_2((1/3)LaCl_3)/mol kg$ would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water.	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mo had expressed the s	e author's notation would be better ol kg ⁻¹ , that is, i salt effect
Note that the first salt effect parameter in gram equivalents per kg was represented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water.	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mc had expressed the s per kg water rather INFORMATION SOURCE AND PURITY OF N	e author's notation would be better ol kg ⁻¹ , that is, i salt effect than equivalents
Note that the first salt effect parameter in gram equivalents per kg was represented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARMETHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mc had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa	e author's notation would be better ol kg ⁻¹ , that is, i salt effect than equivalents MATERIALS: ared from ethanol
Note that the first salt effect parameter in gram equivalents per kg warepresented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARMETHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix containing the ethene gas plus solvent vapor at a total pressure of one	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mo had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric (2) Lanthanum chlo	A author's notation would be better ol kg ⁻¹ , that is, i salt effect than equivalents MATERIALS: ared from ethanol acid.
Note that the first salt effect parameter in gram equivalents per kg warepresented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARY METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mo had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric	e author's notation would be better ol kg ⁻¹ , that is, i salt effect than equivalents "ATERIALS: ared from ethanol acid. oride. "AnalaR"
Note that the first salt effect parameter in gram equivalents per kg warepresented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARY METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solventy vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mc had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric (2) Lanthanum chlomaterial.	e author's notation would be better ol kg ⁻¹ , that is, i salt effect than equivalents "ATERIALS: ared from ethanol acid. oride. "AnalaR"
Note that the first salt effect parameter in gram equivalents per kg warepresented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARY METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mc had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric (2) Lanthanum chlomaterial.	e author's notation would be better ol kg ⁻¹ , that is, i salt effect than equivalents "ATERIALS: ared from ethanol acid. oride. "AnalaR"
Note that the first salt effect parameter in gram equivalents per kg warepresented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARY METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solventy vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mc had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric (2) Lanthanum chlo material. (3) Water. No inf	Atternals: action of the second seco
mole fraction gas solubility ratio. Note that the first salt effect paramination of the first salt effect paramination of the sentence of the	<pre>ter. The author's c -1 = 3 m₂(LaCl₃)/mc had expressed the s per kg water rather INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric (2) Lanthanum chlo material. (3) Water. No inf ESTIMATED ERROR:</pre>	Atternals: action of the second seco
Note that the first salt effect parameter in gram equivalents per kg warepresented as m ₂ ((1/3)LaCl ₃)/mol kg would have been better if the author parameter in terms of moles of LaCl ₃ of LaCl ₃ per kg water. AUXILIARY METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solventy vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached	ter. The author's c -1 = 3 m ₂ (LaCl ₃)/mc had expressed the s per kg water rather (INFORMATION SOURCE AND PURITY OF M (1) Ethene. Prepa and phosphoric (2) Lanthanum chlo material. (3) Water. No inf ESTIMATED ERROR:	A author's notation would be better of kg ⁻¹ , that is, i salt effect than equivalents ATTERIALS: ared from ethanol acid. oride. "AnalaR" formation given. 0.010

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C_2H_4 ; [74-85-1]	Morrison, T. J.; Billett, F.
(2) Lithium chloride; LiCl; [7447-41-8]	J. Chem. Soc. <u>1952</u> , 3819 - 3822.
(3) Water; H ₂ O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K: 285.75 - 344.85 p/kPa: 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	L
Temperature	Salt Effect Parameters
$t/^{\circ}C$ T/K $1/(T/K)$ $(1/m)$	$\frac{(1/m_2)\log(s^{\circ}/s)^1}{(1/m_2)\log(x^{\circ}/x)}$
12.6 285.75 0.0035	0.104 0.119
30.0 303.15 0.0033 49.4 322.55 0.0031	0.089 0.104 0.082 0.097
71.7 344.85 0.0029	0.083 0.098
water. For the 1-1 electrolyte the m2/mol kg ⁻¹ . The ethene solubility The salt effect parameters were calcu	lated from two measurements. The and in the one molal salt solution, S. n water, and the value of the salt er. The solubility values in the
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent flows in a thin	(1) Ethene. Prepared from ethanol
film down an absorption helix con- taining the ethene gas plus solvent	and phosphoric acid.
vapor at a total pressure of one	(2) Lithium chloride. "AnalaR"
atmosphere. The volume of gas absorbed is measured in an attached	material.
buret system (1).	(3) Water. No information given.
	ESTIMATED ERROR:
	$\delta k/kg^{-1}$ mol = 0.010
×	
	REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033.
	l

COMPONENTS: 1. Ethene, (Ethylene); C ₂ H ₄ ;		
1. Ethene, (Ethylene); C ₂ H _k ;	ORI	GINAL MEASUREMENTS:
[74-85-1]	. Ethene, (Ethylene); C ₂ H ₄ ; Onda, K.; Sada, E.; Kobayashi [74-85-1] Kito, S.; Ito, K.	
2. Sodium chloride; NaCl; [7647-	-14-5] J.	Chem. Eng. Jpn. <u>1970</u> , 3, 18-24.
3. Water; H ₂ O; [7732-18-5]		
VARIABLES:	PRE	PARED BY:
T/K = 298.15 P/kPa = 101.3		C.L. Young.
		·
EXPERIMENTAL VALUES:		
T/K Co	onc. of s / mol l	
298.15 Pressure = :	0.524 1.123 1.538 2.170 2.619 3.805 4.224 1 atmosph	$\begin{array}{r} 0.0925\\ 0.0759\\ 0.0674\\ 0.0552\\ 0.0467\\ 0.0331\\ 0.0284\\ \end{array}$ here = 1.01325 x 10 ⁵ Pa.
AUX	ILIARY INF	ORMATION
AUX METHOD /APPARATUS / PROCEDURE :		ORMATION JRCE AND PURITY OF MATERIALS:
	sol l. hed s 2. ee 3. s	URCE AND PURITY OF MATERIALS: Commercial sample, minimum purity 99.6 mole per cent.

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COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	Morrison, T. J.; Billett, F.
(2) Sodium chloride; NaCl; [7647-14-5]	J. Chem. Soc. <u>1952</u> , 3819 - 3822.
(3) Water; H ₂ O; [7732-18-5]	
VARIABLES: T/K: 285.75 - 344.85 p/kPa: 101.325 (1 atm)	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	I
	Salt Effect Parameters
$\frac{t/^{\circ}C}{2} \xrightarrow{T/K} \frac{1/(T/K)}{2} \frac{1/m}{2}$	$(1/m_2) \log (s^{\circ}/s)^1$ $(1/m_2) \log (x^{\circ}/x)$
12.6 285.75 0.0035	0.140 0.155
30.0 303.15 0.0033 49.4 322.55 0.0031	0.127 0.142 0.114 0.129
	0.114 0.129
······································	
¹ The authors used (1/c)log(S°/S) wi water. For the 1-1 electrolyte th m ₂ /mol kg ⁻¹ . The ethene solubilit	th c defined as g eq salt per kg of e compiler changed the c to an m for y S is cm^3 (STP) kg ⁻¹ .
The salt effect parameters were calcu solubility of ethene in water, S°, Only the solubility of the ethene i effect parameter are given in the pap salt solution are not given. The compiler calculated the values of mole fraction gas solubility ratio.	and in the one molal salt solution,S. n water, and the value of the salt er. The solubility values in the
	INFORMATION
METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	 SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared from ethanol and phosphoric acid. (2) Sodium chloride. "AnalaR" material. (3) Water. No information given.
	ESTIMATED ERROR: δk/kg ⁻¹ mol = 0.010 REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C_2H_4 ; [74-85-1]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A.
2. Lithium chloride, sodium chloride, sodium bromide or sodium sulfite	Kagaku Kogaku,
3. Water; H ₂ O; [7732-18-5]	<u>1974</u> , <i>38</i> , 320-323.
VARIABLES:	PREPARED BY:
T/K = 298.15 P/kPa = 101.3	C. L. Young
EXPERIMENTAL VALUES:	<u> </u>
Concentration of electrolyte /mol L ⁻¹	Solubility of ethene /mmol L ⁻¹
Lithium chloride; LiCl; [7447-41-8]	
0.000 0.500	4.83 4.29
1.000	4.29 3.75 3.20
Sodium chloride; NaCl; [7647-14-5]	5.20
0.500	4.01
1.000 1.500	3.41 2.83
Sodium bromide; NaBr; [7647-15-6]	
0.500 1.000	4.19 3.57
1.500	3.07
Sodium sulfite; Na ₂ SO ₃ ; [7757-83-7]	
0.500 1.000	3.02 1.87
1.500	3.07
AUXILIARY I	NFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred absorption chamber. Pressure	 High purity sample, purity better than 99.5 mole per cent.
within absorption chamber adjusted to be as near atmospheric pressure	2. Special grade.
as possible. Details in source and ref. 1.	3. Distilled.
	ESTIMATED ERROR:
	Solubility = ± 2 % (Compiler)
	REFERENCES:
	 Yano, T.; Suetaka, T.; Umehara, T.
	Nippon Kagaku Kaishi
	<u>1972</u> , <i>11</i> , 2194.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_{2}H_{4}$; [74-85-1]	Onda, K.; Sada, E.;Kobayashi, T.; Kito, S.; Ito, K.
 Ammonium nitrate, sodium sulfite or sodium sulfate 	J. Chem. Eng. Jpn.
3. Water; H ₂ O; [7732-18-5]	<u>1970</u> , 3, 18-24.
VARIABLES: T/K = 298.15	PREPARED BY:
P/kPa = 101.3	C. L. Young
EXPERIMENTAL VALUES:	
Concentration of salt /mol L ⁻¹	Bunsen coefficient, α
Nitric acid, ammonium salt (Ammonium	nitrate); NH ₄ NO ₃ ; [6484-52-2]
0.537 1.937 2.426 2.793 3.793	0.1050 0.0879 0.0839 0.0798 0.0713
Sulfurous acid, disodium salt (Sodiu	m sulfite); Na ₂ SO ₃ ; [7757-83-7]
0.141 0.267 0.455 0.747 0.818	0.1011 0.0932 0.0770 0.0600 0.0592
Sulfuric acid, disodium salt (Sodium	sulfate); Na ₂ SO ₄ ; [7757-82-6]
0.206 0.448 0.718 0.944 1.139	0.0916 0.0734 0.0587 0.0471 0.0392
AUXILIARY IN	FORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Solutions made up by weight and density measured but not reported in paper. Equilibrium established betweem a measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Details in source.	 Commercial sample, minimum purity 99.6 mole per cert. Analytical grade. Distilled and degassed.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.2; \delta \alpha = \pm 2$ %.
	(estimated by compiler) REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C_2H_4 ; [74-85-1]	Yano, T.; Suetaka, T.; Umehara, T.; Horiuchi, A.
 Potassium bromide, potassium chloride or copper chloride 	Kagaku Kogaku,
3. Water; H ₂ O; [7732-18-5]	<u>1974</u> , <i>38</i> , 320-323.
VARIABLES: T/K = 298.15	PREPARED BY:
P/kPa = 101.3	C. L. Young
EXPERIMENTAL VALUES:	
Concentration of electrolyte /mol L ⁻¹	Solubility of ethene /mmol L ⁻¹
Potassium bromide; KBr; [7758-02-3]	
0.000 0.500	4.83 4.24
1.000 1.500	3.71 3.21
Potassium choride; KCl; [7747-40-7]	
0.500 1.000	4.14 3.52
1.500	3.03
Copper chloride; CuCl ₂ ; [7477-39-4]	
0.500 1.000	3.73 2.33
3.000	1.15
AUXILIARY IN	VFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. Salt solution allowed to enter stirred	 High purity sample, purity better than 99.5 mole per cent.
absorption chamber. Pressure within absorption chamber adjusted	2. Special grade.
to be as near atmospheric pressure as possible. Details in source	3. Distilled.
and ref. 1.	
	ESTIMATED ERROR: Solubility = ±2% (Compiler)
	Solupility = 12% (Compiler)
	REFERENCES:
	 Yano, T.; Suetaka, T.; Umehara, T.
	Nippon Kagaku Kaishi
	<u>1972</u> , <i>11</i> , 2194.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	Morrison, T. J.; Billett, F.
(2) Potassium iodide; KI; [7681-11-0]	J. Chem. Soc. <u>1952</u> , 3819 - 3822.
(3) Water; H ₂ O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K: 285.75 - 344.85 p/kPa: 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	
Temperature	Salt Effect Parameters
$\frac{t/^{\circ}C}{T/K} = \frac{T/K}{T/K} = \frac{1/(T/K)}{(1/m)}$	$(1/m_2)\log(s^{\circ}/s)^{1}$ $(1/m_2)\log(x^{\circ}/x)$
12.6 285.75 0.0035	0.070 0.085
30.0 303.15 0.0033 49.4 322.55 0.0031	0.061 0.076 0.050 0.065
71.7 344.85 0.0029	0.036 0.051
water. For the 1-1 electrolyte th $m_2^{mol} kg^{-1}$. The ethene solubilit	
The salt effect parameters were calcu solubility of ethene in water, S°, Only the solubility of the ethene i effect parameter are given in the pap salt solution are not given.	and in the one molal salt solution, S. n water, and the value of the salt
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The degassed solvent flows in a thin film down an absorption helix con- taining the ethene gas plus solvent vapor at a total pressure of one atmosphere. The volume of gas absorbed is measured in an attached buret system (1).	 SOURCE AND PURITY OF MATERIALS; (1) Ethene. Prepared from ethanol and phosphoric acid. (2) Potassium iodide. "AnalaR" material. (3) Water. No information given.
	ESTIMATED ERROR: δk/kg ⁻¹ mol = 0.010 REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033.

COMPONENTS: (1) Ethene; C_2H_4 ; [74-85-1] (2) Potassium nitrate; KNO ₃ ; [7757-79-1] (3) Water; H_2O ; [7732-18-5] VARIABLES: T/T = 303.15 $p_1/kPa = 101.3$ $a_2/mol^2 dm^{-3} = 0 - 1.08$ EXPERIMENTAL VALUES: Temperature $t/^{0}C$ T/K^{a} $mol^{1} dm^{-3}$ $mol^{2} dm^{-3}$ 0 98.2 ± 0.5 (5) 0 98.2 ± 0.5 (5) 0 98.2 ± 0.5 (5) 0 98.2 ± 0.5 (2) 0 0.0084 96.2 0 0.0173 92.7 ± 1.0 (2) 4.17 0 0.2280 89.6 ± 3.0 (2) 4.03 0 1.096 0.115 84.2 ± 2.5 (3) 3.79 1.08 71.0 ± 1.6 (3) 3.19 1.383 a Calculated by the compiler. Molar volume STP, V/cm^{3} mol ⁻¹ = 22,246 b The solubility ratios give salt effect parameters, k_{goo}/dm^{3} mol ⁻¹ $(1/(a_2/mol dm^{-3})) \log (a_1^{0}/a_1)$, that range from 1.43 at low KNO ₃ concentration to 0.13 at high KNO ₃ concentration. The values at lo KNO ₃ concentrations should be used with caution. AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: SOURCE AND FURITY OF MATERIALS;	-
(2) Potassium nitrate; KNO ₃ ; [7757-79-1] (3) Water; H ₂ O; [7732-18-5] WARIABLES: $T/T = 303.15$ $p_1/(P_2 = 101.3)$ $\sigma_2/mol^2 dm^{-3} = 0 - 1.08$ Temperature Potassium Ethene Solubility at 101.3 kPa Solubility Ratio ^D $t/^{2}C$ T/K^{a} $\sigma_{2}/mol^{2} dm^{-3}$ $rot^{2} dm^{-3} dm$	-
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	-
VARIABLES: $T/T = 303.15$ $p_1/kPa = 101.3$ $c_2/mol^2 dm^{-3} = 0 - 1.08$ PREPARED BY: H. L. Clever Temperature Potassium Nitrate $c_2/c_2/c_2/c_1/c_1/c_2/c_1/c_1/c_2/c_1/c_1/c_2/c_1/c_1/c_2/c_1/c_1/c_1/c_2/c_1/c_1/c_1/c_2/c_1/c_1/c_1/c_1/c_1/c_1/c_1/c_1/c_1/c_1$	a
$\begin{array}{c} T/T = 303.15 \\ p_{1}/kPa = 101.3 \\ \sigma_{2}/mol \ dm^{-3} = 0 - 1.08 \end{array} \qquad H. L. Clever \\ \hline H. H. H. L. Clever \\ \hline H. H. H. H. H. L. Clever \\ \hline H. $	a
Temperature Potassium Ethene Solubility at 101.3 kPa Solubility Ratio $t/^{0}$ C T/K^{a} $Nitrate$ $c_{2/}$ $no1$ $no1^{-3}$ $l0^{3} c_{1/}$ $Ratio$ 30.0 303.15 0 98.2 ± 0.5 (5) 4.41 1.000 0.0084 96.2 10 4.32 1.021 0.0173 92.7 ± 1.0 (2) 4.17 1.059 0.0280 89.6 ± 3.0 (2) 4.03 1.096 0.115 84.2 ± 2.5 (3) 3.19 1.383 1.08 71.0 ± 1.6 3 3.19 1.383 a Calculated by the compiler. Molar volume STP, V/cm^{3} mol ⁻¹ = 22,246 b b The solubility ratios give salt effect parameters, k_{gcc}/dm^{3} mol ⁻¹ $(1/(c_{2}/mol dm^{-3}))$ $1og$ (c_{1}^{0}/c_{1}) , that range from 1.43 at low KNO ₃ concentration to 0.13 at high KNO ₃ concentration. The values at low KNO ₃ concentrations should be used with caution.	a
$\frac{t/^{0}C}{30.0} \frac{T/K^{a}}{30.0} \frac{Nitrate}{m01 \text{ dm}^{-3}} \frac{c_{1}^{1}/c_{1}}{cm^{3}(\text{STP}) \text{ cm}^{-3}} \frac{10^{3}c_{1}/c_{1}}{m01^{3} \text{ dm}^{-3} a} \frac{c_{1}^{0}/c_{1}}{m01^{3} (1 + 3 + 3$	a
$\frac{t/{}^{0}C}{30.0} \frac{T/K^{a}}{303.15} \frac{c_{2}}{m01} \frac{c_{1}}{dm^{-3}} \frac{c_{1}}{cm^{3}} (STP) cm^{-3}}{0} \frac{\frac{10^{3}c_{1}}{m01} \frac{dm^{-3}a}{dm^{-3}a}}{m01} \frac{c_{1}^{0}/c_{1}}{dm^{-3}a} \frac{c_{1}}{cn^{2}/c_{1}} \frac{dm^{-3}a}{dm^{-3}a} \frac{c_{1}}{dm^{-3}a}}{\frac{dm^{-3}}{m01} \frac{dm^{-3}a}{dm^{-3}a}} \frac{c_{1}}{dm^{-3}a} \frac{c_{1}}{dm^{-3}a}}{\frac{dm^{-3}}{m01} \frac{dm^{-3}a}{dm^{-3}a}} \frac{c_{1}}{dm^{-3}a} \frac{dm^{-3}}{dm^{-3}a} $	a
$\frac{0.0084 96.2 \qquad (1) \qquad 4.32 \qquad 1.021}{0.0173 92.7 \ \pm \ 1.0 \ (2) \qquad 4.17 \qquad 1.059} \\ 0.0280 89.6 \ \pm \ 3.0 \ (2) \qquad 4.03 \qquad 1.096 \\ 0.115 \qquad 84.2 \ \pm \ 2.5 \ (3) \qquad 3.79 \qquad 1.166 \\ 0.525 \qquad 73.0 \ \pm \ 5.2 \ (4) \qquad 3.28 \qquad 1.343 \\ 1.08 \qquad 71.0 \ \pm \ 1.6 \ (3) \qquad 3.19 \qquad 1.383 \\ \hline \\ \hline \\ \frac{a}{1.08} \qquad Calculated by the compiler. Molar volume STP, V/cm3 mol-1 = 22,246 \\ \hline \\ b The solubility ratios give salt effect parameters, k_{gcd}/dm^3 \ mol^{-1} \\ (1/(c_2/mol \ dm^{-3})) \ \log \ (c_1^0/c_1), \ that range \ from \ 1.43 \ at \ low \ KNO_3 \\ concentration \ to \ 0.13 \ at \ high \ KNO_3 \ concentration. \ The values \ at \ low \ KNO_3 \ concentrations \ should \ be used \ with \ caution. \\ \hline \\ \hline \\ AUXILIARY INFORMATION \ \hline \\ \hline$	a
^b The solubility ratios give salt effect parameters, $k_{gcc}/dm^3 mol^{-1}$ (1/($c_2/mol dm^{-3}$)) log (c_1^0/c_1), that range from 1.43 at low KNO ₃ concentration to 0.13 at high KNO ₃ concentration. The values at lo KNO ₃ concentrations should be used with caution. AUXILIARY INFORMATION	a
ETHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:	
The apparatus and method were similar to that described by Markham and Kobe (ref 1). (1) Ethene. Matheson Co., Inc. Stated to have 99.5 % minimu purity.	ım
Aqueous solutions of potassium nitrate were prepared, degassed by refuxing under reduced pressure, and (2) Potassium nitrate. Source no given. Reagent grade.	ot
transfered to the solubility appa- ratus without contact with atmos- pheric gases. The solubility of ethene at a total pressure of one	
atm (101.3 kPa) was measured by observing the volume of gas, satu- rated with water vapor, absorbed by an 88.5 cm ³ sample of degassed solu- tion at 30 °C. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta c_1/c_1 = \pm 0.01$	
The solubilities were calculated for one atm partial pressure ethene assuming Henry's law.	
	, 449

56 **COMPONENTS:** ORIGINAL MEASUREMENTS: Clever, H. L.; Baker, E. R.; Hale, W. R. (1) Ethene; C₂H₄; [74-85-1] (2) Silver nitrate; AgNO₃; [7761-88-8] J. Chem. Eng. Data 1970, 15, 411-3. (3) Water; H₂O; [7732-18-5] VARIABLES: PREPARED BY: T/K = 303.15 $p_1/kPa = 95.75$ $c_2/mol dm^{-3} = 0 - 0.0338$ H. L. Clever **EXPERIMENTAL VALUES:** Silver Ethene Solubility at 0.945 atm (95.75 kPa) Temperature Nitrate $10^{3}c_{7}/\text{mol dm}^{-3a}$ c_1/cm^3 (STP) dm^{-3} t/⁰C T/K^{a} $\frac{c_2}{\text{mol dm}^{-3}}$ 4.17 30.0 303.15 0 92.8 ± 0.5 (5) 0.0011 99.2 ± 0.2 (2) 4.46 104 ± 0.0 (2) 0.0028 4.68 ± 2.0 (2) 5.35 0.0056 119 149 ± 2.0 (2) 6.70 0.0113 0.0226 200 ± 2.0 (2) 8.99 10.88 0.0338 242 (1)a Calculated by the compiler. Molar volume STP, $V/cm^3 mol^{-1} = 22,246$ The numbers in () are the number of determinations. Henry's constant for pure water is $K_H = (p_1/kPa)/(c_1/mol dm^{-3}) = 23130$ $C_{2H_4}(aq, c_1) \neq C_{2H_4}(q, p_1)$ The authors combined the data above with other information to calculate the silver ion + ethene association constant $Ag^{+}(aq) + C_{2}H_{4}(aq) + C_{2}H_{4}-Ag^{+}(aq) = 76.$ AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS: The apparatus and method were (1) Ethene. Matheson Co., Inc. similar to that described by Markham Stated to have 99.5 % minimum and Kobe (ref 1). purity. Aqueous solutions of Silver nitrate (2) Silver nitrate. Reagent grade. were prepared, degassed by refluxing under vacuum, and transfered to the (3) Water. Distilled. solubility apparatus without contact with atmospheric gases. The solubility of ethene at a partial pressure of 0.945 atm (95.75 kPa) was measured by observing the volume of gas, saturated with water vapor, absorbed by an 88.5 cm³ sample of degassed solution at 30.0 °C and a ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta c_1 / c_1 = \pm 0.01$ total pressure of 1 atm (101.3 kPa). **REFERENCES:** 1. Markham, A. E.; Kobe, K. A. J. Am. Chem. Soc. <u>1941</u>, 63, 449.

					5
COMPONENTS :			ORIGINA	L MEASUREMENTS	5:
2. Nitric a 3. Sodium a	(Ethylene); C ₂ H ₄ acid; HNO ₃ ; [7697 chloride; NaCl; [H ₂ O; [7732-18-5]	-37-2]	Kito	, S.; Ito, H	
4. water;	H ₂ O; [7732-16-5]		J. C	nem. Eng. Jpi	n. <u>1970</u> , <i>3</i> , 137-142.
VARIABLES:			PREPARI	ED BY:	
	/K = 298.15			C.1	L. Young
P/K.	Pa = 101.3				,
EXPERIMENTAL V	VALUES:		L		
<i>Т/</i> К	Concentration ⁺ of sodium chloride / mol 1 ⁻¹	Concentra of nitric acid / mo	1	Strength	Bunsen * coefficient, α
298.15	0.678 0.875	0.424		1.102	0.0903 0.0834
	1.224 1.421	0.744 0.887		1.988 2.308	0.0754 0.0722
	* quoted in	original p	aper.		~
	+ calculated		-	ngth and sta	atomont
	in paper t	hat ratio	of ion	ic strength onic strengt	of
	Pressure =	l atmosph	ere =	1.01325 x 10	0 ⁵ Pa.
		AUXILIARY	INFORM	TION	
METHOD/APPARA	TUS/PROCEDURE:		SOURCE	AND PURITY OF	MATERIALS:
Concentrate weighing,	ed solution prepa less concentrated	solutions		commercial sa	ample, purity 99.6 t.
establishe	y dilution. Equi d between a measu	red	2. 7	malytical g	rade sample.
of gas-fre	gas and a measure e liquid in a cel	1 fitted	3. A	nalytical g	rade sample.
gas absorb	netic stirrer. A ed estimated from of gas. Details).	change	4. N	lo informatio	on given.
			ESTIMA	TED ERROR:	
				$T/K = \pm 0.2;$ estimated by	δα = ±2%. y compiler).
			REFERI	NCFS ·	· · · · · · · · · · · · · · · · · · ·
			1. 0	• • •	da, E.; Kobayashi, T. o, Y.
				. Chem. Eng	. Jpn. <u>1970</u> , 3,18.

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COMPONENTS:			ORIGINAL MEASUREMENTS:			
2. Carbonic (Sodium b	thylene);C ₂ H ₄ ; acid, monosodiu picarbonate); Na	um salt;	Onda, K.; Sada, E.; Kito, S.; Ito, K.			
[144-55-8] 3. Carbonic	acid disodium s	alt;	J. Chem. Eng. Jpn.	<u>1970</u> , 3, 137-142.		
Na ₂ CO ₃ ; [497-19-8] 0; [7732-18-5]					
VARIABLES:		·	PREPARED BY:			
	K = 298.15		C.L. You	ing.		
P/KI	Pa = 101.3			·		
EXPERIMENTAL V	ALUES:		£			
T/K	Conc of ⁺	Conc of $+$	Ionic strength*	Bunsen		
	sodium bicarbonate /mol l ⁻¹	sodium carbonate /mol 1 ⁻¹	/ mol 1-1	coefficient, α [*]		
298.15	0.248	0.018 0.038	0.302 0.645	0.0951 0.0824		
	0.657	0.047	0.799	0.0774		
	* quoted i	in original	paper.			
		strengths	ic strength and rat due to the two salts			
1	Pressure	e = 1 atmosp	ohere = 1.01325×10^{10}	⁵ Pa.		
		AUXILIARY	INFORMATION			
METHOD/APPARAT	TUS/PROCEDURE:		SOURCE AND PURITY OF MA	ATERIALS:		
weighing, les	l solution prepa ss concentrated subsequent dilu	solutions	1. Commercial samp mole per cent.	ple, purity 99.6		
Equilibrium measured vol	established bet Lume of gas and	tween a a measured	2. Analytical grad			
amount of ga fitted with	as-free liquid i a magnetic stin	in a cell rrer.	3. Analytical grad	de sample.		
Amount of ga	as absorbed esti- plume of gas. I	imated from	4. No information	given.		
			ESTIMATED ERROR:			
			$\delta T/K = \pm 0.2; \delta \delta$ (estimated by δ			
				•		
			REFERENCES: 1. Onda, K.; Sada Kito, S.; Ito,	, E.; Kobayashi, T.; Y.		
			J. Chem. Eng. J	pn. <u>1970</u> , 3, 18.		

$ \begin{array}{c} \hline \text{COMPONENTS:} \\ (1) \ \text{Ethene;} \ C_{2}H_{4}; \ [74-85-1] \\ (2) \ \text{Sulfuric acid;} \ H_{2}SO_{4}; \ [7664-93-9] \\ (3) \ \text{Sodium sulfate;} \ Na_{2}SO_{4}; \\ \ [7757-82-6] \\ (4) \ \text{Water;} \ H_{2}O; \ [7732-18-5] \\ \hline \\ \hline \\ \text{VARIABLES:} \\ \hline \\ p_{1}/\text{kPa:} \ 101.325 \ (1 \ \text{atm}) \\ \hline \\ \hline \\ \text{EXPERIMENTAL VALUES:} \\ \hline \\ $	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
(3) Sodium sulfate; Na_2SO_4 ; [7757-82-6] (4) Water; H_2O ; [7732-18-5] VARIABLES: T/K: 298.15 p_1/kPa : 101.325 (1 atm) EXPERIMENTAL VALUES: Temperature Solvent Ethene $t/^{\circ}C$ T/K Volume Volume V/cm^3 Absorbed α/cm^3 (STP) cm ⁻³ atm ⁻¹ L/cm^3 cm ⁻³ $-\frac{25}{298.15}$ $-\frac{49.54}{49.54}$ 1.19 0.022 0.024	
(3) Sodium sulfate; Na_2SO_4 ; [7757-82-6] (4) Water; H_2O ; [7732-18-5] VARIABLES: T/K: 298.15 p_1/kPa : 101.325 (1 atm) EXPERIMENTAL VALUES: Temperature Solvent Ethene Bunsen Ostwald $t/^{\circ}C$ T/K Volume Volume Volume Coefficient $Coefficient$ $t/^{\circ}C$ T/K Volume Volume $Volume$ $Coefficient L/cm^3 cm^{-3}\frac{v_1/cm}{25 298.15 \frac{49.54}{49.54} 1.19 0.022 0.024$	
[7757-82-6] = 2 - 4 (4) Water; H ₂ O; [7732-18-5] VARIABLES: T/K: 298.15 p ₁ /kPa: 101.325 (1 atm) = 0.022 0.024 EXPERIMENTAL VALUES: Temperature Solvent Ethene Bunsen Ostwald Coefficient Coefficient L/cm ³ cm ³ (STP) cm ⁻³ atm ⁻¹ L/cm ³ cm ⁻³ dm ⁻¹ L/cm ³ cm ⁻³ dm ⁻¹ dp ¹ dp ⁻¹ dp ⁻¹ dp ⁻¹ dp ⁻¹ dp ⁻¹ dp ⁻¹ dp ¹ dp ¹ dp ¹ dp ¹ dp ¹	
VARIABLES: PREPARED BY: T/K : 298.15 P. L. Long p_1/kPa : 101.325 (1 atm) P. L. Long EXPERIMENTAL VALUES: H. L. Clever Temperature Solvent Ethene Bunsen Ostwald $t/^{\circ}C$ T/K Volume Volume Coefficient Coefficient $t/^{\circ}C$ T/K V/cm ³ Absorbed α/cm^3 (STP) cm ⁻³ atm ⁻¹ $L/cm^3 cm^{-3}$ 25 298.15 49.54 1.19 0.022 0.024	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
Image: Second stateEXPERIMENTAL VALUES:Temperature Solvent Ethene Bunsen Ostwald $t/^{\circ}C$ T/K Volume Volume Volume Coefficient Absorbed α/cm^3 (STP) cm ⁻³ atm ⁻¹ $L/cm^3 cm^{-3}$ $$	
Temperature $t/^{\circ}C$ Solvent V/cm^3 Ethene Volume N/cm^3Bunsen Coefficient α/cm^3 (STP) cm ⁻³ atm ⁻¹ Ostwald Coefficient $L/cm^3 cm^{-3}$ 25298.1549.541.19 49.540.0220.024	
Temperature $t/^{\circ}C$ Solvent V/cm^3 Ethene Volume V/cm^3 Bunsen Coefficient $\alpha/cm^3 (STP) cm^{-3} atm^{-1}$ Ostwald Coefficient $L/cm^3 cm^{-3}$ 25298.1549.541.19 49.540.0220.024	
$\frac{t/^{\circ}C}{25} \frac{T/K}{298.15} \frac{Volume}{49.54} \frac{Volume}{49.54} \frac{Volume}{1.19} \frac{Coefficient}{0.022} \frac{Coefficient}{0.022} \frac{Coefficient}{0.024}$	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
49.54 1.19 0.022 0.024	
49.54 1.19 0.022 0.024	
The solvent is a mixture of 800 g H ₂ O	
200 g Na ₂ SO ₄ (anhydrous)	
40 ml H ₂ SO ₄ (Conc., 36 normal)	
Thus the molality of the solution is	
$m_2/\text{mol kg}^{-1} = 0.90 (H_2SO_4)$	
$m_3/\text{mol kg}^{-1} = 1.76 (\text{Na}_2\text{SO}_4)$	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:	
The apparatus is described in detail (1) Ethene. Source not given.	
in an earlier paper (1). The appara- tus consists of a gas buret, a	ent.
prossure componentor and a 200 cm ³ (2, 3) Sulfuric acid and sodium	
absorption bulb and mercury leveling	
bulb. The absorption bulb is attached Analytical grade. to a shaking mechanism. (4) Water. Distilled.	
The solvent and the gas are placed in the abcorntion bulb. The bulb is	
the absorption bulb. The bulb is	
snaken until equilibrium is reached.	
shaken until equilibrium is reached. The remaining gas is returned to the	
The remaining gas is returned to the buret. The difference in the final	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed.	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed. $\delta \alpha / cm^3 = \pm 0.001$ (authors)	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed. $\delta \alpha / cm^3 = \pm 0.001 \text{ (authors)}$ REFERENCES:	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed. $\delta \alpha / cm^3 = \pm 0.001 \text{ (authors)}$ REFERENCES: 1. Kobe, K. A.; Williams, J. S.	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed. $\delta \alpha / cm^3 = \pm 0.001 \text{ (authors)}$ REFERENCES:	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed. $\delta \alpha / cm^3 = \pm 0.001 \text{ (authors)}$ REFERENCES: 1. Kobe, K. A.; Williams, J. S. Ind. Eng. Chem., Anal. Ed.	
The remaining gas is returned to the buret. The difference in the final and initial volumes is taken as the volume of gas absorbed. $\delta \alpha / cm^3 = \pm 0.001 \text{ (authors)}$ REFERENCES: 1. Kobe, K. A.; Williams, J. S. Ind. Eng. Chem., Anal. Ed.	

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COMPONENTS: 1. Ethene; C ₂ H ₄ ; [74-85-1] 2. Sodium chloride, barium chloride or sodium sulfate 3. Nitric acid, ammonium salt (ammonium nitrate); NH ₄ NO ₃ ;	ORIGINAL MEASUREMENTS: Onda, K.; Sada, E.;Kobayashi, T.; Kito, S.; Ito, K. J. Chem. Eng. Jpn.
[6484-52-2] 4. Water; H ₂ O; [7732-18-5]	<u>1970</u> , 3, 137-142.
VARIABLES: T/K = 298.15	PREPARED BY:
P/kPa = 101.3	C. L. Young
EXPERIMENTAL VALUES: ¹ Concentration of component 2 /mol L ⁻¹ ¹ Concentration o ammonium nitrate /mol L ⁻¹	e strength coefficient, α
0.298 0.193 0.662 0.482 0.777 0.834 1.411 1.515 1.777 1.909 Component 2: barium chlo 0.077 0.198 0.124 0.318 0.164 0.419 0.195 0.500 Component2: sodium sulfa 0.055 0.261 0.105 0.502 0.117 0.554 0.118 0.561 0.168 0.801 0.226 1.072	0.430 0.1046 0.691 0.0998 0.911 0.0948 1.086 0.0915 te; Na ₂ SO ₄ ; [7757-82-6] 0.425 0.1020 0.818 0.0965 0.904 0.0926 0.915 0.0964 1.306 0.0894 1.749 0.0798
AUXILIARY IN	FORMATION
METHOD/APPARATUS/PROCEDURE: Concentrated solution prepared by weighing, less concentrated solutions prepared by dilution. Equilibrium established between a measured volume of gas and a measured amount of gas- free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Details in source and ref. (1).	
~	ESTIMATED ERROR: $\delta T/K = \pm 0.2; \delta \alpha = \pm 2$ %. (estimated by compiler) REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, Y. J. Chem Eng. Jpn. <u>1970</u> , 3, 18.

2. Carbonic				61		
[298-14-6		85-1] 1. salt, O ₃ ;	INAL MEASUREMENTS: Onda, K.; Sada Kobayashi, T.; Ito, K.	, E.; Kito, S.;		
(Potassiu [584-08-7			J. Chem. Eng. Jpn. <u>1970</u> , 3, 137-142			
	0; [7732-18-5]					
VARIABLES: T/	′K = 298.15	PREP	PARED BY:			
P/kI	Pa = 101.3		C.L. 1	Young.		
EXPERIMENTAL V	ALUES:					
T/K	potassium pot bicarbonate car	c of ⁺] assium bonate ol 1 ⁻¹	Ionic strength [*] / mol l ⁻¹	Bunsen * coefficient a*		
298.15	0.538 0 0.587 0 0.873 0	.016 .036 .039 .058 .072	0.286 0.645 0.704 1.046 1.299	0.0983 0.0805 0.0848 0.0709 0.0627		
	* quoted in or	iginal pape	er.			
	in paper. Pressure = 1	atmosphere	e = 1.01325 x 1	0 ⁵ Pa.		
	A	JXILIARY INFO	RMATION			
		UXILIARY INFO	· · · · · · · · · · · · · · · · · · ·			
weighing, le prepared by Equilibrium measured vol amount of ga fitted with Amount of ga	US/PROCEDURE: d solution prepared ess concentrated sol subsequent dilution established between tume of gas and a me as-free liquid in a a magnetic stirrer. as absorbed estimate olume of gas. Detai	by utions 1. asured 2. cell 3. d from	RCE AND PURITY OF Commercial sa mole per cent Analytical gr	mple, purity 99.6 ade sample. ade sample.		

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2. Sodiu 3. Bariu 4. Nitri (ammo [6484	: e, (Ethylene); m chloride; NaC m chloride; BaC c acid, ammoniu nium nitrate); -52-2]; ; H ₂ O; [7732-18	l; [7647-14-5] l ₂ ;[14832-99-6] m salt, NH4NO3;	ORIGINAL MEASUREMENTS: Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. J. Chem. Eng. Jpn. <u>1970</u> , 3, 137-142.				
VARIABLES	:		PREPARED BY:				
	Composition		C.L. Young.				
EXPERIMENT	TAL VALUES:		· · · · · · · · · · · · · · · · · · ·				
<i>Т/</i> К	Concentration ⁺ of sodium chloride / mol 1 ⁻¹	Concentration ⁺ of barium chloride / mol 1 ⁻¹	Concentration ⁺ of ammonium nitrate / mol l -1	Ionic * Strength / mol 1-1			
298.15	0.195 0.249 0.317 0.383	0.065 0.083 0.106 0.127	0.195 0.249 0.317 0.382	0.584 0.748 0.952 1.145	0.0985 0.0955 0.0911 0.0881		
	* quoted i	n original pape	r.				
	in paper three sa	that the ratio lts was l:l:l	trength and sta of ionic stren = 1.01325 x 10	gth of			
		AUXILIARY	INFORMATION				
METHOD/AP	PARATUS/PROCEDURE:		SOURCE AND PURITY	OF MATERIALS	5:		
weighing prepared	ated solution p , less concentr by subsequent	ated solutions dilution.	1. Commercial mole per c	ent.	•		
measured	ium established volume of gas	and a measured	2. Analytical	grade sam	ple.		
amount o	f gas-free liqu ith a magnetic	id in a cell	3. Analytical	grade sam	ple.		
Amount o	f gas absorbed n volume of gas	estimated from	4. Analytical	grade sam	ple.		
source a	nd ref. (1).	. Details in	5. No informa	tion given			
		1	ESTIMATED ERROR:				
			$\delta T/K = \pm 0.2$; δα = ±2%	•		
			(estimated)	by compile	r).		
Ì			REFERENCES:				
			Onda, K.; Sada Kito, S.; Ito,		yashi, T.;		
			J. Chem. Eng.	Jpn. <u>1970</u>	, 3, 18.		
			1				

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COMPONENTS: (1) Ethene; C₂H₄; [74-85-1]

(2) Organic Nonelectrolyte

(3) Water; H₂O; [7732-18-5]

EVALUATOR: H. Lawrence Clever Department of Chemistry Emory University Atlanta, GA 30322 USA

August 1992

CRITICAL EVALUATION:

AN EVALUATION OF THE SOLUBILITY OF ETHENE IN AQUEOUS ORGANIC NONELECTROLYTE SOLUTIONS.

Seven papers report ethene solubility data in eleven aqueous organic nonelectrolyte solutions. Most of the data were collected at 298 K and 1 atm (101.3 kPa) partial pressure of ethene. Only one system has been studied by more than one laboratory. There is no reliable way to evaluate these data. They are classed as tentative until confirmed by further experimental work.

Ethene + Methanol [57-56-1] + Water Ethene + Ethanol [64-17-1] + Water Ethene + 1-Propanol [71-23-8] + Water

Yano, Kidaka, Miyamoto and Murakami (3) measured the solubility of ethene in water, the pure alcohol and four mixtures of 0.2, 0.4, 0.6 and 0.8 mole fraction alcohol at 298.15 K by a volumetric method for each of the three systems. The solubility values in water and in the pure alcohols agree well with other data. The data sets are classed tentative.

Ethene + 2-Butanone [74-18-5] + Water

Yorizane, Masuoka, Ida and Ideda (1) measured the solubility of ethene in both phases of the two phase liquid formed by mixing 2butanone, $CH_3COCH_2CH_3$ (methyl ethylketone), and water. The gas phase was stated to be greater than 99 percent ethene. Measuremenets are reported at five temperatures between 281 and 298 K and at ethene pressures between 1.013 and 5.238 MPa (10 - 51.7 atm). Ethene hydrates were observed to form at temperatures < 284 K and pressures > 1.175 MPa. The data are classed as tentative.

Ethene + 2-Amino-ethanol [141-43-5] + Water

Sada and Kito (4) report the solubility of ethene in 0 to 3.83 mol L^{-1} H₂NCH₂CH₂OH at 288.15 K and 0 to 5.70 mol L^{-1} organic component at 298.15 K. The 2-amino-ethanol has little effect on the solubility of ethene in water. The Bunsen coefficient increases about 10 % as the organic component increases from 0 to 5.70 mol L^{-1} at 298.15 K. The data are classed as tentative.

Ethene + 2,2'-Iminobis-ethanol [111-42-2] + Water

Sada, Kumazawa and Butt (5) measured the solubility of ethene in 0 to 3.123 mol L^{-1} (HOCH₂CH₂)₂NH at 298.15 K. The solubility (Bunsen coefficient) appears to go through a small maximum at 2.038 mol L^{-1} amine, but the change is only a percent or two more than experimental error. The data are classed tentative.

Ethene + 2,2',2''-Nitrilotris-ethanol [102-71-6] + Water

Sada et al. (5) Measured the solubility of ethene in 0 to 2.624 mol L^{-1} (HOCH,CH,) N at 298.15 K. There appears to be a small increase in solubility (Bunsen coefficient) as the amine concentration increases, but the increase is only about twice the estimated error of the measurement. The data are classed as tentative.

Ethene + 1-Amino-2-propanol [78-96-6] + Water

Sada *et al.* (6) measured the solubility of ethene in 0 to 3.240 mol L^{-1} CH₂CHOHCH₂NH₂ at 298.15 K. The solubility (Bunsen coefficient) may go through a small maximum as the amine concentration increases, but the change is only about twice the magnitude of the estimated error of the measurement. The data are classed as tentative.

Ethene + 1,2-Ethanediamine [107-15-3] + Water

Sada et al. (5) measured the solubility of ethene in 0 to 3.683 mol L^{-1} H₂NCH₂CH₂NH₂ at 298.15 K. The solubility (Bunsen coefficient) appears to go through a small but definite maximum as the amine concentration increases. The data are classed as tenetative.

Ethene + 1,1'Iminobis-2-propanol [110-97-4] + Water

Sada *et al.* (6) measured the solubility of ethene in 0 to 2.982 mol L^{-1} (CH₃CHOHCH₂)₂NH at 298.15 K. The solubility (Bunsen coefficient) appears to go through a small maximum as the amine concentration increases. The data are classed as tentative.

Ethene + 1-Methyl-2-pyrrolidione [872-50-4] + Water

Shenderei and Ivanovskii (2) report ethene solubilities at 273, 278, 288 and 293 K and 13.3 - 101.3 kPa in mixed solvents of 0 to 0.557 mole fraction water. Wu, Zeck, Langhorst and Knapp (7) report ethene solubility at 298.15 K and 1 bar in mixed solvent of 0.083 to 0.960 mole fraction water. Limited comparison can be made between the Henry's constants calculated by the compiler in atm/mol fraction for the two studies. The results are of similar magnitude, but the Wu *et al*. Henry constants appears to be larger at 0.544-0.557 mole fraction water and shown by the Shenderei and Ivanovskii values. There is no way to say which data set is the more reliable, both data sets are classed as tentative.

REFERENCES

- 1. Yorizane, M.; Masuoka, H.; Ida, S.; Ideda, T. J. Chem Eng. Jpn. 1947, 7, 379-80.
- 2. Shenderei, E. R.; Ivanovskii, F. P. Gaz. Prom. <u>1962</u>, 7, 11 17.; Khim. Prom. <u>1963</u>, 10, 91-97.
- 3. Yano, T.; Kidaka, T.; Miyamoto, H.; Murakami, T. Proc. Soc. Chem. Engrs. Japan (Osaka) <u>Oct 14, 1968</u>, 89-90.

4. Sada, E.; Kito, S. Kagaku Kogaku <u>1972</u>, 36, 218-20.

- 5. Sada, E.; Kumazawa, H.; Butt, M. A. J. Chem. Eng. Data <u>1977</u>, 22, 277-78.
- 6. Sada, E. Kumazawa, H.; Butt, M. A. J. Chem. Eng. Data <u>1978</u>, 23, 161-63.
- 7. Wu, Z.; Zeck, S.; Langhorst, R.; Knapp, H. Proc. Int. Conf. Coal, Gas and Air, Beijing, China 1985, 1, 209-19.

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COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-	1]	Yano, T.; Kidaka,	T. Miyamoto, H.;	
2. Methanol; CH ₄ O; [57-5	6-1]	Murakami, T.		
3. Water; H ₂ O; [7732-18-	5]	Proc. Soc. Chem. Engrs. Japan (Osaka),		
······		<u>Oct. 14</u> , <u>1968</u> , 89-	.90.	
VARIABLES: $T/K = 298.15$		PREPARED BY:		
P/kPa = 101.325 Mole Fraction Alcohol, x		W. Hayduk		
XPERIMENTAL VALUES:				
Mole Fraction			² Ostwald	
Alcohol in t/C Mixed Solvent/ $x_2^{'}$	Ethene so $^{1}P=101.325$	plubility, x_1 , for $p_1 = 101.325$ L /c		
25.0 0.0 (water)	0.0000876	0.000904	0.122	
0.2	0:000175	0.000186	0.200	
0.4	0.000416	0.000454	0.408	
0.6	0.000954	0.001074	0.825	
0.8	0.00219	0.00254	1.711	
1.0 (alcohol)	0.00408	0.00488	2.93	
mixed solvent solution.				
	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MA	TERIALS:	
A glass apparatus was em which the uptake of gas volume of solvent in a d cell was volumetrically The gas was displaced by the gas dissolved at con sure. A magnetically op circulating pump and bub were provided for bubbli through the solvent in t tion cell.	by a known issolution determined. mercury as stant pres- erated gas bling tip ng the gas	Sources and purit	ies not given.	
		ESTIMATED ERROR:		
		· ·	03 (Compiler)	
		REFERENCES:		
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COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-1]	Yano, T.; Kidaka, T. Miyamoto, H.;		
2. Ethanol; $C_2 H_6 O$; [64-17-1]	Murakami, T.		
3. Water; H ₂ O; [7732-18-5]	Proc. Soc. Chem. Engrs. Japan (Osaka),		
-	<u>Oct. 14</u> , <u>1968</u> , 89-	-90.	
VARIABLES: $T/K = 298.15$	PREPARED BY:		
P/kPa = 101.325 Mole Fraction Alcohol, $x_2'= 0-1$	W. Hayduk		
EXPERIMENTAL VALUES:			
EAFERIMENTAL VALUES:			
		² Ostwald	
Mole Fraction Alcohol in Ethene s t/C Mixed Solvent, x_2^1 $p=101.325,x$	olubility for: p=101.325, x L/c	Coefficient cm ³ gas cm ⁻³ solvent	
25.0 0.0 (water) 0.0000876	0.0000904	0.122	
0.2 0.000279	0.000291	0.270	
0.4 0.000847	0.000892	0.633	
0.6 0.00199	0.00212	1.22	
0.8 0.00351	0.00373	2.15	
1.0 (alcohol) 0.00558	0.00605	2.52	
mixed solvent solution.			
AUXILIAR	INFORMATION		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu- tion cell.	Sources and purit	ties not given.	
	ESTIMATED ERROR:		
	$\delta x_1 / x_1 = \pm 0.$.03 (Compiler)	
	REFERENCES:		

COMPONEN	TS:			ORIGINAL MEASUREM	ENTS:		
		,н.; [74-85-	1]	Yano, T.; Kidaka, T. Miyamoto, H.;			
		2 ⁴ , C ₃ H ₆ O; [7		Murakami, T.			
		D; [7732-18-		Proc. Soc. Chem. Engrs. Japan (Osaka),			
J. 114		5, [7752-18-		<u>Oct. 14</u> , <u>1968</u>	<u>B</u> , 89-90.		
Mole	$\frac{T}{P/k}$	/K = 298.15 Pa = 101.325 n Alcohol, x		PREPARED BY: W. Hayduk			
EXPERIME	NTAL VALI	JES:					
t/C	Ale	Fraction cohol in Solvent, x_2^{\prime}	Ethene so ${}^{1}P=101.325, x$	^{2}p =101.325, x_{1}	² Ostwald Coefficient L /cm ³ gas(cm ³ solvent)		
25.0	0.0	(water)	0.0000876	0.000904	0.122		
	0.2		0.000603	0.000622	0.513		
	0.4		0.00174	0.00179	1-068		
	0.6		0.00323	0.00333	1.55		
	0.8		0.00495	0.00509	1.95		
	1.0	(alcohol)	0.00697	0.00717	2.36		
mixe	d solve	nt solution.					
			AUXILIARY	INFORMATION			
METHOD //	APPARATUS	/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:			
which volum cell The ga the ga sure. circu were	the up e of so was volu as was o as disso A magu lating p provideo gh the s	ratus was em take of gas lvent in a d umetrically displaced by olved at con netically op pump and bub for bubbli solvent in t	by a known issolution determined. mercury as stant pres- erated gas bling tip ng the gas	Sources and	purities not given.		
				ESTIMATED ERROR:			
				$\delta x_1/x_1$	= ± 0.03 (Compiler)		
				REFERENCES :	······································		
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COMPONEN	ITS:				ORIGINAL MEASUREMENTS:				
1. Et	hene; C ₂	H ₄ ; [7	4-85-1]		Yorizane, M.; Masuoka, H.;				
	Butanone H _e O; [74			.ketone);	Ida, S.; Ideda, T.				
•	ter; H ₂ C				J. Chem. Eng. (Japan) <u>1947</u> , 7, 379–380.				
VARIABLES: $T/K = 281.15 - 298.15$					PREPARE	ED BY:			
							Hayduk		
<i>P</i> /MPa = 1.013 - 5.238									
EXPERIME	ENTAL VALU	ES:							
		Pres	sure	¹ Mole	Percen uid Ph	it lase	¹ Mole Bottom	Percer Liquid	
t /C	² <i>T</i> /K	Atm	MPa	Ethene	MEK	Water	Ethene	MEK	Water
8.0	281.15	15.0	1.520	18.36	71.50	10.14	0.22	7.05	92.73
10.8	283.05	10.0	1.013	13.22	70.68	16.10	0.21	7.22	92.57
10.8 10.8	283.95 283.95	20.0 48.5	2.026 4.914	26.47 98.10	65.26	8.27 0	0.30 0.26	5.82 2.62	93.88 97.12
14.8	287.95		1.013	10.46	71.94	-	0.20	7.87	91.93
14.8	287.95		2.026	23.99			0.26	6.00	93.47
14.8 14.8	287.95 287.95		3.040 3.546	40.02 52.52		6.75 2.34	0.30 0.21	4.26 3.72	95.44 96.07
14.8	287.95		4.053	62.61			0.41	3.81	95.78
14.8	287.95		4.560	74.03			0.47	3.59	95.94
15.0	288.15	51.0	5.168	91.15	5.99	2.86	0.03	3.23	96.47
¹ This solubility is between a gas (e than 99% ethene and two separate, im compositions expressed as mole perces ² Calculated by compiler.					niscibl nt.	e liquid.	-	ith the	
<u></u>				AUXILIARY	INFORMA	TION			
METHOD /	APPARATUS	PROCEDU	RE:	······································	SOURCE	AND PURIT	Y OF MATERI	ALS:	
The a	pparatus	was d	escribed	earlier			Specified		v
(ref.	1). The	equil	ibrium c	ell was		9.95%.		F	•
with	glass wi	ndows		ss steel in inter- .ibrium	2. 2-Butanone. Specified purity 99.6%.				
			ns of a						
phase	were an	oump. alvzeđ	Samples by mean	or each Is of a	3. 1	later. D	istilled.		
Shima	dzu GC e	quippe	d with a	peak					
integ	rator an	d a Po	rapack C	column.					
			of water	hat they					
	not be			mae cher		TED ERROR:			
At lo	w temper	atures	(less t (greater	han 11°C)	Accu	iracy: N	ot specif	ied.	
11.6	atm) eth	ylene	hydrates	Were					
	ved to f				REFERE	NCES:			
						Corizane, Masuoka,	M.; Yosh H.	imura,	s.;
							Dotuot Tr	at 10	070
					R1	ull. Janan	Petrol. In	80.	5121
					Bi	ull. Japan ¹⁴ , 105.		<u>.</u> , <u>1</u> 8	<u>972</u> ,

OMPONEN	ITS:			ORIGINA	L MEASUREN	ÆNTS:		
1. Et	hene; C ₂ 1	H ₄ ; [74-85-1]		Yorizane, M.; Masuoka, H.;				
2. 2-	Butanone H _a O; [74-	(methyl ethy)	lketone);	Ida, S.; Ideda, T.				
-	U	; [7732-18-5]			Them. Eng. •380.	(Japan) <u>19</u>	<u>147</u> , ⁷ ,	,
ARIABLI	ES: T/1	K = 281.15 - 2	298.15	PREPARE	D BY:			
		a = 1.013 - 5.		W.	Hayduk			
EXPERIMENTAL VALUES:continued								
		Pressure	Mole 1 <u>Top Lie</u>	Percen uid Ph	t lase	Mole Bottom	Percer Liquid	nt Phase
t/C	² T/K	Atm MPa	Ethene					Water
20 20 20 20 20 20 20 20 25 25	293.15 298.15	10 1.013 20 2.026 30 3.040 35 3.546 40 4.053 45 4.560 50 5.066 20 2.026 35 3.546	8.80 18.72 36.66 44.08 55.78 52.25 75.76 20.16 36.76	68.38 56.73 50.69 39.69 44.80 22.65 64.63 54.42	20.81 12.90 6.61 5 23 4.53 2.95 1.59 15.21 8.82	0.15 0.21 0.35 0.39 0.38 0.41 0.39 0.27 0.30	7.07 5.92 4.90 4.41 3.98 3.49 3.04 6.13 4.06	95.20 95.64 96.10 96.57 93.60 95.64
than compo	99% ether sitions of	40 4.053 45 4.560 51.7 5.238 Ity is between ne and two sep expressed as n y compiler.	51.97 71.52 a gas (ef parate, im	26.90 chene) niscibl	1.58 phase, s	0.33 0.33 0.36 stated to I phases w	3.65 3.62 3.35 be greation the	96.05 96.29
25 25 ¹ This than compo	99% ether sitions of	45 4.560 51.7 5.238 Ity is between the and two september of two september	51.97 71.52 a gas (ef parate, im	43.86 26.90 thene) miscibl	4.17 1.58 phase, s e liquid	0.33 0.36	3.62 3.35 be grea	96.05 96.29
25 25 ¹ This than compo ² Calc ² Ca	99% ether sitions of sulated by APPARATUS/F pparatus 1). The guson gau glass win rolume of chieved l lation pu a dzu GC en crator and concentrat	45 4.560 51.7 5.238 ity is between ne and two sep expressed as n y compiler. PROCEDURE: was described equilibrium of nge of stainle ndows having a 90 ml. Equil by means of a ump. Samples alyzed by mean quipped with a d a Porapack (tions of water	51.97 71.52 a gas (ef parate, imm nole percent AUXILIARY d earlier cell was ess steel an inter- librium gas re- of each as of a a peak column. vapor	43.86 26.90 thene) miscibl nt. INFORMA SOURCE 1. E 9 2. 2 F	4.17 1.58 phase, s e liquid TION AND PURIT Sthene. 9.95%. S-Butanor purity 99	0.33 0.36 stated to I phases w Y OF MATERI Specified ne. Speci	3.62 3.35 be greating the greating of the greating of the greater of the greatero	96.05 96.29
25 25 ¹ This than compo ² Calc ² Ca	99% ether solitions of sulated by APPARATUS/F pparatus 1). The guson gan glass win colume of chieved l lation pu were and dzu GC ec rator and oncentrative ethene not be of wetemperative igh press	45 4.560 51.7 5.238 ity is between ne and two sep expressed as n y compiler. PROCEDURE: was described equilibrium of inge of stainle ndows having a 90 ml. Equil by means of a ump. Samples alyzed by mean quipped with a d a Porapack (tions of water were so low t detected. atures (less t sures (greater ylene hydrates	51.97 71.52 a a gas (ef parate, immole percent AUXILIARY d earlier cell was ass steel an inter- librium gas re- of each as of a a peak column. that they chan 11°C)	43.86 26.90 thene) miscibl nt. INFORMA SOURCE 1. E 9 2. 2 P 3. W ESTIMAT ACCU REFEREN 1. Y	4.17 1.58 phase, s e liquid TION AND PURIT Sthene. 9.95%. S-Butanor burity 95 Vater. I FED ERROR: Iracy: M NCES:	0.33 0.36 stated to I phases w Y OF MATERI Specified ne. Speci ne. Speci o.6%. Distilled. Not specif	3.62 3.35 be greating the second seco	96.05 96.29
25 25 ¹ This than compo ² Calc ² Ca	99% ether solitions of sulated by APPARATUS/I pparatus 1). The guson gau glass win colume of chieved l lation pu were and dzu GC ec rator and concentration e ethene not be of wetempera dgh press atm) ethy	45 4.560 51.7 5.238 ity is between ne and two sep expressed as n y compiler. PROCEDURE: was described equilibrium of inge of stainle ndows having a 90 ml. Equil by means of a ump. Samples alyzed by mean quipped with a d a Porapack (tions of water were so low t detected. atures (less t sures (greater ylene hydrates	51.97 71.52 a a gas (ef parate, immole percent AUXILIARY d earlier cell was ass steel an inter- librium gas re- of each as of a a peak column. that they chan 11°C)	43.86 26.90 chene) miscibl at. INFORMA SOURCE 1. E 9 2. 2 P 3. W ESTIMAT ACCU REFEREN 1. Y M	4.17 1.58 phase, for phase, for phase, for phase, for phase, for tracy: for phase, for tracy: for lasuoka, for for tracy for lasuoka, for the formation of the form	0.33 0.36 stated to I phases w Y OF MATERI Specified ne. Speci ne. Speci o.6%. Distilled. Not specif	3.62 3.35 be greating with the ALS: ALS: I purity fied.	96.05 96.29

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COMPONENTS:	ORIGINAL MEASUREMENTS:
 Ethene (Ethylene); C₂H₄; 	Sada, E.; Kito, S.
<pre>2. 2-Aminoethanol, (monoethanolamine); C₂H₇NO; [141-43-5]</pre>	Kagaku Kogaku <u>1972</u> , 36, 218-20.
3. Water; H ₂ O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 288.15, 298.15 P/kPa = 101.3	C.L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of monoetha / mol 1 ⁻¹ (s	
288.15 0.0 0.9679 2.2273 2.8605 3.8283	0.1432 0.1450 0.1432 0.1437 0.1408
298.15 0.0 1.0049 1.9091 2.8337 4.2082 5.7019	0.1111 0.1149 0.1161 0.1187 0.1218 0.1244
	Y INFORMATION
METHOD/APPARATUS/PROCEDURE: Equilibrium established between measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentration of amine determined by titration. Details in source and ref. (1).	SOURCE AND PURITY OF MATERIALS: 1. Purity 99.6 mole per cent. 2/3. Of satisfactory purity. ESTIMATED ERROR: $\delta T/K = \pm 0.2; \ \delta \alpha = \pm 2$ %. (estimated by compiler).
	REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T. J. Chem. Eng. Japan 1970, 3, 18 and 137.

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COMPONENTS:		ORIGINAL MEASUREMENTS:
1. Ethene (Ethylene); C ₂ H ₄ ;		Sada, E.; Kumazawa, H.; Butt, M.A.
[74-85-1] 2. 1,2-Ethanediamine,		J. Chem. Eng. Data 1977, 22,
(Ethyldiamine); C ₂ H ₈ N ₂ ; [107-15-3]		277-278.
3. Water; H_2O ; [7732-	18-5]	277-278.
VARIABLES: $T/K = 293.15$		PREPARED BY:
P/KPa = 101.3		C.L. Young.
		•
EXPERIMENTAL VALUES:		
T/K	Conc. of amin	
	$/ mol 1^{-1}$	coefficient, a
293.15	0.0	0.1111
	0.561 1.049	0.1153 0.1184
	1.596	0.1196
	2.023	0.1187
	2.091 2.890	0.1199 0.1186
	2.929	0.1185
	3.464	0.1145
	3.683	0.1124
<u></u>	AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE	:	SOURCE AND PURITY OF MATERIALS:
Equilibrium establish measured volume of ga amount of gas-free li fitted with a magneti	s and a measured quid in a cell	-
Amount of gas absorbe	d estimated	2. Reagent grade of guaranteed quality.
from change in volume Concentration of amin by titration. Detail and ref.(1).	e determined	3. Distilled and degassed.
		ESTIMATED ERROR:
		$\delta T/K = \pm 0.2; \delta \alpha = \pm 2\%.$
		(estimated by compiler).
		DESTRIBUTION OF CONTRACT OF CONTRACT.
		REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K.
		J. Chem. Eng. Jpn. <u>1970</u> , 3, 18.

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COMPONENTS:		ORIGINAL MEASUREMENTS:
<pre>l. Ethene (Ethylene); C₂H₄; [74-85-1]</pre>		Sada, E.; Kumazawa, H.; Butt, M.A.
2. Ethanol, 2,2'-iminobis- anolamine); C ₄ H ₁₁ NO ₂ ;	-, (Dieth- [111-42-2]	J. Chem. Eng. Data <u>1977</u> , 22, 277-278.
3. Water; H ₂ O; [7732-18-5]	נ	
VARIABLES:	···.	PREPARED BY:
T/K = 298.15 P/kPa = 101.3		C.L. Young
EXPERIMENTAL VALUES:		
T/K	Conc. of am / mol l ⁻¹	
298.15 0.00 0.949 1.540 2.038 2.442 2.895 2.977 3.123 Pressure = 1 atmosp		0.1111 0.1131 0.1141 0.1156 0.1136 0.1121 0.1115 0.1104 where = 1.01325 x 10^{5} Pa.
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: Equilibrium established between a measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentration of amine determined by titration. Details in source and ref.(1).		<pre>1. Commercial sample, minimum purity 99.6 mole per cent. 2. Reagent grade of-guaranteed quality. 3. Distilled and degassed. ESTIMATED ERROR:</pre>
		J. Chem. Eng. Jpn. <u>1970</u> , 3, 18.

COMPONENTS:		73		
		ORIGINAL MEASUREMENTS:		
<pre>1. Ethene (Ethylene); C₂H₄; [74-85-1]</pre>		Sada, E.; Kumazawa, H.; Butt, M.A.;		
<pre>2. Ethánol, 2,2',2''-ni (Triethanolamine); C [102-71-6]</pre>	6H ₁₅ NO ₃ ;	J. Chem. Eng. Data <u>1977</u> , 22, 277-278.		
3. Water; H ₂ O; [7732-18	-5]			
VARIABLES:		PREPARED BY:		
T/K = 298.15		C.L. Young.		
P/kPa = 101.3 EXPERIMENTAL VALUES:		·		
EAFERIMENTAL VALUES;				
Т/К	Conc. of ami / mol 1 ⁻¹	ne Bunsen coefficient, α		
298.15 0.00 0.193 0.443 0.599 0.707 0.889 1.148 1.557 2.277 2.624		0.1111 0.1131 0.1138 0.1156 0.1161 0.1165 0.1163 0.1150 0.1100 0.1053		
- <u> </u>				
· · · · · · · · · · · · · · · · · · ·				
	AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	AUXILIARY	···		
METHOD/APPARATUS/PROCEDURE: Equilibrium established measured volume of gas amount of gas-free liqu fitted with a magnetic Amount of gas absorbed change in volume of gas ion of amine determined Details in source and r	between a and a measured id in a cell stirrer. estimated from . Concentrat- by titration.	 SOURCE AND PURITY OF MATERIALS: 1. Commercial sample, minimum purity 99.6 mole per cent. 2. Reagent grade of guaranteed quality. 		

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>l. Ethene (Ethylene); C₂H₄; [74-85-1]</pre>	Sada, E.; Kumazawa, H.; Butt, M.A.
<pre>2. 2-Propanol, l-amino-, (Isopropanolamine); C₃H₉NO; [78-96-6]</pre>	J. Chem. Eng. Data <u>1978</u> , 23, 161-163.
3. Water; H ₂ O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 298.15	C.L. Young.
<i>P/</i> kPa = 101.3	
EXPERIMENTAL VALUES:	*
I/K Conc.	of amine Bunsen
/mol	1^{-1} coefficient, α
298.15 0	.0 0.1111
	.279 0.1145
0	.819 0.1155
	.1319 0.1145
	.175 0.1124 .301 0.1123
	.802 0.1122
	.240 0.1100
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between measured volume of gas and a measured	1. Commercial sample, minimum purity
amount of gas-free liquid in a cell fitted with a magnetic stirrer.	99.6 mole per cent.2. Reagent grade of guaranteed
Amount of gas absorbed estimated from change in volume of gas.	quality.
Concentration of amine determined by titration. Details in source and refs.(1) and (2).	3. Distilled and degassed.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.2; \ \delta \alpha = \pm 2 $
	(estimated by compiler).
	REFERENCES :
	 Sada, E.; Kumazawa, H.; Butt, M.A. J.Chem.Eng. Data <u>1977</u>,22,277. Onda, K.; Sada, E.; Kobayashi,T.; Kito, S.; Ito, K.
	J.Chem.Eng. Jpn. <u>1970</u> , 3, 18.

	75
COMPONENTS: 1. Ethene (Ethylene); C ₂ H ₄ ;[74-85-1]	ORIGINAL MEASUREMENTS: Sada, E.; Kumazawa, H.; Butt, M.A.
<pre>2. 2-Propanol, 1,1'-aminobis- (Diisopropanolamine); C₆H₁₅NO₂; [110-97-4]</pre>	J. Chem. Eng. Data <u>1978</u> , 23,161- 163.
3. Water; H ₂ O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 298.15 P/kPa = 101.3	C.L. Young
1/kru - 101.5	· · · · · · · · · · · · · · · · · · ·
EXPERIMENTAL VALUES:	
T/K Conc.of / mol	
298.15 0.0 0.2 0.2 0.2 0.5 1.0 1.4 2.1 2.9 Pressure = 1 atmospher	36 0.1131 90 0.1125 50 0.1120 48 0.1105 67 0.1077 27 0.1030 82 0.1001
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentration of amine determined by titration. Details in source	1. Commercial sample, minimum purity
and refs. (1) and (2).	

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COMPON				ORIGINAL MEASUREMENTS:	2
1. E	thene; C	₂ H ₄ ; [74-85-1]		Shenderei, E.R.; Iva	novskii, F.P.
2.2	-Pyrroli N-methyl	dinone, 1-methyl pyrrolidinone);	-,	Gaz. Prom. <u>1962</u> , 7 , 11	-17.
Ċ	с ₅ н ₉ NO; [872-50-4]		Same paper also in:	
3. W	later; H ₂	0; [7732-18-5]		Khim. Prom. <u>1963</u> , 10,91-	-97.
VARIAB		= 273-288		PREPARED BY:	
Wate	<i>P</i> /kPa	= 101.3 (1 atm) mole fraction =	0-0.56	W. Hayduk	
EXPERI	MENTAL VAL	UES:			
			F	ienry's constant	
t/C	тγк	water content in solvent, mole fraction	K/mm me (mole fi	ercury H ¹ /atm raction)-1(mole fraction	¹ Mole Fraction x_1) ⁻¹ Ethene, x_1
0	273.15	0.104 0.241	9390 12400		0.00809 0.00613
		0.378	20500	269.7	0.00371 0.00228
_		0.557	33300		
5	278.15	0.104 0.241	10150 13400	176.3	0.00749 0.00567
		0.378 0.557	22400 36700		0.00339 0.00207
10	283.15	0.104	11100	146.1	0.00685
		0.241 0.378	14700 24000		0.00517 0.00317
		0.557	39300		0.00193
15	293.15	0.104 0.241	12100 15720		0.00628 0.00483
		0.378	26200 41300	344.7	0.00290 0.00184
¹ C៖ p1	alculated ressure c	l by compiler; mc of 101.325 kPa.		ion ethene, x_1 , is for	a partial
			AUXILIARY	INFORMATION	
		/PROCEDURE: prium cell fitted	l with a	SOURCE AND PURITY OF MATER 1. Ethene source and	
magne	etič stir	rer. Pressure n	neasured	given.	
liqui	id analyz	on gauge. Sample ed by stripping	out	2. N-Methylpyrrolid: purity not given	inone source and
measu	ired at s	solubilities wer everal pressures	s below	Properties used 1	by authors:
		nd Henry's const Details in ref.		Normal boiling po Density at 20°C	$= 1.0220 \text{ g/cm}^3$
				Refractive index	$n_D^{20} = 1.4700$
				3. Treatment not spe	ecified.
				ESTIMATED ERROR:	
				$\delta K/K = \pm 0.02$	
				REFERENCES:	
				1. Shenderei, E.R.;	Zelvenskii,
				Ya.D.; Ivanovski:	i, F.P.
				Gaz. Prom. <u>1958</u> ,	12, 36.
			-		

		7		
COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Ethene; C ₂ H ₄ ; [74-85-1]	Wu, Z.; Zeck, S.; Langhors	st, R.;		
<pre>2. 2-Pyrrolidinone, 1-methyl-, (N-methylpyrrolidinone);</pre>	Knapp, H.			
C ₅ H ₉ NO; [872-50-4]	Proc. Int. Conf. Coal Gas and A			
3. Water; H ₂ O; [7732-18-5]	Beijing, China , <u>1985</u> , 1, 20	9-229.		
$\begin{array}{rcl} \text{VARIABLES:} & T/\text{K} = 298.15 \\ P/\text{kPa} = 100 & (1\text{bar}) \end{array}$	PREPARED BY:			
Conc. water/ $x_{3}^{\prime} = 0.08-0.96$ mole fraction	W. Hayduk	<u>.</u> .		
EXPERIMENTAL VALUES: For T/K = 298.15 K:				
³ Solvent Gas		Stwald		
Mole Mole Mole Fraction Fraction Fraction Solubility, $10^4a^2/x_3^2$ / 1y_1 Given $^2p_1=101.325$	Henry's Constant Coe K/bar ² H/atm(mole 1/cm kPa' fraction) ⁻¹ s	efficient ^a gas (cm ³ solvent) - 1		
0.960 0.970 1.231 1.29	7879 7777	0.147		
0.918 0.972 1.609 1.68 0.849 0.975 2.587 2.69	6053 5962 3781 3720	0.168		
0.849 0.975 2.587 2.69 0.747 0.979 4.784 4.95	2060 2020	0.326		
0.582 0.985 12.02 12.36	811.9 808.8	0.607		
0.544 0.987 15.04 15.44		0.708		
0.421 0.991 25.21 25.8	398.3 388.0 331.7 296.6	0.986		
0.371 0.992 33.01 33.7 0.277 0.994 40.63 41.4		1.336		
0.194 0.996 49.53 50.4	202.7 198.5	1.502		
0.083 0.998 62.97 63.9	159.6 156.4	1.721		
³ The relationship between x_1 and x_1' : $x_1 + x_2 + x_3 = 1$; $x_2' + x_3' = 1$; $x_2' + x_3' = 1$;				
)		
AUXILIARY	INFORMATION)		
	INFORMATION SOURCE AND PURITY OF MATERIALS:)		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate	······			
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent.	vol.		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper-	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by	vol. Merck		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent.	vol. Merck f 99.0%		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium	 SOURCE AND PURITY OF MATERIALS; 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying and sieve drying an	vol. Merck f 99.0% with agent		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath.	 SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying the purity was analyzed 	vol. Merck f 99.0% with agent		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was	 SOURCE AND PURITY OF MATERIALS; 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying and sieve drying an	vol. Merck f 99.0% with agent		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from	 SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying the purity was analyzed 	vol. Merck f 99.0% with agent to be nd had a		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from the quantities of gas and solvent	 SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying a the purity was analyzed 99.9%. 3. Water was bidistilled as conductivity of 2 microided the second conduct conduct	vol. Merck f 99.0% with agent to be nd had a mhos/cm.		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from	 SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment of molecular sieve drying the purity was analyzed 99.9%. 3. Water was bidistilled as conductivity of 2 micro 	vol. Merck f 99.0% with agent to be nd had a mhos/cm. 05		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from the quantities of gas and solvent used. The apparatus and procedure are described in detail in	 SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying the purity was analyzed 99.9%. 3. Water was bidistilled as conductivity of 2 microided and conductivity of 2 microided et al. Strikated ERROR: 	vol. Merck f 99.0% with agent to be nd had a mhos/cm. 05		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from the quantities of gas and solvent used. The apparatus and procedure are described in detail in	 SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment molecular sieve drying the purity was analyzed 99.9%. 3. Water was bidistilled as conductivity of 2 micror ESTIMATED ERROR: δP/kPa = ± 0. δL/L = ± 0. 	vol. Merck f 99.0% with agent to be nd had a mhos/cm. 05		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from the quantities of gas and solvent used. The apparatus and procedure are described in detail in	<pre>SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 * percent. 2. Solvent was provided by with a minimum purity or (GC). After treatment * molecular sieve drying * the purity was analyzed 99.9%. 3. Water was bidistilled at conductivity of 2 microf ESTIMATED ERROR:</pre>	vol. Merck f 99.0% with agent to be nd had a mhos/cm. 05 01		
METHOD/APPARATUS/PROCEDURE: Ethylene gas was stored in a glass burette equipped with an accurate manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from the quantities of gas and solvent used. The apparatus and procedure are described in detail in	<pre>SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was 99.9 * percent. 2. Solvent was provided by with a minimum purity of (GC). After treatment * molecular sieve drying * the purity was analyzed 99.9%. 3. Water was bidistilled at conductivity of 2 microf ESTIMATED ERROR:</pre>	vol. Merck f 99.0% with agent to be nd had a mhos/cm. 05 01		

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COMPONENTS: 1. Ethene; C₂H₄; [74-85-1] 2. Alkanes, neohexane and squalane University of Ottawa Ottawa, ON Canada K1N 6N5 September, 1992

CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubility in Alkanes, Neohexane and Squalane

for Pressures up to 101.3 kPa

Data for solubilities of ethene have been reported by ten groups of researchers (1-10) for some of the alkane solvents from pentane to docosane as well as in the branch-chained solvents, 2,2 dimethylbutane (neohexane) and squalane, for pressures to 101.3 kPa and temperatures ranging from 213.2 K to 473.2 K. One group (10) measured ethene solubilities in a twocomponent solvent solution. Four groups of researchers, Jadot (1), Lenoir et al. (7), Ng et al. (8) and Simon and Lukacs (9), utilized gas chromatographic techniques which involve equilibrium at low gas partial pressures so that the values obtained are not always dependable when extrapolated to a partial pressure of 101.3 kPa. The data of McDaniel, obtained some 81 years ago, have often been questioned because of the technique used which tends to yield low values of solubility.

There are too few reliable data to define a relationship between the solubility at 298.15 K and the number of carbons in the alkane solvents (C_N) . It is noted that the alkanes of carbon number greater than C_{16} are solids at this temperature. The paucity of solubility data for this class of solvents is particularly apparent; the data consist mainly of single measurements or those supplied by just one research group for any one solvent. Solubility data are available from two or more independent sources only for the solvents hexane and heptane.

Solubilities for the individual solvents are now discussed. Equations for interpolating consistent data and the applicable temperature ranges are included where possible.

Pentane; C_5H_{12} ; [109-66-0] Hexane; C_6H_{14} ; [110-54-3] 2,2-Dimethylbutane (neohexane); C_6H_{14} ; [75-83-2]

Jadot (1) reported the solubility of ethene in pentane and in hexane at 298.15 K in the form of Henry's constants. The single value for the solubility in pentane is classified as tentative. Sahgal et al. (2) measured the solubility of ethene in hexane at 298.15 K. Waters et al. (3) provided data for the ethene in hexane at four temperatures in the range of 263.15 K to 293.15 K, and at pressures between 26.7 kPa and 85.8 kPa. Tilquin et al. (4) provided a single value at 288.15 K, while McDaniel (5) furnished solubility values at four temperatures, from 295.15 K to 318.15 K. All five sets of data were plotted in the form of log x versus 1/T. The data of McDaniel (5) and the single value of Jadot (1) are about 30% lower than other comparable data, and are consequently rejected. The value of Waters et al. at 293.15 K is about 10% higher than the other data; hence, it too is rejected. Although the graph of these data is not shown, the equation of the line that best fit the data is:

 $\log x_1 = -3.349 + 498.07/(T/K)$ for 298 > T/K > 263 (1)

Equation 1 has a coefficient of correlation of 0.9954 and the maximum deviation of the data points from the line is 3.3%, while the average deviation is 1.3%. The remaining data and Equation 1 are classified as tentative.

Tilquin et al. (4) reported a single value for the solubility of ethene in neohexane at 288.15 K. Their result is classified as tentative.

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COMPONENTS: 1. Ethene; C ₂ H ₄ ; [74-85-1] 2. Alkanes, neohexane and squalane	EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5			
	September, 1992			

CRITICAL EVALUATION:

Heptane; C₇H₁₆; [142-82-5]

Ethene solubilities in heptane were reported by four groups of researchers (1,2,5,6). Three values each were provided by Sahgal et al. (2) at temperatures from 273.15 K to 323.15 K, and by Leites and Ivanovskii (6) for temperatures from 213.15 K to 253.15 K. Four solubilities were reported by McDaniel (5) at temperatures from 295.55 K to 312.15 K, while Jadot (1) reported a single value at 298.15 K. All four sets of data were plotted in the form of log x versus 1/T, and all points were colinear except for the single value of Jadot (1) which deviated by about 16% (see Fig. 1). Omitting this point, the equation of the line which best fit the data is:

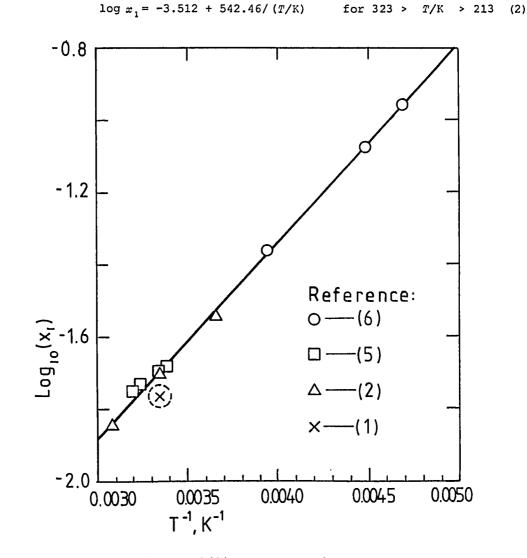


Figure 1 Mole fraction solubility of ethene in n-heptane at 298.15 K and 101.3 kPa gas partial pressure.

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COMPONENTS: 1. Ethene; C ₂ H ₄ ; [74-85-1] 2. Alkanes, neohexane and squalane	EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5 September, 1992
CRITICAL EVALUATION:	
Equation 2 has a correlation condeviation of the data points from the maximum deviation is 6.0%. Equation	

deviation of the data points from the regression line is 2.7%, while the maximum deviation is 6.0%. Equation 2 may be used to estimate ethene solubilities in heptane at temperatures between 213.15 K and 323.15 K and is classified as tentative along with the data on which it is based.

Octane; C₈H₁₈; [111-65-9] Nonane; C₉H₂₀; [111-84-2] Decane; C₁OH₂₂; [124-18-5]

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Ethene solubilities in octane, nonane and decane were reported by Jadot (1). All were single values at 298.15 K. The solubilities showed a definite increase with an increase in the chain length of the alkane. These values are classified as tentative.

Dodecane; $C_{12}H_{26}$; [112-40-3]Hexadecane; $C_{16}H_{34}$; [544-76-3]Heptadecane; $C_{17}H_{36}$; [629-78-7]

Sahgal et al. (2) measured ethene solubilities in dodecane at 101.3 kPa pressure and at four temperatures ranging from 263.95 K to 339.15 K. The equation representing these data with deviations of less than 2.5% is:

 $\log x_1 = -3.6096 + 582.79/(T/K)$ for 339 > T/K > 263 (3)

The data for dodecane are classified as tentative. Lenoir et al. (7) furnished single values for the solubility of ethene in hexadecane as well as heptadecane at 298.15 K, and 323.15 K, respectively. Both values are classified as tentative.

Octadecane; C₁₈H₃₈; [593-45-3] Eicosane; C₂₀H₄₂; [112-95-8] Docosane; C₂₂H₄₆; [629-97-0] Tetracosane, 2,6,10,15,19,23-hexamethyl (squalane); C₃₀H₆₂; [110-01-3]

Ethene solubilities in octadecane, eicosane and docosane were measured by Ng et al. (8) at 101.3 kPa pressure and at temperatures from 308.2 K to 473.2 K. The three equations which best represent the data are:

Ì	For octadecane:	$\log x_1 = -3.2173 + 489.06/(T/K)$	for	423	>	<i>T</i> /K >	308	(4)
	For eicosane:	$\log x_1 = -3.1861 + 479.10/(T/K)$	for	413	>	<i>T</i> /K >	323	(5)
	For docosane:	$\log x_1 = -3.1820 + 484.71/(T/K)$	for	483	>	<i>T/</i> K >	333	(6)

All three sets of data are classified as tentative.

Ethene solubilities in squalane were reported by Simon and Lukacs (9) for temperatures between 293.15 K and 333.15 K. It is noted that this C_{30} hydrocarbon is a liquid at ambient conditions because of its branched structure. The solubilities were significantly higher than those measured by Ng et al. (8) for the $C_{18} - C_{22}$ alkanes. The data of Simon and Lukacs (9) are classified as tentative.

COMPONENTS: 1. Ethene; C_{2H_4} ; [74-85-1]	EVALUATOR: Walter Hayduk
2. Alkanes, neohexane and squalane	Department of Chemical Engineering University of Ottawa Ottawa, ON
	Canada K1N 6N5 September, 1992

CRITICAL EVALUATION:

Hexane and dodecane solvent solutions: $C_{6H_{14}}$; [110-54-3]; $C_{12H_{26}}$; [112-40-3]

Sahgal and Hayduk (10) reported ethene solubilities in mixtures of hexane and dodecane at 298.15 K. The solubility of ethene was essentially insensitive to the amount of dodecane in the mixture until the mole fraction of dodecane exceeded 0.72. Thereafter, a small increase in solubility was observed. These data are classified as tentative.

References

- 1. Jadot, R. J. Chim. Phys. 1972, 69, 1036.
- 2. Sahgal, A.; La, H.M.; Hayduk, W. Can. J. Chem. Eng. 1978, 56, 354.
- 3. Waters, J.A.; Mortimer, G.A.; Clements, H.E. J. Chem. Eng. Data 1970, 15, 174.
- Tilquin, B.; Decanniere, L.; Fontaine, R.; Claes, P. Ann. Soc. Sc. Bruxelles (Belgium) <u>1967</u>, 81, 191.
- 5. McDaniel, A.S. J. Phys. Chem. 1911, 15, 587.
- 6. Leites, I.L. and Ivanovskii, F.P. Khim. Prom. 1962, 9, 653.
- 7. Lenoir, J.-Y.; Renault, P.; Renon, H. J. Chem. Eng. Data 1971 16, 340.
- 8. Ng, S.; Harris, H.G.; Prausnitz, J.M. J. Chem. Eng. Data 1969, 14, 482.
- 9. Simon, F.; Lukacs, J. Magy. Asvanyolaj-Foldaz. Intez. Kozl. (Hungary) 1977, 18, 57.
- 10. Sahgal, A.; Hayduk, W. J. Chem. Eng. Data 1979, 24, 222.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
 Ethene; C₂H₄; [74-85-1] 	Jadot, R.
2. Pentane; $C_{5}H_{12}$; [109-66-0] or Hexane; $C_{6}H_{14}$; [110-54-3]	J. Chim. Phys. <u>1972</u> ,69, 1036-40.
nenane, cfult, [110-24-2]	
VARIABLES: $T/K = 298.15$	PREPARED BY: C.L. Young
P/kPa = 101.3	
EXPERIMENTAL VALUES:	<u> </u>
T/K Henry's Law Constant, H/atm	Mole fraction ⁺ $\# \Delta H^{\infty}$ at partial pressure /cal mol ⁻¹ of 101.3 kPa, $x_{C_2H_4}$ (/J mol ⁻¹)
Pentane; C	5H12; [109-66-0]
298.15 65.45	0.01528 -
Hexane: C.	H14; [110-54-3]
298.15 62.82	0.01592 256 (1071)
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The conventional gas chromatographic technique was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at l atm. pressure. There is also considerable uncertainty in the value of Henry's constant since no allowance was made for surface adsorption.	No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.05; \ \delta H = \pm 2\%$ REFERENCES:

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COMPONENTS:		ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85	-1]	Sahgal, A.; La, H.M.; Hayduk, W.
2. Hexane; C ₆ H ₁₄ ; [110-	54-3]	Can. J. Chem. Eng. <u>1978</u> , 56,
		354-357.
VARIABLES: $T/K = 298.15$		PREPARED BY:
P/kPa = 101.325		W. Hayduk
EXPERIMENTAL VALUES:		· · · · · · · · · · · · · · · · · · ·
	Mole Fract	ion Ostwald Coefficient
t/C T/K	Ethene,	x_1 L/(cm ³ gas /cm ³ solvent)
25.0 298.15	0.0207	3.91
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	<u></u>	SOURCE AND PURITY OF MATERIALS:
A glass apparatus equip a gas storage burette, tube for gas absorption ture internal manometer solution storage burett Degassed solvent was in a constant rate into th spiral by means of a sy	a spiral n, a minia- r and a te was used.	 Ethene was CP grade from Matheson, 99.5 mole % minimum purity. Hexane was from Fisher
while the gas was disp mercury using a mechan: ting device for a mercu at a rate required to b gas pressure constant. of the volume of vapor- consumed and volume of required to achieve sat were obtained from which solubility was calculat temperature fluid was of through a jacket enclose burettes and absorption	he absorption yringe-pump laced by ical eleva- ury bottle, keep the Readings -free gas solvent turation ch the ted. Constant circulated sing the	Chemicals, 99.0 mole % minimum purity. ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 2\%$ $\delta T / K = \pm 0.05$ REFERENCES:

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COMPONEN		• [7/_QE_1]			EASUREMENTS: , J.A.; Morti	mer. G A +
	- '	; [74-85-1]	-			mer, G.A.;
2. He	exane; C ₆ H ₁	4; [110-54-3	3]	Clement	ts, H.E.	
				J. Chem.	Eng. Data, <u>19</u>	70,15 ,
				174-170	б.	
VARIABL	ES: $T/K = 2$	63-293		PREPARED B	Y:	
	P/kPa = 1	01.325		W	. Hayduk	
	-/	011000				
EXPERIM	ENTAL VALUES:				··· ·· ·· ·· ·· ··	
					³ Sol	ubility
t/C	¹ <i>T</i> /K	² F P/mm c mercury	Bunsen Coe x/cm ³ gas cm ³ solve	fficient (NTP)/ ent	Mole/litre s	¹ Average Mole Fraction,a
-10	263.15	200.4 346.9 465.9	6.5 6.3 6.3	5	0.291 0.284 0.283	0.0347
0	273.15	507.0 571.4	5.4 5.3		0.242 0.239	0.0297
10	283.15	543.3 611.9	4.7 4.7		0.213 0.210	0.0266
20	293.15	570.2 643.7	4.3 4.2		0.149 0.190	0.0244
³ Solı	Bunsen coe ubility, s .325 kPa.		calculate	d for a g	as partial pr	essure of
			AUXILIARY	INFORMATION	N	
METHOD	APPARATUS/PRO	OCEDURE:		SOURCE AND	PURITY OF MATE	RIALS:
press of kn were with supp solve one of stir: Gas n press quant	sure change nown volume connected a pressure ly and vacu ent (100 cm of the bulk rer using 1 was charged sure in the titatively	N ³) was degas os equipped v iquid nitros to a higher second bulk charged into	eservoir s bulbs itted , gas The ssed in with a gen. c o and o the	gra 2. Hex	de, purity 99 ane was from roleum, purit	Phillips
tempe in tl	erature. 7	che appropria The final pre rium flask wa	essure	δΤ/	$K = \pm 0.01$ $s = \pm 2\%$	

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COMPONENTS:	ORIGINAL MEASUREMENTS:	
<pre>(1) Ethene or ethylene; C₂H₄; [74-85-1]</pre>	McDaniel, A. S.	
(2) Hexane; C ₆ H ₁₄ ; [110-54-3]	J. Phys. Chem. <u>1911</u> , 15, 587-610.	
VARIABLES:	PREPARED BY:	
T/K = 295.15 - 318.15 $p_1/kPa = 101.3 (1 atm)$	H. L. Clever	
EXPERIMENTAL VALUES:		
Temperature Mol Fraction	Bunsen _ Ostwald _	
$t/^{\circ}C$ T/K $10^{2}x_{1}$	$\begin{array}{c} \text{afficient}^{a} \text{Coefficient}^{b} \\ \alpha \qquad \qquad L/\text{cm}^{3} \text{ cm}^{-3} \end{array}$	
25.0 298.15 1.58 35.0 308.15 1.47	2.8141 3.0382 2.7389 2.9896 ^C 2.5050 2.8265 2.2190 2.5863	
 ^a Bunsen coefficient, α/cm³ (STP) ^b Listed as absorption coefficient Interpreted to be equivalent to ^c Ostwald coefficient (absorption 	t in the original paper. Ostwald coefficient by compiler.	
^d Mole fraction and Bunsen coeffice compiler assuming ideal gas behave EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent of with more reliable data.	avior. data should be used with caution.	
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
The apparatus is all glass. It con- sists of a gas buret connected to a contacting vessel. The solvent is degassed by boiling under reduced pressure. Gas pressure or volume is adjusted using mercury displacement. Equilibration is achieved at atm pressure by hand shaking, and incre- mentally adding gas to the contacting chamber. Solubility measured by obtaining total uptake of gas by known volume of the solvent.	 (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Hexane. No details given. ESTIMATED ERROR: δ L/L ≥ -0.20 	

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Tilquin, B.; Decannière, L.;
2. Hexane; C ₆ H ₁₄ ; [110-54-3]	Fontaine, R.; Claes, P.
	Ann. Soc. Sc. Bruxelles (Belgium)
	<u>1967</u> , <i>81</i> , 191–199.
VARIABLES:	PREPARED BY:
T/K: 288.15 P/kPa: 4.11-8.13	C. L. Young
1/111 4111 0110	
EXPERIMENTAL VALUES:	·····
Octue 14	Mole Henry's b
t/C T/K Coefficien	t, ^a fraction, constant
L	x_1 H/atm
15.0 288.15 4.445	0.0238 42.0
· · · · · · · · · · · · · · · · · · ·	
	r ·
^a Original data at low pressur	e reported as distribution co-
efficient; but if Henry's 1	aw and ideal gas law apply, equivalent to Ostwald coefficient
distribution sections is	equivalent to ostward coefficient
distribution coefficient is as shown here.	
as shown here.	
as shown here. ^b Calculated by compiler for a	gas partial pressure of 101.325
as shown here.	gas partial pressure of 101.325 w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a	gas partial pressure of 101.325 w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a	gas partial pressure of 101.325 w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a	gas partial pressure of 101.325 w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a	gas partial pressure of 101.325 w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a	gas partial pressure of 101.325 w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la	gas partial pressure of 101.325 w and ideal gas law apply. INFORMATION
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la	w and ideal gas law apply.
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY	w and ideal gas law apply. INFORMATION
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY	w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con-	w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very	w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent.
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means	w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent.
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger.	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure	w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent.
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol-	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight.	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR:</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: .</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: . δT/K = 0.05; δx₁/x₁ = 0.01 (estimated by compiler).</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR:</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: . δT/K = 0.05; δx₁/x₁ = 0.01 (estimated by compiler). REFERENCES: 1. Rzad, S.; Claes, P.</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: . δT/K = 0.05; δx₁/x₁ = 0.01 (estimated by compiler). REFERENCES: 1. Rzad, S.; Claes, P. Bull. Soc. Chim. Belges</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: . δT/K = 0.05; δx₁/x₁ = 0.01 (estimated by compiler). REFERENCES: 1. Rzad, S.; Claes, P.</pre>
as shown here. ^b Calculated by compiler for a kPa assuming that Henry's la AUXILIARY METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details	<pre>w and ideal gas law apply. INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: .</pre>

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COMPORENTS:ONIGRAL MEASUREMENTS:1. Ethene; C_2H_1; [74-85-1]Tilquin, B.; Decannière, L.; Fontaine, R.; Claes, P. Am. Soc. Sc. Erwc2lles (Belgium) 1957, 81, 191-199.2. 2,2'-Dimethylbutane (Neo-hexane); C_H1; [75-83-2]Tilquin, B.; Decannière, L.; Fontaine, R.; Claes, P. Am. Soc. Sc. Erwc2lles (Belgium) 1957, 81, 191-199.VARIABLES: T/K: 288.15 L/CT/K: 288.15 C. L. Youngt/CT/KOstwald coefficient, aMole b fraction, b constant bt/CT/KOstwald coefficient, aMole b fraction, constant bt/CT/KOstwald coefficient, aMole b fraction, constant bt/CT/KOstwald coefficient is equivalent to Ostwald coefficient as shown here.Mole b fraction, coefficient is equivalent to Ostwald coefficient as shown here.bCalculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply.NETHOD/APPARATIS/PROCEDURE:SOURCE AND FURITY OF MATERIALS;AUXILLARY INFORMATIONNETHOD/APPARATIS/PROCEDURE:SOURCE AND FURITY OF MATERIALS;1. Source not given; minimum purity specified as 99.0 mole per cent.AUXILLARY INFORMATIONNETHOD/APPARATIS/PROCEDURE:AUXILLARY INFORMATIONNETHOD/APPARATIS/PROCEDURE:1. Source not given; minimum purity specified as 99.0 mole per cent.AUXILLARY INFORMATIONNETHOD/APPARATIS/PROCEDURE:1. Source not given; minimum purity specified as 99.0 mole per cent.AUXILLARY INFORMATIONNot gas datin broasting the pressur	Ì		8
2. 2, 2'-Dimethylbutane (Neo-hexane); C ₄ H ₁₄ ; [75-83-2] Pontaine, R.; Claes, P. Ann. Soc. Sc. Bruzelles (Belgium) <u>1967</u> , 81, 191-199. VARIABLES: P/KP: 2.05-2.11 TK: 288.15 P/KP: 2.05-2.11 PEFARED BY: C. L. Young EXPERIMENTAL VALUES: CostWald Coefficient, a L Mole b fraction, constant b Constant b L Henry's b constant b Constant b L 15.0 288.15 14.56 0.07506 13.32 a Original data at low pressure reported as distribution co- officient; but if Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here. 0.07506 13.32 b Calculated by compiler for a gas partial pressure of 101.325 KPa assuming that Henry's law and ideal gas law apply. Source AND PURITY OF MATERIALS; NII glass apparatus used at very low gas partial pressures, con- taining a replaceable degased sol- vent ampule equipped with a broakablo of a magnetically activated plunger: Quantity of gas fed into system of the could be boken by means of a magnetically activated plunger: Quantity of gas fed into system ditermined by measuring the pressure difficient system of a magnetically activated plunger: Quantity of gas fed into system of a magnetically activated plunger: Quantity of gas fed into system of the per cent. 1. Source not given; minimum purity specified as 99.0 mole per cent. 2. Fluka pure grade; minimum purity specified as 99.0 mole per cent. 3% x = 0.05; ds1/x1 = 0.01 (estimated by compiler). REFERENCES: 1. Rzad, S.; Claes, P. Bull. Soc. Chim. Belges		ORIGINAL MEASUREMENTS:	
T/K: 288.15 $P/KPa: 2.05-2.11$ C. L. YoungEXPERIMENTAL VALUES: t/C T/K Ostwald coefficient, aMole b fraction, fraction,Henry's constant b t/C T/K Ostwald coefficient, aMole b fraction, fraction,Henry's constant b t/C T/K Ostwald coefficient, aMole b fraction, fraction,Henry's constant b t/C T/K Ostwald coefficient, aMole b fraction, fraction, constant b t/C T/K Ostwald coefficient, but if Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here.Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here.Source and pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply.AUXILLARY INFORMATIONMULLIARY INFORMATIONAUXILLARY INFORMATION<	2. 2,2'-Dimethylbutane (Neo-hexane);	Fontaine, R.; Claes, P. Ann. Soc. Sc. Bruxelles	
t/C T/K Ostwald coefficient, aMole fraction, fraction, fraction, fraction, fraction, fraction, fraction, X_1 Henry's constant H/atm 15.0288.1514.560.0750613.32aOriginal data at low pressure reported as distribution co- efficient, but if Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here.0.0750613.32bCalculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply.101.325MUNILIANY INFORMATIONMUNILIANY INFORMATIONMUNIL of gas fed into system of an agnetically activated plunger. Change in a know volume. Outantity of alqued measuring the pressure change in a know volume. Outantity of alqued measured by weight. Pressure change observed after sol- vent released. Change observed after sol-	T/K: 288.15		
t/C T/K coefficient, a fraction, b constant b L x1 H/atm 15.0 288.15 14.56 0.07506 13.32 a Original data at low pressure reported as distribution co- efficient; but if Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here. b b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS; All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by measure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details described by Rzad and Claes, ref. (1) Source and given; minimum purity specified as 99.0 mole per cent. ESTIMATED ERROR: 6 J/K = 0.05; 6x1/x1 = 0.01 (estimated by compiler). REFERENCES: 1. Rzad, S.; Claes, P. Bull. Soc. Chim. Belges	EXPERIMENTAL VALUES:		
 ^a Original data at low pressure reported as distribution coefficient; but if Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here. ^b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. ^b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. ^b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. ^b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. ^b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. ^b Calculated by compiler for a gas partial pressures, containing a replaceable degased solvent angenetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change observed after solvent released. Experimental details described by Rzad and Claes, ref. (1) ^c ATK = 0.05; 6x₁/s₁ = 0.01 (estimated by compiler). ^c REFERENCES: ^c Rzad, S.; Claes, P. Bull. Soc. Chim. Belges 	t/C T/K coefficient	t, ^a fraction ^b	constant ^D
efficient; but if Henry's law and ideal gas law apply, distribution coefficient is equivalent to Ostwald coefficient as shown here. ^b Calculated by compiler for a gas partial pressure of 101.325 kPa assuming that Henry's law and ideal gas law apply. AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details described by Rzad and Claes, ref. (1). REFERENCES: 1. Rzad, S.; Claes, P. Buil. Soc. Chim. Belges	15.0 288.15 14.56	0.07506	13.32
METHOD/APPARATUS/PROCEDURE:SOURCE AND PURITY OF MATERIALS;All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details described by Rzad and Claes, ref. (1).SOURCE AND PURITY OF MATERIALS;1. Source not given; minimum purity specified as 99.0 mole per cent.2. Fluka pure grade; minimum purity specified as 99.0 mole per cent.6 $T/K = 0.05; \delta x_1/x_1 = 0.01$ (estimated by compiler).8REFERENCES: 1. Rzad, S.; Claes, P. Bull. Soc. Chim. Belges			
 All glass apparatus used at very low gas partial pressures, con- taining a replaceable degassed sol- vent ampule equipped with a breakable point which could be broken by means of a magnetically activated plunger. Quantity of gas fed into system determined by measuring the pressure change in a known volume. Quantity of liquid measured by weight. Pressure change observed after sol- vent released. Experimental details described by Rzad and Claes, ref. (1). ESTIMATED ERROR: δ T/K = 0.05; δx₁/x₁ = 0.01 (estimated by compiler). REFERENCES: 1. Rzad, S.; Claes, P. Bull. Soc. Chim. Belges 			
	AUXILIARY	INFORMATION	

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COMPONENTS:		
	ORIGI	NAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85	-1] Sa	hgal, A.; La, H.M.; Hayduk, W.
2. Heptane; C ₇ H ₁₆ ; [142	[-82-5] Car	. J. Chem. Eng. <u>1978</u> , 56,
	35	4-357.
VARIABLES: $T/K = 273 - 323$	PREPA	RED BY:
<i>P/</i> kPa = 101.325		W. Hayduk
EXPERIMENTAL VALUES:	l	
	Mole Fraction	Ostwald Coefficient
⊄/C <i>I</i> /K	Ethene, x_1	L/(cm ³ gas /cm ³ solvent)
0 273.15	0.0284	4.56
25 298.15	0.0198	3.35
50 323.15	0.0143	2.51
	AUXILIARY INFOR	MATION .
METHOD APPARATUS / PROCEDURE :	SOURC	E AND PURITY OF MATERIALS:
A glass apparatus equip a gas storage burette, tube for gas absorption ture internal manometer	a spiral 1, a minia-	
solution storage burett Degassed solvent was ir a constant rate into th spiral by means of a sy while the gas was displ mercury using a mechani ting device for a mercu at a rate required to k gas pressure constant. of the volume of vapor- consumed and volume of required to achieve sat were obtained from whic solubility was calculat temperature fluid was o through a jacket enclos burettes and absorption	2. a was used. a jected at be absorption pringe-pump aced by cal eleva- ary bottle, ceep the Readings free gas solvent curation ch the ced. Constant pringe-pump Readings free gas solvent curation ch the cent curated constant REFE	Ethene was CP grade from Matheson, 99.5 mole % minimum purity. Heptane was chromatography grade from Matheson Coleman and Bell, 99.0 mole % minimum purity. MTED ERROR: $\delta T/K = \pm 2\%$ $\delta T/K = \pm 0.05$ RENCES:

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OMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Ethen	e; C ₂ H ₄ ; [74	-85-1]	Leites, I.L.; Iva	novskii, F.P.
2. Heptan	ne; C ₇ H ₁₆ ; [142-82-5]	Khim. Prom. <u>1962</u> , 1	9, 653-657.
ARIABLES:	<i>T</i> /K = 213	.15 - 253.15	PREPARED BY:	
	p ₁ /kPa = 101	.325	W. Hayd	uk
XPERIMENTA		жину		•
t /C	т /к	¹ log ₁₀ H', H'/mm Hg	² Henry's Constant, H/atm (mole fractio	² Mole Fraction n) ⁻¹ Ethene, x_1
-60	213.15	3.841	9.12	0.1096
-50	223.15	3.965	12.14	0.0824
-20	253.15	4.243	23.02	0.0434
two-compo ¹ Only gra Henry's ² Values	onent solven aphical resu constant (H' of Henry's c	t solutions. lts were availab) were read from onstant (H) and	for the behavior of s a enlarged graphs by mole fraction solubi the graphical result	alues of log of the compiler. lity (x_1) were
two-compo ¹ Only gra Henry's ² Values	onent solven aphical resu constant (H' of Henry's c	t solutions. lts were availab) were read from onstant (H) and	le in this paper; v enlarged graphs by mole fraction solubi	alues of log of the compiler. lity (x_1) were
two-compo ¹ Only gra Henry's ² Values	onent solven aphical resu constant (H' of Henry's c	t solutions. lts were availab) were read from onstant (H) and mpiler based on	le in this paper; v enlarged graphs by mole fraction solubi	alues of log of the compiler. lity (x_1) were
two-composition ¹ Only gr. Henry's ² Values calculat	onent solven aphical resu constant (H' of Henry's c	t solutions. lts were availab) were read from onstant (H) and mpiler based on AUXILIARY	ele in this paper; v enlarged graphs by mole fraction solubi the graphical result	Talues of log of the compiler. lity (x_1) were s.
two-composition ¹ Only gr. Henry's ² Values calculat ² Values calculat A metal dry-ice to a tem The equi in the co purified lation a	onent solven aphical resu constant (H' of Henry's c ed by the co d by the co cryostat was and acetone perature to librium cell ryostat. Th by fraction nd analyzed	t solutions. Its were availab) were read from onstant (H) and mpiler based on AUXILIAR E: cooled with and controlled <u>+</u> 0.05 K. was mounted ie solvent was	The in this paper; v enlarged graphs by mole fraction solubi the graphical result	Aternalis and and aromatography.

O OMPONENTS:	OPICINAL MEASUREATING.
(1) Ethene or ethylene; C ₂ H _A ;	ORIGINAL MEASUREMENTS: McDaniel, A. S.
[74-85-1]	
(2) Heptane; C _{7^H16} ; [142-82-5]	J. Phys. Chem. <u>1911</u> , 15, 587-610.
ARIABLES: T/K = 295.55 - 312.15	PREPARED BY:
$p_1/kPa = 101.3 (1 atm)$	H. L. Clever
XPERIMENTAL VALUES:	
Temperature Mol Fraction	Bunsen a Ostwald b
$t/^{\circ}C$ T/K $10^{2}x_{1}$	$\begin{array}{c} \text{Dursen} & \text{Ostwall} & \text{b} \\ \text{efficient}^{a} & \text{Coefficient}^{b} \\ \alpha & L/\text{cm}^{3} & \text{cm}^{-3} \end{array}$
	3.2071 3.4640
25.0 298.15 2.01	3,1205 3,4061 ^C
	2.8245 · 3.1860 2.7215 3.1100
	~
^a Bunsen coefficient, α/cm^3 (STP)	$cm^{-3} atm^{-1}$.
^b Listed as absorption coefficien Interpreted to be equivalent to	t in the original paper. Ostwald coefficient by compiler.
d Mole fraction and Bunsen coeffi	
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data.	avior. data should be used with caution.
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data.	avior. data should be used with caution.
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data.	avior. data should be used with caution. r more too small when compared INFORMATION
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data.	avior. data should be used with caution. r more too small when compared

MPONENTS:	ORIGINAL MEASUREMENTS:	
. Ethene; C ₂ H ₄ ; [74-85-]	Jadot, R.	
. Heptane; C ₇ H ₁₆ ; [142-82-5] or	J. Chim. Phys. <u>1972</u>	,69,1036-40.
Octane; C ₆ H ₁₈ ; [111-65-9]		
RIABLES: T/K = 298.15	PREPARED BY: C.L. Young	
P/kPa = 101.3		
PERIMENTAL VALUES:		
T/K Henry's Law Constant, H/atm	Mole fraction ⁺ at partial pressure of 101.3 kPa, ^x C ₂ H ₄	#∆H∞ /cal mol ⁻¹ (/J mol ⁻¹)
Heptane; C	27H16; [142-82-5]	
298.15 57.88	0.01728	316 (1322)
Octane; C ₈	H18; [111-65-9]	
298.15 54.26	0.01843	420 (1757)
	of solution at infini	te dilution.
-		te dilution.
	INFORMATION	te dilution.
AUXILIARY THOD/APPARATUS/PROCEDURE: The conventional gas chromatographic technique was used. The carrier tas was helium. The value of Henry's aw constant was calculated from the tetention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at tatm. pressure. There is also ionsiderable uncertainty in the	INFORMATION SOURCE AND PURITY OF MATE	RIALS :
AUXILIARY THOD/APPARATUS/PROCEDURE: The conventional gas chromatographic echnique was used. The carrier as was helium. The value of Henry's aw constant was calculated from the retention time. The value applies to very low partial pressures of gas nd there may be a substantial lifference from that measured at atm. pressure. There is also	INFORMATION SOURCE AND PURITY OF MATE	RIALS :
AUXILIARY THOD/APPARATUS/PROCEDURE: The conventional gas chromatographic echnique was used. The carrier as was helium. The value of Henry's aw constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial lifference from that measured at atm. pressure. There is also considerable uncertainty in the alue of Henry's constant since no	INFORMATION SOURCE AND PURITY OF MATE No details o	RIALS:
AUXILIARY THOD/APPARATUS/PROCEDURE: The conventional gas chromatographic echnique was used. The carrier as was helium. The value of Henry's aw constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at the pressure. There is also considerable uncertainty in the alue of Henry's constant since no allowance was made for surface	INFORMATION SOURCE AND PURITY OF MATE No details of ESTIMATED ERROR: $\delta T/K = \pm 0.05$	RIALS:
AUXILIARY THOD/APPARATUS/PROCEDURE: The conventional gas chromatographic echnique was used. The carrier as was helium. The value of Henry's aw constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at the pressure. There is also considerable uncertainty in the alue of Henry's constant since no allowance was made for surface	INFORMATION SOURCE AND PURITY OF MATE No details of ESTIMATED ERROR:	RIALS:
AUXILIARY THOD/APPARATUS/PROCEDURE: he conventional gas chromatographic echnique was used. The carrier as was helium. The value of Henry's aw constant was calculated from the etention time. The value applies o very low partial pressures of gas nd there may be a substantial ifference from that measured at atm. pressure. There is also onsiderable uncertainty in the alue of Henry's constant since no llowance was made for surface	INFORMATION SOURCE AND PURITY OF MATE No details of ESTIMATED ERROR: $\delta T/K = \pm 0.05$	RIALS:
AUXILIARY THOD/APPARATUS/PROCEDURE: he conventional gas chromatographic echnique was used. The carrier as was helium. The value of Henry's aw constant was calculated from the etention time. The value applies o very low partial pressures of gas nd there may be a substantial ifference from that measured at atm. pressure. There is also onsiderable uncertainty in the alue of Henry's constant since no llowance was made for surface	INFORMATION SOURCE AND PURITY OF MATE No details of ESTIMATED ERROR: $\delta T/K = \pm 0.05$	RIALS:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Ethene; C₂H₄; [74-85-1]</pre>	Jadot, R.
2. Nonane; C ₉ H ₂₀ ; [111-84-2] or	J. Chim. Phys. <u>1972</u> ,69,1036-40.
Decane; $C_{10}H_{22}$; [124-18-5]	
VARIABLES:	PREPARED BY:
T/K = 298.15	C.L. Young
<i>P/</i> kPa = 101.3	
EXPERIMENTAL VALUES:	
T/K Henry's Law Constant, H/atm	Mole fraction ⁺ $\# \Delta H^{\infty}$ at partial pressure /cal mol ⁻¹ of 101.3 kPa, $x_{C_2H_4}$ (/J mol ⁻¹)
Nonane; C ₉	H ₂₀ ; [111-84-2]
298.15 50.97	0.01962 490 (2050)
Decane; Cı	0H22; [124-18-5]
298.15 47.36	0.02111 540 (2259)
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The conventional gas chromatographic technique was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at 1 atm. pressure. There is also considerable uncertainty in the value of Henry's constant since no allowance was made for surface adsorption.	No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.05; \ \delta H = \pm 2\%$ REFERENCES:

OMPONENTS :		ORIG	INAL MEASUREMENTS:
l. Ethene	; C,H,; [74-85-	-1] s	ahgal, A.; La, H.M.; Hayduk, W.
2. Dodecane; $C_{12}H_{26}$; [112-40-3]		2-40-3]	'an. J. Chem. Eng. <u>1978</u> , 56,
		3	54-357.
ARIABLES:	π/κ = 264-339	PREI	ARED BY:
P/k	Pa = 101.325		W. Hayduk
XPERIMENTAL	WAT HEC .		۲
AFERIFENIAL	VALUES:		
		, ,	
-		Mole Fractior	Ostwald Coefficient
t/C	T/K	Ethene, x_1	L/(cm³gas /cm³ solvent)
-9.2	263.95	0.0402	4.08
25	298.15	0.0216	2.35
48	321.15	0.0159	1.81
66	339.15	0.0131	1.55
		AUXILIARY INFO	RMATION
ETHOD /APPAR	ATUS/PROCEDURE:		RMATION RCE AND PURITY OF MATERIALS:
		SOU	RCE AND PURITY OF MATERIALS:
A glass a a gas sto	pparatus equipp prage burette, a	sou bed with 1 A spiral	<pre>RCE AND PURITY OF MATERIALS: . Ethene was CP grade from Matheson, 99.5 mole %</pre>
A glass a a gas sto tube for ture inte	pparatus equipp prage burette, a gas absorption, ernal manometer	bed with I a spiral a minia- and a	<pre>RCE AND PURITY OF MATERIALS: . Ethene was CP grade from Matheson, 99.5 mole % minimum purity.</pre>
A glass a a gas sto tube for ture inte solution Degassed	apparatus equipa prage burette, a gas absorption rnal manometer storage burette solvent was in	bed with 1 spiral a minia- and a was used. 2 jected at	 RCE AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. Dodecane was research grade from Phillips Petroleum of
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by	apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was in it rate into the means of a sym	sou spiral a minia- and a was used. jected at absorption ringe-pump	 RCE AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. Dodecane was research grade
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury t	apparatus equipp orage burette, a gas absorption ernal manometer storage burette solvent was in the rate into the means of a syn a gas was displa	bed with a spiral a minia- and a was used. jected at a absorption ringe-pump aced by cal eleva-	 RCE AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. Dodecane was research grade from Phillips Petroleum of
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate	apparatus equipm orage burette, a gas absorption, arnal manometer storage burette solvent was in at rate into the means of a syn a gas was displa lsing a mechanic ce for a mercun a required to ke	source bed with a spiral a minia- and a was used. jected at a bsorption ringe-pump aced by cal eleva- ry bottle, eep the	 RCE AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity.
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury t ting devi at a rate gas press of the vo	pparatus equipp orage burette, a gas absorption rnal manometer storage burette solvent was in at rate into the means of a syn a gas was displated ising a mechanic ce for a mercunic e required to ke sure constant.	source bed with a spiral a minia- and a was used. jected at absorption ringe-pump aced by cal eleva- cy bottle, eep the Readings free gas	RCE AND PURITY OF MATERIALS: • Ethene was CP grade from Matheson, 99.5 mole % minimum purity. • Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity. IMATED ERROR: $\delta x_1/x_1 = \pm 2\%$
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury t ting devi at a rate gas press of the vo consumed required	pparatus equipp rage burette, a gas absorption rnal manometer storage burette solvent was in a rate into the means of a syn a gas was displa sing a mechanic ce for a mercun e required to ke sure constant. blume of vapor-f and volume of s	bed with a spiral a minia- and a was used. betted at absorption ringe-pump aced by cal eleva- ry bottle, eep the Readings Free gas solvent atton	RCE AND PURITY OF MATERIALS: • Ethene was CP grade from Matheson, 99.5 mole % minimum purity. • Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity. IMATED ERROR: $\delta x_1/x_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed required were obta solubilit	apparatus equipm rage burette, a gas absorption, rnal manometer storage burette solvent was in t rate into the means of a syn a gas was displa ising a mechanic ce for a mercun e required to ke sure constant. olume of vapor- and volume of s to achieve satu ined from which y was calculate	bed with I a spiral a minia- and a e was used. jected at e absorption ringe-pump aced by cal eleva- ry bottle, bep the EST Readings Free gas solvent inthe REF	RCE AND PURITY OF MATERIALS: • Ethene was CP grade from Matheson, 99.5 mole % minimum purity. • Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity. IMATED ERROR: $\delta x_1/x_1 = \pm 2\%$
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed required were obta solubilit temperatu through a	apparatus equipm prage burette, a gas absorption, ernal manometer storage burette solvent was in: at rate into the y means of a syn e gas was displa lsing a mechanic ce for a mercun e required to ke sure constant. Dume of vapor-f and volume of s to achieve satu ined from which y was calculate are fluid was cal	bed with a spiral a minia- and a was used. be absorption cinge-pump aced by cal eleva- cy bottle, bep the Readings free gas solvent iration h the constant rculated ing the	RCE AND PURITY OF MATERIALS: • Ethene was CP grade from Matheson, 99.5 mole % minimum purity. • Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity. IMATED ERROR: $\delta x_1/x_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed required were obta solubilit temperatu through a	apparatus equipa gas absorption rnal manometer storage burette solvent was in t rate into the gas was displa ising a mechanic ce for a mercun required to ke sure constant. olume of vapor- and volume of sa to achieve satu ined from which y was calculate ine fluid was calculate	bed with a spiral a minia- and a was used. be absorption cinge-pump aced by cal eleva- cy bottle, bep the Readings free gas solvent iration h the constant rculated ing the	RCE AND PURITY OF MATERIALS: • Ethene was CP grade from Matheson, 99.5 mole % minimum purity. • Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity. IMATED ERROR: $\delta x_1/x_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed required were obta solubilit temperatu through a	apparatus equipm prage burette, a gas absorption, ernal manometer storage burette solvent was in: at rate into the y means of a syn e gas was displa lsing a mechanic ce for a mercun e required to ke sure constant. Dume of vapor-f and volume of s to achieve satu ined from which y was calculate are fluid was cal	bed with a spiral a minia- and a was used. be absorption cinge-pump aced by cal eleva- cy bottle, bep the Readings free gas solvent iration h the constant rculated ing the	RCE AND PURITY OF MATERIALS: • Ethene was CP grade from Matheson, 99.5 mole % minimum purity. • Dodecane was research grade from Phillips Petroleum of 99.0 mole % minimum purity. IMATED ERROR: $\delta x_1/x_1 = \pm 2\%$ $\delta T/K = \pm 0.05$

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Ethene (Ethylene); C₂H₄ [74-85-1]</pre>	Lenoir, J-Y.; Renault, P.; Renon, H.
2. Hexadecane; C ₁₆ H ₃₄ ; [544-76-3] or Heptadecane; C ₁₇ H ₃₆ ; [629-78-7]	J. Chem. Eng. Data <u>1971</u> , 16, 340-2.
VARIABLES:	PREPARED BY:
<i>T/K</i> = 298.15, 323.15 <i>P/</i> kPa = 101.3	C.L. Young
EXPERIMENTAL VALUES:	· · · · · · · · · · · · · · · · · · ·
T/K Henry's co $H_{C_2H_4}/at$	
Hexad	ecane
298.15 42.	8 0.0234
Hepta	decane
323.15 52.	
	· · · · · · · · · · · · · · · · · · ·
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chromato- graphic unit fitted with a thermal conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at l atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface adsorption was not allowed for although its possible existence was noted.	
	1

OMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Ethene; C_2H_4 ; [74-85-1]	Ng. S.; Harris, H.G.; Prausnitz, J.M.	
 Octadecane; C₁₈H₃₈; [593-45-3], Eicosane; C₂₀H₄₂; [112-95-8], or 	J. Chem. Eng. Data	
Docosane; $C_{22}H_{46}$; [629-97-0]	<u>1969</u> , 14, 482-3.	
ARIABLES:	PREPARED BY:	
T/K = 308.2 - 473.2	C. L. Young	
<i>P</i> /kPa = 101.3		
XPERIMENTAL VALUES:		
T/K Henry's constant /atm	, H ¹ Mole fraction ethene, x_1	
Octadecane; C ₁₈ H ₃₆ ; [593-4	.5-3]	
308.2 42.5	0.0235	
323.2 50.6 343.2 61.8	0.0198 0.0162	
343.2 $51.8363.2$ 74.4	0.0134	
373.2 81.8	0.0122	
423.2 114	0.00877	
Eicosane; C ₂₀ H ₄₂ ; [112-95-	8] 0.0198	
323.2 50.5 343.2 61.9	0.0198	
373.2 79.8	0.0125	
393.2 92.6	0.0108	
413.2 106.4	0.00940	
Docosane; $C_{22}H_{46}$; [629-97-	-0]	
333.2 53.6 383.2 82.6	0.0187 0.0121	
408.2 99.6	0.0100	
433.2 112.7	0.00887	
453.2 128 473.2 147	0.00781 0.00680	
¹ Calculated by compiler for a partia.	l pressure of 101.3 kPa assuming	
a mole fraction equal to 1/H.		
AUXILIARY IN		
IETHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Gas chromatographic method. Solvent supported on Chromosorb P in 6m column. Gas injected as sample,	1. Matheson sample, purity greater than 99 mole per cent.	
helium used as carrier gas. Henry's law constant calculated from know-	2. Matheson, Coleman and Bell sample, m.p.t.:	
ledge of retention time and flow rate.	Octadecane 27-28.5 °C Eicosane 35-36.5 °C	
	Docosane 43-45 °C	
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.1; \delta H/atm = \pm 5\%$	
	REFERENCES:	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C_2H_4 ; [74-85-1]	Simon, F.; Lukacs, J.
2. Tetracosane, 2,6,10,15,19,23-	Magy. Asvanyolaj-Foldaz. Intez.
hexamethyl (squalane); $C_{30}H_{62}$; [110-01-3]	Kozl. (Hungary) <u>1977</u> ,18, 57-66.
[110-01-5]	
VARIABLES:	PREPARED BY:
T/K = 293.15 - 333.15	W. Hayduk
$p_1/kPa = 101.325$	
EXPERIMENTAL VALUES:	••••••••••••••••••••••••••••••••••••••
¹ Bunsen Coefficient	² Ostwald Coefficient
$K_{\rm cm^3}$ gas at NTP	L /cm ³ gas ² Mole Fraction
t/C T/K ^B cm ⁻³ solvent	cm^{-3} solvent Ethene, x_1
20 293.15 1.66	1.78 0.0373
40 313.15 1.25	1.43 0.0289
50 323.15 1.09 60 333.15 0.970	1.30 0.0257 1.18 0.0230
² The Ostwald coefficient and mole fra calculated by the compiler. The solv Also available in the paper were ethe transformer oils, the properties of w	vent densities were extrapolated. ene Bunsen coefficients in four
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The gas solubility was determined using gas chromatography and employing helium as a carrier gas. Based on the retention times and column characteristics, the Bunsen coefficient was calculated.	Sources and purities of gas and solvent not specified.
	ESTIMATED ERROR: $\delta T/K = \pm 0.1$ $\delta p_1 / kPa = 2.0$ $\delta K_B = \pm 6-8$ (authors) REFERENCES:

	MPONENTS:			ENTS:
<pre>l. Ethene; C₂H₄; [74-85-1]</pre>			Sahgal, A.;	Hayduk, W.
2. Hexane; C ₆ H ₁₄ ; [110-54-3]		J. Chem. Eng.	Data <u>1979</u> ,24, 222-227	
3. Dodecane; $C_{12}H_{26}$; [112-40-3]				
ARIABLES: T/K = 298.15			PREPARED BY:	
x_3 /Mole F:	= .101.325 raction = 0-1.	.0	W. Hayd	luk
XPERIMENTAL VAL	.0ES:			
	Concentration	of Solvent	Ethene	e Solubility
<i>t/</i> C <i>T</i> /K	z ₃ , Volume Fraction ¹	x_3 , Mole Fraction ²	Mole Fraction Ethene, x1	Ostwald Coefficient L/(cm ³ gas/cm ³ solvent)
25 298.1	(Hexane) 5 0 0.241 0.380 0.422 0.502 0.578 0.821 0.922 1.0 (Dodecane)	0 0.155 0.261 0.296 0.367 0.442 0.722 0.871 1.000	0.0207 0.0207 0.0206 0.0205 0.0206 0.0205 0.0205 0.0207 0.0214 0.0216	3.91 3.51 3.27 3.17 3.06 2.92 2.564 2.470 2.352
mixing.			-	components before
mixing. ² Mole fract:	ion is shown c	on a gas-fre s were previ	e basis. ously given (in	-
mixing. ² Mole fract: Values for	ion is shown c pure solvents	on a gas-fre s were previ	e basis. ously given (in INFORMATION	n reference 1).
mixing. ² Mole fract: Values for ETHOD/APPARATUS The apparatu flow of dead into a glass by means of pump. The r prepared vol ated and a a density me lift device ously adjust at constant storage bure and gas cons to calculate paper also i densities ar as well as e	ion is shown c pure solvents	AUXILIARY AUXILIARY Continuous injected spiral tube syringe was chen deaer- yzed by A mercury continu- dual volume a gas injection s were used s. This tion indices ar	e basis. ously given (ir INFORMATION SOURCE AND PURITY 1. Ethene wa Matheson of 99.5 m used at 2 kPa was 2 2. Hexane wa purity 99 3. Dodecane from Phil 99.0 mole ESTIMATED ERROR: T/K = ± (n reference 1).

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COMPONENTS: 1. Ethene; $C_{2}H_{4}$; [74-85-1]	EVALUATOR: Walter Hayduk
	Department of Chemical Engineering
2. Propene and Alkanes from C_3 to C_{36} ;	University of Ottawa
for pressures greater than 0.2 MPa	Ottawa, ON
(2 atm)	Canada K1N 6N5
	June, 1993

CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubility in Propene and in Ten Alkanes

from Propane (C₃) to Hexatriacontane (C₃₆), for pressures exceeding 0.2 MPa

There are surprisingly few data for solubilities of ethene in alkane solvents at higher pressures and for some of these data it is not possible to accurately determine the gas partial pressures.

Ethene solubilities in individual solvents are now discussed:

Propane; C₃H₈; [74-98-6] Propene; C₃H₆; [115-07-1]

Elshayal and Lu (1) reported ethene solubilities in propane for total pressures from 0.14 MPa to 3.92 MPa and for temperatures ranging from 199.8 K to 273.2 K. To check for consistency, the data were plotted as log x versus log p. Data for each isotherm were essentially linear over the whole range of partial pressures.

Although propene is not an alkane, the data for this solvent are included here because it is the only alkene for which data are available. The data of Rozhnov and Dorochinskaya (2) for 303.15 K and 323.15 K are reported only as Henry's constants.

Both of the above data are classified as tentative.

2-Methylpropane (isobutane); C₄H₁₀; [75-28-5]

The most extensive solubilities of ethene in 2-methylpropane solvent are those of Naumova and Tyvina (3) which span a temperature range from 293.15 K to 393.15 K and a pressure range from 0.30 MPa to 6.08 MPa. For constant temperatures all the data are essentially linear on a log x versus log p graph. There is a minimum solubility at a temperature of approximately 360 K. This is consistent with data for other gases of low solubility. The results of Kozorozov and Lisin (4) are consistent with those of Naumova and Tyvina at 333.15 K.

Both of the above data are classified as tentative.

The two solubilities of Benedict et al. (5) for 310.93 K and 455.26 K appear to be significantly lower than those from the other two sources for corresponding temperatures and pressures and are rejected.

Hexane; C₆H₁₄; [110-54-3] Heptane; C₇H₁₆; [142-82-5]

Konobeev and Lyapin (6) reported solubilities for ethene in both nhexane and n-heptane at temperatures from 293.15 K to 333.15 K and total pressures from 0.29 MPa to 3.2 MPa. However, the corresponding ethene partial pressures or gas phase compositions were not given. As expected, the solubilities in hexane and heptane are very similar in magnitude for the same temperatures and pressures. These data are classified as tentative.

Paratella (7) reported ethene solubilities in n-heptane for high temperatures, from 373.15 K to 473 K, and high total pressures, from 4.05 MPa to 10.13 MPa. Whereas these data appear self-consistent, no other comparable results are available. The data of Paratella are classified as tentative. COMPONENTS: 1. Ethene; C₂H₄; [74-85-1] 2. Propene and Alkanes from C₃ to C₃₆; for pressures greater than 0.2 MPa (2 atm) EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada KIN 6N5 June, 1993

CRITICAL EVALUATION:

Ethene solubilities in n-heptane were reported by Shenderei and Ivanovskii (8) for relatively low temperatures from 228.15 K to 248.15 K and for total pressures from 0.55 MPa to 1.66 MPa. Henry's constants were also given which permitted extrapolation of these data to solubilities corresponding to a pressure of 101.32 kPa. A comparison of the extrapolated Shenderei and Ivanovskii data with that obtained at low pressure (101.32 kPa) is very favorable, probably because both data were products of the same laboratory. These data are classified as tentative.

Octane; C₈H₁₈; [111-65-9] Nonane; C₉H₂₀; [111-84-2] Dodecane; C₁₂H₂₆; [112-40-3]

Data reported by Shenderei and Ivanovski (8) for ethene solubilities in n-octane are for the three temperatures 248.15 K, 238.15 K and 228.15 K and for pressures ranging from 0.25 MPa to 1.48 MPa. These low temperature data are entirely self-consistent.

Solubilities for ethene in n-nonane as reported by Konobeev and Lyapin (6) are for the temperatures 293.15 K, 313.15 K and 333.15 K and for total pressures ranging from 0.29 to 3.2 MPa. These data are entirely self-consistent.

The data for ethene solubilities in n-dodecane reported by Ribeiro et al. (10) are for relatively large temperature and pressure ranges, from 283.15 K to 348.15 K and from 0.51 MPa to 9.1 MPa. These data are also entirely self-consistent and are approximately consistent (within 8%) with the low pressure solubilities in n-dodecane.

The above data for n-octane, n-nonane and n-dodecane are classified as tentative.

Eicosane; C₂₀H₄₂; [112-95-8] Octacosane; C₂₈H₅₈; [630-02-4] Hexatriacontane; C₃₆H₇₄; [630-06-8]

Only the work of Chou and Chao (11) is available for the three waxlike paraffinic solvents at the relatively high temperatures from 373 K to 573 K and total pressures from 0.51 MPa to 9.12 MPa. These data are consistent with those of lower molecular weight alkane solvents and are classified as tentative.

References

- 1. Elshayal, I.M.; Lu, B.C.-Y. Can. J. Chem. Eng. 1975, 53, 83-87.
- Rozhnov, M.S.; Dorochinskaya, G.S. Teploviz. Stoistva. Veshchestv. 1969, 140-146.
- Naumova, A.S.; Tyvina, T.N. Zh. Prikl. Khim. <u>1981</u>, 2757-2758 (English Translation 2440-2441).
- 4. Kozorzov, Yu, E.; Lisin, V.E. Khim. Prom. 1978, 6, 475.
- 5. Benedict, M.; Solomon, E.; Rubin, L.C. Ind. Eng. Chem. 1945, 37, 55-59.
- 6. Konobeev, B.I.; Lyapin, V.V. Khim. Prom. 1967, 43, 114-116.
- 7. Paratella, A. Riv. Combus. <u>1963</u>, 17, 334-341.

2. Pro for	TS: ne; C ₂ H ₄ ; [74-85-1] pene and Alkanes from C ₃ to C _{36;} pressures greater than 0.2 MPa atm)					
CRITICAL	EVALUATION:					
8. She	nderi, E.R.; Ivanovskii, F.P. K	him. Prom. <u>1963</u> , <i>91</i> , 18-37.				
9. Kay	, W.B. Ind. Eng. Chem. <u>1948</u> , 40	, 1459-1464.				
	10. Ribeiro, W.J.; Susu, A.A.; Kohn, J.P. <i>J. Chem. Eng. Data</i> <u>1972</u> , 17, 79- 80.					
11. Cho	u, J.S.; Chao, K.C. J. Chem. En	g. Data <u>1989</u> , 34, 68-70.				
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	ORIGINAL MEASUREMENTS:
1. Ethene; C,H,; [74-85-1]	Rozhnov, M.S.; Dorochinskaya, G.S.
2. Propene, C_3H_6 ; [115-07-1]	
2. Flopeney C ₃ n ₆ , [113-07-1]	Teploviz. Svoistva. Veshchestv.
	<u>1969</u> , 140-146.
VARIABLES:	PREPARED BY:
T/K = 303.15, 323.15	W. Hayduk
P/MPa = to 4.05	
EXPERIMENTAL VALUES:	
t/C I/K ¹ Henry's Constant, H/ atm (mol fraction) ⁻¹	² Mole Fraction ³ Vapor-liquid Ethene, x_1 Equilibrium Constant, α
30 303.15 62.36	0.01604 2.55
50 323.15 83.33	0.01200 2.67
¹ Actual data were shown in the form were listed in the paper.	of a graph only; Henry's constants
partial pressure of 101.3 kPa. Henr apply to 4.05 MPa (40 atm) total pre-	ssure.
³ The authors showed that the vapor-1 were described by the following equa	
$x_1 + y_1 = \alpha \log (P/P_2^{o})$	
For: α = Vapor-liquid equilibrium	constant
x_1 , y_1 = Ethene mole fraction in	liquid and gas phases, respectively
P = Total pressure	
P = Total pressure P ₂ ° ≖ Propene vapor pressure	
$P_2^{\circ} = Propene vapor pressure$	INFORMATION
$P_2^{\circ} = Propene vapor pressure$	INFORMATION SOURCE AND PURITY OF MATERIALS:
$P_2^{\circ} = $ Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo-	SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A	SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given.
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The	 SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95%
P_2° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in	SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	 SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95%
P_2° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant	 SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95%
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	 SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95%
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	 SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95% pure.
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	 SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95% pure. ESTIMATED ERROR:
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	<pre>SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95% pure. ESTIMATED ERROR:</pre>
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	<pre>SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95% pure. ESTIMATED ERROR:</pre>
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	<pre>SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95% pure. ESTIMATED ERROR:</pre>
P ₂ ° = Propene vapor pressure AUXILIARY METHOD/APPARATUS/PROCEDURE: The gas-liquid equilibrium compo- sitions for the binary system were analyzed by chromatography. A membrane pressure gauge was used for measuring pressure. The equilibrium vessel of 110 cm ³ in volume, was placed in a constant temperature bath. A magnetic	<pre>SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not given. 2. Propene purity measured by chromatography to be 99.95% pure. ESTIMATED ERROR:</pre>

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COMPONENTS:	a		0	ORIGINAL MEASUREMENTS:			
1. Ethene;	C ₂ H ₄ ; [74	1-85-1 J		Elshayal, I.M.; Lu, B.C-Y.			
2. Propane; C ₃ H ₈ ; [74-98-6]				Can. J. Chem. Eng. <u>1975</u> , 53, 83-87.			
VARIABLES:			P	REPARED BY:			
T/K = 200-273				W. Ha	yduk		
P/MPa =	0.14-3.9	2, (1.4-39 at	.m)		• · · · · · · · · · · · · · · · · · · ·		
EXPERIMENTAL							
	Total P:		Partia	ial Pressure n ¹ /MPa liquid r vapor			
<i>Т/</i> К	P/atm	<i>Р</i> /МРа	р	1/MPa	liquid x1	vapor y ₁	
199.83	1.41 1.64 1.84 2.56 3.66 4.13	0.1429 0.1662 0.1864 0.2594 0.3708 0.4185	0 0 0 0	.1270 .1512 .1721 .2482 .3653 .3860	0.2505 0.3025 0.3469 0.522 0.9159 0.9159	0.8890 0.9098 0.9233 0.9567 0.9224 0.9224	
227.9	2.99 4.00 5.43 7.07 9.15 11.34	0.3030 0.4053 0.5502 0.7164 0.9271 1.149	0 0 0 0	2255 3334 4874 6651 8934 139	0.1856 0.2755 0.4065 0.5577 0.7485 0.9355	0.7444 0.8226 0.8858 0.9284 0.9636 0.9909	
255.38	3.77 8.08 11.27 11.82 12.67 12.82 17.09 19.37 24.78	0.3820 0.8187 1.141 1.198 1.284 1.299 1.732 1.963 2.511	0 0 1 1 1	.1222 .5851 .9328 .9933 .087 .103 .580 .840 2.477	0.054 0.254 0.4 0.425 0.463 0.4702 0.6565 0.7505 0.949	0.3198 0.7147 0.8169 0.8294 0.8466 0.8495 0.9127 0.9377 0.9865	
¹ Calculat	ed by com	piler.			continued.	• • •	
		A11 V 1		NFORMATION			
	THE (PROGRAM						
drilled in cell was e dows, with measuremen for the li low temper immersing the cell i vided with and utiliz electric h was surrou jacket for magnetic p used. In	ibrium cel nto a copp equipped w n gauges f nt and tem iquid and ratures we the coppe in liquid n a pressu zing an in neater. T unded by a r insulati plunger-ty most of t liquid pha	l was a chamb er rod. The ith viewing v or pressure	oer vin- oles The by of c lf f c c c s c c c c c c c c c c c c c c	l. Ethene purity	OR: ± 1% δ <i>T</i> /K =	of purity	

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COMPONENTS:		1	ORIGINAL MEASURE			
	; C ₂ H ₄ ; [74-85-1		Elshayal, I.M.; Lu, B.C-Y. Can. J. Chem. Eng. <u>1975</u> , 53, 83-87.			
2. Propan	e; C ₃ H ₈ ; [74-98-	6]	Can. J. Chem. E	mg. <u>1975</u> , 53,	83-87.	
VARIABLES: T/K = 200-273 P/MPa = 0.14-3.92, (1.4-39 atm)		PREPARED BY:				
		4-39 atm)	W. Hayduk			
EXPERIMENTAL	WAT UPO	tinued		•		
	Total Pressur		al Pressure	Mole Fracti	on Ethene	
<i>Т/</i> К	P/atm P/MP		p_1^1/MPa	liquid, x	vapor, y ₁	
273.06	7.72 0.78 10.53 1.06 11.79 1.19	7 5	0.3208 0.6208 0.7561	0.0996 0.1905 0.2308	0.4101 0.5818 0.6329 0.7316	
	15.24 1.54 17.66 1.78	9	1.130 1.394	0.3402 0.4157	0.7793	
	20.13 2.04 22.00 2.22		1.667 1.875	0.4915 0.5466	0.8175 0.8410	
	24.53 2.48 25.96 2.63		2.161 2.323	0.6216 0.6617	0.8693 0.8832	
	29.13 2.95	2	2.689 3.046	0.7478	0.9111 0.9350	
	32.15 3.25 35.41 3.58 38.69 3.92	8	3.442 3.856	0.8980	0.9593	
'Calcula	ted by compiler.					
		AUXILIARY	INFORMATION			
	RATUS/PROCEDURE:		SOURCE AND PURIT			
drilled i	ibrium cell was nto a copper rod	l. The		om Matheson c .9 mole %.)I	
cell was dows, wit measureme for the l low tempe immersing the cell	equipped with vi ch gauges for pre- ent and temperatu- int using two the iquid and gas ple- eratures were ach the copper exter in liquid nitroo ch a pressure cor	ewing win- essure ermocouples bases. The bieved by ension of gen pro-	2. Propane f 99.9 mole	rom Matheson	of purity	
and utili	zing an intermed heater. The cel	liate	NORTHER			
was surro jacket fo magnetic	ounded by a steel or insulation. A plunger-type sti	vacuum An electro- Arrer was	1	\$ δ <i>T</i> /K =	= 0.02	
used. In	n most of the exp liquid phase was	periments	$\delta P/P = \pm 0$ REFERENCES:	.5%		

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				ORIGINAL MEASUREMENTS:			
1. Ethene; C ₂ H ₄ ; [74-85-1]			Naumova, A.A.; Tyvina, T.N.				
2. 2-Methylpropane (isobutane); C ₄ H ₁₀ ; [75-28-5]			Zh. Prikl. Khim. <u>1981</u> , 54, 2757-8.				
			or J. Appl. Ch 2440-1.	em. USSR <u>198</u>	<u>1</u> , 54,		
VARIABLES: $T/K = 293.15 - 393.15$ P/MPa = 0.30 - 6.08, (3-60 atm)				PREPARED BY: W. Hayduk			
<i>t /</i> C	Т/К	Total Pro P/10 ³ hPa	essure F ¹ <i>P</i> /MPa	artial Pressure p_1/MPa		ction	
20	293.15	2.98 10.1 20.3 30.4	0.298 1.01 2.03 3.04	0 0.713 1.746 2.815	0 0.198 0.427 0.605	0 0.706 0.860 0.926	
		40.5	4.05	3.831 4.807	0.765 0.895	0.946 0.950	
40	313.15	5.22 10.1 20.3 30.4 40.5 50.6 60.8	0.522 1.01 2.03 3.04 4.05 5.06 6.08	0 0.505 1.462 2.420 3.382 4.296 5.168	0 0.100 0.285 0.445 0.587 0.718 0.845	0 0.500 0.720 0.796 0.835 0.849 0.850	
60	333.15	8.63 10.1 20.3 30.4 40.5 50.6 60.8	0.863 1.01 2.03 3.04 4.05 5.06 6.08	0 0.131 1.096 1.961 2.835 3.653 4.408	0 0.025 0.187 0.334 0.460 0.576 0.685	0 0.130 0.540 0.645 0.700 0.722 0.725	
¹ Calcu	lated by	compiler.			c	ontinued	
	0	<u> </u>	AUXILIARY	INFORMATION			
METHOD/A	PPARATUS/PH	ROCEDURE:		SOURCE AND PURITY O	F MATERIALS:		
	tic type ment was	of solubil: used.	ity	 Ethene sour given. 	ce and purit	y not	
				2. 2-Methylpro purity not	pane source given.	and	
			ESTIMATED ERROR: $\delta T/K = \pm 0.5$				
					$x = \pm 0.02$	• • •	
				REFERENCES:	(comp	oiler)	

OMPONEN	TS:				ORIGINAL MEASUREMEN	TS:	10	
1. Et	hene; C ₂ H	i ₄ ; [74-85-1]		Naumova, A.A.; Tyvina, T.N.			
<pre>2. 2-Methylpropane (isobutane); C₄H₁₀; [75-28-5]</pre>				Zh. Prikl. Khim. <u>1981</u> , 54, 2757-8.				
C ₄ H ₁₀ ; [/5-28-5]				or J: Appl. C	h <i>cm. USSR</i> <u>198</u>	1, 54,		
				2440-1.				
/ARIABLE	VARIABLES: T/K = 293.15-393.15				PREPARED BY:			
		30-6.08, (3			W. Haydu	k		
<u> </u>						•		
XPERIME	NTAL VALUE	S:contin	ued					
					¹ Ethene	Ethe		
t/C	T/K	Total Pre P/10 ^{3 ·} hPa		P	artial Pressure p ₁ /MPa	Mole Frag Liquid,x ₁	Gas, y	
80	353.15	13.43	1.343		0	0	0	
		20.3	2.03		0.641	0.096	0.316	
		30.4 40.5	3.04 4.05		1.450 2.195	0.225 0.349	0.477 0.542	
		50.6	5.06		2.914	0.458	0.576	
		60.8	6.08		3.567	0.565	0.585	
100	373.15	19.93	1.993		0	0	0	
		20.3 30.4	2.03 3.04		0.016 0.775	0.005 0.130	0.008	
		40.5	4.05		1.462	0.241	0.361	
		50.6	5.06		2.964	0.350	0.408	
120	393.15	28.38	2.838		0	0	0	
		30.4 40.5	3.04 4.05		0.109 0.648	0.024 0.140	0.036 0.160	
		compiler.	AUXILI	ARY	INFORMATION			
ETHOD//	APPARATUS/P	ROCEDURE:			SOURCE AND PURITY O	OF MATERIALS:		
A sta equip	atic type pment was	of solubil: used.	ity		l. Ethene sou given.	rce and purit	y not	
					 2-Methylpropane source and purity not given. 			
					ESTIMATED ERROR:	$T/K = \pm 0.5$	<u></u>	
						$/x_{1} = \pm 0.02$ (comp	iler)	
					REFERENCES:			
				_				

COMPONENTS :)		·····	ORIGINAL MEASUREMENTS:	•	- <u></u>	
1. Ethene; C _{,H} ; [74-85-1]				Benedict, M.; Solomon, E.;			
				Rubin, L.C.			
<pre>2. 2-Methylpropane (isobutane); C H ; [75-28-5] VARIABLES: T/K = 310.93, 344.26</pre>				1 ·	3045 37		
				Ind. Eng. Chem.	<u>1945</u> , <i>b</i> ,	22-22.	
				PREPARED BY:			
P/M	1Pa = 3.447	(34.02 at	tm)	W. Hayduk			
XPERIMENT	AL VALUES:			I			
	<i>Т/</i> К	Total Pr P/atm	ressure ¹ P/MPa	¹ Ethene Partial Pressure p/MPa		hene Traction Gas,y	
37.78	310.93	34.02	3.447	2.897	0.497	0.8405	
71.11	344.26	34.02	3.447	2.151	0.296	0.624	
-			all chac	are available for	the two-com	ne nponent	
-			all that	are available for	the two-com	nponent	
				are available for T	the two-com	nponent	
	ARATUS / PROCE					nponent	
A steel solubil solvent mercury piston measure aided h content sampled cell to constar remains and a l The gas content		DURE: sements. In mercury. stact with is for pre- milibration the cell a gas is s flows int. pressure only liqui. sure is in ble is obt. sities and cmined for	AUXILIARY he The The a free- ssure n is and lowly o the d ncreased ained. d olefin	INFORMATION SOURCE AND PURITY OF 1. Ethene, anes obtained fro It was purif distillation have 0.5 mol 2. 2-Methylprop was from Phi with a purit ESTIMATED ERROR: δT/ δP/	MATERIALS: thesia grad m Ohio Chem ied by flas and estima e % ethane. ane of the llips Petro y of 99.2%. $K = \pm 0.02$ $P = \pm 0.001$ $= \pm 0.02$	de, was nical. sh ated to CP grade pleum	

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OMPONENT	S:			ORIGINAL MEASURE	MENTS:		
1. Eth	ene; C_2H_4	; [74-85-1]		Kozorezov,	Kozorezov, Yu.I.; Lisin, V.E.		
<pre>2. Propane, 2-methyl (isobutane); C₄H₁₀; [75-28-5]</pre>			utane);	Khim. Prom.	<u>1978</u> , 6, 475.		
ARIABLES	T/K = 2	93-333		PREPARED BY:	duk		
	P/MPa = 0	.097-0.782		W. Hay	duk .		
XPERIMEN	TAL VALUES:	Gas Partia	l Pressure	l	Solubility		
t /c	T/K1		p ₁ /MPa ¹		(g) ⁻¹ x ₁ ,mole fractio		
20	293.15	0.96 1.93 2.89 4.82 7.72	0.097 0.196 0.293 0.488 0.782	13.17 28.85 40.86 75.27 122.40	0.033 0.070 0.096 0.162 0.241		
30	303.15	0.96 1.93 2.89 4.82 7.72	0.097 0.196 0.293 0.488 0.782	11.52 23.30 34.98 62.43 102.60	0.029 0.057 0.083 0.139 0.210		
40	313.15	0.96 1.93 2.89 4.82	0.097 0.196 0.293 0.488	9.22 19.84 32.20 54.51	0.023 0.049 0.077 0.124		
60	333.15	0.96 1.93 2.89 3.86	0.097 0.196 0.293 0.391	7.43 14.00 22.20 36.12	0.019 0.035 0.054 0.089		
Alth	ulated by hough Henry listed her	y's law con	lata obey	e calculated b Henry's law on INFORMATION	y authors, they are ly very approximately		
ETHOD/AP	PARATUS/PROC	CEDURE:		SOURCE AND PURIT	Y OF MATERIALS:		
temper 400-45 The ve mixer isobut pressu satura for ch Method	ature was 0 cm ³ of 1 essel was p for equili- cane was sa ire with ga ted soluti- promatograp for detei	l kept at c charged wi liquid isob provided wi ibration. aturated at as. A samp ion was wit phic analys rmining gas	th utane. th a Constant le of the ndrawn is. partial	-	urity 99.6%. e purity 99.3%.		
pressu	ire was not	: given in	paper.	ESTIMATED ERROR $\delta s/s =$			
				REFERENCES:			

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08		
COMPONENTS:		ORIGINAL MEASUREMENTS:
1. Ethene; C_2H_4 ;	[74-85-1]	Konobeev, B.I.; Lyapin, V.V.
2. Heptane; C ₇ H ₁₆	; [142-82-5]	Khim. Prom. <u>1967</u> ,43, 114-6.
VARIABLES: m (W 20	3.15 - 333.15	PREPARED BY:
$\frac{T}{K} = 29$ $\frac{P}{MPa} = 0.$		
r/mra - 0.	20 - 3.2	C. L. Young
EXPERIMENTAL VALUES:	<u>, 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 199</u>	L
<i>T/K</i>	P/10 ⁵ Pa	Mole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$
293.15	3.090 8.106 15.60	0.060 0.156 0.291
313.15	32.12 2.827 8.248 17.43	0.576 0.040 0.123 0.266
333.15	32.42 2.847 8.278 17.53 32.53	0.471 0.031 0.100 0.221 0.396
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PROC	EDURE:	SOURCE AND PURITY OF MATERIALS:
magnetic stirrer.	m cell fitted with Samples analysed aphy. Details in	1. Purity better than 99.6 mole per cent.
source.		2. No details given.
		ESTIMATED ERROR:
		$\begin{cases} \delta T/K = \pm 0.1; \delta P = \pm 0.58; \delta x_{C_2 H_4} = \pm 0.002 \\ \text{(estimated by compiler)} \end{cases}$
		REFERENCES:

COMPONENTS: 1. Ethene; C.II.;		ORIGINAL MEASUREMENTS:
	[74-85-]]	Konobeev, B.I.; Lyapin, V.V.
		Khim. Prom. <u>1967</u> , 43, 114-6.
2. Hexane; C ₆ H ₁₄	; [110-54-3]	knim. Prom. <u>1907</u> , 43, 114-0.
VARIABLES:		PREPARED BY:
$\frac{1}{K} = 29$ $\frac{P}{MPa} = 0$	3.15 - 333.15 29 - 3.2	C. L. Young
EXPERIMENTAL VALUES:		·
<i>Т/</i> К	P/10 ⁵ Pa	Mole fraction of ethene in liquid ^x C ₂ H ₄
293.15	3.090 8.106 15.50 17.43 31.92	0.056 0.153 0.285 0.318 0.573
313.15	2.878 8.177 17.53 32.32	0.040 0.129 0.267 0.464
333.15	2.888 8.238 17.63 32.42	0.025 0.092 0.207 0.364
1999 - 1 999 - 199	AUXILIAR	Y INFORMATION
METHOD/APPARATUS/PROC Static equilibriu magnetic stirrer. by gas chromatogr source.	m cell fitted with Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given.
Source.		
		ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta P = \pm 0.5 *; \delta x_{C_2 H_4} = \pm 0.002$
		(estimated by compiler)
		REFERENCES:

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COMPONENTS:	· · ·		ORIGINAL MEASUREMENTS	:	
1. Ethene; $C_2 H_4$;	[74-85-1]		Shenderei, E.R.; Ivanovskii, F.P.		
2. Heptane; C ₇ H ₁₀	; [142-82-	5]	Khim. Prom. <u>19</u>	<u>963</u> , <i>91</i> , 18-37.	
VARIABLES: T/K =	228.15 - 2	248.15	PREPARED BY: W. Hayduk		
P/MPa =	0.552 - 1.	663	-		
EXPERIMENTAL VALUES:			A		
t/C ¹ T/K	P/Atm	¹ P/MPa	Mole fraction ethene, x_1	Solubility cm ² (STP)/g	
-25 248.15 -35 238.15 ¹ Calculated by c Henry's constant for low pressure T/K H/Atm (mole fra	determined range show	0.552 0.556 0.876 0.902 1.033 1.382 1.493 1.597 1.663 0.551 0.561 0.786 0.867 1.305 1.309 4 for pressive ving that Here 228.15 13.5	enry's law is obey 238.15	248.15 20.9	
				continued	
		AUXILIARY		······	
METHOD/APPARATUS/PROCEDURE: The apparatus utilized an absorp- tion tube with a magnetic stirrer. The temperature controlled bath had two compartments, one contain- ing methanol solution, the other containing solid dry ice in acetone. The walls of the vessels served as the heat transfer medium. Capillary tubing connected the absorber to pressure devices, gas and solvent vessels and a vacuum system. A known amount of solvent was charged into the absorber and the quantity of gas was determined by pressure difference in the gas supply vessel.			<pre> δx1/2 REFERENCES: 1. Shenderei, E.I Ya.D.; Ivanova </pre>	analyzed by GC. not given. $K = \pm 0.1$ $w_1 = \pm 2$ (compiler) R.; Zelvenski,	

				111	
COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Ethene; $C_2 H_4$;	[74-85-1]		Shenderei, E.R.; Ivanovskii, F.P.		
2. Heptane; C ₇ H ₁	₆ ;[142-82·	-5]	Khim. Prom. <u>196</u>	<u>3</u> , ⁹¹ , 18-37.	
VARIABLES: T/K =	228.15 - 2	248.15	PREPARED BY: W. Haydu	le .	
L	0.552 - 1		w. nayuu	,	
EXPERIMENTAL VALUES:					
t/C ¹ T/K	P/Atm	¹ P/MPa	Mole fraction ethene, x ₁	Solubility cm ³ (STP)/g	
-35 238.15	14.06 14.22	1.425 1.441	0.8550 0.8539	1305.30 1294.80	
	14.84	1.504	0.8945	1877.70	
-45 228.15	4.90 5.21 5.18	0.496 0.528 0.525	0.3636 0.3765 0.3742	126.58 133.80 132.50	
	7.55 7.84	0.765 0.794	0.5742 0.5929	298.76 322.74	
	7.87 10.19	0.797	0.5962 0.8161	324.24 981.15	
	10.29	1.043	0.8218	1022.30	
	10.55 10.96	1.069 1.111	0.8413 0.8908	1176.70 1806.70	
	11.17	1.132	0.9012	2024.69	
for low pressure T/K H/Atm(mole fra	range show	ving that I 228.15 13.5		248.15 20.9	
	<u></u>	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROG	CEDURE :	<u></u>	SOURCE AND PURITY OF MAT	TERIALS:	
The apparatus ut tion tube with a The temperature had two compartm ing methanol sol containing solid acetone. The wa	magnetic a controlled ents, one o ution, the dry ice in	stirrer. bath contain- other	 Purified and an Actual purity n Not given. 		
served as the he Capillary tubing absorber to pres and solvent vess	at transfe: connected sure device els and a	r medium. the es, gas vacuum			
was charged into the quantity of	gas was det	ber and termined	ESTIMATED ERROR: § T/K	= <u>+</u> 0.1	
by pressure diff supply vessel.	erence in 1	cne gas	$\delta x, /x,$	= <u>+</u> 2% (compiler)	
			REFERENCES:		
			1. Shenderei, E.R. Ya.D.; Ivanovsk		
			Khim. Prom., <u>1</u>	<u>960</u> , 5, 370.	

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COMPONENTS :				ORIGINAL	MEASUREME	NTS:	
1. Ethene;	С, Н.; [74	-85-1]		Paratella, A.			
2. Heptane;	С_Н_;[142-82-5]		Riv.	Combust.	<u>1963</u> , 17,	\$
	/ 16			334-	341.		
VARIABLES:	T/K = 373	.15 - 473.	.15	PREPAREI	D BY:		
P/		5 - 10.13			W.	Hayduk	
EXPERIMENTAL VA				L			
	1020.	,					,
<u></u>				~ Co	nstants:		······································
$\frac{1}{t/C} \frac{1}{T/K}$	Total P P/atm	ressure	- Ethe	ne H	eptane	² Ethene Mol Vapor, y ₁	e Fraction Liquid, x_1
100 373.15		4.05	2.9		0.144	0.900	0.306
	60 80	6.08 8.11	2.0 1.5		0.148 0.237	0.919 0.905	0.450 0.599
	100	10.13	1.0	8	0.724	0.837	0.775
150 423.15	5 40 60	4.05 6.08	3.1		0.298 0.283	0.775	0.245 0.371
	80 100	8.11 10.13	1.6	3	0.354	0.925	0.506
200 473.15		4.05	2.6		0.596	0.520	0.195
200 4/3.15	60 80	4.05 6.08 8.11	1.9	3	0.595	0.586	0.304
the Equilib were shown	orium Cons	tants; the	ese wer	e not g	iven in t	ne Compiler the paper al	though they
			UXILIARY	INFORMAT	LION	-	<u> </u>
METHOD/APPARATL	IS/PROCEDURE	· · · · ·		SOURCE	AND PURITY	OF MATERIALS:	
of a magnet	glass ca d in mer ation was ically-op	pillary cury was by means erated		 Ethene was prepared by reaction of Zn with dibromoethane in an alcohol solution. The purity was determined at 99.5%. 			
was used to of solvent microburett	of a magnetically-operated agitation system. A cathetometer was used to determine the quantity of solvent charged and a microburette was used to measure the volumes of gas dissolved.				etroleum	as from Phil of the high specified).	lips lest purity
				ESTIMAT	δΠ/atm :	= <u>+</u> 0.1 = <u>+</u> 0.5 = <u>+</u> 0.02	
				REFEREN	ICES :		
				1			

							113
COMPONENTS:				ORIGINAL	MEASUREMENT	rs :	
1. Ethene	e; C ₂ H ₄ ; [74	-85-1]		Kay,	W.B.		
2. Heptar	ne; C ₇ H ₁₆ ; (142-82-5]		Ind.	Eng. Cher	n. <u>1948</u> , 40,	
				1459	-1464.		
VARIABLES:	T/K = 211	.5 - 522.0		PREPARED	BY:		
	P/MPa = 0.6			ļ	W. Н	ayduk	
						•	
EXPERIMENTAL				1 22 4 7 4 7		.	
in Li		Tempe	rature	foi	brium Cons r Ethene	Total P	ressure
w, mass	x_1, mol	t/°F	¹ T/K	K	$= y_1 / x_1$	P/psia	¹ p/MPa
0.0208	0.0704	183.0 260.2	357. 399.		12.94 11.38	100 150	0.689 1.034
		317.1	431.		9.87	200	1.379
		360.7	455.		8.66	250	1.724
		396.0 426.7	475. 492.		7.70 6.89	300 350	2.068 2.413
		454.6	507.	93	6.15	400	2.758
		480.0	522.	04	5.50	450	3.103
0.0596	0.1846	36.0	275.		5.41	100	0.689
		86.8 131.5	303. 328.		5.38 5.34	150 200	1.034 1.379
		173.4	351.	71	5.28	250	1.724
		214.2 253.0	374. 395.		5.18 5.05	300 350	2.068 2.413
		289.6	416.	26	4.90	400	2.758
		325.1 359.1	435. 454.		4.71 4.50	450 500	3.103 3.447
		392.0	473.	15	4.27	550	3.792
1		424.9 468.0	491. 515.		4.01 3.58	600 650	4.137 4.482
¹ Calculat compositi	ed by compilion and K, b	ler. Raou	lt's l	aw was u imations	used to ca	lculate the continu	vapor ed
		AU	XILIARY	INFORMAT	ION		<u></u>
METHOD/APPAR	ATUS/PROCEDUR	E:		SOURCE A	AND PURITY O	F MATERIALS:	
	as charged					high purity	
pressure	cell, degas determined	sed, and is by volume.	ts A			nated then (freezing,	
measured	volume of e	ethene gas w		ai	nd melting	. Actual p	
	om a storage temperature			11	ndicated.		
known lig	uid composi	tion by a		2. He	eptane pur	ity not spe	cified.
material compositi	balance. " on was cons	he liquid idered to					
remain co	onstant for	the changes					
	re and pres eries of ex		ved	ESTIMAT	ED ERROR:		
because c	of the small	gas volume	B				
propertie	ensities and as of the so	lutions we	re	1	$\frac{\delta T/K}{\delta P/P} = \frac{+}{+}$	0.02	
also give	en at high p	pressure.			$x_1/x_1 = +$	0.03 (Compi	ler)
	of experimer reference 1			REFEREN	CES:		
Vapor-lig	uid equilik	oria for eig	ght	4			
	mpositions ts for four		eu.		ay, W.B.		
compositi	ons, in whi	ch the mole		Ir	nd. Eng. C	hem. <u>1938</u> ,	30, 459.
	are less t d solubilit						
	isted here.			<u> </u>			

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COMPONENTS:				ORIGINAL	MEASUREMEN	rs:	
1. Ethene; $C_2 H_4$; [74-85-1]				Kay, W.B.			
2. Heptane; C ₇ H ₁₅ ; [142-82-5]				Ind.	Eng. Chem	n. <u>1948</u> , 40,	
				1459-	1464.		
VARIABLES:	m/x - 211	.5 - 522.0		PREPARED	BY:		
:	-				W. H	layduk	
	<i>P</i> /MPa = 0.6						
EXPERIMENTAL		continued		_			
Fraction in Li		Temper	ature	Equilib for	rium Cons Ethene	tant Total P	ressure
w, mass	x_1, mol	t/°F	¹ T/K	ĸ	$= y_1 / x_1$	P/psia	¹ p/MPa
0.1007	0.2857	-5 32	252. 273.		3.50 3.50	100 150	0.689 1.034
		52 64	290.		3.49	200	1.379
l		93.9	307.		3.49	250	1.724
		122.2 149.8	323.		3.48 3.46	300	2.068 2.413
		176.7	338. 353.	-	3.40	350 400	2.413
		203.2	368.		3.42	450	3.103
		230.1	383.		3.40	500	3.447
		257.2	398.		3.36	550	3.792
		284.6 312.5	413. 428.		3.32 3.26	600 650	4.137 4.482
		341	444.		3.19	700	4.826
		372	462.	04	3.11	750	5.171
		411.3	483.	87	2.97	800	5.516
0.2005	0.4725	80.5	300.		2.114	400	2.758
		96.2 111.4	308.		2.113 2.112	450 500	3.103 3.447
		126.2	325.		2.110	550	3.792
		141	3334	71	2.109	600	4.137
¹ Calculat compositi	ed by compi on and K, b	ler. Raoul oth being a	t's la pproxi	aw was u mations	sed to ca	lculate the continu	
		AUX	ILIARY	INFORMATI	ON		
METHOD/APPAR/	ATUS/PROCEDURE	2:		SOURCE A	ND PURITY C	OF MATERIALS:	
Hentane w	as charged	into the hi	ah	1. 00	mmercial	high purity	ethene
	cell, degas					nated then	
quantity	determined	by volume.	A			l freezing,	
	volume of e		as			. Actual p	urity not
	m a storage temperature			110	dicated.		
known lig	uid composi	tion by a		2. He	ptane pur	ity not spe	cified.
material	balance. T	he liquid		ļ			
	on was cons						
	nstant for re and pres						
in each s	eries of ex	periments				·····	
	f the small		:	ESTIMATE			
	nsities and s of the so				$\delta T/K = +$	0.02	
	n at high p		C	8	$\delta P/P = \frac{+}{+}$	0.005 0.03 (Compi	ler)
Details o	of experimen	tal method			11-1		,
	reference 1		• •	REFERENC	ES:		
vapor-lig	Vapor-liquid equilibria for eight ethene compositions are reported.				W P		
	ts for four		.u.	'• ^{xa}	у, W.B.		
	ons, in whi		1	In	d. Ena. (Chem. <u>1938</u> ,	30, 459.
fractions	are less t	han 0.5, ma	y be			•	
	d solubilit isted here.		a				
and are 1	.isted here.						
				L			

				11
COMPONENTS:		ORIGINAL MEASUREME	NTS:	
1. Ethene; C ₂ H ₄ ; [74-85-1]		Kay, W.B.		
2. Heptane; C ₇ H ₁₆ ; [142-82-5	51	Ind. Eng. Chem	. <u>1948</u> , 40,	
		1459-1464.		
VARIABLES: $T/K = 211.5 - 522$.0	PREPARED BY:	· · .	
P/MPa = 0.677 - 19.		W. H	ayduk	
			•	
EXPERIMENTAL VALUES:continue				
Fraction Ethene in Liquid Tem	'I Iperature	Quilibrium Cons for Ethene		ressure
$w, mass x_1, mol t/°F$			P/psia	¹ p/MPa
0.2005 0.4725 155.8			650	4.482
170.5			700	4.826
186.0			750	5.171
201.3 217.0			800 850	5.516 5.861
233.5			900	6.205
250.7			950	6.550
269.0			1000	6.895
288.2			1050	7.239
310.0			1100	7.584
343.0	445.93	2.031	1150	7.929
	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY	OF MATERIALS:	
Heptane was charged into the pressure cell, degassed, and quantity determined by volum measured volume of ethene ga added from a storage bomb at constant temperature to give	l its Ne. A Ns was	by repeated	high purity nated then freezing, . Actual p	degassed evacuation
known liquid composition by material balance. The liqui composition was considered t remain constant for the chan temperature and pressure inv	a .d .co .ges in .colved	2. Heptane pur	ity not spe	cified.
in each series of experiment		ESTIMATED ERROR:		
because of the small gas vol used. Densities and critica properties of the solutions	1	$\frac{\delta T/K}{\delta P/P} = \frac{+}{+}$	0.02	
also given at high pressure. Details of experimental meth		$\delta x_1 / x_1 = \pm$	0.03 (Compi	ler)
given in reference 1.		REFERENCES:		
Vapor-liquid equilibria for ethene compositions are repo	eight rted.	1. Kay, W.B.		
The results for four of the compositions, in which the m fractions are less than 0.5, considered solubility equili	ole may be		them. <u>1938</u> ,	<i>30</i> , 4 59.
and are listed here.				

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COMPONENT	S:			ORIGINAL MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-1]				Shenderei, E.R.; Ivanovskii, F.P.		
2. Octane; C _{8 18} ; [111-65-9]				Khim. Prom. <u>1963</u>	<u>3</u> , ⁹¹ , 18-37.	
VARIABLES: $T/K = 228.15 - 248.15$				PREPARED BY:		
		0.285 - 1.		W. Haydı	۶k	
EXPERIMEN	NTAL VALUES:					
		7/24-	¹ P/MPa	Mala farakian	C-1	
t/c	• 17 K	P/atm	P/MPa	Mole fraction ethene, x ₁	Solubility cm ³ (STP)/g	
-25	248.15	5.29	0.536	0.2370	60.38	
		12.82 14.63	1.299 1.482	0.5937 0.6811	284.02 415.10	
-35	238.15	2.18	0.285	0.1458	33.19	
- 55	250.15	2,96	0.300	0.1568	36.14	
		4.64	0.470	0.2578	67.53	
		4.80 4.87	0.486 0.493	0.2656 0.2803	70.29 75.71	
		6.32	0.640	0.3692	113.75	
		9.24	0.936	0.5261	215.18	
		10.70 11.74	1.084 1.190	0.6210 0.6773	318.43 407.94	
		12.62	1.279	0.7483	577.85	
		13.39	1.357	0.7820	697.83	
		13.44 14.11	1.362 1.430	0.8083 0.8337	819.73 974.60	
for lo	cm(mole fra	range show	ving that 1 228.1! 14.2	17.0	248.15 20.2 continued	
	·····	· · · · · · · · · · · · · · · · · · ·				
····			AUXILIARY	INFORMATION		
METHOD /A	PPARATUS/PROC	CEDURE:		SOURCE AND PURITY OF MA	TERIALS:	
tion t The te had tw ing me contai aceton served	The apparatus utilized an absorp- tion tube with a magnetic stirrer. The temperature controlled bath had two compartments, one contain- ing methanol solution, the other containing solid dry ice in acetone. The walls of the vessels served as the heat transfer medium.			 Purified and an Actual purity Not given. 		
absorb	lary tubing per to pres plvent vess	sure devic	es, gas			
system was ch	n. A known harged into	amount of the absor		ESTIMATED ERROR:		
the qu by pre	antity of essure diff	gas was de	termined		= <u>+</u> 0.1	
supply	vessel.				1 = <u>+</u> 2% (compiler)	
				REFERENCES: 1. Shenderei, E.R Ya.D.; Ivanovs		
				Khim. Prom.,	<u>1960</u> , 5, 370.	

74-85-1] [111-65-9] 28.15 - 2253 - 1.04 253 - 1.04 contin P/atm 2.50 2.85 3.58 4.52 5.55 7.46 7.97 9.40	2 48.15 18	ORIGINAL MEASUREMENTS: Shenderei, E.R.; I <i>Khim. Prom.</i> <u>1963</u> PREPARED BY: W. Haydu Mole fraction ethene, x_1 0.1715 0.1950 0.2583 0.3169	, 91 , 18-37.
(111-65-9) (28.15 - 3) (28.15 - 3) (253 - 1.04) (2.50 - 3) (2.50 - 3) (2.55 - 3) (2.57 - 3) (2.50 - 3) (2.55 - 3) (2.55 - 3) (2.55 - 3) (2.57 - 3)	248.15 18 nued ¹ P / MPa 0.253 0.289 0.363 0.458 0.562	Khim. Prom. 1963 PREPARED BY: W. Haydu Mole fraction ethene, x_1 0.1715 0.1950 0.2583	, 91 , 18-37. k Solubility cm (STP)/g 40.23 47.09
28.15 - 2253 - 1.04 contin P/atm 2.50 2.85 3.58 4.52 5.55 7.46 7.97	248.15 18 nued ¹ P / MPa 0.253 0.289 0.363 0.458 0.562	PREPARED BY: W. Haydu Mole fraction ethene, x_1 0.1715 0.1950 0.2583	k , Solubility cm (STP)/g 40.23 47.09
253 - 1.04 contin P/atm 2.50 2.85 3.58 4.52 5.55 7.46 7.97	¹ B ¹ P/MPa 0.253 0.289 0.363 0.458 0.562	W. Haydu Mole fraction ethene, x_1 0.1715 0.1950 0.2583	Solubility cm (STP)/g 40.23 47.09
<pre>P / atm 2.50 2.85 3.58 4.52 5.55 7.46 7.97</pre>	¹ P/MPa 0.253 0.289 0.363 0.458 0.562	Mole fraction ethene, x ₁ 0.1715 0.1950 0.2583	Solubility cm (STP)/g 40.23 47.09
P/atm 2.50 2.85 3.58 4.52 5.55 7.46 7.97	¹ P/MPa 0.253 0.289 0.363 0.458 0.562	ethene, x ₁ 0.1715 0.1950 0.2583	40.23 47.09
P/atm 2.50 2.85 3.58 4.52 5.55 7.46 7.97	¹ P/MPa 0.253 0.289 0.363 0.458 0.562	ethene, x ₁ 0.1715 0.1950 0.2583	40.23 47.09
2.50 2.85 3.58 4.52 5.55 7.46 7.97	0.253 0.289 0.363 0.458 0.562	ethene, x ₁ 0.1715 0.1950 0.2583	40.23 47.09
2.85 3.58 4.52 5.55 7.46 7.97	0.289 0.363 0.458 0.562	0.1950 0.2583	47.09
10.34	0.808 0.952 1.048	0.4032 0.5457 0.5924 0.6991 0.8164	90.17 132.38 233.47 282.48 474.88 864.13
etermined	wing that 1 228.1!	Henry's law is obeyed 5	ic. Graphs given • 248.15 20.2
	AUXILIARY	INFORMATION	······································
agnetic a ntrolled ts, one o ion, the ry ice in s of the transfe: onnected re device s and a mount of he absord s was de	stirrer. bath contain- other n vessels r medium. the es, gas vacuum solvent ber and termined	ł	<pre>alyzed by GC. ot given. = ± 0.1 = ± 2% (compiler) ; Zelvenski, :ii, F.P.</pre>
	URE: Lzed an a introlled is, one of the transfe onnected re device s and a mount of s was de	atermined for press ange showing that i 228.11 Lon) ⁻¹ 14.2 AUXILIARY	etermined for pressures below atmospher ange showing that Henry's law is obeyed 228.15 238.15 14.2 17.0 AUXILIARY INFORMATION AUXILIARY INFORMATION AUXILIARY INFORMATION URE: Lzed an absorp- agnetic stirrer. atrolled bath is, one contain- ton, the other cy ice in s of the vessels transfer medium. onnected the re devices, gas s and a vacuum mount of solvent he absorber and s was determined ence in the gas $\delta x_1/x_1$ REFERENCES: 1. Shenderei, E.R. Ya.D.; Ivanovsk

INAL MEASUREMENTS: obeev, B.I.; Lyapin, V.V. m. <i>Prom.</i> <u>1967</u> , <i>43</i> , 114-6.	
m. Prom. <u>1967</u> , 43, 114-6.	
ARED BY:	
C. L. Young	
······································	
fraction of ethene in liquid x	
C ₂ H ₄	
0.063	
0.154 0.282	
0.562 0.043	
0.124	
0.242 0.453	
0.036 0.104	
0.217 0.380	
RMATION	
CE AND PURITY OF MATERIALS:	
Purity better than 99.6 mole cent.	
No details given.	
MATED ERROR:	
$ \begin{array}{l} \text{TRATED ERROR:} \\ \text{`K=\pm0.1; } \delta P = \pm 0.5\%; \\ \delta x_{C_2H_4} = \pm 0.002 \end{array} $	
estimated by compiler)	
ERENCES:	

OMPONENTS :		ODICINAL MEASUDENENTS.	11
		ORIGINAL MEASUREMENTS:	
1. Ethene; $C_2 H_4$		Ribeiro, V.J.; Susu, A.A.;	
2. Dodecane; C_{12} H	; [112-40-3]	Kohn, J.P.	
		J. Chem. Eng. Data <u>1972</u> , 17, 79-	80.
ARIABLES: $T/K = 283$	-348	PREPARED BY:	
P/MPa = 0.5	1-9.12	W. Hayduk	
XPERIMENTAL VALUES:	<u> </u>	Liquid Solu	tion
<i>t/C</i> ¹ <i>T/K</i>	Total Pressure P/atm ¹ P/MI	Ethene in liquid Molar Volu	me
10 283.15	5.00 0.50 10.00 1.00 15.00 1.52 20.00 2.02	30.245182.800.350165.4	
	25.00 2.53 30.00 3.04	3 0.530 135.7	
	35.00 3.54 40.00 4.05	6 0.690 110.3	
	45.00 4.50		
25 298.15	5.00 0.50 10.00 1.01		
	15.00 1.52	0 0.270 185.3	
	20.00 2.02 25.00 2.53		
	30.00 3.04	0 0.500 148.6	
	35.00 3.54 40.00 4.05		
	45.00 4.56		
	50.00 5.06		
	55.00 5.50 60.00 6.08		
	65.00 6.58	6 0.950 82.0	
Calculated by com	piler.	continu	ed
	AUXILIARY	INFORMATION	
ETHOD/APPARATUS/PROCEI	URE :	SOURCE AND PURITY OF MATERIALS:	
A 10-cm ³ borosili brium cell contai of degassed solve a constant temper was quantitativel charged from a re	nt was mounted in ature bath. Gas y (±0.006 cm ³)	 Ethene was CP grade from Matheson; minimum purity 9 Gas critical temperature a pressure measured as 9.34° 50.09 atm. 	nd
constant pressure placement. Press on the cell and t accurate to 0.07 umes inside the c	, by mercury dis- bre gauges mounted be reservoir were atm. Liquid vol-	 Dodecane was from Humphrey Wilkinson; 99.0% minimum purity. Freezing point: -9.57°C. 	-
wall. Agitation magnetically acti	vas by using a	ESTIMATED ERROR:	
	solubility was	$\delta x_1 / x_1 = \pm 0.01$ $T/K = \pm 0$.02
consumed. Satura		$\delta P/P = \pm 0.01$	
volumes were read volumes in the ce details in refere	ll. Additional	REFERENCES:	
dodecane vapor pro considered neglig.	essure was	l. Lee, K.H.; Kohn, J.P.	
when it correspondence mercury.		J. Chem. Eng. Data <u>1969</u> , 14	, 292

OMPONENTS	:			ORIGINAL MEASUREMENTS:	······································		
1. Ethene; C ₂ H ₄ ; [74-85-1]			1]		Ribeiro, V.J.; Susu, A.A.;		
2. Dodecane; C ₁₂ H ₂₆ ; [112-40-3]				Kohn, J.P.			
12 26 / 1		J. Chem. Eng. Data	1972. 17. 79-80.				
				o. chem. Eng. Data	<u>1972</u> , 17, 19 00 .		
ARIABLES: I/K = 283-348 P/MPa = 0.51-9.12				PREPARED BY: W. Hayduk			
XPERIMENT	AL VALUES:	continue	ed	L			
t/C	¹ <i>T</i> /K	Total P/atm	Pressure ¹ P/MP	Ethene in liquid a Mole Fraction, x ₁	Liquid Solution Molar Volume V _L /cm ³ (mole) ⁻¹		
50	323.15	5.00	0.50		222.6		
		10.00	1.01		212.3 201.8		
		15.00 20.00	1.52 2.02		191.7		
		25.00	2.53		182.0 173.2		
		30.00 35.00	3.04 3.54	6 0.435	165.2		
		40.00 45.00	4.05 4.56		157.2 150.0		
		50.00	5.06		142.8		
		55.00 60.00	5.57 6.08		136.8 130.5		
		65.00	6.58		125.0		
					110 5		
		70.00 75.00	7.09	3 0.720	119.5 113.9		
		75.00 80.00	7.60 8.10	3 0.720 0 0.753 6 0.785	113.9 109.3		
		75.00	7.60	3 0.720 0 0.753 6 0.785 3 0.817	113.9		
Calcula	ated by comp	75.00 80.00 85.00 90.00	7.60 8.10 8.61	3 0.720 0 0.753 6 0.785 3 0.817	113.9 109.3 104.3		
Calcula	ated by comp	75.00 80.00 85.00 90.00	7.60 8.10 8.61	3 0.720 0 0.753 6 0.785 3 0.817	113.9 109.3 104.3 99.0		
Calcula	ated by comp	75.00 80.00 85.00 90.00	7.60 8.10 8.61 9.11	3 0.720 0 0.753 6 0.785 3 0.817	113.9 109.3 104.3 99.0		
	ated by comp	75.00 80.00 85.00 90.00	7.60 8.10 8.61 9.11	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850	113.9 109.3 104.3 99.0 		
ETHOD/APP A 10-cr	PARATUS/PROCEDL m ³ borosilic	75.00 80.00 85.00 90.00 iler. JRE: ate glass	7.60 8.10 8.61 9.11 AUXILIARY equili-	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M. 1. Ethene was CP	113.9 109.3 104.3 99.0 continued		
ETHOD/APP A 10-cr brium d of dega a const was qua	PARATUS/PROCEDL m ³ borosilic cell contain assed solven tant tempera antitatively	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a kno t was mou ture bath (±0.006	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³)	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M. 1. Ethene was CP Matheson; min: Gas critical	113.9 109.3 104.3 99.0 continued		
ETHOD/APP A 10-cr brium o of dega a const was qua charged constan placeme	PARATUS/PROCEDL m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure, ent. Pressu	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a knou ture bath (±0.006 ervoir, k by mercu re gauges	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M. 1. Ethene was CP Matheson; min: Gas critical t pressure measu 50.09 atm. 2. Dodecane was f Wilkinson; 99	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5% temperature and ured as 9.34°C at from Humphrey-		
ETHOD/APP A 10-cr brium o of dega a const was qua charged constar placema on the accurat umes in	PARATUS/PROCEDL m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure,	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a kno t was mou ture bath (±0.006 ervoir, k by mercu re gauges e reservo tm. Liqu 11 could	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted ir were id vol- be read	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M. 1. Ethene was CP Matheson; min: Gas critical t pressure measu 50.09 atm. 2. Dodecane was f	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5% temperature and ured as 9.34 °C at from Humphrey- .0% minimum		
ETHOD/APP A 10-cr brium o of dega a const was qua charged constan placeme accurat umes in using o wall.	PARATUS/PROCEDU m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure, ent. Pressu cell and th te to 0.07 a nside the ce calibration Agitation w	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a kno t was mou ture bath (±0.006 ervoir, k by mercu re gauges e reservo tm. Liqu ll could marks on as by usi	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted ir were id vol- be read the cell ng a	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M 1. Ethene was CP Matheson; min: Gas critical to pressure measu 50.09 atm. 2. Dodecane was to Wilkinson; 99 purity.	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5% temperature and ured as 9.34 °C at from Humphrey- .0% minimum		
ETHOD/APP A 10-cr brium o of dega a const was qua charged constan placeme accurat umes in using o wall. magnet: steel b	PARATUS/PROCEDU m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure, ent. Pressu cell and th te to 0.07 a nside the ce calibration Agitation w ically activ ball. The s	75.00 80.00 85.00 90.00 iler. IRE: ate glass ing a kno t was mou ture bath (±0.006 ervoir, k by mercu re gauges e reservo tm. Liqu ll could marks on as by usi ated stai olubility	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted ir were id vol- be read the cell ng a nless was	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M 1. Ethene was CP Matheson; min: Gas critical to pressure measu 50.09 atm. 2. Dodecane was for Wilkinson; 99 purity. Freezing point	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5% temperature and ured as 9.34°C at from Humphrey- .0% minimum t: -9.57°C.		
ETHOD/APF A 10-cr brium of of dega a const was qua charged constan placeme on the accurat umes in using of wall. magnet: steel b determ: consume	PARATUS/PROCEDL m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure, ent. Pressu cell and th te to 0.07 a nside the ce calibration w ically activ ball. The s ined from th ed. Saturat	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a kno t was mou ture bath (±0.006 ervoir, k by mercu re gauges e reservo tm. Liqu ll could marks on as by usi ated stai olubility e volume ed soluti	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted ir were id vol- be read the cell ng a nless was of gas on	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF MA 1. Ethene was CP Matheson; min: Gas critical for pressure measures 50.09 atm. 2. Dodecane was for wilkinson; 99 purity. Freezing point ESTIMATED ERROR:	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5%. temperature and ured as 9.34°C at from Humphrey- .0% minimum t: -9.57°C.		
ETHOD/APP A 10-cr brium of of dega a const was qua charged constar placeme on the accurat umes in using of wall. magnet: steel 1 determ: consume volumes	PARATUS/PROCEDL m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure, ent. Pressu cell and th te to 0.07 a nside the ce calibration w ically activ ball. The s ined from th	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a kno t was mou ture bath (±0.006 ervoir, k by mercu re gauges e reservo tm. Liqu ll could marks on as by usi ated stai olubility e volume ed soluti from the	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted ir were id vol- be read the cell ng a nless was of gas on observed	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M 1. Ethene was CP Matheson; min: Gas critical to pressure measu 50.09 atm. 2. Dodecane was to Wilkinson; 99 purity. Freezing point ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 0.01$	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5% temperature and ured as 9.34°C at from Humphrey- .0% minimum t: -9.57°C.		
ETHOD/APP A 10-cr brium o of dega a const was qua charged charged placema on the accurat umes in using o wall. steel 1 determi consume volumes details dodecar	PARATUS/PROCEDU m ³ borosilic cell contain assed solven tant tempera antitatively d from a res nt pressure, ent. Pressu cell and th te to 0.07 a nside the ce calibration Agitation w ically activ ball. The s ined from th ed. Saturat	75.00 80.00 85.00 90.00 iler. JRE: ate glass ing a kno t was mou ture bath (±0.006 ervoir, k by mercu re gauges e reservo tm. Liqu ll could marks on as by usi ated stai olubility e volume ed soluti from the l. Addit ce l. Th ssure was	7.60 8.10 8.61 9.11 AUXILIARY equili- wn mass nted in . Gas cm ³) ept at ry dis- mounted ir were id vol- be read the cell ng a nless was of gas on observed ional e	3 0.720 0 0.753 6 0.785 3 0.817 9 0.850 INFORMATION SOURCE AND PURITY OF M 1. Ethene was CP Matheson; min: Gas critical to pressure measu 50.09 atm. 2. Dodecane was f Wilkinson; 99 purity. Freezing point ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.01$ $\delta P/P = \pm 0.01$	113.9 109.3 104.3 99.0 continued ATERIALS: grade from imum purity 99.5%. temperature and ured as 9.34 °C at from Humphrey- .0% minimum t: -9.57 °C. T/K = ± 0.02		

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MPONENTS:		0	RIGINAL MEASUREMENTS:	
1. Ethene; C_2H_1	L. Ethene; C ₂ H ₄ ; [74-85-1]			su, A.A.;
2. Dodecane; C ₁₂ H ₂₆ ; [112-40-3]			Kohn, J.P.	
			J. Chem. Eng. Data	<u>1972</u> , <i>17</i> , 79-80.
ARIABLES: $T/K = 28$	3-348	P	PREPARED BY:	
<i>P</i> /MPa = 0.5	51-9.12		W. Hayduk	
XPERIMENTAL VALUES:	continued			
<i>t /</i> C ¹ <i>T /</i> K	Total Pres P/atm 1	sure <i>P</i> /MPa	Ethene in liquid Mole Fraction,x ₁	Liquid Solution Molar Volume V _L /cm ³ (mole) ⁻¹
75 348.15	15.00 20.00 25.00 30.00 35.00 40.00 55.00 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00 90.00	0.507 1.013 1.520 2.026 2.533 3.040 3.546 5.066 5.573 6.080 6.586 7.093 7.600 8.106 8.613 9.119	0.120 0.170 0.220 0.265 0.310 0.353 0.395 0.435 0.475 0.510 0.542 0.575 0.602 0.632 0.660 0.685	230.7 221.7 213.7 205.3 198.0 190.8 183.7 177.0 170.5 164.0 158.2 152.8 147.2 142.5 137.2 132.7 128.2 123.5
· · · · · · · · · · · · · · · · · · ·	AUXI	LIARY I	NFORMATION	
ETHOD/APPARATUS/PROC	EDURE :		SOURCE AND PURITY OF MA	TERIALS:
A 10-cm ³ borosil: brium cell conta: of degassed solve a constant temper was quantitative charged from a re constant pressure placement. Press on the cell and the accurate to 0.07 umes inside the using calibration	ining a known ma ent was mounted cature bath. Ga y (± 0.006 cm ³) eservoir, kept a sure gauges mour che reservoir we atm. Liquid vo cell could be re	in in is it s- ited ere ol- ead	Gas critical t	mum purity 99.5%. emperature and red as 9.34°C at rom Humphrey- 0% minimum
wall. Agitation magnetically act: steel ball. The determined from a consumed. Satura volumes were read volumes in the co details in refere dodecane vapor po	was by using a vated stainless solubility was the volume of ga ated solution from the obser all. Additional ence 1. The	s is ved -	ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 0.01$ $\delta P/P = \pm 0.01$ REFERENCES: 1. Lee, K.H.; Koh	

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COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-1]			Chou, J.S.; Chao, K. C.		
2. Eicosane (n-Eicosane); $C_{20}H_{42}$;			J. Chem.	Eng. Data <u>1989</u> , 34,	
[112-95-	[112-95-8]		68-70.		
	T/K = 373.25		PREPARED BY	-	
P/	MPa = 1.01 -	5.06	W. Hayduk		
EXPERIMENTAL VA	EXPERIMENTAL VALUES:				
		Pressur			
t/°C	¹ <i>T</i> /K	P/atm	¹ P/MPa	Mole Fraction, Ethene, x_1	
100.1	373.25	1.0	0.1013	0.0123 ²	
		10.10 20.06	1.023 2.033	0.123 0.228	
		29.94	3.034	0.320	
		40.04	4.057	0.395	
		49.95	5.061	0.456	
200.0	473.15	1.0	0.1013	0.0081 2	
		10.18 20.03	1.031 2.030	0.0820 0.155	
		29.91	3.031	0.221	
		39.96 49.91	4.049 5.057	0.281 0.335	
300.0	573.15	1.0	0.1013	$0,0065^{2}$	
	0.001.0	10.12	1.025	0.0659	
		20.06 29.95	2.033 3.035	0.132 0.190	
		39.98	4.051	0.245	
		49.93	5.059	0.296	
¹ Calculated	by Compiler	•			
² Estimated	by Compiler.				
		AUXILIARY	INFORMATION		
METHOD/APPARATI	US/ PROCEDURE		SOURCE AND	PURITY OF MATERIALS:	
	ubbled throu	igh a		e was from Matheson Gas	
	r and then t		Produ of 99	cts at a specified purity	
	lten solvent	being filled	01 99		
		trogen bath.		ane was from Sigma	
sample is w	ation, a (mo vithdrawn int	olten) liquid	Chemi of 99	cals at a specified purity	
evacuated t	rap connecte	ed to a gas			
handling sy	stem. The and the vol	vme of the			
gas release	d is measure	ed in a			
	er water at a and pressur		ESTIMATED E		
of the soli	d solvent is	determined.		$\delta T/K = 0.1$	
Further det	ails are in	Ref. 1.		P/atm = 0.05	
				$\delta x/x = 0.02$ (Compiler)	
			REFERENCES:		
				, S.H.; Lin, H.M.; K.C.	
			Fluic 141.	l Phase Equil. <u>1987</u> , 36,	
				· · · · · · · · · · · · · · · · · · ·	

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COMPONENTS:	COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Ethene;	C ₂ H ₄ ; [74-85	5-1]	Chou, J	.S.; Chao, K. C.		
2. Octacosa	2. Octacosane; $C_{2,8}H_{5,8}$; [630-02-4]		J. Chem	. Eng. Data 1989, 34,		
- 20 38		68-70.				
			00-70.			
VARIABLES:	T/K = 373.05	5 - 573.05	PREPARED B	Υ:		
	MPa = 1.01 -		W. Hayduk			
EXPERIMENTAL V	ALUES:	Pressur	e			
t/°C	¹ <i>T</i> /K	p/atm	¹ P/MPa	Mole Fraction, Ethene, x_1		
99.9	373.05	1.0	0.1013	0.0146 ²		
		10.04 20.06	1.017 2.033	0.147 0.255		
		30.02	3.042	0.344		
		39.98 49.94	4.051 5.060	0.422 0.488		
199.9	473.05	1.0 10.03	0.1013 1.016	0.0098 ² 0.0979		
		20.00	2.026	0.181		
		29.97	3.037	0.251		
		39.99 49.89	4.052 5.055	0.311 0.369		
299.9	573.05	1.0	0.1013	0.0080 ²		
		9.99 20.07	1.012 2.034	0.0804 0.151		
		30.01	3.041	0.214		
		40.00 49.98	4.053 5.064	0.273 0.321		
	by Compiler by Compiler					
		AUXILIARY	INFORMATION			
METHOD/APPARAT			SOURCE AND	PURITY OF MATERIALS:		
	ubbled throu	ian a		ene was from Matheson Gas		
presaturato equilibrium	r and then t	hrough the being filled	Prod	lucts at a specified purity 9.5%.		
After satur sample is w evacuated t	ated in a ni ation, a (mo ithdrawn int rap connecte stem. The s	ed to a gas	Chem	cosane was from the Aldrich nical Company at a specified ty of 99.0%.		
solidifies,	and the vol d is measure	lume of the				
burette ove	r water at a		ESTIMATED			
of the soli	d solvent is ails are in	determined.	ESTIMATED	$\delta T/K = 0.1$ $\delta P/atm = 0.05$ $\delta x/x = 0.02$ (Compiler)		
				-		
			REFERENCES 1. Huan Chao	: ng, S.H.; Lin, H.M.; , K.C.		
				id Phase Equil. <u>1987</u> , 36,		

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COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Ethene; (1. Ethene; C ₂ H ₄ ; [74-85-1]			.S.; Chao, K. C.	
2. Hexatriacontane; C ₃₆ H ₇₄ ;			J. Chem	. Eng. Data 1989, 34 ,	
[630-06-8]			68-70.		
VARIABLES:			PREPARED BY	: W. Hayduk	
EXPERIMENTAL VALUES:			<u>.</u>		
t/ °C	¹ <i>T</i> /K	<u> </u>	¹ P/MPa	Mole Fraction, Ethene, x_1	
100.1	373.25	1.0 10.13 19.99 29.97 39.97 49.93	0.1013 1.026 2.026 3.037 4.050 5.059	0.0170 ² 0.172 0.292 0.393 0.467 0.527	
199.9	473.05	1.0 10.09 20.06 29.95 40.01 49.97	0.1013 1.022 2.033 2.964 4.054 5.063	0.0112 ² 0.113 0.205 0.280 0.352 0.403	
299.9	573.05	1.0 10.10 20.07 29.99 39.97 50.01	0.1013 1.023 2.034 3.039 4.050 5.067	0.0093 ² 0.0937 0.177 0.242 0.306 0.361	
¹ Calculated ² Estimated	by Compiler by Compiler.	, 	INFORMATION		
				PURITY OF MATERIALS:	
presaturato equilibrium	ubbled throu r and then t cell, both	hrough the being filled	 Ethene was from Matheson Gas Products at a specified purity of 99.5%. 		
with the molten solvent. The cell is thermostated in a nitrogen bath. After saturation, a (molten) liquid sample is withdrawn into an evacuated trap connected to a gas handling system. The solvent solidifies, and the volume of the gas released is measured in a		Aldr	triacontane was from the ich Chemical Company at a ified purity of 99.0%.		
temperature of the soli	burette over water at a known temperature and pressure. The mass of the solid solvent is determined. Further details are in Ref. 1.		ESTIMATED	ERROR: $\delta T/K = 0.1$ $\delta P/atm = 0.05$ $\delta x/x = 0.02$ (Compiler)	
				: g, S.H.; Lin, H.M.; , K.C.	
			Flui 141.	d Phase Equil. <u>1987</u> , 36,	

COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

 Aromatic, cyclic and alicyclic compounds for pressures less than 0.2 MPa (2 atm)

October, 1993

CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubilities in Aromatic, Cyclic and

Alicyclic Compounds for Pressures less than 0.2 MPa

The solubilities of ethene in aromatic, cyclic and alicyclic compounds for a pressure of essentially 101.3 kPa were reported by some ten groups of researchers (1-10). Three groups of researchers reported their results in the form of graphs or correlations only (4,7,8) and from these solubility values were determined or calculated for comparison with other data.

For the solvents composed of carbon-ring structures, some general observations can be made concerning their solvating ability for ethene. It is observed that the ethene solubility is increased when the number of methyl side groups on a carbon ring compound is increased. The solubility is also increased when the degree of saturation of an unsaturated carbonring compound is increased. Finally, solvents having a ring structure all appear to have similar temperature coefficients of solubility for ethene. These observations are based on the fact that at the same temperatures the solubility in decahydronaphthalene is higher than in tetrahydronaphthalene, in methylbenzene it is higher than in benzene, and in turn in dimethyl benzene it is higher still than in methylbenzene. Finally, the solubilities in methylcyclohexane, when extrapolated, appear higher than those in cyclohexane solvent for the same temperatures.

Solubilities in individual solvents are now discussed in more detail below.

Benzene; C₆H₆; [71-43-2]

Horiuti (1) reported solubility data for ethene in benzene at low pressures for temperatures ranging from 278.15 K to 323.15 K. In spite of the date of the publication (1931/1932), Horiuti's data are known to be of high accuracy. Narasimhan and Nageshwar (2), and Jadot (3) reported ethene solubilities at 293.15 K, and at 298.15 K, respectively. Krauss and Gestrich (4) reported their results as a correlation utilizing an enthalpy of solution which permitted the calculation of solubilities in the temperature range from 293.15 to 313.15 K. The early results of McDaniel (5), while of historical interest, have been usually found to be significantly lower than those of more recent researchers as in this case, and are rejected. When compared with the other data, the result of Jadot is also rejected because it is approximately 9% lower than comparable data. The single value of Narasimhan and Nageshwar (2) is 4% higher than those of the remaining two research groups and is also rejected.

The remaining data are well represented by the following equation applicable for a temperature range from 278.15 K to 323.15 K and having a correlation coefficient of 0.9995:

$$\ln x_1 = -8.0954 + 1103.8/(T/K) \tag{1}$$

Equation (1) has a maximum deviation from the experimental data of 0.9%. This equation and the data on which it is based are classified as tentative. It is noted that while both constants of Equation (1) are different than those listed in the compilation of the Horiuti data (1), the calculated values are virtually identical, differing by a maximum of only one figure in the fourth significant place.

COMPONENTS:	EVALUATOR;
1. Ethene; C ₂ H ₄ ; [74-85-1]	Walter Hayduk
	Department of Chemical Engineering
2. Aromatic, cyclic and alicyclic	University of Ottawa
compounds for pressures less than	Ottawa, ON
0.2 MPa (2 atm)	Canada K1N 6N5
	October, 1993

CRITICAL EVALUATION:

The mole fraction solubilities for ethene in benzene at 101.3 kPa pressure as calculated by means of Equation (1) are tabulated below:

T/K	$10^2 x_1$	T/K	10 ² x ₁
278.15	1.606	303.15	1.158
283.15	1.518	308.15	1.093
288.15	1.398	313.15	1.036
293.15	1.327	318.15	0.9828
298.15	1.229	323.15	0.9327

Methylbenzene (toluene); C7H8; [108-88-3]

Solubilities of ethene in methylbenzene at low pressure of four groups of researchers(4,6,7,8) are available over a wide temperature range, from 213.15 K (-60°C) to 313.15 K (40°C). The data of Waters et al. (6) were obtained using three different methods; hence, it is unlikely that systematic errors occurred. The data of Krauss and Gestrich (4) as well as of Hannaert et al. (7) were presented only as correlations. Values of the latter two groups were calculated for the temperature ranges for which the measurements were made. Leites and Ivanoskii (8) reported solubilities at low temperatures. A consistency test indicated that there is a good correlation for the temperature range from 243.15 K to 313.15 K, provided that the low temperature data of Leites and Ivanovskii are omitted. The equation obtained for the temperature range from 243.15 K to 313.15 K, having a correlation coefficient of 0.9980, an average deviation of 1.2% and a maximum deviation of 3.2% is:

$$\ln x_1 = -8.1440 + 1161.47/(T/K)$$
(2)

The data on which it is based and Equation (2) are classified as tentative. The value of Leites and Ivanovskii (8) is about 6% higher than the correlation of Hannaert et al. at 243.15 K. The low temperature data are also significantly higher, by about 10%, than Equation (2). It is, however, impossible to ascertain whether the data are too high or there is a curvature in the solubility-temperature relation. Until additional solubilities become available, the data of Leites and Ivanovskii are classified as tentative.

The mole fraction solubilities for ethene in methylbenzene at 101.3 kPa pressure were calculated by means of Equation (2) and are tabulated below:

T/K	$10^2 x_1$	T/K	$10^2 x_1$
243.15	3.449	293.15	1.527
253.15 263.15	2.856 2.399	398.15 303.15	1.429 1.340
273.15 283.15	2.041 1.756	313.15	1.186

Dimethylbenzenes (xylenes); C8H10; [108-38-3]

Two research groups reported ethene solubilities in dimethylbenzene. Krauss and Gestrich (4) and Hannaert et al. (7), both reported their results as correlations only, but for different temperature ranges. Four values of solubility were calculated from each correlation and together were found to be very consistent. The correlating line representing data from both sources is:

COMPONENTS: 1. Ethene; C₂H₄; [74-85-1] 2. Aromatic, cyclic and alicyclic compounds for pressures less than 0.2 MPa (2 atm)
EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada KIN 6N5

October, 1993

CRITICAL EVALUATION:

$\ln x_1 = -8.19193 + 1186.94/(T/K)$

Equation (3) covers temperatures from 243.15 K to 313.15 K, has a correlation coefficient of r = 0.9992 and maximum, and average deviations from the equation of 2.4%, and 1.1%, respectively. Attention is drawn to the fact that the solvent used by Hannaert et al. (7) contained only 90% dimethylbenzene of an unspecified isomer, with the remaining components being methylbenzene and ethylbenzene. Similarly, the solvent purity and isomer type used by Krauss and Gestrich (4) likewise were not specified. Hence, it is not possible to determine in which isomer the solubilities were obtained. However, because there is a relatively small difference in ethene solubilities in methylbenzene and in dimethylbenzene, it appears likely that the solubilities in all three dimethylbenzene isomers are similar. Equation (3) and the data on which it is based are classified as tentative.

Cyclohexane; C₆H₁₂; [110-82-7] and methylcyclohexane; C₇H₁₄; [108-87-2]

Only the results of Krauss and Gestrich (4), expressed as a correlation, are available for the solubilities of ethene in cyclohexane. The temperature range is from 293.15 K to 313.15 K. Only the results of Leites and Ivanovskii at low temperature (8) are available for solubilities in methylcyclohexane. These data are both classified as tentative.

Tetrahydronaphthalene; C10H12; [119-64-2] and decahydronaphthalene; C10H18; [91-17-8]

Only the results of Krauss and Gestrich (4) for the temperature range from 293.15 to 313.15 K are available for the solubility of ethene in tetrahydronaphthalene. Again, only the results of Lenoir et al. (9) are available at two temperatures for the solubility in decahydronaphthalene. These data are both classified as tentative.

(R)-1-Methyl-4-(1-methylethenyl)cyclohexene, (Limonene); C10H16;

[5989-27-5]

The result of McDaniel (5) is the only solubility of ethene available in limonene. As with most of McDaniel's results, a caution is expressed because his results have been found to be more than 20% too low. Hence, this result is considered to be of qualitative value only, and is rejected.

1,1'-Methylenebis(methylbenzene) or ditolylmethane; C15H16; [1335-47-3]

Glazunova et al. (10) reported ethene solubilities in 1,1'-methylenebis (methylbenzene) at temperatures to 413.15 K. These solubilities appear consistent and no other source of data is available for this solvent. These data are classified as tentative.

Two component solvent solutions composed of n-heptane; C7H16; [142-82-5]

and methylbenzene; C7H8; [108-88-3], as well as of methylcyclohexane;

C7H14; [108-87-2] and methylbenzene.

The solubilities of ethene in the mixed solvent solutions were reported for both solvent solutions for the low temperatures of 223.15 K and 213.15 K by Leites and Ivanovskii (8). These results were shown only graphically as Henry's constants and were recalculated as mole fraction solute. There is a maximum mole fraction solubility of ethene in

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(3)

2. Aromati compoun	C ₂ H ₄ ; [74-85-1] ic, cyclic and alicyclic ds for pressures less than (2 atm)	EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5 October, 1993	
CRITICAL EVA	LUATION:		
whereas, t increasing	the solubility in n-heptane-m	ons at about 25% methylbenzene, ethylbenzene solutions increases with ese results appear consistent and are	
References	3		
1. Hori 256.	uti, J. Sci. Pap. Inst. Phys.	Chem. Res. (Jpn) <u>1931/32</u> , 17, 125-	
2. Nara: 13-1		Chem. Petro-Chem. J. (India) <u>1979</u> , 10,	
3. Jado	t, R. J. Chim. Phys. <u>1972</u> , 69	9, 1036-40.	
4. Krau	ss, V.W.; Gestrich, W. Khemie	-Technik <u>1977</u> , 6, 513-516.	
5. McDa	niel, A.S. J. Phys. Chem. <u>191</u>	1, <i>15</i> , 587-610.	
	rs, J.A.; Mortimer, G.A.; Cle 174-176.	ments, H.E. J. Chem. Eng. Data <u>1970</u> ,	
7. Hanna 156-1		.eu, M.P. Ind. Chim. Belge <u>1967</u> , 32,	
8. Leit	Leites, I.L.; Ivanovskii, F.P. <i>Khim. Prom.</i> <u>1962</u> 9, 653-657.		
9. Leno 340-		h, H. J. Chem. Eng. Data <u>1971</u> , 16,	
	unova, T.V.; Ryabov, M.I.; Li 449-451.	pshtein, R.A. Sov. At. Energ. <u>1987</u> ,	

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COMPONENTS: ·	ORIGINAL MEASUREMENTS:
<pre>(1) Ethene or ethylene; C₂H₄; [74-85-1]</pre>	Horiuti, J.
(2) Benzene; C ₆ H ₆ ; [71-43-2]	Sci. Pap. Inst. Phys. Chem. Res. (Jpn) <u>1931/32</u> , 17, 125 - 256.
VARIABLES:	PREPARED BY:
T/K: 278.15 - 323.15	M. E. Derrick
p_{1}/kPa : 101.325 (1 atm)	H. L. Clever
	,
EXPERIMENTAL VALUES: T/K Mol Fraction Bun	sen Ostwald
Croff	icient Coefficient
$10^2 x_1$ α/cm^3 (S	TP) $cm^{-3} atm^{-1} L/cm^{3} cm^{-3}$
278.15 1.606 4.1	
283.15 1.518 3.8	
288.15 1.398 3.5	98 3.796
293.15 1.327 3.3	46 3.591
298.15 1.229 3.1	18 3.403
303.15 1.158 2.9	
308.15 1.093 2.7	
313.15 1.036 2.5	
318.15 0.9828 2.4	
323.15 0.9327 2.2	89 2.708
piler with the assumption the gas is	
Smoothed Data: For use between 278.1	
$\ln x_{7} = -8.0797 + 10.$	9921/(T/100K)
The standard error about the	regression line is 8.15×10^{-5} .
	-
T/K Mol Fraction $10^2 x_1$	T/K Mol Fraction 10 ² x ₁
278.15 1.612 2	98.15 1.236
283.15 1.503 3	03.15 1.163
	13.15 1.036
<u> 293.15 </u>	23.15 0.930
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
The apparatus consists of a gas buret	
a solvent reservoir, and an absorp- tion pipet. The volume of the pipet	ethanol into orthophosphoric acid. The gas was cooled, passed
is determined at various meniscus	through several wash solutions,
heights by weighing a quantity of	dried, and fractionated from
water. The meniscus height is read	liquid air several times.
with a cathetometer.	(2) Benzene. Merck. Extra pure and
	free of sulfur. Refluxed with
The dry gas is introduced into the	sodium amalgam, distilled.
degassed solvent. The gas and solvent	
are mixed with a magnetic stirrer	80.18°C.
until saturation. Care is taken to	
prevent solvent vapor from mixing	ESTIMATED ERROR:
with the solute gas in the gas buret.	$\delta T/K = 0.05$
The volume of gas is determined from	$\delta x_1 / x_1 = 0.01$
the gas buret readings, the volume	
of solvent is determined from the	
meniscus height in the absorption	REFERENCES:
pipet.	Internets ;
	1
	1
4	ļ
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	L
,	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Narasimhan, S.; Nageshwar, G.W.
2. Benzene; C ₆ H ₆ ; [71-43-2]	Chem. Petro-Chem. J. (India)
	· <u>1979</u> , <i>10</i> , 13-15.
VARIABLES: $T/K = 293.15$	PREPARED BY:
	W. Hayduk
P/kPa = 101.325 kPa	
EXPERIMENTAL VALUES:	· · · · · · · · · · · · · · · · · · ·
$t/C T/K {}^{1}P = 101.325 {}^{2}P_{1} =$	nene, x_1 , for: ² Ostwald Coefficient 101.325 L/cm^3 gas(cm ³ solvent) ⁻¹
20 293.15 0.01235	0.01369 3.737
¹ Although not specifically stated in mole fraction solubility is for a to	
² Calculated by compiler; a gas molar at 293.15 K and 101.325 kPa for the was assumed to apply for the calcula	calculation of L , and Henry's law
It was confirmed by personal communi measured at atmospheric pressure.	cation that the solubilities were
	· · · · · · · · · · · · · · · · · · ·
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based on a design given in reference 1.	 Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given. Benzene was distilled twice in a laboratory packed column.
	ESTIMATED ERROR:
	$\delta x_1 / x_1 = \pm 3\%$ (Estimated by compiler)
	REFERENCES:
	1. Dubois, H.D.; Skoog, D.A.
	Anal. Chem. <u>1948</u> , 20, 624.
1	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Krauss, V.W.; Gestrich, W.
2. Benzene; C ₆ H ₆ ; [71-43-2]	Khemie – Technik <u>1977</u> , 6, 513–516.
VARIABLES: T/K = 293.15 - 313.15	PREPARED BY:
p ₁ /kPa ≈ 101.32	W. Hayduk
EXPERIMENTAL VALUES: Mole Fraction ¹ Osty t/C ¹ T/K Ethene, x_1 L/cm^3	vald Coefficient ¹ Bunsen Coefficient gas (cm ³ solvent) ⁻¹ α/cm ³ (STP)cm ³ atm ¹
20 293.15 0.0132	3.60 3.36
25 298.15 0.0124 30 303.15 0.0116	3.41 3.12 3.23 2.91
40 313.15 0.0103	2.92 2.54
using equations given in the paper for as follows: $H = H_o \exp(-\Delta H_L/fRT); C = HP$ C = Solubility, mol/l; P = Press H = Henry's constant, mol/l.bar $H_o = A constant, 0.00195, mol/l.bar$ $-\Delta H_L = Enthalpy of solution, 10544,$ R = Gas constant, l.bar/mol.K fR = Conversion factor, 8.324, W so compiler from graphs of H very	sure, bar ar W s/mol
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The absorption vessel whose volume was 160 ml, containing a thermo- meter and stirring bar, was mounted in a constant temperature bath. A volume of about 100 ml of solvent was degassed then pressurized with ethene to a pressure not exceeding 2 bar in the absorption vessel. After equilibrium was achieved, the gas was slowly released into an evacuated gas expansion system connected to a mercury manometer. Any solvent vapor present in the gas was condensed in a low temper- ature coil. By material balance, considering the volumes of gas in the system, it was possible to calculate solubilities as Henry's constants.	Sources and purities not specified. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 3$ % (compiler) REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Jadot, R.
2. Benzene; C ₆ H ₆ ; [71-43-2]	J. Chim. Phys. <u>1972</u> ,69,1036-40.
VARIABLES:	PREPARED BY:
T/K = 298.15	
P/kPa = 101.3	C.L. Young
P/RPA = 101.5	
EXPERIMENTAL VALUES:	
EXPERIMENTAL VALUES:	
T/K Henry's Law Constant,	Mole fraction ⁺ #∆H∞
H/atm	at partial pressure /cal mol ⁻¹
	of 101.3 kPa, $x_{C_2H_4}$ (/J mol ⁻¹)
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
298.15 89.46	0.01118 625 (2615)
250125 05140	
+ Calculated by compiler assuming	$g_{C_0H_h} = 1/H$ .
	024
	- f. aslution of infinite dilution
# Excess partial molar enthalpy	of solution at infinite dilution.
AUXILIARY	INFORMATION
METHOD /ADDADATUS /DDOCEDURE .	COURCE AND DURING OF MATERIALS
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The conventional gas chromatographic	
technique was used. The carrier	
gas was helium. The value of Henry's	
law constant was calculated from the	
retention time. The value applies	No details given.
to very low partial pressures of	-
gas and there may be a substantial	
difference from that measured at	
1 atm. pressure. There is also	1
considerable uncertainty in the	
value of Henry's constant since no allowance was made for surface	ESTIMATED ERROR:
allowance was made for surface adsorption.	
and a second s	$\delta T/K = \pm 0.05; \ \delta H = \pm 2\%$
	REFERENCES:

-

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	McDaniel, A. S.
(2) Benzene; C ₆ H ₆ ; [71-43-2]	J. Phys. Chem. <u>1911</u> , 15, 587-610.
6 6	
VARIABLES:	
T/K = 295.15 - 323.15 $p_1/kPa = 101.3 (1 atm)$	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
Temperature Mol Fraction	Bunsen Ostwald Defficient ^a Coefficient ^b
$t/^{\circ}C$ $T/K$ $10^{2}x_{1}$	coefficient ^α Coefficient ^D α L/cm ³ cm ⁻³
22.0 295.15 1.10	2.7865 3.0100
25.0 298.15 1.06 35.0 308.15 0.94	2.6826 2.9281 ^C 2.3530 2.6545
50.0 323.15 0.86	2.3330         2.6345           2.1000         2.4820
^a Bunsen coefficient, $\alpha/cm^3$ (STP)	cm ⁻³ atm ⁻¹ .
^b Listed as absorption coefficien Interpreted to be equivalent to	it in the original paper. Ostwald coefficient by compiler.
C Ostwald coefficient (absorption 298.15 K value by author.	a coefficient) estimated as
-	•
d Mole fraction and Bunsen coeffi	
compiler assuming ideal gas beh	havior.
compiler assuming ideal gas beh	data should be used with caution.
Mole fraction and Bunsen coeffi compiler assuming ideal gas ben EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data.	data should be used with caution.
Mole fraction and Bunsen coeffi compiler assuming ideal gas ben EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data.	data should be used with caution. or more too small when compared
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus is all glass. It con-	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus is all glass. It con- sists of a gas buret connected to a	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with
Mole fraction and Bunsen coeffi compiler assuming ideal gas beh EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus is all glass. It con-	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction
Mole fraction and Bunsen coeffice compiler assuming ideal gas between the second secon	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with
Mole fraction and Bunsen coeffice compiler assuming ideal gas between the second secon	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper.
Mole fraction and Bunsen coeffice compiler assuming ideal gas between the second secon	<pre>navior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Benzene.</pre>
Mole fraction and Bunsen coeffi compiler assuming ideal gas ben EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent of with more reliable data. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus is all glass. It con- sists of a gas buret connected to a contacting vessel. The solvent is degassed by boiling under reduced pressure. Gas pressure or volume is adjusted using mercury displacement. Equilibration is achieved at atm pressure by hand shaking, and incre- mentally adding gas to the contacting	<pre>navior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Benzene.</pre>
Mole fraction and Bunsen coeffice compiler assuming ideal gas between the second secon	<pre>navior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Benzene.</pre>
Mole fraction and Bunsen coeffi compiler assuming ideal gas ben EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent of with more reliable data. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus is all glass. It con- sists of a gas buret connected to a contacting vessel. The solvent is degassed by boiling under reduced pressure. Gas pressure or volume is adjusted using mercury displacement. Equilibration is achieved at atm pressure by hand shaking, and incre- mentally adding gas to the contacting chamber. Solubility measured by	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Benzene.
Mole fraction and Bunsen coeffice compiler assuming ideal gas between the second secon	Aavior. data should be used with caution. or more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Benzene. ESTIMATED ERROR:
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Mole fraction and Bunsen coeffice compiler assuming ideal gas between the second seco	havior. data should be used with caution. for more too small when compared INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper. (2) Benzene. ESTIMATED ERROR: $\delta L/L \ge -0.20$

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OMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Ethene; C ₂ H ₄ ; [74-85-1]			Leites, I.L.; Ivanovs	skii, F.P.
2. Methy	lbenzene (to)	luene);	Khim. Prom. <u>1962</u> , 9, 6	653-657.
C ₇ H ₈ ;	[108-88-3]			
ARIABLES: $T/K = 213.15 - 243.15$			PREPARED BY:	
$p_{\rm r}/k{\rm Pa} = 101.325$			W. Hayduk	
PERIMENTAL	L VALUES:			
t/C	<i>T</i> /K	¹ log ₁₀ H', H' /mm Hg	² Henry's Constant, ² H/atm (mole fraction) ⁻¹	Mole Fraction Ethene, $x_1$
-60	213.15	3.998	13.10	0.0764
-50	223.15	4.119	17.31	0.0578
-30	243.15	4.304	26.50	0.0377
Henry's Values	constant (H' of Henry's co	) were read from	ble in this paper; value m enlarged graphs by the mole fraction solubility the graphical results.	compiler.
Henry's Values	constant (H' of Henry's co	) were read from	m enlarged graphs by the mole fraction solubility	compiler.
Henry's Values	constant (H' of Henry's co	) were read from	m enlarged graphs by the mole fraction solubility the graphical results. Y INFORMATION	compiler. y ( <i>x</i> 1) were
Henry's Values calculat	constant (H' of Henry's co ed by the con RATUS/PROCEDURE	) were read from onstant (H) and mpiler based on AUXILIAR	m enlarged graphs by the mole fraction solubility the graphical results. Y INFORMATION SOURCE AND PURITY OF MATERI	<pre>compiler. y (x₁) were ALS:</pre>
THOD/APPA A metal The equi in the courified	constant (H' of Henry's co ed by the con RATUS/PROCEDURE cryostat was and acetone perature to librium cell	) were read from onstant (H) and mpiler based on AUXILIAR : cooled with and controlled <u>+</u> 0.05 K. was mounted <u>e</u> solvent was al distil- by chromato-	m enlarged graphs by the mole fraction solubility the graphical results. Y INFORMATION	compiler. y (x ₁ ) were TALS: stated to distilled hromatography
THOD/APPA A metal Iry-ice Co a tem The equi In the courified	constant (H' of Henry's co ed by the con ed by the con RATUS/PROCEDURE cryostat was and acetone a perature to librium cell librium cell by fractiona nd analyzed 1	) were read from onstant (H) and mpiler based on AUXILIAR : cooled with and controlled <u>+</u> 0.05 K. was mounted <u>e</u> solvent was al distil- by chromato-	<pre>m enlarged graphs by the mole fraction solubility the graphical results.  Y INFORMATION SOURCE AND PURITY OF MATERI 1. Ethene purity was be 99.9%. 2. Methylbenzene was and analyzed by cl Actual purity not ESTIMATED ERROR:</pre>	compiler. y (x ₁ ) were TALS: stated to distilled hromatography
THOD/APPA A metal Iry-ice Co a tem The equi In the courified	constant (H' of Henry's co ed by the con ed by the con RATUS/PROCEDURE cryostat was and acetone a perature to librium cell librium cell by fractiona nd analyzed 1	) were read from onstant (H) and mpiler based on AUXILIAR : cooled with and controlled <u>+</u> 0.05 K. was mounted <u>e</u> solvent was al distil- by chromato-	<pre>m enlarged graphs by the mole fraction solubility the graphical results.  Y INFORMATION SOURCE AND PURITY OF MATERI 1. Ethene purity was     be 99.9%. 2. Methylbenzene was     and analyzed by cl     Actual purity not</pre>	compiler. y (x ₁ ) were TALS: stated to distilled hromatography
THOD/APPA A metal The equi in the courified	constant (H' of Henry's co ed by the con ed by the con RATUS/PROCEDURE cryostat was and acetone a perature to librium cell librium cell by fractiona nd analyzed 1	) were read from onstant (H) and mpiler based on AUXILIAR : cooled with and controlled <u>+</u> 0.05 K. was mounted <u>e</u> solvent was al distil- by chromato-	<pre>m enlarged graphs by the mole fraction solubility the graphical results.  Y INFORMATION SOURCE AND PURITY OF MATERI 1. Ethene purity was be 99.9%. 2. Methylbenzene was and analyzed by cl Actual purity not ESTIMATED ERROR:</pre>	compiler. y (x ₁ ) were ALS: stated to distilled hromatography given.
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THOD/APPA A metal Iry-ice Co a tem The equi In the courified	constant (H' of Henry's co ed by the con ed by the con RATUS/PROCEDURE cryostat was and acetone a perature to librium cell librium cell by fractiona nd analyzed 1	) were read from onstant (H) and mpiler based on AUXILIAR : cooled with and controlled <u>+</u> 0.05 K. was mounted <u>e</u> solvent was al distil- by chromato-	m enlarged graphs by the mole fraction solubility the graphical results. Y INFORMATION SOURCE AND PURITY OF MATERI 1. Ethene purity was be 99.9%. 2. Methylbenzene was and analyzed by cl Actual purity not ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Aut	compiler. y (x ₁ ) were ALS: stated to distilled hromatography given.
THOD/APPA A metal The equi in the courified	constant (H' of Henry's co ed by the con ed by the con RATUS/PROCEDURE cryostat was and acetone a perature to librium cell librium cell by fractiona nd analyzed 1	) were read from onstant (H) and mpiler based on AUXILIAR : cooled with and controlled <u>+</u> 0.05 K. was mounted <u>e</u> solvent was al distil- by chromato-	m enlarged graphs by the mole fraction solubility the graphical results. Y INFORMATION SOURCE AND PURITY OF MATERI 1. Ethene purity was be 99.9%. 2. Methylbenzene was and analyzed by cl Actual purity not ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Aut	compiler. y (x ₁ ) were ALS: stated to distilled hromatography given.

AUIN 4						135
COMPONENTS: 1. Ethene; $C_2 H_k$ ; [74-85-1]				ORIGINAL MEASUREMENTS: Waters, J.A.; Mortimer, G.A.;		
1. Et	hene; $C_2H_4$ ;	[74-85-1]		Waters	, J.A.; Mort	imer, G.A.;
2. Methylbenzene (toluene); C ₇ H ₈ ; [108-88-3]			Clemer	ts, H.E.		
			J. Cher	n.Eng.Data ,	<u>1970</u> , 15 ,	
				174-17	6.	
VARIABLE	ES:			PREPARED	BY:	
	T/K = 25	0-295	i	ĥ	. Hayduk	
	<i>P</i> /kPa = 10	1.325				•
EXPERIME	ENTAL VALUES:	2_	_		3	
<i>t /</i> C	¹ <i>T</i> /K	P/mm mercury	unsen Coei α/cm³ gas (cm³ so	s NTP lvent)-1	Mole/litre s	$\begin{array}{c} \underline{\text{ubility}}\\ {}^{1}\text{Average Mole}\\ Fraction, x_{1} \end{array}$
-23	250.15	760.0	6.89	4	$0.311_{p}^{B}$	0.0306
-20	253.15	760.0	6.320		$0.283^{B}_{A}$ $0.237^{A}_{A}$	0.0280 0.0236
-10	263.15	222.6 359.9	5.31( 5.24)		0.234A	0.0236
0	070 15	475.6	5.27		0.235 ^A 0.199 ^A	0.0001
0	273.15	243.3 393.6	4.45		0.199 ⁻⁴ 0.196 ^A	0.0201
		520.1	4.40	D	0.196 ^A	
		594.5 765.0	4.41		0.196 ^A 0.197 <mark>B</mark>	
		765.0	4.44		0.199 ^C	
10	283.15	260.9	3.85		$0.172^{A}$	0.0176
20	293.15	422.6 275.4	3.770		0.168 ^A 0.153 ^A	0.0159
		445.6	3.360	3	$0.150_{p}^{A}$	
22  ¹ Calc ² Alth	295.15 ulated by c	760.0 compiler. becified in	3.189	9	0.142	0.0149 α as given is
¹ Calc ² Alth the ³ Solu	ulated by c ough not sp Bunsen coef bility, s a	compiler. Decified in ficient. and $x$ , are	paper, con calculated	npiler co	0.142 ^b onfirms that as partial p	α as given is
¹ Calc ² Alth the ³ Solu	ulated by c ough not sp Bunsen coef	compiler. Decified in ficient. and $x$ , are	paper, con calculated sed as desc	npiler co	0.142 ^b onfirms that yas partial p elow.	α as given is
¹ Calc ² Alth the ³ Solu 101 A,B,t	ulated by c ough not sp Bunsen coef bility, s a	compiler. Decified in ficient. and $x_1$ , are pomethods us	paper, con calculated sed as desc	npiler co d for a <u>c</u> cribed be INFORMATIC	0.142 ^b onfirms that yas partial p elow.	α as given is pressure of
¹ Calc ² Alth the ³ Solu 101 A,B,t	culated by c ough not sp Bunsen coef bility, s a 325 kPa. C, Refers to	compiler. Decified in ficient. and $x_1$ , are b methods us CEDURE:	paper, con calculated sed as desc AUXILIARY	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT hene, Monsant	α as given is pressure of ERIALS: o polymerization
¹ Calc ² Alth the ³ Solu 101 A,B,t METHOD// Two o measu	eulated by cough not sp Bunsen coef bility, s a 325 kPa. C, Refers to APPARATUS/PROC of three met aring the pr	compiler. pecified in ficient. and $x_1$ , are p methods us CEDURE: chods used in cessure char	paper, con calculated sed as deso AUXILIARY nvolved age in a	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT hene, Monsant	α as given is pressure of ERIALS;
¹ Calc ² Alth the ³ Solu 101 A,B,t METHOD/A Two o measu gas r third	culated by conserved by conserv	compiler. Decified in ficient. and x ₁ , are b methods us CEDURE: chods used i cessure char known volu	paper, con calculated sed as desc AUXILIARY nvolved age in a ime. The	mpiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met	0.142 ^b onfirms that gas partial p elow. DN D PURITY OF MAT hene, Monsant ade, minimum chyl benzene,	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher
¹ Calc ² Alth the ³ Solu 101 A,B,t METHOD/A Two o measu gas r third Metho	culated by conserved by conserv	compiler. pecified in ficient. and x ₁ , are b methods us comethods used comethods used in cessure char known volu yeighing. plass bulbs	paper, con calculated sed as dese AUXILIARY nvolved age in a ume. The were	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met	0.142 ^b onfirms that gas partial p elow. D PURITY OF MAT hene, Monsant ade, minimum chyl benzene, ectrophotomet	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade;
¹ Calc ² Alth the ³ Solu 101 A,B,C METHOD/# Two o measu gas r third <u>Metho</u> conne	APPARATUS/PROC of three met reservoir of involved by tube	compiler. pecified in fficient. and x ₁ , are b methods us central second central second	paper, con calculated sed as desc AUXILIARY novolved nge in a nume. The were with a	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met	0.142 ^b onfirms that gas partial p elow. DN D PURITY OF MAT hene, Monsant ade, minimum chyl benzene,	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade;
¹ Calc ² Alth the ³ Solu 101 A,B,C METHOD// Two o measu gas r third <u>Metho</u> conne press vacuu	APPARATUS/PROC of three met reservoir of involved w d A: Two g cted by tub ure transdu	compiler. pecified in fficient. and x ₁ , are p methods us CEDURE: thods used in ressure char thown volu yeighing. ylass bulbs plas bulbs plas fitted acer, gas such the solvent	paper, con calculated sed as desc AUXILIARY .nvolved age in a mme. The were with a apply and	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met	0.142 ^b onfirms that gas partial p elow. D PURITY OF MAT hene, Monsant ade, minimum chyl benzene, ectrophotomet	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade;
¹ Calc ² Alth the ³ Solu 101 A,B,C METHOD// Two o measu gas r third Metho conne press vacuu (100	APPARATUS/PROC of three met reservoir of involved w d A: Two g cure transdu m lines. T cm ³ ) was de	compiler. pecified in fficient. and x ₁ , are p methods us CEDURE: chods used in ressure char chods used in ressure char known volu yeighing. ylass bulbs bing fitted acer, gas su the solvent egassed in c	paper, con calculated sed as desc AUXILIARY .nvolved age in a amme. The were with a apply and one bulb	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met	0.142 ^b onfirms that gas partial p elow. D PURITY OF MAT hene, Monsant ade, minimum chyl benzene, ectrophotomet	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade;
¹ Calc ² Alth the ³ Solu 101 A,B,t Two o measu gas r third <u>Metho</u> conne press vacuu (100 equip quid	APPARATUS/PROC out A the first state of the first s	compiler. pecified in ficient. and x ₁ , are pomethods used centressure char cessure char chods used in cessure char construction cessure char cessure cessure char cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure ces	paper, con calculated sed as desc AUXILIARY nvolved age in a mme. The were with a apply and one bulb .ng li- .gher	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met	0.142 ^b onfirms that gas partial p elow. D PURITY OF MAT hene, Monsant ade, minimum chyl benzene, ectrophotomet	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade;
¹ Calc ² Alth the ³ Solu 101 A,B,C METHOD/A Two o measu gas r third Metho conne press vacuu (100 equip quid press	culated by c ough not sp Bunsen coef bility, s a 325 kPa. C. Refers to APPARATUS/PROO of three met tring the pr reservoir of l involved w od <u>A</u> : Two g octed by tub um lines. T cm ³ ) was de oped with a nitrogen. oure in the	compiler. pecified in ficient. and x ₁ , are b methods use centres cessure char cessure char cessure char known volu veighing. glass bulbs bing fitted the solvent egassed in construction stirrer usi Gas at a hi second bulb	paper, con calculated sed as desc AUXILIARY nvolved age in a mme. The were with a apply and one bulb .ng li- .gher o was	npiler co d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met spe pun	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT hene, Monsant ade, minimum thyl benzene, ectrophotomet	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade;
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¹ Calc ² Alth the ³ Solu 101 A,B,C METHOD// Two o measu gas r third Method conne press vacuu (100 equip quid press quant first the easu	APPARATUS/PROC approximation of the second approximation of the second	compiler. pecified in ficient. and x ₁ , are b methods use central second second central second second second but second	paper, con calculated sed as desc AUXILIARY nvolved age in a ame. The were with a apply and one bulb ang li- .gher o was o the the tem- are in s	npiler co d for a <u>c</u> cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met pun ESTIMATED $\delta T_{2}$	0.142 ^b onfirms that gas partial p elow. DN D PURITY OF MAT hene, Monsant hene, Monsant hene, Monsant hete, minimum thyl benzene, ectrophotomet tity not spec	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade; ified.
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¹ Calc ² Alth the ³ Solu 101 A,B,C METHOD/A Two o measu gas r third Metho conne press vacuu (100 equip press vacuu (100 equip press vacuu (100 equip guant first the e measu of ga bomb	APPARATUS/PROC of three met find the pr servoir of involved w d A: Two g cted by tub um lines. T cm ³ ) was de oped with a nitrogen. oure in the citatively c bulb at th ure. The f equilibratic on B: For 1 is a stainle connected t	compiler. pecified in ficient. and x ₁ , are p methods use cedure: chods used i cessure char cessure char cessure char cessure char chods used i cessure char con component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component component compon	paper, con calculated sed as desc AUXILIARY nvolved age in a mme. The were with a apply and one bulb .ng li- .gher o was o the the tem- ire in stities apply re gauge	npiler cc d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met spe put ESTIMATED $\delta T/$ $\delta s/$	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT ade, minimum thyl benzene, ectrophotomet tity not spec	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade; ified.
¹ Calc ² Alth the ³ Solu 101 A,B,C Two o measu gas r third Metho conne press vacuu (100 equip press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid press vacuu (100 equid equid so f qa so f qa f qa f qa f qa f qa f qa f qa f qa	culated by conserved by the second se	compiler. pecified in ficient. and x ₁ , are performed by the second performance of the second by the second	paper, con calculated sed as desc AUXILIARY nvolved age in a mme. The were with a apply and one bulb age in- gher o was o the te tem- ire in stities apply re gauge Equil-	npiler cc d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met spe put ESTIMATED $\delta T/$ $\delta s/$	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT ade, minimum thyl benzene, ectrophotomet tity not spec	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade; ified.
¹ Calc ² Alth the ³ Solu IOI A,B,C Two ou measure thirdo METHOD/A Two ou measure thirdo conne press vacuu (100 p quid press vacuu (100 p quid press vacuu Metho of ga was f ibrate equip	APPARATUS/PROC bility, s a 325 kPa. Preservoir of three met apped with a nitrogen. bulb at the connected the s stainle connected the stainle the three met three m	compiler. pecified in ficient. and x, are performed a use performed a use centre of the second second performed a use cessure char cessure char tessure char tessure char tessure char tessure char tessure char tessure char tess bulbs ping fitted tess bulbs ping fitted tess stells tess at a hi second bulb charged into tess steel su tess steel su tess steel su tess flast mercrury magents tess flast tess flas	paper, con calculated as desc AUXILIARY nvolved age in a mme. The were with a apply and one bulb age in -	npiler cc d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met spe put ESTIMATED $\delta T/$ $\delta s/$	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT ade, minimum thyl benzene, ectrophotomet tity not spec	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade; ified.
¹ Calc ² Alth the ³ Solu (1,0,1,1) METHOD// Two on measur gas r third Method connes vacuu (100 equip quid press quant first the easur Method of ga bomb was f ibrat equip Method	culated by conserved of the second se	compiler. pecified in ficient. and x ₁ , are b methods used central second second cessure char cessure cessure cessure char cessure cessure cessure char cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure cessure	paper, con calculated as desc AUXILIARY nvolved age in a mme. The were with a apply and one bulb age in -	npiler cc d for a c cribed be INFORMATIC SOURCE AN 1. Eth gra 2. Met spe put ESTIMATED $\delta T/$ $\delta s/$	0.142 ^b onfirms that yas partial p elow. D PURITY OF MAT ade, minimum thyl benzene, ectrophotomet tity not spec	α as given is pressure of ERIALS: o polymerization purity 99.85%. Fisher ric grade; ified.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_4$ ; [74-85-1]	Krauss, V.W.; Gestrich, W.
2. Methylbenzene (toluene);	Khemie – Technik <u>1977</u> ,6 , 513–516.
С,Н,; [108-88-3]	
7 8	
VARIABLES: $T/K = 293.15 - 313.15$	PREPARED BY:
g/kPa = 101.32	W. Hayduk
-•	
EXPERIMENTAL VALUES: Mole Fraction	ald Coefficient ¹ Bunsen Coefficient gas(cm solvent) ⁻¹ $\alpha/cm$ (STP)cm ³ atm
$t/C$ ¹ $T/K$ Ethene, $x_1$ $L/cm$	gas(cm solvent) · α/cm (STP)cm atm
20 293.15 0.0154	3.51 3.27
25 298.15 0.0144 30 303.15 0.0134	3.32 3.04 3.14 2.83
40 313.15 0.0119	2.83 2.47
¹ There were no direct results, only a calculated by the compiler for a gas using equations given in the paper fo as follows:	partial pressure of 101.325 kPa
$H = H_o \exp(-\Delta H_L / fRT); C = HP$	
C = Solubility, mol/l; P = Press	sure, bar
H = Henry's constant, mol/l.bar	
H _o = A constant, 0.00175, mol/l.ba	r
$-\Delta H_1 = \text{Enthalpy of solution, 10742,}$	W s/mol
R = Gas constant, l.bar/mol.K	
f R = Conversion factor, 8.324, W.s compiler from graphs of H ver	s.l.bar $(mol^2.K)^{-1}$ (determined by sus $T^{-1}$ )
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE;	SOURCE AND PURITY OF MATERIALS:
The absorption vessel whose volume	Sources and purities not
was 160 ml, containing a thermo- meter and stirring bar, was mounted	specified.
in a constant temperature bath. A volume of about 100 ml of solvent	
was degassed then pressurized with	
ethene to a pressure not exceeding 2 bar in the absorption vessel.	
After equilibrium was achieved, the	
gas was slowly released into an evacuated gas expansion system	
connected to a mercury manometer. Any solvent vapor present in the	ESTIMATED ERROR:
gas was condensed in a low temper- ature coil. By material balance,	$\delta x_1/x_1 = + 3 $ (compiler)
considering the volumes of gas in the system, it was possible to	
calculate solubilities as Henry's	REFERENCES :
constants.	
	I

ORIGINAL MEASUREMENTS:
Hannaert, H.; Haccuria, M.; Mathieu, M.P.
Ind. Chim. Belge <u>1967</u> , 32, 15 <b>6-164.</b>
PREFARED BY:
W. Hayduk H.L. Clever
l
¹ Mole fraction Ethene, $x_1$
0.0356
0.0241 0.0172
0.0148
by compilers for a gas partial tion developed by the authors with e range:
ol ¹ )/(2.3R( <i>T</i> /K))
nthalpy of dissolution
<u>ion qas in gas phase</u> ion gas in liquid phase
acity
to a Henry's constant in the form he fugacity.
INFORMATION
SOURCE AND PURITY OF MATERIALS:
1. Ethene. Air Liquide. For narcosis, 99.9 per cent.
2. Methylbenzene. Qualite UCB. Density, ρ ²⁰ /g cm ³ = 0.8689.
ESTIMATED ERROR:
$\delta x_1/x_1 = \pm 10 \text{ to } 15\%$ (authors)
REFERENCES :

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Krauss, V.W.; Gestrich, W.
2. Dimethylbenzene, (xylene), actual type not specified; C ₀ H ₁₀ ; taken to be m-xylene [108-38-3]	Khemie – Technik <u>1977</u> ,6 , 513–516.
VARIABLES: $T/K = 293.15 - 313.15$ g /kPa = 101.32	PREPARED BY: W. Hayduk
EXPERIMENTAL VALUES: Mole Fraction ¹ Ostv $t/C$ ¹ $T/K$ Ethene, $x_1$ $L/cm^{4}$	vald Coefficient ¹ Bunsen Coefficient ³ gas (cm ³ solvent) ⁻¹ $\alpha/cm^3$ (STP) cm ⁻³ atm ⁻¹
20         293.15         0.0161           25         298.15         0.0150           30         303.15         0.0140           40         313.15         0.0123	3.192.983.002.752.832.552.532.21
¹ There were no direct results, only a calculated by the compiler for a gas using equations given in the paper for as follows:	partial pressure of 101.325 kPa
$H = H_{\circ} \exp(-\Delta H_{L} / fRT);  C = HP$	
C = Solubility, mol/1; $P = $ Press	sure, bar
H = Henry's constant, mol/l.bar	
$H_{\circ} = A \text{ constant}, 0.00126, \text{ mol/l.ba}$	ır
$-\Delta H_r$ = Enthalpy of solution, 11309,	W s/mol
R = Gas constant, l.bar/mol.K	
f R = Conversion factor, 8.324, W s compiler from graphs of H ver	s.l.bar. $(mol^2.K)^{-1}$ (determined by sus $T^{-1}$ )
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The absorption vessel whose volume was 160 ml, containing a thermo- meter and stirring bar, was mounted in a constant temperature bath. A volume of about 100 ml of solvent was degassed then pressurized with ethene to a pressure not exceeding 2 bar in the absorption vessel. After equilibrium was achieved, the gas was slowly released into an evacuated gas expansion system connected to a mercury manometer. Any solvent vapor present in the gas was condensed in a low temper- ature coil. By material balance, considering the volumes of gas in the system, it was possible to	Sources and purities not specified.
calculate solubilities as Henry's constants.	REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Hannaert, H.; Haccuria, M.; Mathieu, M.P.
2. Dimethylbenzenes (xylenes); C _g H ₁₀ ; [108-38-3]	Ind. Chim. Belge <u>1967</u> , 32, 156–164.
VARIABLES: T /K = 243.15 - 293.15	PREPARED BY: W. Hayduk
p ₁ /kPa = 101.3	
EXPERIMENTAL VALUES:	
t/C T/K	¹ Mole Fraction Ethene, $x_1$
-30 243.15 -10 263.15 10 283.15	0.0368 0.0251 0.0180
20 293.15	0.0155
¹ Mole fraction solubility calculate pressure of 101.3 kPa using the equal v = 1, for the applicable temperature	ation developed by the authors with re range:
$\log (K\pi v) = 3.63 - (\Delta H / cal )$	mol )/(2.3R(T/K))
The authors' definitions are:	
	Enthalpy of dissolution
$K = y_1 / x_1 = \frac{\text{mole frac}}{\text{mole frac}}$	<u>tion gas in gas phase</u> tion gas in liquid phase
$\pi$ / atm = total pressure	
v = coefficient of fu	gacity
The function, $K\pi v/atm$ , is equivalent H _{1,2} /atm = $(f_1/atm)/x_1$ where $f_1$ is t	t to a Henry's constant in the form the fugacity.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The authors describe several methods used; the one used in this	1. Ethene. Air Liquide. Specified purity 99.9%.
case is the least accurate. The apparatus is of glass and consists of a burette in which the gas is confined over mercury, two bulbs for the solvent, one above the other, a mercury manometer and a constant temper- ature bath. A measured volume of solvent is degassed in the top	<ol> <li>Dimethylbenzenes. Merck and Co. Mixture of 90% dimethyl- benzenes, 5% methylbenzene, and 5% ethylbenzene.</li> </ol>
bulb at ambient temperature and charged to the absorption bulb in the bath. Gas is charged to the desired pressure. The quantity of gas added at constant pressure is measured. Agitation is manual.	ESTIMATED ERROR: $\delta x_1/x_1 = \pm 10$ to 15% (authors) REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-1]	Krauss, V.W.; Gestrich, W.		
2. Cyclohexane; C ₆ H ₁₂ ; [110-82-7]	Khemie – Technik <u>1977</u> ,6 , 513–516.		
VARIABLES: T/K = 293.15 - 313.15	PREPARED BY: W. Hayduk		
$p_1/kPa = 101.32$			
EXPERIMENTAL VALUES: $t/C$ $T/K$ Mole Fraction $L/cm^3$	vald Coefficient ¹ Bunsen Coefficient gas( $cm^3$ solvent) ⁻¹ $\alpha / cm^3$ (STP) $cm^{-3}$ atm ⁻¹		
20293.150.016125298.150.015030303.150.013940313.150.0122	3.633.383.403.123.202.882.852.48		
¹ There were no direct results, only a calculated by the compiler for a gas using equations given in the paper fo as follows:	partial pressure of 101.325 kPa		
$H = H_{o} \exp(-\Delta H_{L}/fRT); C = H P$			
C = Solubility, mol/l; P = Press	sure, bar		
H = Henry's constant, mol/l.bar			
H _e = A constant, 0.00123, mol/l.bar			
$-\Delta H_{L} =$ Enthalpy of solution, 11679,	W s/mol		
R = Gas constant, l.bar/mol.K f R = Conversion factor, 8.324, W.s	$(mol^2,K)^{-1}$ (determined by		
compiler from graphs of H ver	$T^{-1}$		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The absorption vessel whose volume was 160 ml, containing a thermo- meter and stirring bar, was mounted in a constant temperature bath. A volume of about 100 ml of solvent was degassed then pressurized with ethene to a pressure not exceeding 2 bar in the absorption vessel. After equilibrium was achieved, the gas was slowly released into an evacuated gas expansion system	Sources and purities not specified.		
connected to a mercury manometer. Any solvent vapor present in the gas was condensed in a low temper- ature coil. By material balance, considering the volumes of gas in the system, it was possible to calculate solubilities as Henry's constants.	ESTIMATED ERROR: $\delta x_1/x_1 = \pm 3$ % (compiler) REFERENCES:		

OMPONENTS :		ORIGINAL MEASUREMENTS:	
1. Ethene	; C ₂ H ₄ ; [74-85-1]	Leites, I.L.; Ivanov	vskii, F.P.
2. Methylcyclohexane; $C_7 H_{14}$ ;		Khim. Prom. <u>1962</u> , 9,	653-657.
[108-8	7-2]		
			····
VARIABLES: $T/K = 213.15, 223.15$ $p_1/kPa' = 101.325$		PREPARED BY: W. Hayduk	
		n. nayuux	•
XPERIMENTAL	VALUES:	······································	
t∕c	<i>T</i> /K ¹ log ₁₀ ( <i>H</i> /mmHg)	² Henry's Constant, _ H/atm (mole fraction)	² Mole Fraction Ethene, $x_1$
-60	213.15 3.909	10.67	0.0937
-50	223.15 4.037	14.33	0.0698
	MBCanc (A ) were read rio	m enlarged graphs by the	comprier.
	Henry's constant (H) and by the compiler based on	mole fraction solubilit	
	Henry's constant (H) and by the compiler based on	mole fraction solubilit	
calculated	Henry's constant (H) and by the compiler based on	mole fraction solubilit the graphical results.	y (x ₁ ) were
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	Henry's constant (H) and by the compiler based on AUXILIAR	mole fraction solubilit the graphical results. Y INFORMATION	<pre>xy (x₁) were IALS: stated to was distilled chromatography.</pre>
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	<pre>mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR:</pre>	<pre>xy (x₁) were IALS: x stated to x was distilled chromatography.</pre>
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	<pre>mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR:</pre>	IALS: stated to was distilled chromatography. given.
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Au	IALS: stated to was distilled chromatography. given.
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	<pre>mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR:</pre>	IALS: stated to was distilled chromatography. given.
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Au	IALS: stated to was distilled chromatography. given.
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Au	IALS: stated to was distilled chromatography. given.
ETHOD/APPARA A metal cr dry-ice ar to a tempe The equili in the cry purified h lation and	AUXILIAR AUXILIAR TUS/PROCEDURE: Cyostat was cooled with a acetone and controlled erature to <u>+</u> 0.05 K. Ibrium cell was mounted yostat. The solvent was by fractional distil- i analyzed by chromato-	mole fraction solubilit the graphical results. Y INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by c Actual purity not ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Au	IALS: stated to was distilled chromatography. given.

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COMPONENTS :	ORIGINAL MEASUREMENTS:
<pre>1. Ethene (Ethylene); C₂H₊; [74-85-1]</pre>	Lenoir, J-Y.; Renault, P.; Renon, H.
2. Decahydronaphthalene, (Decalin) C10H10; [91-17-8]	J. Chem. Eng. Data <u>1971</u> , 16, 340-2.
VARIABLES:	PREPARED BY:
T/K = 298.15, 323.15 P/kPa = 101.3 (1 atm)	C.L. Young
EXPERIMENTAL VALUES:	
T/K Henry's con $H_{C_2H_*}/atm$	
298.15 72.	2 0.0139
323.15 84.	9 0.0118
	INFORMATION
METHOD /APPARATUS / PROCEDURE:	
A conventional gas-liquid chromato-	SOURCE AND PURITY OF MATERIALS;
graphic unit fitted with a thermal conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at l atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface	<ol> <li>L'Air Liquide sample, minimum purity 99.9 mole per cent.</li> <li>Touzart and Matignon or Serlabo sample, purity 99 mole per cent.</li> </ol>
conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at l atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface adsorption was not allowed for	<ul> <li>(1) L'Air Liquide sample, minimum purity 99.9 mole per cent.</li> <li>(2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent.</li> </ul>
conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at l atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface	<ol> <li>L'Air Liquide sample, minimum purity 99.9 mole per cent.</li> <li>Touzart and Matignon or Serlabo sample, purity 99 mole per cent.</li> </ol>
conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at 1 atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface adsorption was not allowed for although its possible existence was	(1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/\text{atm} = \pm 6\%$
conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at 1 atm. pressure. There is also considerable uncertainty in the value of Henry's constant since surface adsorption was not allowed for although its possible existence was	(1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/\text{atm} = \pm 6\%$ (estimated by compiler).

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143 **COMPONENTS:** ORIGINAL MEASUREMENTS: 1. Ethene; C, H; [74-85-1] Krauss, V.W.; Gestrich, W. Khemie - Technik 1977, 6, 513-516. 2. Naphthalene, 1,2,3,4tetrahydro-, (tetralin); C, H,; [119-64-2] VARIABLES: PREPARED BY: T/K = 293.15 - 313.15W. Hayduk p/kPa = 101.32EXPERIMENTAL VALUES: 1 Mole Fraction ¹Ostwald Coefficient ¹Bunsen Coefficient ¹ т/к  $L/cm^{3}gas(cm^{3}solvent)^{-1} \alpha/cm^{3}(STP)cm^{-3}atm^{-1}$ Ethene,  $x_1$ t/C 20 0.0127 2.25 2.09 293.15 25 298.15 0.0119 2.15 1.97 30 303.15 0.0113 2.05 1.85 40 0.0101 1.88 313.15 1.64 ¹There were no direct results, only a correlation. The results were calculated by the compiler for a gas partial pressure of 101.325 kPa using equations given in the paper for the applicable temperature range as follows:  $H = H_{\circ} \exp(-\Delta H_{1} / fRT); \quad C = H P$ C = Solubility, mol/l; P = Pressure, bar H = Henry's constant, mol/1.bar  $H_o = A \text{ constant}, 0.00212, \text{ mol/l.bar}$  $-\Delta H_1$  = Enthalpy of solution, 9190, W s/mol R = Gas constant, l.bar/mol.K f R = Conversion factor, 8.324, W.s.l.bar (mol².K)⁻¹ (determined bycompiler from graphs of H versus  $T^{-1}$ ) AUXILIARY INFORMATION SOURCE AND PURITY OF MATERIALS: METHOD/APPARATUS/PROCEDURE: The absorption vessel whose volume Sources and purities not specified. was 160 ml, containing a thermometer and stirring bar, was mounted in a constant temperature bath. A volume of about 100 ml of solvent was degassed then pressurized with ethene to a pressure not exceeding 2 bar in the absorption vessel. After equilibrium was achieved, the gas was slowly released into an evacuated gas expansion system connected to a mercury manometer. Any solvent vapor present in the gas was condensed in a low temper-ESTIMATED ERROR: ature coil. By material balance,  $\delta x_1/x_1 = \pm 3$ % (compiler) considering the volumes of gas in the system, it was possible to calculate solubilities as Henry's **REFERENCES:** constants.

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COMPONENTS:		ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]		McDaniel, A. S.
(2) (R)-1-Methyl-4- cyclohexene or C ₁₀ H ₁₆ ; [5989-2 see also [499-9	Limonene; 7-5]	J. Phys. Chem. <u>1911</u> , 15, 587-610.
		PREPARED BY:
VARIABLES: T/K = 295.15 $p_1/kPa = 101.3$ (1 atm)		H. L. Clever
EXPERIMENTAL VALUES:	ι	
	Temperature O	stwald Coefficient
	t/°C T/K	$L/cn^3$ cm ⁻³
	22.0 295.15	2.753 → 3.05 in 12 h. Equilibrium not established
	often 20 percent o	data should be used with caution. r more too small when compared
		INFORMATION
METHOD/APPARATUS/PROCED	JRE :	SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: The apparatus is all glass. It con- sists of a gas buret connected to a contacting vessel. The solvent is degassed by boiling under reduced pressure. Gas pressure or volume is adjusted using mercury displacement. Equilibration is achieved at atm pressure by hand shaking, and incre- mentally adding gas to the contacting chamber. Solubility measured by obtaining total uptake of gas by known volume of the solvent.		<ol> <li>Ethene. Prepared by reaction of 1,2-dibromoethane with zinc-copper.</li> <li>Limonene.</li> </ol>
WINNI ADTORIG OT CUG	JULVEILL.	ESTIMATED ERROR:
		$\delta L/L \geq -0.20$
		REFERENCES:

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OMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Ethene;	C ₂ H ₄ ; [74-85-1]		Leites, I.L.; Ivanov	skii, F.P.
2. Heptane	e; C ₇ H ₁₆ ; [142-82-5]		Khim. Prom. <u>1962</u> , 9,	653-657.
	penzene (toluene); 108-88-3]			
ARIABLES:	<i>T</i> /K = 213.15, 223.15		PREPARED BY:	
P	/kPa = 101.325 $x_3 = 0 - 1.0$		W. Hayduk	•
XPERIMENTAL	VALUES:			
¹ 5 t/с т/к	Solvent Composition, $x_3$ , Mole Fraction Toluene ² log.	(H/mmH	³ Henry's Constant H/atm Ig) (mole fraction) ¹	Ethene. r.
				·
-60 213.1				0.110
	0.25 0.50	3.848		0.108 0.104
	0.75	3.900		0.0957
	1.0 (toluene)	3.998	3 13.10	0.0764
-50 223.1		3.965		0.0824
	0.25	3.978		0.0800
	0.50 0.75	4.030		0.0767 0.0709
	1.0 (toluene)			0.0578
free basis ² Only grap	3.	ailabl	nt solutions are given e; values of log Henry by the compiler.	
<pre>free basis ² Only grag ( H') were ³ Values of</pre>	s. hical results were av read from an enlarged	ailabl graph	e; values of log Henry.	's constant
<pre>free basis ² Only grag ( H') were ³ Values of</pre>	whical results were av read from an enlarged Henry's constant (H) by the compiler.	ailabl graph and m	e; values of log Henry by the compiler.	's constant
free basis ² Only grap ( <i>H'</i> ) were ³ Values of calculated	whical results were av read from an enlarged Henry's constant (H) by the compiler.	ailabl graph and m	e; values of log Henry by the compiler. nole fraction solubilit	's constant y $(x_1)$ were
free basis ² Only grap ( H') were ³ Values of calculated METHOD/APPARA A metal cr	hical results were av read from an enlarged Henry's constant (#) by the compiler. AUX TUS/PROCEDURE: yostat was cooled wit	ailabl graph and m ILLIARY	e; values of log Henry by the compiler. hole fraction solubilit INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was	's constant y $(x_1)$ were
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar	hical results were av read from an enlarged Henry's constant (H) by the compiler. AUX TUS/PROCEDURE: Syostat was cooled with d acetone and the tem	ailabl graph and m HLLARY	e; values of log Henry by the compiler. hole fraction solubilit INFORMATION	's constant y (x ₁ ) were
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equili in the cry purified f	Aux Aux Trus/PROCEDURE: Tyostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- rostat. The solvents by fractional distil-	ailabl graph and m ILLIARY h per- K. ted were	e; values of log Henry by the compiler. hole fraction solubilit INFORMATION SOURCE AND PURITY OF MATER 1. Ethene purity was	's constant y (x ₁ ) were (ALS: stated to lled and atography.
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux Aux Trus/PROCEDURE: Tyostat was cooled wit action cell was mount ostat. The solvents	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>e; values of log Henry by the compiler.</li> <li>nole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN 1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom</li> </ul>	's constant y (x ₁ ) were (ALS: stated to lled and atography. ied. distilled hromatography
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>.e; values of log Henry h by the compiler.</li> <li>hole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIANAL</li> <li>1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disting analyzed by chrom Purity not specified</li> <li>3. Methylbenzene was and analyzed by chromity not specified</li> <li>Yurity not specified</li> </ul>	's constant y (x ₁ ) were (ALS: stated to lled and atography. ied. distilled hromatography
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>e; values of log Henry by the compiler.</li> <li>hole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIAN</li> <li>1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom Purity not specified</li> <li>3. Methylbenzene was and analyzed by chrom</li> </ul>	's constant y (x ₁ ) were (ALS: stated to lled and atography. ied. distilled hromatography
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>.e; values of log Henry h by the compiler.</li> <li>hole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIANAL</li> <li>1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disting analyzed by chrom Purity not specified</li> <li>3. Methylbenzene was and analyzed by chrom Purity not specified</li> <li>ESTIMATED ERROR: <pre></pre></li></ul>	's constant y (x ₁ ) were ALS: stated to lled and atography. ied. distilled hromatography ied.
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>e; values of log Henry by the compiler.</li> <li>nole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN 1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom Purity not specif</li> <li>3. Methylbenzene was and analyzed by c Purity not specif</li> <li>ESTIMATED ERROR:</li> </ul>	's constant y (x ₁ ) were ALS: stated to lled and atography. ied. distilled hromatography ied.
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>a.e; values of log Henry h by the compiler.</li> <li>bole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN 1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom Purity not specif</li> <li>3. Methylbenzene was and analyzed by c Purity not specif</li> <li>ESTIMATED ERROR:</li></ul>	's constant y (x ₁ ) were ALS: stated to lled and atography. ied. distilled hromatography ied.
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>a.e; values of log Henry h by the compiler.</li> <li>bole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN 1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom Purity not specif</li> <li>3. Methylbenzene was and analyzed by c Purity not specif</li> <li>ESTIMATED ERROR:</li></ul>	's constant y (x ₁ ) were ALS: stated to lled and atography. ied. distilled hromatography ied.
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>a.e; values of log Henry h by the compiler.</li> <li>bole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN 1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom Purity not specif</li> <li>3. Methylbenzene was and analyzed by c Purity not specif</li> <li>ESTIMATED ERROR:</li></ul>	's constant y (x ₁ ) were ALS: stated to lled and atography. ied. distilled hromatography ied.
free basis ² Only grap (H') were ³ Values of calculated METHOD/APPARA A metal cr dry-ice ar ature was The equility in the cruity purified f lation and	Aux TUS/PROCEDURE: Yostat was cooled with a controlled to <u>+</u> 0.05 bration cell was moun- ostat. The solvents by fractional distil- a analyzed by chromato	ailabl graph and m HLLARY h per- K. ted were -	<ul> <li>a.e; values of log Henry h by the compiler.</li> <li>bole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN 1. Ethene purity was be 99.9%.</li> <li>2. Heptane was disti analyzed by chrom Purity not specif</li> <li>3. Methylbenzene was and analyzed by c Purity not specif</li> <li>ESTIMATED ERROR:</li></ul>	's constant y (x ₁ ) were ALS: stated to lled and atography. ied. distilled hromatography ied.

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OMPONENTS:			
		ORIGINAL MEASUREMENTS:	
1. Ethene; $C_2$	H ₁ ; [74-85-1]	Leites, I.L.; Ivanovs	kii, F.P.
2. Methylcycl [108-87-2]	ohexane; $C_{7}H_{14};$	Khim. Prom. <u>1962</u> , 9, 6	53-657.
3. Methylbenz [108-88-3]	ene (toluene); C ₇ H ₈ ;		
/ARIABLES: T/	K = 213.15, 223.15	PREPARED BY:	
p ₁ /kp x	a = 101.325 $_3 = 0 - 1.0$	W. Hayduk	
XPERIMENTAL VALUE	S:		
¹ Solv <i>x</i> <i>t/C T/K</i>	ent Composition, , Mole Fraction Toluene ² log ₁₀ (H/	³ Henry's Constant ³ <i>H</i> /atm mmHg) (mole fraction) ⁻¹	Mole Fraction Ethene, $x_1$
-60 213.15	0 (m.c.hexane) 3.90	9 10.67	0.0937
	0.25 3.90	0 10.45	0.0957
	0.50 3.90		0.0957
	0.75 3.91 1.0 (toluene) 3.99		0.0924 0.0763
-50 223.15	0 (m.c.hexane) 4.03	7 14.33	0.0698
-50 223.15	0.25 $4.03$	0 13.78	0.726
	0.50 4.02		0.0713
	0.75 4.05		0.0668
	1.0 (toluene) 4.11	9 17.31	0.0578
free basis. ² Only graphic	al results were availab	le; values of log Henry'	n a solute- s constant
<pre>² Only graphic ( H') were rea ³ Values of He</pre>	d from an enlarged grap	le; values of log Henry'	s constant
<pre>² Only graphic ( H') were rea ³ Values of He</pre>	d from an enlarged grap nry's constant (H) and the compiler.	le; values of log Henry' h by the compiler.	s constant
² Only graphic (H') were rea ³ Values of He calculated by	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY	ble; values of log Henry' h by the compiler. mole fraction solubility	s constant (x ₁ ) were
² Only graphic (H') were rea ³ Values of He calculated by METHOD/APPARATUS/I A metal cryos dry-ice and a	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper-	De; values of log Henry' h by the compiler. mole fraction solubility INFORMATION	s constant $(x_1)$ were
<pre>² Only graphic (H') were rea ³ Values of He calculated by #ETHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost</pre>	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were	<pre>ble; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was     be 99.9%. 2. Methylcyclohexane     and analyzed by ch</pre>	s constant (x ₁ ) were LS: stated to was distilled romatography.
<pre>² Only graphic (H') were rea ³ Values of He calculated by #ETHOD/APPARATUS/I A metal cryoss dry-ice and a ature was con The equilibra in the cryost purified by f</pre>	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil-	<pre>ble; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was     be 99.9%. 2. Methylcyclohexane</pre>	s constant (x ₁ ) were LS: stated to was distilled romatography.
² Only graphic (H') were rea ³ Values of He calculated by ÆTHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were	<pre>ble; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was     be 99.9%. 2. Methylcyclohexane     and analyzed by ch</pre>	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography.
<pre>² Only graphic (H') were rea ³ Values of He calculated by ŒTHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an</pre>	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	<ul> <li>values of log Henry' h by the compiler.</li> <li>mole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIA</li> <li>1. Ethene purity was be 99.9%.</li> <li>2. Methylcyclohexane and analyzed by ch Purity not specifi</li> <li>3. Methylbenzene was and analyzed by ch Purity not specifi</li> </ul>	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography.
<pre>² Only graphic (H') were rea ³ Values of He calculated by ŒTHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an</pre>	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	<ul> <li>values of log Henry' h by the compiler.</li> <li>mole fraction solubility</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIA</li> <li>1. Ethene purity was be 99.9%.</li> <li>2. Methylcyclohexane and analyzed by ch Purity not specifi</li> <li>3. Methylbenzene was and analyzed by ch Purity not specifi</li> <li>ESTIMATED ERROR:</li> </ul>	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography.
² Only graphic (H') were rea ³ Values of He calculated by ETHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	<pre>Die; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was     be 99.9%. 2. Methylcyclohexane     and analyzed by ch     Purity not specifi 3. Methylbenzene was     and analyzed by ch     Purity not specifi ESTIMATED ERROR:</pre>	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography. ed.
² Only graphic (H') were rea ³ Values of He calculated by METHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	Die; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by ch Purity not specifi 3. Methylbenzene was and analyzed by ch Purity not specifi ESTIMATED ERROR: $\delta T / K = \pm 0.05$ $\delta x_1 / x_1 = \pm 0.01$ (Aut	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography. ed.
² Only graphic (H') were rea ³ Values of He calculated by METHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	<pre>Die; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was     be 99.9%. 2. Methylcyclohexane     and analyzed by ch     Purity not specifi 3. Methylbenzene was     and analyzed by ch     Purity not specifi ESTIMATED ERROR:</pre>	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography. ed.
² Only graphic (H') were rea ³ Values of He calculated by METHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	Die; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by ch Purity not specifi 3. Methylbenzene was and analyzed by ch Purity not specifi ESTIMATED ERROR: $\delta T / K = \pm 0.05$ $\delta x_1 / x_1 = \pm 0.01$ (Aut	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography. ed.
² Only graphic (H') were rea ³ Values of He calculated by ÆTHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	Die; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by ch Purity not specifi 3. Methylbenzene was and analyzed by ch Purity not specifi ESTIMATED ERROR: $\delta T / K = \pm 0.05$ $\delta x_1 / x_1 = \pm 0.01$ (Aut	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography. ed.
<pre>² Only graphic (H') were rea ³ Values of He calculated by ETHOD/APPARATUS/I A metal cryos dry-ice and a ature was con The equilibra in the cryost purified by f lation and an</pre>	d from an enlarged grap nry's constant (H) and the compiler. AUXILIARY PROCEDURE: tat was cooled with cetone and the temper- trolled to <u>+</u> 0.05 K. tion cell was mounted at. The solvents were ractional distil- alyzed by chromato-	Die; values of log Henry' h by the compiler. mole fraction solubility INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was be 99.9%. 2. Methylcyclohexane and analyzed by ch Purity not specifi 3. Methylbenzene was and analyzed by ch Purity not specifi ESTIMATED ERROR: $\delta T / K = \pm 0.05$ $\delta x_1 / x_1 = \pm 0.01$ (Aut	s constant (x ₁ ) were LS: stated to was distilled romatography. ed. distilled romatography. ed.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Ethene; C₂H₄; [74-85-1] 2. 1,1'-Methylenebis(methylbenzene), (ditolyl methane); C₁₅H₁₆; [1335-47-3]</pre>	Glazunova, T.V.; Ryabov, M.I.; Lipshtein, R.A. <i>Sov. At. Energ.</i> , <u>1987</u> , 62, 449-451.
VARIABLES: $T/K = 291-413$	PREPARED BY:
$P_1/kPa = 101.3$	C.L. Young
EXPERIMENTAL VALUES:	· · · · · · · · · · · · · · · · · · ·
t/°C T/K Bunsen coeff	icient Mole fraction at partial pressure of 1 atm.*
18 291 1.7149	0.01512
50         323         1.2607           140         413         0.7444	0.01116 0.00662
^a Calculated by compiler assuming th volume of component 2 is 200.7 cm ³	e ideal gas law and the molar mol ⁻¹ .
AUXILIARY INFOR	MATION
METHOD/APPARATUS/PROCEDURE	SOURCE AND PURITY OF MATERIALS:
Single pass flow system in which sample of solvent was saturated with gas at or near atmospheric pressure. Sample of solvent withdrawn and analysed using gas chromatography fitted with thermal conductivity detector.	<ol> <li>Purity at least 99.8 per cent by volume.</li> <li>Technical grade to TU 3810298-76 standard.</li> </ol>
	ESTIMATED ERROR: $\delta T/K = \pm 0.5;  \delta x/x = \pm 0.10$
	REFERENCES :

COMPONENTS:

1. Ethene; C₂H₄; [74-85-1]

2. Aromatic and Alicyclic compounds T/K = 196 - 423 P/MPa up to 19.3 EVALUATOR: C.L. Young School of Chemistry University of Melbourne Parkville, Victoria Australia, 3052

December 1993

CRITICAL EVALUATION:

## Critical Evaluation of Ethene Solubilities in Cyclohexane and Various

Aromatic Hydrocarbons for Pressures greater than 0.2 MPa (2 atm)

Ten groups of researchers (1-10) have measured solubilities for ethene in cyclohexane and in various aromatic hydrocarbons at elevated pressures. Solubilities were measured by two or more groups for benzene, toluene and xylenes but in general there are relatively few data available so that extensive evaluations are not possible. One group (3) has studied two-component solvent systems.

Few sets of data included both the liquid and gas phase compositions. In this evaluation we have, where possible, checked if the available data give a linear relationship for  $\log x$  versus  $\log P$ , which is indicative but not conclusive of consistent data. Furthermore, where possible we have compared extrapolated values at a partial pressure of 0.1013 MPa with values determined at or near 0.1013 MPa pressure. Correlating equations have been included where possible.

#### Cyclohexane; C₆H₁₂; [110-82-7]

This system has been investigated (1) at six temperatures from 303 K to 423 K at pressures between 1.7 MPa and 9.0 MPa. Linear plots were obtained at all temperatures when log x was plotted against log P. There are no gross inconsistencies in the data. Considerable uncertainty is involved in the long extrapolation of the data to 101.3 kPa. but the values obtained appear about 10% greater than the values obtained from the work of Krauss and Gestrich (11) (Please see low pressure Critical Evaluation). The values of Zhuze et al. (1) are therefore classified as tentative.

# Benzene; C₆H₆; [71-43-2]

Ethene solubilities in benzene have been reported by five groups of research workers (2,4,8-10) for total pressures from 0.28 MPa to 19.3 MPa and for temperatures ranging from 293 to 423 K. The results of Paratella and Sagramora (8) are rejected. Their solubilities are considerably lower than those of any other group and extrapolate to 101.3 kPa to give values considerably smaller than the tentative low pressure values. The data of Hiraoka (10) are difficult to evaluate; the lower temperature solubilities are broadly consistent with Henry's law constants determined from low pressure measurements but there are no low pressure results at the higher temperatures for comparison. The data of Ellis et al. (9) at 348.15 K are broadly consistent with the data of Kozorezov et al. (4) at the same temperature. The data of Kozorezov et al. (4) appear to have a reasonable temperature dependency and together with the limited data of Ellis et al. are classified as tentative. The data of Konobeev and Lyapin (2) are consistent with the data of Kozorezov et al. (4) and are also classified as tentative.

### Methylbenzene; C7H8; [108-88-3]

This system has been studied by four groups of workers (2, 5-7) for temperatures ranging from 228 K to 473 K and total pressures from 0.1 to 6 MPa. It is difficult to evaluate the data because of the different temperature and pressure ranges involved. Frank (7) measured the solubilities of ethene in toluene at four temperatures between 273 and 323 K up to pressures of 0.4 MPa. The values of the solubilities extrapolated to 0.1013 MPa are several percent lower than the values measured at or near 0.1013 MPa. The Henry's law constants obtained from the graphs given by Tyvina et al. (5) can be used to calculate the mole fraction solubility of ethane in toluene at a partial pressure of 0.1013 MPa. The values are in fair agreement with the values measured at or near 0.1013

COMPONENTS:	EVALUATOR:
1. Ethene; C ₂ H ₄ ; [74-85-1]	C.L. Young School of Chemistry
2. Aromatic and Alicyclic compounds T/K = 196 - 423 P/MPa up to 19.3	University of Melbourne Parkville, Victoria Australia, 3052
	December 1993

## CRITICAL EVALUATION:

MPa considering the problem of obtaining the solubility from the graphs. The results of Knonbeev and Lyapin (2) are consistent with the values of Tyvina et al. (5). The data of Shenderei et al. (6) are the only low temperature data available at elevated pressures. The values extrapolated to 0.1013 MPa and 238.15 and 248.15 K are consistent with the low pressure data of Leites and Ivanovskii (12). Please see low pressure Critical Evaluation. None of the sets of data can be recommended but the data of Shenderei et al. (6), Tyvina et al. (5) and Konobeev and Lyapin (2) are classified as tentative for the temperature and pressure range covered by the respective data. Please see Table 1.

Table 1.Comparison of Extrapolated High Pressure Solubilities with LowPressure Results for the System Ethene - Methylbenzene

T/K	Av. extrapolate	d solubility ^a	Solubility measured at low pressure ^a	<pre>% deviation</pre>
	Ref. 5	Ref. 7	-	
273.15		0.0204	0.0207	-1.4
293.15	0.0139		0.0152	-8.5
		0.0146		-3.9
308.15		0.0114	0.0124	-8.1
313.15	0.0108		0.0116	-6.9

a at a partial pressure of 0.1013 MPa

Ethene solubilities in a mixture of xylenes were reported by Konobeev and Lyapin (2) at pressures from 0.28 MPa to 3.21 MPa and temperatures from 293 K to 333 K. Nakamura et al. (3) reported ethene solubilities in each xylene isomer at six temperatures ranging from 213 K to 303 K and total pressures up to 1.28 MPa. Although the authors did not provide ethene partial pressures, they gave average Henry's constants for each operating temperature. Assuming a direct inverse relationship between Henry's law constant and the mole fraction solubility at an ethene partial pressure of 101.3 kPa, the latter was calculated and plotted against 1/T. A linear relationship was obtained in all cases and this shows some degree of consistency of the data. The equation of the line of best fit was determined for each of the isomers. The equations of the lines and the corresponding correlation coefficients are:

1,2-dimethylbenzene

 $\log x = -3.74 + 569.3/(T/K) \quad \text{coeff.} = 0.9991 \tag{1}$ 

1,3-dimethylbenzene

 $\log x = -3.85 + 591.2/(T/K) \quad \text{coeff.} = 0.9998 \tag{2}$ 

1,4-dimethylbenzene

$$\log x = -3.90 + 599.7/(T/K)$$

It is not meaningful to give a correlation coefficient for the 1,4dimethylbenzene solubilities since half of the values were obtained by extrapolation of data for the binary solvent (1,4-dimethylbenzene + ethylbenzene) results.

3)

^{1,2-}Dimethylbenzene; C₈H₁₀; [106-42-3] 1,3-Dimethylbenzene; C₈H₁₀; [108-38-3] 1,4-Dimethylbenzene; C₈H₁₀; [95-47-6]

COMPONENTS:	EVALUATOR:
1. Ethene; C ₂ H ₄ ; [74-85-1]	C.L. Young School of Chemistry
<pre>2. Aromatic and Alicyclic compounds T/K = 196 - 423 P/MPa up to 19.3</pre>	University of Melbourne Parkville, Victoria Australia, 3052
-	December 1993

## CRITICAL EVALUATION:

In Table 2 the extrapolated high pressure solubility data of Nakamura et al. (3) have been compared with the low pressure measurements of Krauss and Gestrich (11) for 1,3-dimethylbenzene. The average deviation between the two sets of data was 3.9%. At 293.15 K the data of Konobeev and Lyapin (2) for the dimethylbenzene mixture are consistent with those of Nakamura et al. (3) at the same temperature. Both are classified as tentative.

Table 2. Comparison of Extrapolated High Pressure Solubilities with Low Pressure for the System Ethene - 1,3-Dimethylbenzene

T/K	Av. extrapolated solubility ^a	Solubility measured at low pressure ^a	<pre>% deviation</pre>
293.15	0.0151	0.0159	-5.0

 273.15
 0.0205
 0.0214

 252.65
 0.0313
 0.0304

^a at a partial pressure of 0.1013 MPa

### Ethylbenzene; C₈H₁₀; [100-41-4]

Nakamura et al. (3) reported solubility data for ethene in ethylbenzene at temperatures ranging from 196 K to 293 K and Kororezov et al. (4) measured ethene solubilities at similar pressures but for temperatures in the range 323 K to 423 K. Both workers gave Henry's constants and using these constants values of solubilities at a partial pressure of 101.3 kPa were calculated. The data of the two groups of workers gave colinear points on a plot of log x versus 1/T and are thus considered to be consistent with each other. The equation of the best fit line is:

$$\log x = -3.628 + 534.5/(T/K)$$
(4)

-4.0

+2.7

Since this equation has a correlation coefficient of 0.9983 it provides a suitable estimate of the solubility of ethene in ethylbenzene over the temperature range 196 K to 423 K.

The data of Nakamura et al. (3) and Kororezov et al. (4) are both classified as tentative.

# Diethylbenzene; C10H14; [25340-17-4]

Ethene solubilities in diethylbenzene were reported by Kozorezov et al. (4) for total pressures from 0.25 MPa to 1.52 MPa at temperatures ranging from 323 to 423 K. The authors gave Henry's constants and the mole fraction solubilities at partial pressures of 101.3 kPa were calculated (assuming a direct inverse relationship) and were plotted against 1/T.

A linear plot was obtained; therefore, the data of Kozorezov et al. (4) are classified as tentative.

Benzene, 1, 4-dimethyl-, (p-xylene); C₈H₁₀; [106-42-3]

and Ethylbenzene, C₈H₁₀; [100-41-4] solvent mixtures Benzene,1,3-dimethyl-, (m-xylene); C₈H₁₀; [108-38-3] and Ethylbenzene; C₈H₁₀; [100-41-4] solvent mixtures

	151	
COMPONENTS:	EVALUATOR:	
1. Ethene; C ₂ H ₄ ; [74-85-1]	C.L. Young School of Chemistry	
2. Aromatic and Alicyclic compounds T/K = 196 - 423	University of Melbourne Parkville, Victoria Australia, 3052	
P/MPa up to 19.3	December 1993	
CRITICAL EVALUATION:		
<ul> <li>Benzene,1,2-dimethyl-, (o-xylene); C₈H₁₀; [95-47-6] and Ethylbenzene; C₈H₁₀; [100-41-4] solvent mixtures</li> <li>Nakamura et al. [3] measured the solubilities of ethene in two component solvent mixtures containing ethylbenzene and each of the three xylene isomers at temperatures in the range of 213.15 K to 273.15 K. The working pressures were in the range of 192.5 kPa to 983 kPa. Based on the evaluation of the data in the pure solvents by these authors, these data also are classified as tentative.</li> </ul>		
References		
<ol> <li>Zhuze, T.P.; Zhurba, A.S.; Esakov, E.A. Bull. Acad. Sci. USSR, Inst. Geol. Min. Fuels, <u>1960</u>, 2, 2150-2152.</li> </ol>		
2. Konobeev, B.I.; Lyapin, V.V. Khim	Konobeev, B.I.; Lyapin, V.V. Khim. Prom., <u>1967</u> , 43, 114-116.	
<ol> <li>Nakamura, E.; Koguchi, K.; Amemiya 42-47.</li> </ol>	a, T. Kogyo Kagaku Zaschi, <u>1966</u> , 69,	
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- Tyvina, T.N.; Naumova, A.A.; Polyakov, S.A. Zhur. Prikl. Khim., <u>1979</u>, 52, 949-952 or J. Appl. Chem. USSR, 1979, 52, 910-913.
- Shenderei, E.R.; Zel'venskii, Ya.D.; Ivanovskii, F.P. Zhur. Fiz. Khim., <u>1962</u>, 36, 801-808.
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- 11. Krauss, V.W.; Gestrich, W. Khemie Technik, 1977, 6, 513-516.
- 12. Leites, I.L.; Ivanovskii, F.P. Khim. Prom., 1962, 9, 653-657.

	:			DRIGINAL MEASUR		
l. Eth	ene; $C_2 H_4$ ;	[74-85-1]		Zhuze, T.P	.; Zhurba, A.S.	;
2. Cyc	lohexane;	C ₆ H ₁₂ ; [110-	82-7]	Esakov, E.A	Α.	
				Bull. Acad. 1	Sci. USSR, Inst.	Geol.
				Min. Fuels.	<u>1960</u> , 2, 215	0-2152.
ARIABLES: T/K =	300-423		1	PREPARED BY:	· · · · · · · · · · · · · · · · · · ·	
P/MPa	= 2 - 10,	(20-100 atm)		W. Ha	ayduk	
XPERIMENT	AL VALUES:					
		Pressure	Partia	l Pressure ^l	Mole Fraction	n Ethylene
t/°C	T/K	P/Atm	p1/Ati	m p ₁ /MPa	liquid, x1	vapor,y ₁
30	303.15	20 40	19.8 39.8	4.03	0.245 0.520	0.990
50	323.15	60	59.4		0.830	0.990
50	323.15	20 40 60 80	19.5 39.2 58.8 76.4	3.97 5.96	0.200 0.405 0.510 0.845	0.980 0.980 0.955
75	348.15	20 40 60 80	19.0 38.6 58.5 76.8	3.91 5.93	0.160 0.315 0.460 0.635	0.950 0.965 0.975 0.960
² Only	lated by c graphical	data availab	88.0 ble in re		0.860 a read from enl	0.880 Larged
² Only graph	graphical by compil	ompiler. data availab er.	ole in re		0.860 a read from enl	larged
² Only graph	graphical by compil	ompiler. data availak er. molar volum	ble in re mes are a	ference; dat	0.860 a read from enl a graph.	larged
² Only graph Liqui	graphical by compil d solution	ompiler. data availab er. molar volum DURE:	ole in re nes are a AUXILIARY 1	ference; dat lso shown as INFORMATION	0.860 a read from enl a graph.	larged
² Only graph Liqui ETHOD/APP The met describ	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage	ompiler. data availak er. molar volum DURE: ilar to that and Lacey.	ole in re nes are a AUXILIARY I	ference; dat. lso shown as INFORMATION SOURCE AND PURI	0.860 a read from enl a graph. continu	larged
² Only graph Liqui ETHOD/APP The met describ Accurat and gas	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage ely known were char	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of sc ged into an	ole in re nes are a AUXILIARY 1 	ference; dat lso shown as INFORMATION SOURCE AND PURN 1. Ethene	0.860 a read from end a graph. continu ITY OF MATERIALS: contains 2.9% e	arged med
² Only graph Liqui ETHOD/APP The met describ Accurat and gas ated eq peratur	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage ely known s were char uilibrium e was cont	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of sc	AUXILIARY I evacu- e tem- ).05 K.	ference; dat lso shown as INFORMATION SOURCE AND PURN 1. Ethene 2. Cyclohe	0.860 a read from end a graph. continu ITY OF MATERIALS: contains 2.9% e xane properties	arged med ethane. s given as
² Only graph Liqui ETHOD/APP The met describ Accurat and gas ated eq peratur The vol in the	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage ely known swere char uilibrium e was cont ume occupi equilibriu	ompiler. data availab er. molar volum DURE: ilar to that and Lacey. masses of sc ged into an vessel. The rolled to ± 0 ed by the sy m vessel was	AUXILIARY I evacu- e tem- 0.05 K. ystem	ference; dat. lso shown as INFORMATION SOURCE AND PURN 1. Ethene 2. Cyclohe Density	0.860 a read from end a graph. continu ITY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78	arged med ethane. s given as
² Only graph Liqui ÆTHOD/APP The met describ Accurat and gas ated eq peratur The vol in the varied of merc	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage ely known swere char uilibrium e was cont ume occupi equilibriu by forcing sury into i	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of sc ged into an vessel. The rolled to ± 0 ed by the sy	AUXILIARY I AUXILIARY I c c c c c c c c c c c c c c c c c c c	ference; dat. lso shown as INFORMATION SOURCE AND PURN 1. Ethene 2. Cyclohe Density n _D ²⁰ = 1.	0.860 a read from end a graph. continu ITY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78 4271	ethane. 301 g/cm ³
² Only graph Liqui ETHOD/APP The met describ Accurat and gas ated eq peratur The vol in the varied of merc mercury a movab Equilib	graphical by compil d solution ARATUS/PROCE hod is sim ed by Sage ely known were char uilibrium e was cont ume occupi equilibriu by forcing cury into i supply ve ble electri orium was a	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of so ged into an vessel. The rolled to ± 0 ed by the sy m vessel was a definite t from a gra ssel equippe c indicator. ttained usin	AUXILIARY I AUXILIARY I evacu- e tem- ).05 K. ystem amount aduated ed with	ference; data lso shown as INFORMATION SOURCE AND PURN 1. Ethene 2. Cyclohe Density n ²⁰ = 1. Normal	0.860 a read from end a graph. continu TY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78 4271 boiling point =	ethane. 301 g/cm ³
² Only graph Liqui ÆTHOD/APP The met describ Accurat and gas ated eq peratur The vol in the varied of merco mercury a movab Equilib electro	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage ely known s were char uilibrium e was cont ume occupi equilibriu by forcing sury into i y supply ve ble electri rium was a magnetic s	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of so ged into an vessel. The rolled to ± 0 ed by the sy m vessel was a definite t from a gra ssel equippe c indicator. ttained usin	AUXILIARY I AUXILIARY I evacu- e tem- 0.05 K. ystem amount aduated ed with ig an	ference; data lso shown as INFORMATION SOURCE AND PURN 1. Ethene 2. Cyclohe Density n ²⁰ = 1. Normal	0.860 a read from end a graph. continu TTY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78 4271 boiling point = R:	ethane. s given as 301 g/cm ³
² Only graph Liqui ETHOD/APP The met describ Accurat and gas ated eq peratur The vol in the varied of merc mercury a movab Equilib electro pressur sure gu phase w	graphical by compil d solution ARATUS/PROCE the d is sime bed by Sage the d by Sage th	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of so ged into an vessel. The rolled to ±0 rolled to ±0 rolled to ±0 m vessel was a definite t from a gra ssel equippe c indicator. ttained using tirrer. The ured using p ample of the to a trap co	AUXILIARY I AUXILIARY I AUXILIARY I evacu- e tem- 0.05 K. ystem amount aduated ed with ng an e pres- e gas poled	ference; dat. lso shown as INFORMATION SOURCE AND PURI 1. Ethene 2. Cyclohe Density n ²⁰ = 1. Normal ESTIMATED ERRON Original	0.860 a read from end a graph. continu TY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78 4271 boiling point =	ethane. s given as 301 g/cm ³ = 80.9 °C.
² Only graph Liqui ETHOD/APP The met describ Accurat and gas ated eq peratur The vol in the varied of mercury a movab Equilib electro pressur sure gu phase w to 213 From a	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage sely known were char uilibrium was cont uilibrium equilibrium by forcing sury into i supply ve ble electri orium was a magnetic s te was mass ages. A s vas passed K with ace reading of	ompiler. data availab er. molar volum DURE: ilar to that and Lacey. masses of sc ged into an vessel. The rolled to ±0 ed by the sy m vessel was a definite t from a gra ssel equippe c indicator. ttained using p ured using p to a trap co to a trap co tone and dry a gas buret	AUXILIARY I AUXILIARY I evacu- e tem- ).05 K. ystem amount aduated ed with ig an e gas poled y ice.	ference; dat. lso shown as INFORMATION SOURCE AND PURI 1. Ethene 2. Cyclohe Density n ²⁰ = 1. Normal ESTIMATED ERRON Original	0.860 a read from enl a graph. continu ITY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78 4271 boiling point = R: data: $\delta x_1 / x_1$ =	ethane. s given as 301 g/cm ³ = 80.9 °C.
² Only graph Liqui #ETHOD/APP The met describ Accurat and gas ated eq peratur The vol in the varied of merc pressur sure gu phase w to 213 From a connect	graphical by compil d solution ARATUS/PROCE hod is sim bed by Sage ely known were char uilibrium was cont uilibrium equilibrium by forcing cury into i supply ve ble electri orium was a magnetic s was meas ages. A s vas passed K with ace reading of ted to the	ompiler. data availak er. molar volum DURE: ilar to that and Lacey. masses of sc ged into an vessel. The rolled to ±0 ed by the sy m vessel was a definite t from a gra ssel equippe c indicator. ttained using p ample of the to a trap co tone and dry	AUXILIARY I AUXILIARY I evacu- e tem- ).05 K. ystem amount aduated ed with ig an pres- e gas pooled y ice. tte plume	ference; dat. lso shown as INFORMATION SOURCE AND PURN 1. Ethene 2. Cyclohe Density n ²⁰ = 1. Normal ESTIMATED ERRO Original Tabulated REFERENCES:	0.860 a read from enl a graph. continu ITY OF MATERIALS: contains 2.9% e xane properties at 20°C = 0.78 4271 boiling point = R: data: $\delta x_1 / x_1$ =	ethane. s given as 301 g/cm ³ = 80.9 °C.

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COMPONENTS: 1. Ether		[74-85-1]		ORIGINAL MEASURE	EMENTS: ; Zhurba, A.S.	•
		C ₆ H ₁₂ ; [110-8	82-7]	Esakov, E.A		*
-					ci. USSR, Inst. G	201
					<u>1960</u> , 2, 2150	
$\begin{array}{l} \text{JARIABLES:} \\ T \ / K \ = \ 300 - 423 \end{array}$				PREPARED BY:		
P/MPa =	2 - 10,	(20-100 atm)		W. Ha	ıyduk	
XPERIMENTAL		continue	l ed		•	
		Pressure		al Pressure ¹	Mole Fraction	Ethvlene
t ∕°C	T/K	P/Atm	·	$p_1/MPa$	liquid, x,	vapor, y ₁
100	373.15	20	17.9		0.125	0.895
100	3/3.15	40	37.2	2 3.77	0.260	0.930
		60 80	56. 75.		0.380 0.525	0.935 0.940
		100	91.0		0.670	0.910
125	398.15	20	16.	7 1.69	0.105	0.835
145	550.15	40	35.0	3.55	0.220	0.875
		60 80	53. 72.0		0.335 0.450	0.895 0.900
		100	88.		0.580	0.885
150	423.15	20			0.085	
		40			0.185 0.290	
		60 80			0.390	
		100			0.520	
graph	by compil	ler.		eference; data also shown as	a read from enl a graph.	arged
,		Δ		INFORMATION	<u> </u>	
ETHOD /APPAF	ATUS (DDOCE				THE MATURE ALC.	
	•	nilar to that		SOURCE AND PURI	TY OF MATERIALS:	
describe	d by Sage	e and Lacey.		l Ethono	contains 2.9% e	thang
and gas	were chai	masses of so rged into an	evacu-			
ated equ	ilibrium	vessel. The trolled to ±0	tem-	2. Cyclohe:	xane properties	given as
The volu	me occupi	ied by the sy	stem	Density	at $20^{\circ}C = 0.78$	01 g/cm ³
in the e	quilibriu	um vessel was g a definite	amount	$n_{-}^{20} = 1$ .	4271	
of mercu	ry into i	it from a gra	duated	ע ו		
mercury a movabl	supply ve	essel equippe ic indicator.	d with	Normal	boiling point =	80.9°C.
Equilibr	ium was a	attained usin	ig an	ESTIMATED ERROR	\:	
electrom pressure	agnetic s was meas	stirrer. The sured using p			data: $\delta x_1 / x_1 =$	:±2%
sure gua	ges. A s	sample of the to a trap co	gas	1	values: $\delta x_1/x_1$	
to 213 K	with ace	etone and dry	/ ice.			1
From a r	eading of	f a gas buret trap, the vo	te	REFERENCES:	.; Lacey, W.N.	
of ethyl	ene was d	determined.	From	-		
the incr	ease in v	weight of the olvent conten	e trap	Trans. Am.	Inst. Mining Met.	Eng.,
the gas	phase was	s obtained.		<u>1940</u> , 136,	138.	
				J		
				1		

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Konobeev, B.I.; Lyapin, V.V.
2. Benzene; C ₆ H ₆ ; [71-43-2]	Khim. Prom. <u>1967</u> , 43, 114-6.
VARIABLES: T/K = 293.15 - 333.15	PREPARED BY:
P/MPa = 0.286 - 3.23	C. L. Young
EXPERIMENTAL VALUES:	
<i>T/K P/</i> 10 ⁵ Pa	Mole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$
293.15 3.070 8.106 14.19 17.43 21.08	0.036 0.096 0.172 0.224 0.288 0.502
313.15 313.15 313.15 313.15 3.258 3.258 3.7.63 23.31 32.12	0.024 0.076 0.174 0.220 0.380
333.15 333.15 2.878 8.268 17.43 32.32	0.018 0.061 0.136 0.278
AUXILIARY	
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Static equilibrium cell fitted with magnetic stirrer. Samples analysed by gas chromatography. Details in	1. Purity better than 99.6 mole per cent.
source.	2. No details given.
	ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta P = \pm 0.5\%; \ \delta x_{C_2H_4} = \pm 0.002$ (estimated by compiler)
	REFERENCES :
	1

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			ORIGINAL MEASUREME	NTS:	
1. Ethene; $C_2H_4$	; [74-85-1]		Kozorezov, Yu. Pikalo, N.M.	.I.; Rusako	ov, A.P.;
2. Benzene; C ₆ H	1 ₆ ; [71-43-2	2]	{ · ·		
			Khim. Prom. <u>1969</u> , 5,343-5.		
ARIABLES:			PREPARED BY:		
T/K = 323.15 - 423.15				C.L. Young W. Hayduk	3
P/MPa = 0	P/MPa = 0.25 - 1.54			w. nayuuk	
XPERIMENTAL VALUES:					
T/K	¹ ₽/10 ⁵ Pa	P/atm	Mole fraction of in liquid, ^x C;	f ethene 2H4	Solubility cm ³ (STP)/g
323.15	2.5	2.5	0.020		6.0
	5.1 10.1	5.0 10.0	0.040 0.081		11.9 25.4
	15.2	15.0	0.122		39.9
373.15	2.5 5.1	2.5 5.0	0.004 0.017		1.3 5.1
	10.1	10.0	0.043		13.0
403.15	15.2 5.1	15.0 5.0	0.072 0.006		22.3 1.7
400120	10.1	10.0	0.030		8.6
423.15	15.2 6.6	15.0 6.5	0.051 0.003		14.9 1.0
120120	10.1 15.2	10.0	0.010		5.1 12.1
	it given as	atm/mole f 323.15 115.2	raction as follo 373.15 403 181.0 204	.15 42	3.15 9.0
Henry's constan T/K	it given as	323.15	373.15 403.	.15 42	
<i>т/</i> к	it given as	323.15 115.2	373.15 403.	.15 42	
Henry's constan T/K	at given as	323.15 115.2	373.15     403       181.0     204	.15 42 .0 229	9.0
Henry's constan T/K H, atm /mole fr METHOD/APPARATUS/PRO Single pass flow	action DCEDURE:	323.15 115.2 AUXILIARY	373.15 403. 181.0 204. INFORMATION	0 225	9.0 S:
Henry's constan T/K H, atm /mole fr ETHOD/APPARATUS/PRO Single pass flow Ethene allowed to solvent for 3 to	CEDURE: w apparatus to flow thro o 5 hours.	323.15 115.2 AUXILIARY	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po	.15 42: .0 22: OF MATERIAL 93 mole pe int 80°C;	9.0 5: r cent.
Henry's constan T/K H, atm /mole fr ÆTHOD/APPARATUS/PRO Single pass flow Ethene allowed to solvent for 3 to Liquid sample wi analysed by str:	DCEDURE: w apparatus of flow thre o 5 hours. ithdrawn and ipping out of	323.15 115.2 AUXILIARY ough d ethene	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C	.15 42: .0 22: OF MATERIAL: 93 mole pe int 80°C;	9.0 S: r cent. melting
Henry's constan T/K H, atm /mole fr ETHOD/APPARATUS/PRO Single pass flow Ethene allowed to solvent for 3 to Liquid sample with	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po	.15 42: .0 22: OF MATERIAL: 93 mole pe int 80°C;	9.0 S: r cent. melting
Henry's constan T/K H, atm /mole fr	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C d ²⁰ ₄ = 0.8	.15 42: .0 22: OF MATERIAL: 93 mole pe int 80°C;	9.0 S: r cent. melting
Henry's constan T/K H, atm /mole fr METHOD/APPARATUS/PRO Single pass flow Ethene allowed to solvent for 3 to Liquid sample with analysed by str: and measuring and Solvent in samp?	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C $d_4^{20} = 0.8$ ESTIMATED ERROR: $\delta T/K = \pm 0$ .	.15 42: .0 22: OF MATERIAL: 93 mole pe int 80°C; 796; n _D ²⁰ 5; δ <i>P</i> /10 ⁵ P	9.0 S: r cent. melting = 1.5010.
Henry's constan T/K H, atm /mole fr METHOD/APPARATUS/PRO Single pass flow Ethene allowed to solvent for 3 to Liquid sample with analysed by str: and measuring and Solvent in samp?	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C $d_4^{20} = 0.8$ ESTIMATED ERROR: $\delta T/K = \pm 0.$ $\delta x_{C_2H_4} = \pm$	.15 42: .0 22: OF MATERIAL: 93 mole pe int 80°C; 796; n _D ²⁰ 5; δ <i>P</i> /10 ⁵ P	<pre>9.0 5; r cent. melting = 1.5010. a = ±0.1;</pre>
Henry's constan T/K H, atm /mole fr METHOD/APPARATUS/PRO Single pass flow Ethene allowed to solvent for 3 to Liquid sample with analysed by str: and measuring and Solvent in samp?	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C $d_4^{20} = 0.8$ ESTIMATED ERROR: $\delta T/K = \pm 0.$ $\delta x_{C_2H_4} = \pm$	.15 42: .0 229 OF MATERIAL 93 mole pe int 80°C; 796; n _D ²⁰ 796; n _D ²⁰ 5; 6 <i>P</i> /10 ⁵ P 0.001	<pre>9.0 5; r cent. melting = 1.5010. a = ±0.1;</pre>
Henry's constan T/K H, atm /mole fr	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C $d_4^{20} = 0.8$ ESTIMATED ERROR: $\delta T/K = \pm 0.$ $\delta x_{C_2H_4} = \pm$ (estimated	.15 42: .0 229 OF MATERIAL 93 mole pe int 80°C; 796; n _D ²⁰ 796; n _D ²⁰ 5; 6 <i>P</i> /10 ⁵ P 0.001	<pre>9.0 5; r cent. melting = 1.5010. a = ±0.1;</pre>
Henry's constan T/K H, atm /mole fr	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C $d_4^{20} = 0.8$ ESTIMATED ERROR: $\delta T/K = \pm 0.$ $\delta x_{C_2H_4} = \pm$ (estimated	.15 42: .0 229 OF MATERIAL 93 mole pe int 80°C; 796; n _D ²⁰ 796; n _D ²⁰ 5; 6 <i>P</i> /10 ⁵ P 0.001	<pre>9.0 5; r cent. melting = 1.5010. a = ±0.1;</pre>
Henry's constan T/K H, atm /mole fr	DCEDURE: w apparatus to flow thre o 5 hours. ithdrawn and ipping out on mount volume	323.15 115.2 AUXILIARY ough d ethene etrically.	373.15 403. 181.0 204. INFORMATION SOURCE AND PURITY 1. Purity 99. 2. Boiling po point 54°C $d_4^{20} = 0.8$ ESTIMATED ERROR: $\delta T/K = \pm 0.$ $\delta x_{C_2H_4} = \pm$ (estimated	.15 42: .0 229 OF MATERIAL 93 mole pe int 80°C; 796; n _D ²⁰ 796; n _D ²⁰ 5; 6 <i>P</i> /10 ⁵ P 0.001	<pre>9.0 5; r cent. melting = 1.5010. a = ±0.1;</pre>

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COMPONENTS:			ORIGINAL MEASUREM	ENTS:	
l. Ethen	e; C ₂ H ₄ ; [74	-85-1]	Hiraoka, H.		
2. Benze	ene; C ₆ H ₆ ; [71	-43-2]	Rev. Phys. Cher	m. Japan,	
			<u>1958</u> , 28, 64	-66.	
VARIABLES:			PREPARED BY:		
T/K = 29			W. Hay	duk	
	4.1 - 19.3, (40	-189 atm)			
EXPERIMENTAL	VALUES:				
	Total Pressur	e Part	ial Pressure ²	Mole Fract	ion Ethene
<i>т/</i> к	kg/cm² MPa ¹	p ₁ /At	m p ₁ /MPa	liquid, x	vapor, $y_1$
298.15	42 4.12		5 4.11	0.559	0.999
323.15	42 4.12 103 10.1	40.4 99.6		0.421 0.786	0.995 0.999
373.15	42 4.12 70 6.86	39.3	3.98 7 6.76	0.264 0.445	0.967 0.985
	103 10.1 197 19.3	99.1	10.0	0.654	0.994
		189.8			0.995
423.15	42 4.12 70 6.86	63.7	7 3.62 7 6.46	0.186 0.333	0.879 0.940
	103 10.1 154 15.1	96.0 146.7	5    9.78 7   14.9	0.483 0.617	0.969 0.984
	197 19.3	187.8		0.527	0.985
¹ Calcula	ted by compiler	•			
² Calcula	ted by compiler	assuming Rac	oult's Law.		
MUTUOD /ADDAD		AUXILIARY	INFORMATION		
METHOD/APPAR	ATUS/PROCEDURE:		SOURCE AND PURITY	OF MATERIALS:	
bubbling ature and solvent s vessel. sampled a phase was then slow ature. T evaporati sidered t	um was acheived gas at constant pressure throu tored in a stai Gas and liquid and analyzed. T condensed with yly warmed to ro the residual liq on of ethylene to be benzene.	temper- gh benzene nless steel phases were he gas liquid air om temper- uid after was con- The liquid	of ethanc distillat spectrum	indicated no ource and pu	ed by red ether.
pressure mercury i gas at a	by slowly displ n a sample bomb rate required t	acing the and adding o keep the	ESTIMATED ERROR:		
	constant. The is analyzed. Fu	liquid rther	$\delta x_1 / x_1 =$	0.02	
details c tions wer although	of analysis and e not given in some earlier wo but the refere	this paper, rk was	REFERENCES :		

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COMPONE	NTS:			ORIGINAL MEASUREMENTS:			
1. Et	hene; C	,H_; [74-85	i-1]	Paratel	la, A.; Sagra	amora, G.	
		2 4 . C ₆ H ₆ ; [71-4		Ric. Sci. (Italy), <u>1959</u> , 29,			
				2605-2613.			
VARIABLES: T /K = 298.15,348.15			PREPARED BY:				
				W	W. Hayduk		
<i>P</i> /MPa = 2.94-9.81, (29-97 atm) EXPERIMENTAL VALUES:							
EXPERIT	MENIAL VAL	.UE2 :					
<b></b>				Partial	Mole	'Henry's	
t/C	¹ <i>T</i> /K	Total Pre P/kg cm ⁻²		Pressure p ₁ /MPa	Fraction, ^x 1	Constant H/atm (mole fraction)	
25.0	298.15	30	2.942	2.930	0.0212	1364	
		60	5.884	5.872	0.0521	1112	
75.0	348.15	30	2.942	2.856	0.00719	3920	
		60	5.884	5.800	0.0251	2281	
		100	9.807	9.738	0.2050	469	
It :	is noted	by compiler by compile her results	er that these	results ar	e in serious	disagreement	
It :	is noted	by compile	er that these	results ar	e in serious	disagreement	
It :	is noted	by compile	er that these	results ar		disagreement	
It : wit	is noted	by compile	er that these	Y INFORMATIO			
It : with METHOD A dyn the s bling The i ed of achie the s gas v solve cell, with	AAPPARATUS MAPPARATUS namic me solvent g the ga body of f metal. eved by solvent. was high ent was , and so drawn, b	by compile her results S/PROCEDURE: thod was us was saturat s through t the cell was saturation passing the The consu (20-40 1/H initially f lution subs y means of	AUXILIAR AUXILIAR sed in which the solvent. as construct- on was a gas through imption of 1). The fed into the sequently a valve and	Y INFORMATION SOURCE AND 1. Ethe at 9	N PURITY OF MATH ne was spect 9.7% purity. ene source a	ERIALS; roscopy grade	
It : with METHOD A dyn the s bling The f ed of achie the s gas w solve cell, with capil press	APPARATUS APPARATUS Mamic me solvent g the ga body of f metal. eved by solvent. was high ent was , and so lirawn, b llary tu sure con	by compile her results S/PROCEDURE: thod was us was saturat s through t the cell was saturation passing the The consu (20-40 1/H initially f lution subs y means of	AUXILIAR AUXILIAR sed in which ted by bub- the solvent. as construct- on was e gas through imption of h). The ted into the sequently a valve and atls of the halytical	Y INFORMATION SOURCE AND 1. Ethe at 9 2. Benz give ESTIMATED Probabl	N PURITY OF MATH ne was spect 9.7% purity. ene source a n. ERROR: δT/K =	ERIALS; roscopy grade nd purity not	
It : with METHOD A dyn the s bling The f ed of achie the s gas w solve cell, with capil press	APPARATUS APPARATUS Mamic me solvent g the ga body of f metal. eved by solvent. was high ent was , and so lirawn, b llary tu sure con	by compile her results S/PROCEDURE: thod was us was saturat s through t the cell was saturation passing the The consu (20-40 1/r initially f lution subs y means of bing. Deta trol and ar	AUXILIAR AUXILIAR sed in which ted by bub- the solvent. as construct- on was e gas through imption of h). The ted into the sequently a valve and atls of the halytical	Y INFORMATION SOURCE AND 1. Ethe at 9 2. Benz give ESTIMATED Probabl	N PURITY OF MATH ne was spect 9.7% purity. ene source a n. ERROR: $\delta T / K =$ e error in s Compiler)	ERIALS; roscopy grade nd purity not ± 0.3	

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COMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Ethene;	C ₂ H ₄ ; [74-	85-1]	Ellis, S.R.M.; Valteris, H	R.L.;
2. Benzene;	C ₆ H ₆ ; [71-	43-2]	Harris, G.J.	
		1	Chem. Eng. Prog. Symp. Ser.,	
			<u>1968</u> , 64, 16-21.	
VARIABLES:			PREPARED BY:	
T/K = 348.19			W. Hayduk	
P/MPa = 1.4- EXPERIMENTAL VAL	-8.3 (14-82 at	.m)		
P/atm	Partial pre	ssure ¹	Mole fraction ethene	
	p ₁ /atm p ₁	/MPa	in liquid, $x_1$ in vapor,	У ₁
15.0 21.1 29.9 38.1 57.1 73.5 81.6 87.1 90.0	13.9 20.1 28.5 36.7 55.3 70.5 78.0 81.8 82.1	1.41 2.04 2.88 3.72 5.60 7.14 7.90 8.29 8.32	$\begin{array}{cccccc} 0.099 & 0.925 \\ 0.144 & 0.954 \\ 0.205 & 0.952 \\ 0.259 & 0.964 \\ 0.398 & 0.968 \\ 0.554 & 0.959 \\ 0.599 & 0.956 \\ 0.665 & 0.939 \\ 0.710 & 0.912 \end{array}$	
		AUXILIARY	INFORMATION	
METHOD /APPARATUS			INFORMATION SOURCE AND PURITY OF MATERIALS;	ified
stainless ste with a plunge stirrer was a cup was attac which was rat electromagne under its own displaced fro cury using a to the desire equilibration liquid were During the sa equivalent vo allowed to f bomb back to vessel. The samples was ic pressure acetone where aspirated vo	nod with a 500 bel vessel equ er, perforated used. The per ched to a soft ised up by mea t, and dropped h weight. Eth om a reservoin volumetric pi ed pressure. h, samples of withdrawn for ampling process olume of mercu low from the so the equilibra the equilibra condensed at a using dry-ice eas the gas po lumetrically of ysis was by gathy.	tipped troup forated iron rod ns of an downward by hene was toy mer- ston pump After gas and analysis. as, an by was sample tion on of the troospher- and ortion was	Sources and purities not spec ESTIMATED ERROR: $\delta x / x = \pm 0.03$ $T/K = \pm 0.01$ REFERENCES:	

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OMPONENTS :			ORIGINAL MEA	ASUREMENTS :		
1. Ethene; C,	н.: [74-	85-11	Frank, V			
<ol> <li>Methylbenz</li> </ol>	,					
-		uene),	J	-	1907, 00,	
C ₇ H ₈ ; [108-88-3]			360-361.	•		
ARIABLES: T/	K = 273.	15 - 323.15	PREPARED BY	:		
р/мр	a = 0.10	13 - 0.4053		W. Hayduk		
XPERIMENTAL VALU	ES:		l			
	E	l Pressure thene	Percent by Weight	¹ Mole Fraction	² Values	
<i>T</i> /K	p/atm	¹ p ₁ /MPa	Ethene, $w_1$	Ethene, $x_1$	of k	
273.15 (0°C)	1	0.1013	0.63	0.0204	0.55	
	2 3	0.2026 0.3040	1.3 1.9	0.0415 0.0598		
	4	0.4053	2.7	0.0835		
293.15 (20°C)		0.1013	0.45	0.0146	0.40	
	2 3	0.2026 0.3040	0.90 1.4	0.0290 0.0446		
	4	0.4053	1.9	0.0598		
308.15 (35°C)	1	0.1013	0.35	0.0114	0.30	
	2 3	0.2026 0.3040	0.70 1.1	0.0226 0.0352		
	4	0.4053	1.5	0.0476		
323.15 (50°C)		0.1013	0.25	0.00816	0.20	
	2	0.2026	0.50	0.0162		
the form of t	3 4 y compile type of 1 he follo	0.3040 0.4053 er. Henry's consta wing equation	0.75 1.1 ant (actually $C = k.p$	0.0242 0.0352 (H ⁻¹ ) were als		
² Values of a the form of t C = Equi k = A ty	3 4 type of 1 he follo librium pe of Her	0.3040 0.4053 er. Henry's consta wing equation	0.75 1.1 ant (actually $C = k.p$ , g ethene/10	0.0242 0.0352		
² Values of a the form of t C = Equi k = A ty	3 4 type of 1 he follo librium pe of Her	0.3040 0.4053 er. Henry's constant wing equations concentration nry's constant pressure, atm	0.75 1.1 ant (actually $C = k \cdot p$ , g ethene/10	0.0242 0.0352 (H ⁻¹ ) were als		
² Values of a the form of t C = Equi k = A ty p = Gas	3 4 y compile type of the he follow librium pe of Her partial p	0.3040 0.4053 er. Henry's constant wing equation: concentration nry's constant pressure, atm AUXILIA	0.75 1.1 ent (actually C = k.p g ethene/10 RY INFORMATION	0.0242 0.0352 7 H ⁻¹ ) were als 00 ml of solver	1t	
² Values of a the form of t C = Equi k = A ty p = Gas ÆTHOD/APPARATUS/	3 4 type of 1 he follor librium of pe of Her partial p	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION	0.0242 0.0352 y H ⁻¹ ) were als 00 ml of solver PURITY OF MATERIA	lts;	
² Values of a the form of t C = Equi k = A ty p = Gas	3 4 y compil. type of 1 he follow librium pe of Her partial partial PROCEDURE: the data ce 1. Of in that tated that ny (Germa	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION	0.0242 0.0352 y H ⁻¹ ) were als 00 ml of solver PURITY OF MATERIA ces and puritie	ls:	
² Values of a the form of t C = Equi k = A ty p = Gas (ETHOD/APPARATUS/ The source of to be referen is available It was also s Hoechst compa	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND Source	0.0242 0.0352 y H ⁻¹ ) were als 00 ml of solver PURITY OF MATERIA ces and puritie	lts;	
² Values of a the form of t C = Equi k = A ty p = Gas METHOD /APPARATUS/ The source of to be referen is available It was also s Hoechst compa these values There were no	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND Source given	0.0242 0.0352 7 H ⁻¹ ) were als 00 ml of solver PURITY OF MATERIA ces and puritie	lts;	
² Values of a the form of t C = Equi k = A ty p = Gas METHOD /APPARATUS/ The source of to be referen is available It was also s Hoechst compa these values There were no	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND Source given ESTIMATED E	0.0242 0.0352 7 H ⁻¹ ) were als 00 ml of solver PURITY OF MATERIA ces and puritie	LS: LS not	
² Values of a the form of t C = Equi k = A ty p = Gas METHOD /APPARATUS/ The source of to be referen is available It was also s Hoechst compa these values There were no	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND Source given ESTIMATED E $\delta w_1/w$	$0.0242$ $0.0352$ $(H^{-1}) \text{ were als}$ $00 \text{ ml of solver}$ $PURITY \text{ OF MATERIA}$ $Ces and puritients$ $0.04 (cost)$	LS: LS not	
² Values of a the form of t C = Equi k = A ty p = Gas METHOD /APPARATUS/ The source of to be referen is available It was also s Hoechst compa these values There were no	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND SOURCE AND SOURCE AND ESTIMATED E $\delta w_1/w$ REFERENCES:	$0.0242$ $0.0352$ $(H^{-1}) \text{ were als}$ $00 \text{ ml of solver}$ $PURITY \text{ OF MATERIA}$ $Ces and puritients$ $0.04 (cost)$	ut LS: ss not	
² Values of a the form of t C = Equi k = A ty p = Gas METHOD /APPARATUS/ The source of to be referen is available It was also s Hoechst compa these values There were no	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND SOURCE AND Source given ESTIMATED E $\delta w_1/w$ REFERENCES: 1. Bier	0.0242 0.0352 ( H ⁻¹ ) were also 20 ml of solver PURITY OF MATERIA ces and puritie 1. ERROR: $p_1 = \pm 0.04$ (constraints) ; G.; Lehmann,	ut LS: ss not ompiler) G.	
² Values of a the form of t C = Equi k = A ty p = Gas (ETHOD/APPARATUS/ The source of to be referen is available It was also s Hoechst compa these values There were no	3 4 type of 1 he follor librium of pe of Her partial p PROCEDURE: the data ce 1. Or in that is tated that of solubing details	0.3040 0.4053 er. Henry's constant wing equation: concentration, nry's constant pressure, atm AUXILIA a was stated nly a graph reference. at the any) used ility.	0.75 1.1 ant (actually C = k.p g ethene/10 RY INFORMATION SOURCE AND SOURCE AND Source given ESTIMATED E $\delta w_1/w$ REFERENCES: 1. Bier, "Copol	$0.0242$ $0.0352$ $(H^{-1}) \text{ were als}$ $00 \text{ ml of solver}$ $PURITY \text{ OF MATERIA}$ $Ces and puritients$ $0.04 (cost)$	st LS: ms not ompiler) G. p. IVB of High	

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60 COMPONENTS:		ORIGINAL MEASUREMENTS:
L. Ethene; $C_2H_4$ ;	[74-85-1]	Konobeev, B.I.; Lyapin, V.V.
2. Methylbenzene C ₇ H ₈ ; [108-8	e (Toluene);	Khim. Prom. <u>1967</u> , 43,114-6.
VARIABLES:	93.15 - 333.15	PREPARED BY:
	.284 - 3.16	C. L. Young
F/ma = 01		·
EXPERIMENTAL VALUES:	1	
<i>Т</i> /К	P/10 ⁵ Pa	Mole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$
293.15	3.070 8.197 14.89 31.11	0.040 0.109 0.199 0.430
313.15	2.837 8.268 31.41	0.029 0.087 0.347
333.15	2.837 8.299 17.73 31.61	0.022 0.070 0.151 0.287
		INFORMATION
	DCEDURE:	SOURCE AND PURITY OF MATERIALS:
magnetic stirrer	DCEDURE: um cell fitted with . Samples analysed	
Static equilibriu magnetic stirrer by gas chromatogu	DCEDURE:	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole
Static equilibriu magnetic stirrer	DCEDURE: um cell fitted with . Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent.
Static equilibriu magnetic stirrer by gas chromatogu	DCEDURE: um cell fitted with . Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given.
Static equilibriu magnetic stirrer by gas chromatogu	DCEDURE: um cell fitted with . Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent.
Static equilibriu magnetic stirrer by gas chromatogu	DCEDURE: um cell fitted with . Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given. ESTIMATED ERROR:
Static equilibriu magnetic stirrer by gas chromatogu	DCEDURE: um cell fitted with . Samples analysed	<pre>SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given. ESTIMATED ERROR:</pre>
Static equilibriu magnetic stirrer by gas chromatogu	DCEDURE: um cell fitted with . Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given. ESTIMATED ERROR: $\delta T/K=\pm 0.1; \ \delta P=\pm 0.5\%; \ \delta x_{C2H4} =\pm 0.002$ (estimated by compiler)

OMPONENTS :			ORIGINAL MEASUREMENTS:	
. Ethene;			Shenderei, E.R.;Zel Ivanovskii, F.P.	'venskii, Ya.D.;
2. Benzene, C7Hg; [1		(toluene);	Zhur. Fiz. Khim. <u>19</u> OR Russian J. Phys. Chu 415-419.	
ARIABLES:	K = 228.05	- 248 15	PREPARED BY:	<u></u>
•	r = 1 - 18		C.L. Yo	ung.
XPERIMENTAL	VALUES:			
т/к	P/atm	P/bar Mol	le fraction of ethene in liquid, ^x C2H4	Solubility ⁺
248.15	1 3 5 10 12 15 18	1.0 3.0 5.1 10.1 12.2 15.2 18.2	$\begin{array}{c} 0.0330 \\ 0.1010 \\ 0.1700 \\ 0.3600 \\ 0.4410 \\ 0.5832 \\ 0.7390 \end{array}$	8.24 <i>S</i> 26.80 49.42 135.61 191.31 336.90 682.40
238.15	1 3 5 10 12 15	1.0 3.0 5.1 10.1 12.2 15.2	0.0408 0.1280 0.2135 0.4881 0.6200 0.8263	10.29 35.40 67.22 229.71 294.60 1505.00
228.05	1 3 5 10	1.0 3.0 5.1 10.1	0.510 0.1680 0.2930 0.7300	12.95 48.71 99.90 651.60
+ cm ³ g	-1 at p ₁ =	101.325 kPa.	ARY INFORMATION	
ETHOD/APPARA	TUS/PROCEDUF		SOURCE AND PURITY OF MAT	TERIALS:
	tirrer. P	ll fitted with ressure measure	1. Prepared from eth hydration and pu	hanol by de-
with Bourd	lysed by s	Samples of tripping out	under pressure.	

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OMPONENTS:	ORIGINAL MEASUREMENTS:	<del>, , , , , , , , , , , , , , , , , , , </del>	
1. Ethene; C ₂ H ₄ ; [74-85-1]	Tyvina, T.N.; Naumova, A.A.; Polyakov, S.A. Zhur. Prikl. Khim. <u>1979</u> ,52 , 949-952.		
2. Methylbenzene (toluene); C ₇ H ₈ ;			
[108-88-3]	OR J. Appl. Chem. USSR <mark>1979</mark> ,52 , <b>910-913</b> .		
ARIABLES: $T / K = 293.15 - 473.15$	PREPARED BY:		
	W. Hayduk		
P/MPa = 0.507 - 6.08 XPERIMENTAL VALUES:			
MERITENIN, VALUES.			
1 Henry's	Constants		
t/C T/K H'/atm (mol fraction)	¹ H/MPa (mol fraction)	Mole Fraction Ethene, $x_1$	
20 293.15 72.2	7.32	0.0139	
40 313.15 92.8	9.40	0.0108	
60 333.15 112.7	11.42	0.00888	
80 353.15 135.4	13.72	0.00739	
100 373.15 156.1	15.82	0.00641	
120 393.15 170.3	17.25	0.00587	
140 413.15 184.7	18.71	0.00542	
160 433.15 196.7	19.93	0.00508	
180         453.15         200.7           200         473.15         203.3	20.33 20.60	0.00498 0.00493	
¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr	fincluded. fraction ethene for a p from total pressures and raph by the compiler. Ra	partial nd aoult's	
function of mole fraction toluene was ¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor	fincluded. fraction ethene for a p from total pressures and raph by the compiler. Ray pressure. Henry's law	partial nd aoult's was obeyed	
function of mole fraction toluene was ¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least	fincluded. fraction ethene for a p from total pressures and aph by the compiler. Rates pressure. Henry's law	partial nd aoult's was obeyed	
function of mole fraction toluene was ¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY	fraction ethene for a plant total pressures and total pressures and total pressures and the compiler. Rate pressure. Henry's law to 0.30 mole fraction	partial nd aoult's was obeyed on.	
Eunction of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in	included. fraction ethene for a plant from total pressures and aph by the compiler. Rate pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was a	partial nd aoult's was obeyed on. ALS:	
Function of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber	included. fraction ethene for a pl from total pressures an aph by the compiler. Ra pressure. Henry's law up to 0.30 mole fraction INFORMATION	partial nd aoult's was obeyed on. ALS:	
Eunction of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature	included. fraction ethene for a plant from total pressures and aph by the compiler. Rate pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was a	ALS:	
Eunction of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at	<ul> <li>included.</li> <li>fraction ethene for a plant of the compiler. Rates and the compiler of the compiler. Rates and the compiler of the compiler.</li> <li>Source AND PURITY OF MATERIANS and the compiler of the second secon</li></ul>	ALS:	
Eunction of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours.	<ul> <li>included.</li> <li>fraction ethene for a plant of the compiler. Rates and the compiler of the compiler. Rates and the compiler of the compiler.</li> <li>Source AND PURITY OF MATERIANS and the compiler of the second secon</li></ul>	ALS:	
AUXILIARY AUXILIARY THOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a	<ul> <li>included.</li> <li>fraction ethene for a plant of the compiler. Rates and the compiler of the compiler. Rates and the compiler of the compiler.</li> <li>Source AND PURITY OF MATERIANS and the compiler of the second secon</li></ul>	ALS:	
Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr aw was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the	<ul> <li>included.</li> <li>fraction ethene for a plant of the compiler. Rates and the compiler of the compiler. Rates and the compiler of the compiler.</li> <li>Source AND PURITY OF MATERIANS and the compiler of the second secon</li></ul>	ALS:	
Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr aw was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY THOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber vas a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a refuel a constant temperature at the thene was passed through a reflux condenser to minimize the escape of solvent vapor. After	<ul> <li>included.</li> <li>fraction ethene for a plant of the compiler. Rates and the compiler of the compiler. Rates and the compiler of the compiler.</li> <li>Source AND PURITY OF MATERIANS and the compiler of the second secon</li></ul>	ALS:	
Values of Henry's constants and mole oressure of 101.3 kPa were calculated compositions read from an enlarged gr aw was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the scape of solvent vapor. After saturation was complete, a sample of the solution was directed to an	<pre>included. included. ifraction ethene for a pl from total pressures an aph by the compiler. Ra pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIN 1. Ethene purity was a to be 99.9%. 2. Methylbenzene was a CP grade.</pre>	ALS:	
Values of Henry's constants and mole oressure of 101.3 kPa were calculated compositions read from an enlarged gr aw was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber yas a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the saturation was directed to an syncuted separator and allowed to	<ul> <li>included.</li> <li>fraction ethene for a plant of the compiler. Rates and the compiler of the compiler. Rates and the compiler of the compiler.</li> <li>Source AND PURITY OF MATERIANS and the compiler of the second secon</li></ul>	ALS:	
Values of Henry's constants and mole oressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to clash to a low temperature and	<ul> <li>included.</li> <li>fraction ethene for a plant total pressures and the compiler. Repressure. Henry's law up to 0.30 mole fraction</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIANATION</li> <li>SOURCE AND PURITY OF MATERIANATION</li> <li>2. Methylbenzene was of CP grade.</li> <li>ESTIMATED ERROR:</li> </ul>	partial aoult's was obeyed on. ALS: specified of the	
Eunction of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the escape of solvent vapor. After saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to clash to a low temperature and pressure. The quantity of solvent	<pre>included. included. ifraction ethene for a pl from total pressures an aph by the compiler. Ra pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIN 1. Ethene purity was a to be 99.9%. 2. Methylbenzene was a CP grade.</pre>	ALS: ALS: be the	
Eunction of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the escape of solvent vapor. After saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to clash to a low temperature and poressure. The quantity of solvent from the flashing step was weighed,	<ul> <li>included.</li> <li>fraction ethene for a plant total pressures and the compiler. Repressure. Henry's law up to 0.30 mole fraction</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIANATION</li> <li>SOURCE AND PURITY OF MATERIANATION</li> <li>2. Methylbenzene was of CP grade.</li> <li>ESTIMATED ERROR:</li> </ul>	partial aoult's was obeyed on. ALS: specified of the	
function of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the escape of solvent vapor. After saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to flash to a low temperature and pressure. The quantity of solvent from the flashing step was weighed, while the quantity of ethene	included. fraction ethene for a plant from total pressures and appressures. Henry's law pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was and to be 99.9%. 2. Methylbenzene was and CP grade. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 4\%$ (conditional)	partial aoult's was obeyed on. ALS: specified of the	
function of mole fraction toluene was ¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the escape of solvent vapor. After saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to flash to a low temperature and pressure. The quantity of solvent from the flashing step was weighed, while the quantity of ethene released was determined by measuring the increase in pressure,	<ul> <li>included.</li> <li>fraction ethene for a plant total pressures and the compiler. Repressure. Henry's law up to 0.30 mole fraction</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERIANATION</li> <li>SOURCE AND PURITY OF MATERIANATION</li> <li>2. Methylbenzene was of CP grade.</li> <li>ESTIMATED ERROR:</li> </ul>	partial aoult's was obeyed on. ALS: specified of the	
function of mole fraction toluene was ¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the	included. fraction ethene for a plant from total pressures and appressures. Henry's law pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIA 1. Ethene purity was and to be 99.9%. 2. Methylbenzene was and CP grade. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 4\%$ (conditional)	ALS: specified of the	
function of mole fraction toluene was ¹ Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the escape of solvent vapor. After saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to flash to a low temperature and pressure. The quantity of solvent from the flashing step was weighed, while the quantity of ethene released was determined by measuring the increase in pressure, by manometer, in a gas accumulator	included. fraction ethene for a plane total pressures and apply the compiler. Rate of pressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERIAL 1. Ethene purity was a to be 99.9%. 2. Methylbenzene was a CP grade. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 4$ % (conditional conditional condi	ALS: ALS: specified of the Rusakov,	
function of mole fraction toluene was Values of Henry's constants and mole pressure of 101.3 kPa were calculated compositions read from an enlarged gr law was assumed for the solvent vapor for ethene concentrations of at least AUXILIARY ETHOD/APPARATUS/PROCEDURE: The method was described in reference 1. The ethene absorber was a 1-litre pressure vessel submerged in a constant temperature bath. Ethene was bubbled through the solvent continuously at constant pressure for 3-5 hours. The ethene was passed through a reflux condenser to minimize the escape of solvent vapor. After saturation was complete, a sample of the solution was directed to an evacuated separator and allowed to flash to a low temperature and pressure. The quantity of solvent from the flashing step was weighed, while the quantity of ethene released was determined by measuring the increase in pressure, by manometer, in a gas accumulator	included. fraction ethene for a plant from total pressures and appressure. Henry's law up to 0.30 mole fraction INFORMATION SOURCE AND PURITY OF MATERINAL 1. Ethene purity was a to be 99.9%. 2. Methylbenzene was a CP grade. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 4$ % (conditional) REFERENCES: 1. Kozorezov, Yu. I.; A.P.; Pikalo, N.M.	ALS: ALS: specified of the Rusakov,	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Konobeev, B.I.; Lyapin, V.V.
2. Xylene (mixture of the three isomers); C ₈ H ₁₀ ;	ee Khim. Prom. <u>1967</u> , 43, 114-6.
VARIABLES:	PREPARED BY:
T/K = 293.15 - 333.15	C. L. Young
<i>P/</i> MPa = 0:286 - 3.21	
EXPERIMENTAL VALUES:	
T/K P/10 ⁵ Pa	Mole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$
293.15 3.080 8.106 14.49 20.67	0.044 0.117 0.206 0.316
31.71 313.15 2.857 8.238	0.455 0.030 0.091 0.360
32.02 333.15 2.867	0.024
8.248 20.97	0.074 0.193
32.12	0.300
Al	JXILIARY INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Static equilibrium cell fitted magnetic stirrer. Samples anal	ysed per cent.
by gas chromatography. Details source.	2. No details given.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \delta P = \pm 0.5\%; \delta x_{C_2H_4} = \pm 0.002$
	(estimated by compiler)
	REFERENCES :

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COMPONENTS:			ORIGINAL	MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [7				cezov, Yu.I. Lo, N.M.	, Rusako	ov, A.P.;
2. Ethylbenzene; C ₈	H ₁₀ ; [100-	-41-4]	Khim.	Prom. <u>1969</u>	, 5, 343	3-5.
VARIABLES: T/K = 323.15	- 423.15		PREPARED	BY:		
P/MPa = 0.25 -				C.L. W. Haj		
EXPERIMENTAL VALUES:						
T/K	¹ <i>P</i> /10 ⁵ Pa		Mole fra in l:	action of et iquid, ^x C ₂ H ₄	hene	Solubility, cm ³ (STP)/g
323.15	2.5 5.1 10.1	2.5 5.0 10.0		0.024 0.047 0.099		5.2 10.5 23.1
373.15	5.1	15.0 2.5 5.0 10.0		0.152 0.013 0.029 0.061		37.5 2.8 6.4 13.9
403.15	15.2 5.1 10.1	15.0 5.0 10.0		0.097 0.022 0.050		22.6 4.8 11.1
423.15	6.6 10.1	15.0 6.5 10.0 15.0		0.078 0.024 0.041 0.068		17.9 5.3 8.9 15.5
Henry's constant re T/K H, atm/mole fract	32	atm./mo 23.15 01.6	le frac 373.15 158.6	403.15	423.1	5
		AUXILIARY	INFORMAT	ION		
METHOD/APPARATUS/PROCEDUR	E:		SOURCE A	ND PURITY OF M	IATERIALS :	
Single pass flow app	aratus. 1	Ethene	1. P	urity 99.93	mole pe	r cent.
allowed to flow thro 3 to 5 hours. Liqui	ugh solve d sample w	nt for with-		- oiling point		
drawn and analysed b ethene and measuring rically. Solvent in gravimetrically.	amount vo	olumet-	đ	²⁰ = 0.8673;	n _D ²⁰ =	1.4960.
				ED ERROR:		
			δ δ;	$T/K = \pm 0.5;$ $x_{C_2H_4} = \pm 0.0$	δ <i>P/</i> 10 ⁵ Ρ. 01.	a = ±0.1;
			( REFEREN	estimated by CES:	compil	er).
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COMPONENTS:			ORIGINAL MEASUREMENTS:	165
1. Ethene; $C_2H_4$ ; [	74-85-1]		Kozorezov, Yu.I.; Rusako Pikalo, N.M.	DV, A.P.;
2. Diethylbenzene;	C10H14;			
[25340-17-4]			Khim. Prom. <u>1969</u> , 5, 34	3-5.
VARIABLES: T/K = 323.1	L5 - 423.15		PREPARED BY:	
<i>P/MPa</i> = 0.25	- 1.52		C.L. Young W. Hayduk	
EXPERIMENTAL VALUES:				-
T/K	¹ <i>P</i> /10 ⁵ Pa	P/ atm	Mole fraction of ethene in liquid, ^x C ₂ H ₄	Solubility, cm ³ (STP)/g
323.15	2.5	2.5	0.026 0.053	4.6 9.3 20.1
	10.1 15.2	10.0 15.0	0.106 0.163	32.6
373.15	2.5 5.1	2.5 5.0	0.017 0.035	2.9 6.0
	10.1	10.0	0.070	12.6
403.15	15.2 5.1	15.0 5.0	0.106 0.028	20.0
403113	10.1	10.0	0.056	10.1
423.15	15.2 6.6	15.0 6.5	0.089 0.034	16.2 5.7
	10.1 15.2	10.0	0.050 0.079	8.9 14.6
¹ Calculated by comp	-			
Henry's constants	given as a		le fraction as follows:	15
Henry's constants T/K	given as a ,323.1	53	373.15 403.15 423.	,
Henry's constants	given as a ,323.1	53		,
Henry's constants T/K	given as a ,323.1	53	373.15 403.15 423.	,
Henry's constants T/K	given as a ,323.1	53	373.15 403.15 423.	
Henry's constants T/K H, atm/mole frac	given as a 323.19 tion 94.1	5 3	373.15 403.15 423. 141.2 170.1 185.0 INFORMATION	0
Henry's constants T/K	given as a 323.19 tion 94.1	5 3	373.15 403.15 423. 141.2 170.1 185. INFORMATION SOURCE AND PURITY OF MATERIALS	0 5:
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU	given as a 323.1 tion 94.1 At RE:	5 3	373.15 403.15 423. 141.2 170.1 185.0 INFORMATION	0 5:
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f	given as a 323.19 tion 94.1 AL RE: paratus. low through	5 3 J	373.15 403.15 423. 141.2 170.1 185. INFORMATION SOURCE AND PURITY OF MATERIALS	D S: r cent.
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow app Ethene allowed to f solvent for 3 to 5 sample withdrawn and	given as a 323.11 tion 94.1 Al RE: paratus. low through hours. Lig d analysed	5 3 J JXILIARY uid	AND AND PURITY OF MATERIALS NFORMATION SOURCE AND PURITY OF MATERIALS 1. Purity 99.93 mole per 2. Boiling point range	0 5: r cent. 179-182°C;
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et	given as a 323.11 tion 94.1 Al RE: paratus. low through hours. Lig d analysed hene and me	5 3 J JXILIARY uid asur-	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range 1         d20       0.8643;       n_D^{20}	0 5: r cent. 179-182°C; = 1.4962;
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow app Ethene allowed to f solvent for 3 to 5 sample withdrawn and	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	AND AND PURITY OF MATERIALS NFORMATION SOURCE AND PURITY OF MATERIALS 1. Purity 99.93 mole per 2. Boiling point range	0 3: r cent. 179-182°C; = 1.4962; 5.5% 0-
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole period         2.       Boiling point range $d_4^{20} = 0.8643; n_D^{20} =$ (60.9% m-isomer and 31 and p-isomers by chross	0 3: r cent. 179-182°C; = 1.4962; 5.5% 0-
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range $d_4^{20} = 0.8643;$ $n_D^{20} =$ (60.9% m-isomer and 31 and p-isomers by chromanalysis).         ESTIMATED ERROR: $\delta T/K = \pm 0.5;$ $\delta P/10^5 P.$	0 5: r cent. 179-182°C; = 1.4962; 5.5% o- omatographic
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range $d_4^{20} = 0.8643; n_D^{20} = 0.8643; n_D^{20} = 0.9\%$ (60.9\% m-isomer and 31 and p-isomers by chromanalysis).         ESTIMATED ERROR;	0 5: r cent. 179-182°C; = 1.4962; 5.5% o- omatographic a = ±0.1;
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range 1 $d_4^{20} = 0.8643; n_D^{20} =$ (60.9% m-isomer and 31         and p-isomers by chromatical products         analysis).         ESTIMATED ERROR: $\delta T/K = \pm 0.5; \delta P/10^5 Product         \delta x_{C_2H_4} = \pm 0.001 $	0 5: r cent. 179-182°C; = 1.4962; 5.5% o- omatographic a = ±0.1;
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range $d_4^{20} = 0.8643; n_D^{20} = 0.8643; n_D^{20} = 0.9\%$ (60.9\% m-isomer and 31 and p-isomers by chromanalysis).         ESTIMATED ERROR: $\delta T/K = \pm 0.5; \delta P/10^5 P.         \delta x_{C_2H_4} = \pm 0.001         (estimated by compile)   $	0 5: r cent. 179-182°C; = 1.4962; 5.5% o- omatographic a = ±0.1;
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range $d_4^{20} = 0.8643; n_D^{20} = 0.8643; n_D^{20} = 0.9\%$ (60.9\% m-isomer and 31 and p-isomers by chromanalysis).         ESTIMATED ERROR: $\delta T/K = \pm 0.5; \delta P/10^5 P.         \delta x_{C_2H_4} = \pm 0.001         (estimated by compile)   $	0 5: r cent. 179-182°C; = 1.4962; 5.5% o- omatographic a = ±0.1;
Henry's constants T/K H, atm/mole frac METHOD/APPARATUS/PROCEDU Single pass flow ap Ethene allowed to f solvent for 3 to 5 sample withdrawn an by stripping out et ing amount volumetr.	given as a 323.11 tion 94.1 Al RE: low through hours. Lig d analysed hene and me ically. So	5 3 J JXILIARY uid asur- lvent	373.15       403.15       423.15         141.2       170.1       185.0         INFORMATION         SOURCE AND PURITY OF MATERIALS         1.       Purity 99.93 mole per         2.       Boiling point range $d_4^{20} = 0.8643; n_D^{20} = 0.8643; n_D^{20} = 0.9\%$ (60.9\% m-isomer and 31 and p-isomers by chromanalysis).         ESTIMATED ERROR: $\delta T/K = \pm 0.5; \delta P/10^5 P.         \delta x_{C_2H_4} = \pm 0.001         (estimated by compile)   $	0 5: r cent. 179-182°C; = 1.4962; 5.5% o- omatographic a = ±0.1;

COMPONENTS: 1. Ethene; $C_2 H_4$ ;				
			ORIGINAL MEASURE	MENTS:
	; [74-85-	1]	Nakamura, E.	; Koguchi, K.;
2. Benzene,1,2-0	dimethyl-	1 5 47 61	Amemiya, T.	
(o-xylene); (	⁶ ⁸ ¹⁰ ; 19	5-4/-6]	Kogyo Kagaku Z	Lasshi , <u>1966</u> , 69, 42-47.
VARIABLES T/K = 213	15-202 1	F.	PREPARED BY:	
_			W. Hay	rduk
P/kPa = 182.4-12	276.7 (1.	8-12.6 atm)		
EXPERIMENTAL VALUES	:			Average
<i>t</i> /C ¹ <i>T</i> /K		Pressure M ¹ P/kPa	ole Fraction Ethene, x ₁	Henry's Constant H/atm (mole fraction) ⁻¹
20.0 293.15	3.9	395.2	0.056	69.1
	6.8	689.0	0.097	
0.0 273.15	9.7 3.9	982.9 395.2	0.140 0.076	50.9
	6.8	689.0	0.134	
04 6 054 55	9.7	982.9	0.190	
-21.6 251.55	3.9 6.8	395.2 689.0	0.119 0.203	33.2
	9.7	982.9	0.288	
	12.6	1276.7	0.379	
-30.0 243.15	4.8	486.4	0.173	27.5
	4.8 6.8	486.4 689.0	0.175 0.247	
	8.7	881.5	0.322	
	8.7	881.5	0.322	
	9.7	982.9 1276.7	0.361 0.482	
		AUXILIARY	INFORMATION	
METHOD/APPARATUS/PR	OCEDURE :	AUXILIARY		TY OF MATERIALS:
For lower press	ures a 20	0 cm³ grad-	SOURCE AND PURIT	rity was 99.6%; the
For lower pressu uated glass cell	ures a 20 1 was use	0 cm³ grad- d. Solvent	SOURCE AND PURI 1. Ethene pu impurity	rity was 99.6%; the consisted of 0.4%
For lower press	ures a 20 1 was use 100 cm ³ ;	0 cm ³ grad- d. Solvent then the	SOURCE AND PURIT	consisted of 0.4%
For lower press uated glass cell was charged to cell and content degassing, ether	ures a 20 1 was use 100 cm ³ ; ts were w ne was pr	0 cm ³ grad- d. Solvent then the eighed. For essured	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for	ures a 20 1 was use 100 cm ³ ; ts were w ne was pr rom a 170	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.98	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell	ures a 20 1 was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.98	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.98	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell evacuated and co ethene several d sing, the cell of	ures a 20 1 was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil-	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.98	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell evacuated and ce ethene several de sing, the cell of ibrated at const	ures a 20 1 was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.98	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell evacuated and ce ethene several de sing, the cell ibrated at const pressure for 3-4 ume of solution	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the	SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the evacuated and ca ethene several is sing, the cell of ibrated at const pressure for 3-4 ume of solution sealed cell was	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi-	<pre>SOURCE AND PURIT 1. Ethene pu impurity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR δT /K = ± 0</pre>	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell sing, then the cell bibrated and const pressure for 3-4 ume of solution sealed cell was cator and later	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
uated glass cell was charged to cell and content degassing, ether into the cell fr bomb; then the c evacuated and ce ethene several d sing, the cell c ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. Fo two cells, one cell	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss.	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell bomb; then the cell sing, the cell of ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. For two cells, one of identical vo	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the lume were	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss, used	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the evacuated and ce ethene several d sing, the cell of ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. For two cells, one of of identical vo	ures a 20 1 was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the lume were The sam	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss, used e procedure	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$ $\delta x_1/x_1 = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the evacuated and ce ethene several for ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. For two cells, one of of identical vo simultaneously, was used except volume was measu	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the lume were The sam that the ured in t	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss, used e procedure solution he glass	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$ $\delta x_1/x_1 = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the cell bomb; then the cell ibrated and content ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. For two cells, one content of identical vois simultaneously. was used except volume was meas cell and the fin	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the lume were The sam that the ured in t nal mass	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss, used e procedure solution he glass in the ss	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$ $\delta x_1/x_1 = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the evacuated and ca ethene several ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. For two cells, one of of identical vo simultaneously. was used except volume was measu cell and the fin cell. The glass	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the lume were The sam that the ured in t nal mass	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss, used e procedure solution he glass in the ss	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$ $\delta x_1/x_1 = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.
For lower press uated glass cell was charged to cell and content degassing, ether into the cell for bomb; then the evacuated and ca ethene several ibrated at const pressure for 3-4 ume of solution sealed cell was cator and later temperature. For two cells, one of of identical vo simultaneously. was used except volume was measu cell and the fit	ures a 20 l was use 100 cm ³ ; ts were w ne was pr rom a 170 cell was ell reach times. A contents tant temp 4 h. Aft was meas placed i weighed or higher glass the lume were The sam that the ured in t nal mass	0 cm ³ grad- d. Solvent then the eighed. For essured cm ³ ss chaken, gas aged with fter degas- were equil- erature and er the vol- ured, the n a dessi- at room pressures other ss, used e procedure solution he glass in the ss	SOURCE AND PURIT 1. Ethene purity nitrogen. 2. The 1,2-c was 99.99 after dry ESTIMATED ERROR $\delta T/K = \pm 0$ $\delta P/P = \pm 0$ $\delta x_1/x_1 = \pm 0$	arity was 99.6%; the consisted of 0.4% dimethylbenzene purity as checked by GC ying using solid sodium.

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COMPONENTS:	_		ORIGINAL MEASURE	
1. Ethene;	C ₂ H ₄ ; [74-85-1	1	Nakamura, E.	; Koguchi, K.;
2. Benzene	,1,2-dimethyl-, ne); C ₈ H ₁₀ ; [95	-47-61	Amemiya, T.	
(0-7716	mer, c ₈ m ₁₀ , [35	-47-01	Kogyo Kagaku Za	asshi , <u>1966</u> , 69, 42-47.
VARIABLES:	= 213.15-293.15		PREPARED BY:	
	2.4-1276.7 (1.8		W. Hay	duk
r/KPa = 10				•
EXPERIMENTAL	•continued		T 1	
	Total P	ressure ² Mo	le Fraction	Average Henry's Constant _,
t/C ¹ T/		¹ <i>P</i> /kPa	Ethene, $x_1$	H/atm (mole fraction) -1
-40.0 233	.15 1.8 3.9	182.4 395.2	0.091 0.184	21.0
	5.8	587.7	0.276	
	6.8	689.0	0.328	
-60.0 213		192.5	0.162	11.9
	3.9	395.2	0.319	
1 Calculate	d by compiler.			
	nt vapor pressu on for Henry's			= 3.90-601 (T/K) ⁻¹
	·····	AUXILIARY	INFORMATION	
METHOD/APPAR	ATUS/PROCEDURE:	·····	SOURCE AND PURIT	Y OF MATERIALS:
uated glas was charge cell and c degassing, into the c bomb; then evacuated ethene sev sing, the ibrated at pressure f ume of sol sealed cel cator and	pressures a 200 s cell was used d to 100 cm ³ ; t contents were we ethene was pre cell from a 170 the cell was s and cell rechar eral times. Af cell contents w constant tempe or 3-4 h. Afte ution was measu l was placed in later weighed a ce. For higher	L. Solvent then the elighed. For essured cm ³ ss thaken, gas reged with ther degas- vere equil- erature and er the vol- nred, the a dessi- at room	impurity nitrogen. 2. The 1,2-d was 99.9% after dry ESTIMATED ERROR: $\delta T / K = \pm 0$ $\delta P / P = \pm 0$	imethylbenzene purity as checked by GC ing using solid sodium.
two cells, of identic simultanec was used e volume was cell and t	one glass the al volume were ously. The same except that the measured in th the final mass i glass tended t	other ss, used procedure solution a glass n the ss	REFERENCES:	

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COMPONEI	NTS:			ORIGINAL MEASU	UREMENTS:
1. Et]	hene; $C_2 H_4$ ;	[74-85-1	]	Nakamura,	E.; Koguchi, K.;
2. Ber	nzene,1,3-d	imethyl-,		Amemiya, T	·
(m-	-xylene); C	₈ H ₁₀ ; [10	8-38-3]	Kogyo Kagaku	Zasshi , <u>1966</u> , 69 , 42-47.
				noggo naganat	,, ,
VARIABL	$\frac{ES:}{T/K} = 213.$	45 000 41	•	PREPARED BY:	
				W. H	layduk
P/kPa	= 182.4-12	76.7 (1.8	3-12.6 atm)		
EXPERIM	ENTAL VALUES:		Pressure	Mole Fraction	Average Henry's Constant
t/C	¹ <i>T</i> /K	P/atm	1 .	Ethene, $x_1$	H/atm(mole fraction) ⁻¹
20.0	293.15	3.9	395.2	0.058 0.103	66.3
		6.8 9.7	689.0 982.9	0.146	
0.0	273.15	3.9	395.2	0.080	48.7
		6.8 9.7	689.0 982.9	0.141 0.119	
-20.5	252.65	3.9	395.2	0.120	32.0
		6.8	689.0	0.207	
		9.7 12.6	982.9 1276.7	0.302 0.395	
-40.0	233.15	3.9	395.2	0.189	20.5
		6.8	689.0	0.332	
-50 0	223.15	9.7 1.8	982.9 182.4	0.510 0.120	15.5
-50.0	223.13	3.9	395.2	0.250	15.5
	2040 45	5.8	587.7	0.388	44.0
-60.0	² 213.15	1.9 3.9	192.5 395.2	0.164 0.331	11.8
		4.8	486.4	0.441	
else The	where in th solvent vap	is volume or pressu	e. Tre was nec	lected.	ylene mixtures given $y_{10} H = 3.84-591 (T/K)^{-1}$
			AUXILIA	ARY INFORMATION	
METHOD	APPARATUS/PRO	CEDURE:		SOURCE AND PU	IRITY OF MATERIALS:
For 1	ower pressu	res a $200$	) cm ³ arad-	1. Ethene	purity was 99.6%; the
uated	glass cell	was used	l. Solvent	: impurit	y consisted of 0.4%
	harged to 1			nitroge	èn.
	and content sing, ethen				-dimethylbenzene purity
into 🗄	the cell fr	om a 170	cm ³ ss	was 99.	9% as checked by GC
	then the c ated and ce			after d	lrying using solid sodium.
	e several t				
sing,	the cell c	ontents v	vere equil-		
	ed at const				
	ure for 3-4 f solution			ESTIMATED ER	ROR:
seale	d cell was	placed in	n a dessi-	$\delta T/K = \pm$	
	and later rature. Fo			$\frac{\delta P}{P} = \pm \frac{\delta P}{P} = $	
two c	ells, one g	lass the	other ss,	$\int_{0}^{0} x_{1} / x_{1} = x$	0.02 (Compiler)
of id	entical vol	ume were	used	REFERENCES:	
simul	taneously. sed except	The same	procedure		
volum	e was measu	red in th	ne glass		
cell .	and the fin	al mass i	In the ss		
cell.	The glass gh pressure	tended t	o fail		
	5. LTC02016	~•		I	

	NTS:			ORIGINAL MEASU	JREMENTS :
1. Et)	hene; $C_{2}H_{4}$	; [74-85-	11 /	Nakamura,	E.; Koguchi, K.;
	nzene,1,4-0			Amemiya, T	
(p	-xylene);	C ₈ H ₁₀ ;[10	6-42-3]		
				кодуо кадакі	a Zasshi , <u>1966</u> , 69, 42-47.
ARIABL	$\frac{ES}{T}K = 233$	.15-303.1	5	PREPARED BY:	<u> </u>
P/kPa	= 192.5-98	B2.9 (1.9-	-9.7 atm)	W. H	ayduk
XPERIM	ENTAL VALUES				······································
t/C	¹ T /K		Pressure Mo ¹ P/kPa	Ethene, x ₁	Average Henry's Constant H/atm(mole fraction) ⁻¹
30.0	303.15	3.9	395.2	0.050	71.2
		3.9 6.8	395.2 689.0	0.051 0.091	
		6.8	689.0	0.091	
20 0	293.15	9.7 3.9	982.9 395.2	0.132 0.061	62.8
20.0	293.15	6.8	689.0	0.106	02.0
		9.7	982.9	0.154	· · ·
10.0	283.15	6.8 9.7	689.0 982.9	0.125 0.177	54.4
0.0	² 273.15	3.9	395.2	0.081	46.9
		6.8	689.0	0.145	
_21 2	² 251.95	9.7 3.9	982.9 395.2	0.206 0.130	30.7
-21.2	231.33	6.8	689.0	0.221	50.7
	<b>1</b>	9.7	982.9	0.311	
-40_0	² 233.15	1.9	192.5	0.104	19.6
		2 0	205 2		
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Calcu The were elsey The	solubilitie calculated where in the solvent var	6.8 compiler. es at temp d from the nis volume por pressu	689.0 peratures log e data for e e. ure was negle constant was	0.197 0.360 wer than the thylbenzene-x	xylene freezing point ylene mixtures given
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170					
COMPONEN	rs:			ORIGINAL MEASUREM	ENTS:
1. Eth	ene; C ₂ H ₄ ;	[74-85-1	1	Nakamura, E.;	Koguchi, K.;
2. Eth	ylbenzene;	C ₈ H ₁₀ ;[	100-41-4]	Amemiya, T.	,
				Kogyo Kagaku Za	sshi , <u>1966</u> , 69, 42-47.
VARIABLE	Й́/К = 195.	15-293.15	;	PREPARED BY:	_
<i>P</i> /kPa	= 121.6-1	277 (1.2-	12.6 atm)	W. Hayd	uk
EXPERIME	NTAL VALUES:				Average
<i>t /</i> C		otal Pres P/atm ¹		raction Ethene Ethene, ^x 1	Henry's Constant H/atm (mole fraction) ⁻¹
20.0	293.15	3.9 6.8	395.2 689.0	0.057 0.103	65.8
0.0	273.15	9.7 3.9 6.8	982.9 395.2 689.0	0.147 0.080 0.139	48.4
-21.2	251.95	9.7 3.9 6.8	982.9 395.2 689.0	0.201 0.121 0.210	31.8
-40.0	233.15	9.7 12.6 3.9 6.8	982.9 1276.7 395.2 689.0	0.306 0.395 0.190 0.329	20.6
-60.0	213.15	9.7 1.9 3.9	982.9 192.5 395.2	0.516 0.160 0.338	12.1
-77.2	195.95	4.8 1.2 1.9	486.4 121.6 192.5	0.495 0.159 0.279	7.3
		1.9 2.9 2.9	192.5 293.8 293.8	0.284 0.476 0.464	
	_	-			e was neglected. I = $3.77-571 (T/K)^{-1}$
		. Henry S		given: 109 ₁₀ 1	
			AUXILIARY	INFORMATION	
METHOD/4	PPARATUS/PR	OCEDURE:		SOURCE AND PURITY	OF MATERIALS;
uated	glass cell	l was used	) cm ³ grad- 1. Solvent		tity was 99.6%; the vas nitrogen, 0.4%.
cell a degass	ing, ether	s were we he was pre	eighed. For essured	2. Ethyl benz purity not	ene source and given.
bomb;	he cell fi then the o ted and co	cell was s	shaken, gas		
ethene sing,	several the cell of	times. Af contents v	Eter degas- vere equil-		
pressu	re for 3-4	4 h. Afte	erature and er the vol-	POTIMATE PROP	
sealed		placed in	n a dessi-	ESTIMATED ERROR: $\delta T / K = \pm 0$ .	
temper		or higher	at room pressures other ss,	$\delta P / P = \pm 0.$ $\delta x_1 / x_1 = \pm 0.$	01 02 (compiler)
of ide simult	entical vol aneously.	lume were The same	used procedure	REFERENCES:	
volume cell a cell.	ed except was measu nd the fir The glass	red in th al mass i	ne glass		
nigh p	pressures.				
L				J	

							I.
COMPONEN	ITS :			0	RIGINAL MEAS	SUREMENTS:	
1. Eth	nene; C ₂	H ₄ ;[74	-85-1]	5 g - 1	Nakamura,	E.; Koguchi, K	• 7
(0-		; C ₈ H ₁₀	hyl-, ; [95-47- 1 ₁₀ ; [100-		Amemiya, Kogyo Kagak	<b>т.</b> xu Zasshi , <u>1966</u> ,	69, 42-47.
/ARIABLI	ES:	40 45 0		P	REPARED BY:		
P/kPa		13.15-2 -689.0	(1.8-6.8	atm)	w.	Hayduk	
Ethylb	oenzene	mole fr	x, x, =0,31	1-0.593		-	
XPERIM	ENTAL VAL	JES:		╺╼╼╼╼╼╼╼╼╼╼	3	Mole Fraction	Mole
t/C	¹ <i>т</i> /к	Total P/atm	Pressure ¹ P/kPa	Number o: ² Solvent	E Moles,	Ethylbenzene in Solvent, $x'_3$	Fraction
-40.0	233.15	1.8	182.4	o:0.554		0.311	0.091
		3.9	395.2		4 0.1608	0.311	0.186
1		5.8	587.7		7 0.3066	0.311	0.278
		6.8	689.0		0.3722	0.311	0.328
-60.0	213.15	1.9	192.5	o:0.3272 e:0.476		0.593	0.161

¹Calculated by compiler.

² The symbols o, and e, refer to actual number of moles of o-xylene, and ethylbenzene, in gas-free solvent solution, respectively.

³The ethene-free solvent composition (x',) was calculated by the compiler.

The purpose of these low temperature measurements was to determine the hypothetical solubility in xylene below the xylene freezing point.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

For lower pressures a 200 cm ³ graduated glass cell was used. Solvent was charged to 100 cm³; then the cell and contents were weighed. For degassing, ethene was pressured into the cell from a  $170 \text{ cm}^3 \text{ ss}$ bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degassing, the cell contents were equilibrated at constant temperature and pressure for 3-4 h. After the vol ume of solution was measured, the sealed cell was placed in a dessicator and later weighed at room temperature. For higher pressures two cells, one glass the other ss, of identical volume were used simultaneously. The same procedure was used except that the solution volume was measured in the glass cell and the final mass in the ss cell. The glass tended to fail at high pressures.

SOURCE AND PURITY OF MATERIALS;

- 1. Ethene purity was 99.6%.
- 2. 1,2-Dimethylbenzene purity was 99.9% as determined by GC.
- 3. Ethylbenzene source and purity not given.

ESTIMATED ERROR:

 $\begin{array}{rll} \delta T/\mathrm{K} &= \pm \ 0.1 \\ \delta P/P &= \pm \ 0.01 \\ \delta x_1/x_1 &= \pm \ 0.02 \ \text{(Compiler)} \end{array}$ 

**REFERENCES:** 

$P/kPa = 192.5-486.4$ (1.9-4.8 atm)       W. Hayduk         Ethylbenzene mole fr., $x_3^i = 0.298$ W. Hayduk         EXPERIMENTAL VALUES:       3Mole Fraction       Mo $t/C$ $^{1}T/K$ $^{1}P/kPa$ Number of Moles, Ethylbenzene in Solvent, $x_3^i$ Ethen $-60.0$ 213.15       1.9       192.5       m:0.5630       0.1561       0.2977       0.1 $e:0.2387$ 3.9       395.2       m:0.5677       0.4032       0.2978       0.3	2-47.									2	
2. Benzene, 1, 3-dimethyl-, (m-xylene); C _H ; [108-38-3] 3. Ethylbenzene; C ₈ H ₁₀ ; [100-41-4] VARIABLES: T/K = 213.15 P/kPa = 192.5-486.4 (1.9-4.8 atm) Ethylbenzene mole fr., $x_3^* = 0.298$ EXPERIMENTAL VALUES: Total Pressure Number of Moles, $t/C$ ${}^{1}T/K$ $P/atm$ ${}^{1}P/kPa$ ${}^{2}Solvent$ Ethene in Solvent, $x_3^*$ = 60.0 213.15 1.9 192.5 m:0.5630 0.1561 0.2977 0.1 e:0.2387 3.9 $395.2$ m:0.5630 0.1561 0.2977 0.1 e:0.2387 3.9 $395.2$ m:0.5677 0.4032 0.2978 0.3 e:0.2408 4.8 $486.4$ m:0.5677 0.6210 0.2978 0.4 e:0.2408 1 Calculated by compiler. 2 The symbols m, and e, refer to actual number of moles of m-xylene,	2-47.	) <b>.</b>	AL MEASUREMENTS:	ORIG					NTS	MPONEN	
$(m-xylene); C_{8}^{H}_{10}; [108-38-3]$ 3. Ethylbenzene; C ₈ H ₁₀ ; [100-41-4] VARIABLES: P/kPa = 192.5-486.4 (1.9-4.8 atm) Ethylbenzene mole fr., $x_{3}^{+} = 0.298$ EXPERIMENTAL VALUES: $t/C \ ^{1}T/K \ ^{1}P/atm \ ^{1}P/kPa \ ^{2}Solvent \ ^{3}Mole \ ^{1}Fraction \ ^{1}Solvent, x_{3}^{+} \ ^{3}Ethen \ ^{3}Solvent, ^{2}Solvent \ ^{3}Solvent, ^{2}Solvent \ ^{3}Solvent, x_{3}^{+} \ ^{1}Solvent, x_{$	2-47.	Nakamura, E.; Koguchi, K.;				-85-1]	; [74	ne; C ₂ H	the	1. Et	
3. Ethylbenzene; $C_{g}H_{10}$ ; [100-41-4] (ARIABLES: $T/K = 213.15$ P/kPa = 192.5-486.4 (1.9-4.8 atm) Ethylbenzene mole fr., $x_{3}^{+} = 0.298$ (C) $T/K$ Total Pressure Number of Moles, $T/K$ P/atm $T$	2-47.	<b>x</b>	miya, T.	31 A	8-3	hyl-, ; [108-3	-dimet CH	ene,1,3 vlene);	enz m-x	2. Be	
$P/kPa = 192.5-486.4$ (1.9-4.8 atm)       W. Hayduk         Ethylbenzene mole fr., $x_3^{i} = 0.298$ W. Hayduk         EXPERIMENTAL VALUES:       3Mole Fraction       Mo $t/C$ $^{1}T/K$ $^{P}/atm$ $^{1}P/kPa$ $^{2}Solvent$ Ethene $t/C$ $^{1}T/K$ $^{P}/atm$ $^{1}P/kPa$ $^{2}Solvent$ Ethene $^{3}Mole$ $^{5}Fraction$ $-60.0$ $213.15$ $1.9$ $192.5$ $m:0.5630$ $0.1561$ $0.2977$ $0.1$ $e:0.2387$ $3.9$ $395.2$ $m:0.5677$ $0.4032$ $0.2978$ $0.3$ $e:0.2408$ $4.8$ $486.4$ $m:0.5677$ $0.6210$ $0.2978$ $0.4$ $e:0.2408$ $4.8$ $486.4$ $m:0.5677$ $0.6210$ $0.2978$ $0.4$ $e:0.2408$ $4.8$ $486.4$ $m:0.5677$ $0.6210$ $0.2978$ $0.4$ $e:0.2408$ $1^{2}$ $The$ symbols m, and e, refer to actual number of moles of m-xylene, $The$		<i>i</i> i, <u>1966</u> , ⁶⁹ , 42	jo Kagaku Zasshi				- •				
Total Pressure       Number of Moles, 3 Mole Fraction       Mode Fraction       M		:		tm)							
Total Pressure P/atm       Number of Moles, $^{1P}/kPa$ Ethylbenzen Solvent       Ethylbenzen in Solvent, $x'_{3}$ Fract Ethen         -60.0       213.15       1.9       192.5       m:0.5630       0.1561       0.2977       0.1         -60.0       213.15       1.9       192.5       m:0.5630       0.1561       0.2977       0.1         -60.0       213.15       1.9       192.5       m:0.5677       0.4032       0.2978       0.3         -60.2408       4.8       486.4       m:0.5677       0.6210       0.2978       0.4         -1       Calculated by compiler.				<b>-</b>		, , , , , , , , , , , , , , , , , , ,	:	AL VALUES	ÆNT	KPERIM	
Total Pressure P/atm       Number of Moles, $^{1P}/kPa$ Ethylbenzen Solvent       Ethylbenzen in Solvent, $x'_{3}$ Fract Ethen         -60.0       213.15       1.9       192.5       m:0.5630       0.1561       0.2977       0.1         -60.0       213.15       1.9       192.5       m:0.5630       0.1561       0.2977       0.1         -60.0       213.15       1.9       192.5       m:0.5677       0.4032       0.2978       0.3         -60.2408       4.8       486.4       m:0.5677       0.6210       0.2978       0.4         -1       Calculated by compiler.	le	Fraction Mol	³ Mole								
e:0.2387 3.9 395.2 m:0.5677 0.4032 0.2978 0.3 e:0.2408 4.8 486.4 m:0.5677 0.6210 0.2978 0.4 e:0.2408 ¹ Calculated by compiler. ² The symbols m, and e, refer to actual number of moles of m-xylene,	ion	lbenzene Fracti	les, Ethylb						1	t/C	
3.9 395.2 m:0.5677 0.4032 0.2978 0.3 e:0.2408 4.8 486.4 m:0.5677 0.6210 0.2978 0.4 e:0.2408 ¹ Calculated by compiler. ² The symbols m, and e, refer to actual number of moles of m-xylene,	63	0.16	.1561 0.			192.5	1.9	213.15	0	-60.0	
4.8 486.4 m:0.5677 0.6210 0.2978 0.4 e:0.2408 1 Calculated by compiler. 2 The symbols m, and e, refer to actual number of moles of m-xylene,	33	0.33	.4032 0.	m:0.5677	2 1	395.2	3.9				
¹ Calculated by compiler. ² The symbols m, and e, refer to actual number of moles of m-xylene,	35	0.43	.6210 0.	m:0.5677	l r	486.4	4.8				
AUXILIARY INFORMATION					AUXI						
ÆTHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:					•			-			
For lower pressures a 200 cm ³ grad- uated glass cell was used. Solvent		:y was 99.6%.	Ethene purity	lvent	Sol	used.	ll was	lass ce	dg	uated	
	was	<ol> <li>2. 1,3-Dimethylbenzene purity was 99.9%.</li> <li>3. Ethylbenzene purity not given.</li> </ol>			the ned.	cm ³ ; then ere weigh	100 c nts we	rged to d conte	cha ar	was o cell	
cell and contents were weighed. For 99.9%.	ven.				³ ss	170 cm ³	from a	ecell	th	into	
cell and contents were weighed. For 99.9%. degassing, ethene was pressured into the cell from a 170 cm ³ ss 3. Ethylbenzene purity not giv				ith egas- quil- e and	bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degas- sing, the cell contents were equil-						
<ul> <li>cell and contents were weighed. For degassing, ethene was pressured into the cell from a 170 cm³ ss</li> <li>bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degassing, the cell contents were equilibrated at constant temperature and</li> <li>99.9%.</li> <li>3. Ethylbenzene purity not give statements were equilibrated at constant temperature and</li> </ul>				the EST	the v l, tl	pressure for 3-4 h. After the vol-					
<pre>cell and contents were weighed. For degassing, ethene was pressured into the cell from a 170 cm³ ss bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degas- sing, the cell contents were equil- ibrated at constant temperature and pressure for 3-4 h. After the vol- ume of solution was measured, the</pre> 99.9%. 3. Ethylbenzene purity not giv	$\delta T/K = \pm 0.1$				ume of solution was measured, the sealed cell was placed in a dessi-						
cell and contents were weighed. For degassing, ethene was pressured into the cell from a 170 cm ³ ss bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degas- sing, the cell contents were equil- ibrated at constant temperature and pressure for 3-4 h. After the vol- ume of solution was measured, the sealed cell was placed in a dessi- cator and later weighed at room $\delta P/P = \pm 0.01$		(Compiler)	· / ···· · · · · · · · · · · · · · · ·		:oom	measured ed in a hed at r	r weig	nd late	r a	cato	
cell and contents were weighed. For degassing, ethene was pressured into the cell from a 170 cm ³ ss bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degas- sing, the cell contents were equil- ibrated at constant temperature and pressure for 3-4 h. After the vol- ume of solution was measured, the sealed cell was placed in a dessi- cator and later weighed at room temperature. For higher pressures two cells, one glass the other ss,				ss,	cator and later weighed at room cemperature. For higher pressures two cells, one glass the other ss, of identical volume were used					tempe two o	
cell and contents were weighed. For degassing, ethene was pressured into the cell from a 170 cm ³ ss bomb; then the cell was shaken, gas evacuated and cell recharged with ethene several times. After degas- sing, the cell contents were equil- ibrated at constant temperature and pressure for 3-4 h. After the vol- ume of solution was measured, the sealed cell was placed in a dessi- cator and later weighed at room temperature. For higher pressures				ss, edure ion ss	essum er s ed coced utions	measured ed in a hed at r gher pres the oth were use same pr the sol in the g	r weig For hi glass olume . The t that sured	nd late ture. ls, one tical v neously d excep was mea	r a cel den lta use me	tempe two of of ic simu: was u volum	

				0			173
COMPONENTS:			,			SUREMENTS:	
1. Ethene; C ₂	H ₄ ; [74-	85-1]		N	lakamura,	E.; Koguchi, K	• ;
<pre>2. Benzene,1,     (p-xylene)</pre>	4-dimeth; C ₈ H ₁₀ ;	y1-, [106-42	-3]		amemiya,		co 4 <b>0</b> 47
3. Ethylbenze	ene; C ₈ H ₁	<b>;</b> [100-	41-4]	Ň	ogyo kagal	ku Zasshi , <u>1966</u> ,	69; 42-4/.
VARIABLES: T/K = 2 P/kPa = 192.5 Ethylbenzene	)-982 <b>.</b> 9 (	1.9-9.7	atm) -0.729	PRI	EPARED BY: W.	Hayduk	
EXPERIMENTAL VAL	UES:				·····	³ Mole Fraction	Mole
<i>t</i> /C ¹ <i>T</i> /K	Total P <i>P</i> /atm	ressure ² P/kPa	Number ² Solven		Moles, Ethene	Ethylbenzene in Solvent, $x_3'$	Fraction
0.0 273.15	3.9	395.2	p:0.55		0.0699	0.3042	0.081
	6.8	689.0	e:0.24 p:0.56 e:0.24	13	0.1358	0.3041	0.144
	9.7	982.9	p:0.55 e:0.24	67	0.2053	0.3041	0.204
-21.2 251.95	3.9	395.2	p:0.35	05	0.1144	0.5599	0.126
	6.8	689.0	e:0.44 p:0.35	36	0.2214	0.5599	0.216
	9.7	982.9		30	0.3540	0.5599	0.306
-40.0 233.15	5 1.9	192.5		72	0.0834	0.7285	0.094
	3.9	395.2		77	0.1904	0.7285	0.192
	6.8	689.0	e:0.58 p:0.21 e:0.58	97	0.4125	0.7285	0.338
² The symbols p, and e, refer to actua and ethylbenzene, in gas-free solven ³ The ethene-free solvent composition The purpose of these low temperature hypothetical solubility in xylene be					) was ca asuremen	lculated by the its was to deter	mine the
			AUXILIARY	INF	ORMATION		
METHOD/APPARATUS	/PROCEDURE	:		so	URCE AND P	URITY OF MATERIALS	:
For lower pre				1	. Ethene	purity was 99.	6%.
uated glass c was charged t cell and cont	o 100 cm cents wer	³ ; then e weighe	the d. For	2		methylbenzene p as determined b	
degassing, et into the cell bomb; then th evacuated and ethene severa sing, the cel ibrated at co	from a ne cell w l cell re l times. l conten	170 cm ³ as shake charged After ts were	ss n, gas with degas- equil-	3	. Ethylb not gi	enzene source a ven.	nd purity
pressure for ume of soluti sealed cell w cator and lat temperature. two cells, or	3-4 h. on was m vas place cer weigh For hig	After th easured, d in a d ed at ro her pres	e vol- the essi- om sures		TIMATED EN $\delta T/K = \delta P/P = \delta x_1/x_1 = \delta x_1$	± 0.1	r)
of identical simultaneousl was used exce volume was me cell and the	volume w by. The ept that easured i final ma lass tend	ere used same pro the solu n the gl ss in th	cedure tion ass e ss	RE	FERENCES:		
				L	· · · · · · · · · · · ·		

EVALUATOR:

1.	Ethene;	C ₂ H ₄ ;	[74-85-1]

- Alcohols; pressures less than 0.2 MPa (2 atm)
- W. Hayduk Chemical Engineering University of Ottawa Ottawa, Ontario Canada K1N 6N5 June, 1992

## CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubility in Alkanols and Other Alcohols

# for pressures Less than 0.2 MPa

The solubilities of ethene in normal alkanols for a pressure of essentially 101.3 kPa were reported by some seven groups of researchers (1-7). Only for two of these solvents, for methanol and butanol, were data provided over temperature range greater than 10 K. In addition, ethene solubilities are available for 2-propanol (7), cyclohexanol (8), dipropylene glycol (9), phenol (9) and benzyl alcohol (9). Finally, solubilities are available for a two-component solvent solution composed of 1-butanol and 1,2-ethanediol (ethylene glycol) (10) at 298.15 K.

It is useful to test whether the solubility of ethene at one temperature (298.15 K) follows a linear relation in the normal alcohols when plotted as  $\log x_1$  versus  $\log C_n$  where  $x_1$  is the mole fraction solubility and  $C_n$  is the number of carbon atoms in each of the alkanols. It was previously found that such a linear relation was obtained for the solubilities of ethane (11) and for propane, butane and 2-methylpropane as well (12). Only three research groups reported ethene solubilities in more than one alkanol solvent. Boyer and Bircher (2) provided solubility data for all the alkanols from methanol to 1-octanol at 298.15, Narasimhan et al. (4) for ethanol to 1-pentanol and Yano et al. (5) provided data for methanol to 1-propanol. These data especially, provide a means for testing the consistency of the data at 298.15 K among three groups.

Figure 1 shows all the available data for ethene solubilities at 298.15 K in the alkanols from methanol to 1-octanol as the mole fraction solubility,  $x_1$ , versus the solvent carbon number on log scales. It may be observed that the data appear consistent except for the solubilities in methanol. For this solvent only, the data of Boyer and Bircher (2) appear consistent while that of Narasimhan et al. (4) and Yano et al. (5) appear too high by more than 5% whereas the data of Ohgaki et al. (3) appear too low by more than 5%. It will be shown subsequently that the data of Boyer and Bircher in methanol are also consistent with the extrapolated data of Hannaert et al. (6) and Shenderei et al. (1). The resulting linear relation for the solubility of ethene in the alkanols for a gas partial pressure of 101.3 kPa and a temperature of 298.15 K, excluding the data outside the 5% range mentioned above, and expressed in two ways is:

 $\log x_1 = 0.5140 \log C_n - 2.3702 \tag{1}$ 

$$x_{n} = 0.004264 C_{n}^{0.5140}$$

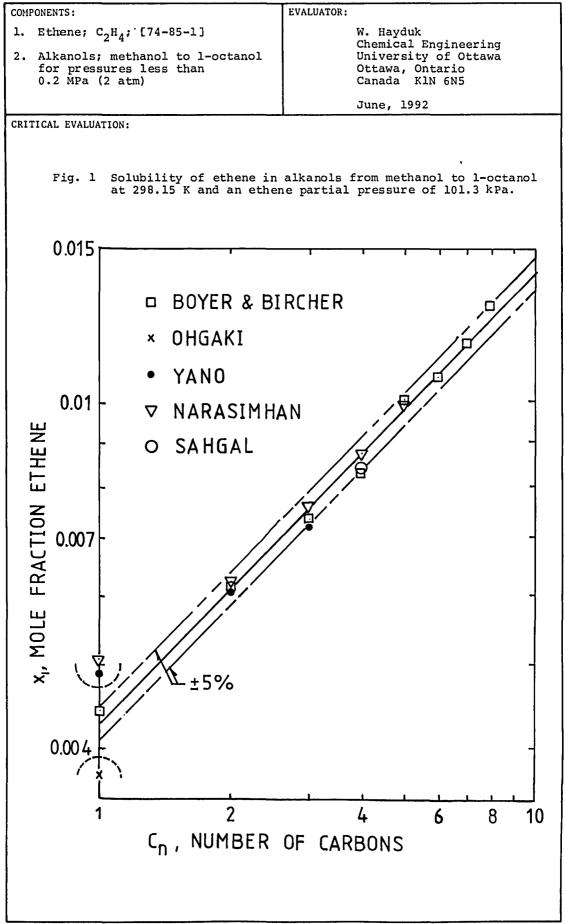
The correlation coefficient for equation (1) is 0.9950 and the maximum deviation of the 15 data points from the calculated line is 5%. Based on equation (1) the solubilities were calculated and are shown in Table 1.

Table 1: Calculated	solubility of ethene in the alkanols at 298.15 K and

101.3 kPa partial pressure					
Cn	1 (methanol)	2 (ethanol)	3 (propanol)	4 (butanol)	
<i>x</i> ₁	0.00426	0.00609	0.00750	0.00869	
Cn	5 (pentanol)	6 (hexanol)	7 (heptanol)	8 (octanol)	
<i>x</i> ₁	0.00975	0.0107	0.0116	0.0124	

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COMPONENTS ·



176

COMPONENTS:

 Alcohols; pressures less than 0.2 MPa (2 atm)

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1

### CRITICAL EVALUATION:

Solubilities in the individual solvents are discussed in more detail below.

EVALUATOR:

## Methanol; CH4O; [67-56-1]

Solubilities of ethene in methanol were measured at temperatures from 298.15 K (25°C) to 217.15 K (-56°C) but, surprisingly, there are no data above 298.15 K. The low temperature values of Shenderei et al. (1) and Hannaert et al. (6) as well as that of Boyer and Bircher (2) at 298.15 K are highly consistent and can be represented by the following linear relationship in which T is in K and x is the mole fraction solubility:

 $\log x_1 \approx 574.8 / (T/K) - 4.284 \tag{2}$ 

The correlation coefficient for the regression line is 0.9992. The values for the ethene solubility in methanol as expressed by equation (2) are classified as tentative for the temperature range from 217.15 K to 298.15 K and are shown in Table 2.

Table 2:	Calculated	values	for mole	fraction	solubility	of ethene in

methanol		
t, °C	т,К	$x_{1}$ , Mole fraction ethene
25	298.15	0.00440
20	293.15	0.00475
10	283.15	0.00557
0	273.15	0.00661
-10	263.15	0.00795
-20	253.15	0.00970
-30	243.15	0.0120
~40	233.15	0.0152
-50	223.15	0.0196

## Ethanol; C₂H₆O; [64-17-5]

The three values of Boyer and Bircher (2), Narasimhan et al. (4) and Yano et al. (5) for ethene solubility in ethanol at 298.15 K are within 2% of the average value which corresponds to a mole fraction at an ethene partial pressure of 101.3 kPa of  $x_1 = 0.00614$ . The solubility of Narisamhan et al. at 293.15 K is consistent with those at 298.15 K. These solubilities are classified as tentative.

Further, if it is assumed that the temperature coefficient of solubility is the same as for methanol, extrapolation to other temperatures may be made using the following equation:

$$\log x_1 = 574.8/(T/K) - 4.140 \tag{3}$$

The above equation is not recommended if accurate results are required and for extrapolation to temperatures far from the ambient.

COMPONENTS:

- 1. Ethene; C₂H₄; [74-85-1]
- Alcohols; pressures less than 0.2 MPa (2 atm)

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## CRITICAL EVALUATION:

### 1-Propanol; C₃H₈O; [71-23-8]

The three values of Boyer and Bircher (2), Narasimhan et al. (4) and Yano et al. (5) for ethene solubility in 1-propanol at 298.15 K are within 3% of the average value which corresponds to a mole fraction at an ethene partial pressure of 101.3 kPa of  $x_1 = 0.00737$ . The solubilities of Narisamhan et al., and Boyer and Bircher at 293.15 K, and 308.15 K, respectively, are consistent with those at 298.15 K. These solubilities are classified as tentative.

EVALUATOR:

Further, if it is assumed that the temperature coefficient of solubility in 1-propanol is the same as that in 1-butanol (see below), extrapolation to other temperatures may be made using the following equation:

$$\log x_1 = 543.6/(T/K) - 3.956$$
 (4)

The temperature span for 1-propanol alone is insufficient to provide an accurate temperature coefficient of solubility. The above equation is not recommended if accurate data are required outside the temperature range within which experimental results are available.

## 1-Butanol; C₄H₁₀O; [71-36-3]

Three research groups have contributed to the solubility data for ethene in 1-butanol; these are Narasimhan et al. (4) Boyer and Bircher (2) and Sahgal et al. (7). The temperature span of the data, nearly 80 K, permits a reasonably good estimate of the temperature coefficient of solubility. A regression line including the 8 data points yields the following equation with a maximum deviation of 5% and a correlation coefficient of 0.9942:

$$\log x = 543.6/(T/K) - 3.890$$
 (5)

The above equation is considered to be the best available relation for the solubility of ethene in 1-butanol and is classified as tentative for the temperature range for which data are available, that is from 263.95 K to 343.15 K. Solubilities calculated by means of equation (5) are listed in Table 3.

Table 3: Ethene solubilities in 1-butanol for a gas partial pressure

#### of 101.3 kPa as calculated using equation (5).

<u>t,_°C</u>	<u>Т, К</u>	x, Mole fraction ethene
-10 0 20 25 30 40 50 60 70	$\begin{array}{c} 263.15\\ 273.15\\ 283.15\\ 293.15\\ 298.15\\ 303.15\\ 313.15\\ 323.15\\ 333.15\\ 343.15\\ \end{array}$	0.0150 0.0126 0.0107 0.00921 0.00858 0.00800 0.00701 0.00620 0.00552 0.00495
1-Pentanol;	C ₅ H ₁₂ O; [71-41-0]	

The two values for ethene solubilities in 1-pentanol at 298.15 K (2,4) are within 2% of the average value which corresponds to a mole

Γ	COMPONENTS:	EVALUATOR:
	<ol> <li>Ethene; C₂H₄; [74-85-1]</li> <li>Alcohols; pressures less than 0.2 MPa (2 atm)</li> </ol>	W. Hayduk Chemical Engineering University of Ottawa Ottawa, Ontario Canada K1N 6N5 June, 1992

CRITICAL EVALUATION:

fraction of  $x_1 = 0.0102$ . The solubilities of Narisamhan et al. (4) and Boyer and Bircher (2), at 293.15 K and 308.15 K, respectively, are consistent with those at 298.15 K. These solubilities are classified as tentative.

Further, if it is assumed that the temperature coefficient of solubility in 1-pentanol is the same as that in 1-butanol, extrapolation to other temperatures may be made using the following equation:

 $\log x_{*} = 543.6/(T/K) - 3.185$ (6)

While the above equation represents the limited solubility data, it is not recommended if accurate data are required outside the temperature range within which experimental results are available.

1-Hexanol; C₆H₁₄O; [111-27-3] 1-Heptanol; C₇H₁₆O; [110-70-6] 1-Octanol; C₈H₁₈O; [111-87-5]

Only the data of Boyer and Bircher (2) are available for the solubilities of ethene at an ethene partial pressure of 101.3 kPa in 1-hexanol, 1-heptanol and 1-octanol at 298.15 K and in the latter solvent at 308.15 K as well. The data of Boyer and Bircher appear entirely consistent with those of other researchers when comparisons are possible. Hence these data are classified as tentative.

Since extrapolation to other temperatures is often required, equations will be provided based on the temperature coefficient of solubility in 1-butanol:

For 1-hexanol:

$$\log x_{\star} = 543.6/(T/K) - 3.794 \tag{7}$$

For 1-heptanol:

 $\log x_{1} = 543.6/(T/K) - 3.755$ (8)

For 1-octanol

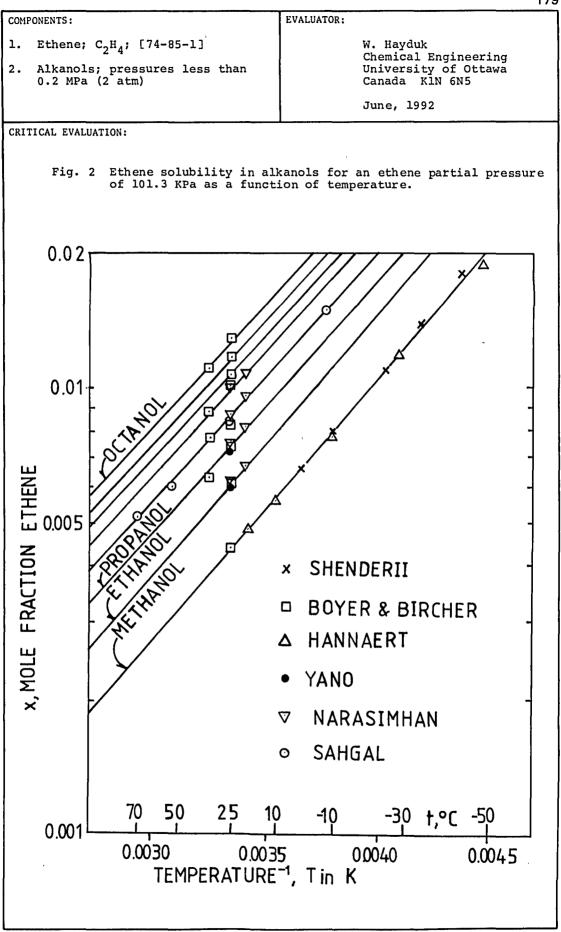
$$\log x_{1} = 543.6/(T/K) - 3.718$$
 (9)

It is emphasized that the above equations are approximate only, and are based on few data and uncertain temperature coefficients of solubility.

Figure 2 is shown for three reasons. First it summarizes most of the available data for the solubilities of ethene in the normal alcohols at low pressure. Next it emphasizes the scarcity of the data for most temperatures above and below the ambient even in these common solvents. Finally, Figure 2 shows the diagrammatic representation of the extrapolating equations, Equations 2 to 9, that are listed in this Critical Evaluation.

### 2-Propanol (isopropanol); C₃H₈O; [67-63-0]

Ethene solubilities in 2-propanol were reported for three temperatures, 273.15, 298.15 and 323.15 K, by Sahgal et al. (7). The solubilities in this branch-chained alcohol are some 11% lower than in the straight-chained alcohol, 1-propanol. The temperature span is sufficient to calculate an equation for interpolating or extrapolating the data:



EVALUATOR:

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CRITICAL EVALUATION:

# $\log x_1 = 581.7/(T/K) - 4.1247$

The above equation should not be considered accurate beyond the temperature range for which it was developed. Calculated values of solubility based on equation (10) are listed in Table 4. These data are classified as tentative.

Table 4: Ethene solubilities in 2-propanol for a gas partial pressure of

### 101.3 kPa as calculated using equation (1)

•	
0 273.15 0.0101	
10 283.15 0.00851	
20 293.15 0.00724	
25 298.15 0.00671	
30 303.15 0.00623	
40 313.15 0.00541	
50 323.15 0.00474	

# Cyclohexanol; C₆H₁₂O; [108-93-0]

Cauquil's (8) single value for the ethene solubility in cyclohexanol is rejected for two reasons. It is most unlikely that the solubility in cyclohexanol will be only about one tenth that in 1-hexanol. Also Clever (13) found that the value reported by Cauquil for the solubility of methane in cyclohexanol was only one half that found by reliable researchers.

## 1,2-Ethanediol (ethylene glycol); C₂H₅O₂; [107-21-1]

Two groups of researchers measured the solubility of ethene in 1,2-ethanediol. These were Sahgal et al. (7) at 298.15 K and Hannaert et al. (6) at 303.15 K. The value of Hannaert et al. is less than half that of Sahgal et al., a most unlikely reduction in solubility for an increase in temperature of 5 K. Since the work was conducted under my supervision, I am aware of the care that was taken to ensure saturation of this viscous solvent and, therefore, believe the higher solubility to be correct. The value of Hannaert et al. was measured by a gas chromatographic method which in many instances has been subject to errors. The former value is classified as tentative.

## 2,2-[1,2 Ethanediylbis (oxy)] bis-ethanol, (triethylene glycol); C₆H₁₄O₄;

### [112-27-6]

The solubility of ethene in triethylene glycol was measured by Hannaert et al. for a temperature of 303.15 K. There is some doubt as to the accuracy of the chromatographic method used by these workers (see above) for viscous solvents, but no real comparison is possible in this case. Therefore, the value reported is classified as tentative.

Propanol, oxybis-, (Dipropylene glycol); C₆H₁₄O₃, [25265-71-8] Phenol; C₆H₆O; [108-95-2] Benzenemethanol (benzyl alcohol); C7H8O; [100-51-6]

Lenoir et al. (9) reported ethene solubility data for the solvents oxybispropanol, phenol and benzenemethanol. Their method of measurement involved gas chromatography at very low gas partial pressures with the

COMPONENTS:

- Ethene; C₂H₄; [74-85-1] 1.
- 2. Alcohols; pressures less than 0.2 MPa (2 atm)

(10)

COMPONENTS:

- 1. Ethene; C₂H₄; [74-85-1]
- Alcohols; pressures less than 0.2 MPa (2 atm)

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### CRITICAL EVALUATION:

result that extrapolation of the data to pressures in the order of 101.3 kPa is considered to involve significant errors. Because there are not other comparable results, these data are classified as tentative.

EVALUATOR:

1-Butañol and 1,2-Ethanediol (ethylene glycol) solutions; C4H10O;

### [71-36-3] and C₂H₅O₂; [107-21-1]

Sahgal and Hayduk (10) reported solubilities of ethene at 101.3 kPa pressure at 298.15 K in the two-component solvent solutions composed of 1-butanol and 1,2-ethanediol (ethylene glycol). All compositions from pure 1-butanol to pure 1,2-ethanediol were used. These results are consistent with those for the pure solvents and are classified as tentative.

### References

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- Hayduk, W., Ed. PROPANE, BUTANE AND METHYLPROPANE, Solubility Data Series, <u>1986</u>, Vol. 24, 231, Pergamon Press Ltd., Oxford and New York.
- Clever, H.L.; Young, C.L.; Eds. METHANE, Solubility Data Series, <u>1987</u>, Vol. 27/28, 637, Pergamon Press Ltd., Oxford and New York.

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COMPONENTS:		ORIGINAL MEASUREMENTS:		
<pre>1. Ethene; C₂H₄; [74</pre>		Shenderei, E.R.; Zel'venskii,		
2. Methanol; CH ₄ O: [	67-56-1]	Ya.D.; Ivanovskii, F.P.		
		Russian J. Appl. Chem.	<u>1962</u> , 35,	
		669-672. (Zhur. Prik	l. Khim., 690-693.)	
VARIABLES:	····	PREPARED BY:		
T/K = 217 - 273		W. Hayduk		
<i>P</i> /kPa = 101.325				
EXPERIMENTAL VALUES:				
t/C T/K	Henry's Consta H/atm(mole fract	nt Mole Fraction ¹ ion) ⁻¹ Ethene, $x_1$	Partial Molal Volume Ethene $v_1 / \text{cm}^3 \text{(mole)}^{-1}$	
0 273.15	152.2	0.00657		
-10 263.15	126.3	0.00792		
-25 248.15	91.5	0.0109	62.5	
-35 238.15	72.5	0.0138	59.0	
-45 228.15	56.3	0.0178	55.0	
-56 217.15	42.3	0.0236		
Partial molal volume of ethylene dissolved in methanol at low temperatures are also given. ¹ Calculated by compiler for an ethylene partial pressure of 101.325 kPa.				
n.		•		
		INFORMATION		
METHOD/APPARATUS/PROCEDURI Glass equilibrium ce with a magnetic stin measured with a Boun Samples of liquid an stripping out ethene bilities were measur pressures below atme Henry's constant was Details in ref. (1)	ell fitted crer. Pressure don gauge. halyzed by e. The solu- red at several ospheric and s determined.	tion at 0°C und cuprous chlorid	<pre>ne was purified nd complex forma- er pressure in e. Impurities ed. The ethylene at 60°C, con- lyzed by GC. not given. compiler) ; Zel' venskii, ii, F.P.</pre>	

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ORIGINAL MEASU	REMENTS: .; Bircher, L. J.
J. Phys. Ch 1330 - 1331	
PREPARED BY:	. E. Derrick
	. L. Clever
	,
Bunsen Coefficient ¹	Ostwald Coefficient
α	$L/cm^3 cm^{-3}$
2.41	$2.63 \pm 0.02$
by the comp	iler.
n from Boyer	's thesis (1).
	en the logarithm of the alcohol carbon atoms.
or 298.15 K	
r 308.15 K	
	ost of the mole fraction were calculated from the
INFORMATION	
	DITY OF MATERIALS.
(1) Ethene.	Matheson Co. Stated 9.5 mol per cent.
	1. Source not given.
Treated remove then dr	by standard methods to aldehydes and ketones, ied and distilled.
ESTIMATED ERRO	DR:
	$\delta T/K = \pm 0.01$ /cm ³ = ± 0.02
	F. L., Ph.D. thesis, <u>1959</u> , ilt Univ., Nashville, TN.
2. Peters, Quantito	J. P.; Van Slyke, D. D. ative Clinical Chemistry re, MD, 1932, Volume II.
	Boyer, F. I J. Phys. Ch 1330 - 1331 PREPARED BY: M Bunsen Coefficient ¹ α 2.41 by the comp en from Boyer conship betwe ber of linear or 298.15 K or 308.15 K or 308.15 K bon atoms. M of the paper INFORMATION SOURCE AND PUH (1) Ethene. to be 9 (2) Methano Treated remove then dr ESTIMATED ERR δL REFERENCES: 1. Boyer, Vanderb 2. Peters, Quantit.

OMPONENTS *		OPICINAL MEACURE	TC .
OMPONENTS:		ORIGINAL MEASUREMEN	
1. Ethene; $C_2 H_4$ ; ['		Ohgaki, K.; Ni	shii, H.;
2. Methanol; C ₁ H ₄ O; [67-56-1]		Katayama, T.	
		J. Chem. Eng. (Japan) <u>1983</u> , 16 , 72 <b>-</b> 73.	
ARIABLES: $T/K = 2$	98.15 + 0.01	PREPARED BY:	
$T/K = 298.15 \pm 0.01$ P/kPa = 60.8 - 97.0		W. Hayduk	
XPERIMENTAL VALUES:			
Total Pressure P/kPa	Liquid Mole fraction M (10 [°] )x ₁	Gas He fraction $y_1$	enry's Constant, MPa H = $p_1 / x_1$
60.771	1.568	0.7103	27.26
61.564	1.573	0.7140	27.68
87.980	2.541	0.7986	27.30
97.007	2.842	0.8169	27.50
The solubility ca pressure of 101.3	lculated by compile 25 kPa is $x_1 = 0.00$	er for an ethylen	rage = 27.43
The solubility ca pressure of 101.3	lculated by compile 25 kPa is $x_1 = 0.00$	er for an ethylen	e partial
The solubility ca pressure of 101.3	25 kPa is $x_1 = 0.00$	er for an ethylen	e partial
The solubility ca pressure of 101.3 AETHOD / APPARATUS / PROCED A small (20 cm ³ ) m stirred absorption connected to a lar gas reservoir at h in a constant temp The volumes of lin vessels were accur mined. A quartz B was used to measur pressure. A known	AUXILIARY AUXILIARY URE: agnetically vessel was ger (100 cm ³ ) igher pressure erature bath. es, valves and ately deter- ourdon gauge e the system	er for an ethylen 0369 mole fractio INFORMATION SOURCE AND PURITY ( 1. Ethene, min 2. Methanol, s actual puri	DF MATERIALS: . purity 99.95%.

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COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Ethene; $C_2 H_4$ ; [74-85-1]	Narasimhan, S.; Natarajan, G.S.;		
2. Methanol; CH ₄ 0; [67-56-1]	Nageshwar, G.D.		
	Indian J. Technol. <u>1981</u> , 19, 298–299.		
VARIABLES: $T/K = 293.15, 298.15$	PREPARED BY:		
P/kPa = 101.325	W. Hayduk		
	۰		
EXPERIMENTAL VALUES:	· ·		
Mole Fraction E	thene_for		
$t/C$ $T/K$ $P = 101.325, x$ ${}^{1}p_{1}$	= 101.325, x ₁ L/cm ³ gas(cm ³ solvent) ⁻		
20 293.15 0.00484	0.00554 3.29		
25 298.15 0.00422	0.00505 3.03		
calculated for a partial pressure of 101.325 kPa. Gas molar volumes of 23910, and 24330 cm ³ /mole were used for the temper- atures 293.15 K, and 298.15 K, respectively, and for a pressure of 101.325 kPa when calculating $L$ . It was confirmed by private communication with Dr. Nageshwar that $x$ was for a <u>total</u> pressure of one atmosphere.			
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based on a design given in reference 1.	<ol> <li>Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>Methanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column.</li> </ol>		
	ESTIMATED ERROR:		
	$\delta x_1 / x_1 = \pm 3\%$ (Estimated by compiler)		
	REFERENCES: 1. Dubois, H.D.; Skoog, D.A. Anal. Chem. <u>1948</u> , 20, 624.		

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2H_4$ ; [74-85-1]	Yano, T.; Kidaka, T. Miyamoto, H.;
2. Methanol; CH ₄ O; [67-56-1]	Murakami, T.
	Proc. Soc. Chem. Engrs. Japan (Osaka),
	<u>Oct. 14</u> , <u>1968</u> , 89-90.
VARIABLES: $T/K = 298.15$	PREPARED BY:
P/kPa = 101.325	W. Hayduk
P/KPa = 101.525	
EXPERIMENTAL VALUES:	,
Ethene, x, Fo	¹ Henry's Ostwald Coefficient Constant $L/cm^{3}gas(cm^{3} H/atm)$ 325 kPa solvent) ⁻¹ (mole fraction) ⁻¹
25.0 298.15 0.00408 0.	00488 2.93 204.8
¹ Calculated by compiler.	
that the reported solubility was for	ial pressure of 101.325 kPa was cal-
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A glass apparatus was employed in	1. Source and purity not given.
which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu- tion cell.	2. Source and purity not given.
	ESTIMATED ERROR:
	$\delta x_1 / x_1 = \pm 0.03 \text{ (Compiler)}$
	REFERENCES :
	<b>1</b>

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COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_{i_1}$ ; [74-85-1]	Hannaert, H.; Haccuria, M.; Mathieu, M.P.
2. Methanol; $CH_{\downarrow}O$ ; [67-56-1]	Ind. Chim. Belge <b>1967</b> , 32,
	156-164.
VARIABLES: $T/K = 223.15 - 293.15$	PREPARED BY:
$p_1 / kPa = 101.3$	W. Hayduk
EXPERIMENTAL VALUES:	
	1
t/C T/K	¹ Mole Fraction Ethene, $x_1$
-50 223.15	0.0187
-30 243.15	0.0117
	0.0078
10 283.15 20 293.15	0.0056 0.0048
¹ Mole fraction solubility calculated pressure of 101.3 kPa using the equa v = 1, for the applicable temperature	ation developed by the authors with
log ( $K\pi\nu$ ) = 4.21 - ( $\Delta H/cal$	nol ¹ )/(2.3R(T/K))
The authors' definitions are:	
$\Delta H = 2,530 \text{ cal mol}^{-1}, 1$	Enthalpy of dissolution
$K = y_1 / x_1 = \frac{\text{mole frac}}{\text{mole frac}}$	tion gas in gas phase tion gas in liquid phase
$\pi$ / atm = total pressure	
v = coefficient of fu	gacity
The function, $K\pi v/atm$ , is equivalent $H_{1,2}/atm = (f_1/atm)/x_1$ where $f_1$ is	t to a Henry's constant in the form the fugacity.
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The authors describe several methods used; the one used in this case is the least accurate.	1. Ethene. Air Liquide. Specified purity 99.9%.
The apparatus is of glass and consists of a burette in which the gas is confined over mercury, two bulbs for the solvent, one above the other, a mercury manometer and a constant temper- ature bath. A measured volume of	<pre>2. Methanol. Merck and Co. At 20°C density specified as ρ = 0.7944 g cm⁻⁹ and refractive index n(D) = 1.3285.</pre>
solvent is degassed in the top bulb at ambient temperature and	ESTIMATED ERROR:
charged to the absorption bulb in the bath. Gas is charged to the	$\delta x_1/x_1 = \pm 10 \text{ to } 15\%$
desired pressure. The quantity of gas added at constant pressure is	(authors)
measured. Agitation is manual.	REFERENCES:
	l

COMPONENTS :		ORIGINAL MEAS	SURFMENTS .
(1) Ethene; C ₂ H ₄ ; [7	4-85-1]		L.; Bircher, L. J.
(2) Ethanol; C ₂ H ₅ OH;	[64-17-5]	J. Phys. C 1330 - 133	Chem. <u>1960</u> , 64, 91.
VARIABLES: T/K: 298.15 P/kPa: 101.32			M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:			
т/к	Mol Fraction	Bunsen Coefficient ¹	Ostwald Coefficient
	10 ⁴ <i>x</i> ₁	α	$L/cm^3 cm^{-3}$
298.15	61.4	2.34	$2.56 \pm 0.02$

 $\alpha/cm^{3}(STP) cm^{-3} atm^{-1}$ 

The Bunsen coefficient was calculated by the compiler.

The mole fraction solubility was taken from Boyer's thesis (1).

See the methanol data sheet for the equations relating the mole fraction solubility and the number of normal alcohol carbon numbers.

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AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details of the extraction procedure.	

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COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Yano, T.; Kidaka, T. Miyamoto, H.;
2. Ethanol; C ₂ H ₆ O; [64-17-5]	Murakami, T.
	Proc. Soc. Chem. Engrs. Japan (Osaka),
	<u>Oct. 14</u> , <u>1968</u> , 89-90.
VARIABLES: $T/K = 298.15$	PREPARED BY:
P/kPa = 101.325	W. Hayduk
	•
EXPERIMENTAL VALUES:	
·	
Mole Fraction Ethene, $x_1$ For: $t/C$ $T/K$ $P=101.325$ kPa $P_1=101.$	¹ Henry's ¹ Ostwald Coefficient Constant $L/cm^{3}gas(cm^{3} H/atm)$ 325 kPa solvent) ⁻¹ (mole fraction) ⁻¹
25.0 298.15 0.00558 0.0	0605 2.52 165.2
¹ Calculated by compiler.	
that the reported solubility was for	ial pressure of 101.325 kPa was cal-
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A glass apparatus was employed in	1. Source and purity not given.
which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu- tion cell.	2. Source and purity not given.
	ESTIMATED ERROR:
	$\delta x_1/x_1 = \pm 0.03$ (Compiler)
	REFERENCES:
	1

90	
COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Lthene; $C_2 H_4$ ; [74-85-1]	Narasimhan, S.; Natarajan, G.S.;
2. Ethanol; C ₂ H ₆ O; [64-17-5]	Nageshwar, G.D.
	Indian J. Technol. <u>1981</u> , 19, 298–299.
VARIABLES: T/K = 293.15, 298.15	PREPARED BY:
P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	
Mole Fraction F	thene for
t/C $T/K$ $P = 101.325/x$ ¹ p	¹ Ostwald Coefficient = 101.325/x ₁ L/cm ³ gas(cm ³ solvent) ⁻¹
20 293.15 0.00633	0.00671 2.77
25 298.15 0.00575	0.00624 2.60
Gas molar volumes of 23910, and 24330 atures 293.15 K, and 298.15 K, respec 101.325 kPa when calculating L. It was confirmed by private communica for a <u>total</u> pressure of one atmospher	tively, and for a pressure of tion with Dr. Nageshwar that $x$ was
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based on a design given in reference 1.	<ol> <li>Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>Ethanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column.</li> </ol>
	ESTIMATED ERROR:
	$\delta x_1 / x_1 = \pm 3\%$ (Estimated by compiler)
	REFERENCES: 1. Dubois, H.D.; Skoog, D.A. Anal. Chem. <u>1948</u> , 20, 624.

COMPONENTS :	·····	ORIGINAL MEAS	IDEMENTS .	1
(1) Ethene; C ₂ H ₄ ; [7	4-85-11	1	L.; Bircher, I	L. T.
		J		
(2) 1-Propanol; C ₃ H ₇	On; [/1-25-6]	1330 - 133	hem. <u>1960</u> , 64, 1.	,
VARIABLES:		PREPARED BY:		· · · · · · · · · · · · · · · · · · ·
T/K: 298.15 P/kPa: 101.32			M. E. Derrick H. L. Clever	,
-,	- (,			
EXPERIMENTAL VALUES:				
т/к	Mol Fraction	Bunsen	Ostwald	_
*	C 10 ⁴ x ₇	oefficient ¹	Coefficient L/cm ³ cm ⁻³	
		α		
298.15	73.6	2.21	$2.41 \pm 0.01$	
308.15	62.7	1.95	2.20 ± 0.08	
1 a /am ³	(STP) cm ⁻³ atm ⁻¹			
•	•	<b>.</b>		
The Bunsen coefficies	nts were calculat	ed by the co	ompiler.	Ū
The mole fraction so	lubilities were t	aken from Bo	oyer's thesis	(1).
See the methanol data solubility and the n				
See the methanol data solubility and the n				
See the methanol data solubility and the no		INFORMATION	, 	
, , , , ,	AUXILIARY		JRITY OF MATERIAL	 S :
Solubility and the n METHOD/APPARATUS/PROCEDUR A commercial Van Sly	AUXILIARY E: ke blood gas	SOURCE AND PU (1) Ethene.	. Matheson Co	. Stated
Solubility and the nu METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sarg	AUXILIARY E: ke blood gas gent Co.) was	SOURCE AND PU (1) Ethene. to be 9	. Matheson Co 99.5 mol per c	Stated
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sar modified by the autho	AUXILIARY E: ke blood gas gent Co.) was Drs.	SOURCE AND PU (1) Ethene. to be 9 (2) 1-Propa	Matheson Co 99.5 mol per c anol. Source	not given.
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sar modified by the author The total pressure of the solvent vapor in	AUXILIARY E: ke blood gas gent Co.) was ors. f the gas and the solution	SOURCE AND PU (1) Ethene. to be 9 (2) 1-Propa Treated remove	. Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and	not given. methods to ketones,
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sarq modified by the author The total pressure of the solvent vapor in chamber was adjusted of one atm. The pres	AUXILIARY E: ke blood gas gent Co.) was prs. f the gas and the solution to a pressure ssure was main-	SOURCE AND PU (1) Ethene. to be S (2) 1-Propa Treated remove then dr	. Matheson Co 99.5 mol per c anol. Source d by standard	not given. methods to ketones,
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sare modified by the author The total pressure of the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm dur	AUXILIARY E: ke blood gas gent Co.) was ors. f the gas and the solution to a pressure ssure was main- ring the solution	SOURCE AND PU (1) Ethene. to be S (2) 1-Propa Treated remove then dr	. Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and	not given. methods to ketones,
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sara modified by the author The total pressure of the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm dur process. The saturation	AUXILIARY E: ke blood gas gent Co.) was ors. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was o below the lower	SOURCE AND PU (1) Ethene. to be S (2) 1-Propa Treated remove then dr	. Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and	not given. methods to ketones,
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sara modified by the author The total pressure or the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm dur process. The saturation transferred to a bull stopcock of the extra	AUXILIARY E: ke blood gas gent Co.) was ors. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was b below the lower action vessel and	SOURCE AND PU (1) Ethene. to be S (2) 1-Propa Treated remove then dr	. Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and ried and disti	not given. methods to ketones,
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sard modified by the author The total pressure or the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was b below the lower action vessel and and solvent ght to volume	SOURCE AND PU (1) Ethene. to be 9 (2) 1-Propa Treated remove then dr	. Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and ried and disti	not given. methods to ketones,
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sard modified by the author The total pressure of the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug over mercury. See (2)	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was b below the lower action vessel and and solvent ght to volume 2) for details	SOURCE AND PU (1) Ethene. to be S (2) 1-Propa Treated remove then dr ESTIMATED ERF	Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and cied and disti	<pre>. Stated ent. not given. methods to ketones, lled. (at 298.15 K</pre>
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sard modified by the author The total pressure of the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug over mercury. See (2)	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was b below the lower action vessel and and solvent ght to volume 2) for details	SOURCE AND PU (1) Ethene. to be S (2) 1-Propa Treated remove then dr ESTIMATED ERF	Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and cied and disti	<pre>. Stated ent. not given. methods to ketones, lled. (at 298.15 K</pre>
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sar modified by the author The total pressure or the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug over mercury. See (2)	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was below the lower action vessel and and solvent ght to volume 2) for details	SOURCE AND PU (1) Ethene. to be 9 (2) 1-Propa Treated remove then dr ESTIMATED ERF & & & L/	Matheson Co 9.5 mol per c anol. Source h by standard aldehydes and ried and disti ROR: $ST/K = \pm 0.01$ $\pm 0.08$	<pre>. Stated ent. not given. methods to ketones, lled. (at 298.15 K (at 308.15 K)</pre>
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sard modified by the author The total pressure or the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was below the lower action vessel and and solvent ght to volume 2) for details	SOURCE AND PU (1) Ethene. to be 9 (2) 1-Propa Treated remove then dr ESTIMATED ERE & & & L/ REFERENCES: 1. Boyer,	Matheson Co 99.5 mol per c anol. Source d by standard aldehydes and cied and disti	<pre>. Stated ent. not given. methods to ketones, lled. (at 298.15 K (at 308.15 K thesis, 1959</pre>
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sard modified by the author The total pressure of the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug over mercury. See (2)	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was below the lower action vessel and and solvent ght to volume 2) for details	SOURCE AND PU (1) Ethene. to be 9 (2) 1-Propa Treated remove then dr ESTIMATED ERF & & & & L/ REFERENCES: 1. Boyer, Vanderb	Matheson Co 99.5  mol per c anol. Source h by standard aldehydes and cied and distin ROR: $T/K = \pm 0.01$ $\pm 0.08$ F. L., Ph.D. pilt Univ., Na	<pre>. Stated ent. not given. methods to ketones, lled. (at 298.15 K (at 308.15 K thesis, <u>1959</u> shville, TN.</pre>
METHOD/APPARATUS/PROCEDUR A commercial Van Slyl apparatus (E. H. Sar modified by the author The total pressure or the solvent vapor in chamber was adjusted of one atm. The pres tained at one atm du process. The saturation transferred to a bull stopcock of the extra sealed off. The gas vapor were then broug over mercury. See (2)	AUXILIARY E: ke blood gas gent Co.) was Drs. f the gas and the solution to a pressure ssure was main- ring the solution ted solution was below the lower action vessel and and solvent ght to volume 2) for details	SOURCE AND PU (1) Ethene, to be 9 (2) 1-Propa Treated remove then dr ESTIMATED ERE & & & & L/ REFERENCES: 1. Boyer, Vanderh 2. Peters, Quantit	Matheson Co 9.5 mol per c anol. Source 1 by standard aldehydes and cied and disti ROR: $DT/K = \pm 0.01$ $\pm 0.08$ F. L., Ph.D.	<pre>. Stated eent. not given. methods to ketones, lled. (at 298.15 K (at 308.15 K (at 308.15 K thesis, <u>1959</u> shville, TN. lyke, D. D. <i>Chemistry</i></pre>

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COMPONENTS:	
1 Ethonos C H + [74-85-1]	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Narasimhan, S.; Natarajan, G.S.;
2. 1- Propanol; C ₃ H ₈ O; [71-23-8]	Nageshwar, G.D.
	Indian J. Technol. <u>1981</u> , 19, 298–299.
VARIABLES: T/K = 293.15, 298.15	PREPARED BY:
<i>P</i> /kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	
Mole Fraction	 Ethene for
t/C $T/K$ $P = 101.325/x$ ¹ $p$	¹ Ostwald Coefficient
20 293.15 0.00804	0.00820 2.64
25 298.15 0.00737	0.00758 2.47
AUXILIARY	Y INFORMATION
	Y INFORMATION SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Propanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Propanol was treated for the removal of aldehydes and ketones and then distilled</li> </ul>
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:         <ol> <li>Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>I-Propanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column.</li> </ol> </li> <li>ESTIMATED ERROR:         <ol> <li>δx₁/x₁ = ± 3%</li> </ol> </li> </ul>

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COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Ethene; C ₂ H ₂ ; [74-85-1]	Yano, T.; Kidaka, T. Miyamo	oto, H.;
2. 1-Propanol; $C_{3}H_{0}$ ; [71-23-8]	Murakami, T.	
	Proc. Soc. Chem. Engrs. Japan (0	saka),
	<u>Oct. 14</u> , <u>1968</u> , 89-90.	
VARIABLES: $T/K = 298.15$	PREPARED BY:	
P/kPa = 101.325	W. Hayduk	
F/KFA = 101.325	· · · · · · · · · · · · · · · · · · ·	
EXPERIMENTAL VALUES:		
Mole Fraction Ethene/ $z_1$ For: $t/C$ T/K P=101.325 kPa $p_1$ =101.	¹ Ostwald Coefficient Co	lenry's onstant I/atm fraction
25.0 298.15 0.00697 0.0	0717 2.34 1	39.6
¹ Calculated by compiler.	т. Солониция — с на спорт — с на станиция — с на с	
Although not specifically stated in that the reported solubility was for	paper it was assumed by the c a total pressure of 101.325 ial pressure of 101.325 kPa w	kPa;
	athone melar volume of 24220	as car-
culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa.	ethene motal volume of 24520	cm /
culated assuming Henry's law and an	ethene motal volume of 24320	cm /
culated assuming Henry's law and an	ethene motal volume of 24320	cm /
culated assuming Henry's law and an	ethene motat votume of 24320	cm /
culated assuming Henry's law and an	ethene motat volume of 24320	cm 7
culated assuming Henry's law and an	ethene motat votume of 24320	cm 7
culated assuming Henry's law and an	ethene motat volume of 24320	cm 7
culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa.	INFORMATION	cm '/
culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa.		cm 7
culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in	INFORMATION	
culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known yolume of solvent in a dissolution	INFORMATION SOURCE AND PURITY OF MATERIALS:	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined.	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi ESTIMATED ERROR:	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.03$ (Compi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.03$ (Compi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.03$ (Compi	.ven.
Culated assuming Henry's law and an mole at 298.15 K and 101.325 kPa. AUXILIARY METHOD/APPARATUS/PROCEDURE: A glass apparatus was employed in which the uptake of gas by a known volume of solvent in a dissolution cell was volumetrically determined. The gas was displaced by mercury as the gas dissolved at constant pres- sure. A magnetically operated gas circulating pump and bubbling tip were provided for bubbling the gas through the solvent in the dissolu-	INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Source and purity not gi 2. Source and purity not gi ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.03$ (Compi	.ven.

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COMPONENTS: (1) Ethene; $C_{2}H_{4}$ ; [74-85-1]	ORIGINAL MEAS Bover, F.	UREMENTS: L.; Bircher, L. J.
(2) 1-Butanol; C ₄ H ₉ OH; [71-36-3]		hem. 1960, 64,
VARIABLES: T/K: 298.15, 308.15 P/kPa: 101.325 (1 atm)	PREPARED BY:	M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:		
T/K Mol Fraction $1$	Bunsen efficient ¹ α	Ostwald Coefficient $L/cm^3 cm^{-3}$
<u> </u>	2.07	2.26 ± 0.01
. 308.15 77.3	1.87	2.11 ± 0.02
$\frac{1}{\alpha/cm^3(STP)}$ cm ⁻³ atm ⁻¹		
The Bunsen coefficients were calculate	ed by the c	ompiler.
The mole fraction solubilities were to	aken from B	oyer's thesis (1).
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PI	URITY OF MATERIALS:
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors.	to be	. Matheson Co. Stated 99.5 mol per cent.
The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and	Treate remove then d	nol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled.
sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details of the extraction procedure.	ESTIMATED ER	
		F. L., Ph.D. thesis, <u>1959</u> , bilt Univ., Nashville, TN.
	Quanti	, J. P.; Van Slyke, D. D. tative Clinical Chemistry ore, MD, 1932, Volume II.

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MPONENTS:		ORIGINA	L MEASUREMENTS:
1. Ethene;	C ₂ H ₄ ; [74-85-	1] Sahg	al, A.; La, H.M.; Hayduk, W.
2. 1-Butan	ol; C4H100; [7	1-36-3] Can.	J. Chem. Eng. <u>1978</u> , 56,
		354-	357.
ARIABLES: T/	K = 264 - 343	PREPARE	D BY:
	a = 101.325		W. Hayduk
XPERIMENTAL V			•
		Mole Fraction	Ostwald Coefficient
t/C	<i>T /</i> K	Ethene <i>x</i> ₁	L/ cm ³ gas (cm ³ solvent)-
-9.2	263.95	0.0149	3.62
25	298.15	0.00834	2.23
		0 00506	1.67
49	322.15	0.00596	
70	343.15	0.00511	1.50
70	343.15	0.00511	1.50
70	343.15	0.00511	1.50 rtial pressure of 101.325 kPa.
70 Mole fra	343.15	0.00511 $x_1$ , is for a gas pa	1.50 rtial pressure of 101.325 kPa.

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COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Narasimhan, S.; Natarajan, G.S.;
2. 1- Butanol; C ₄ H ₁₀ O; [71-36-3]	Nageshwar, G.D.
	Indian J. Technol. <u>1981</u> , 19, 298–299.
VARIABLES: T/K = 293.15, 298.15	PREPARED BY:
P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	
$\frac{Mole \ Fraction \ E}{t/C} t/K P = 101.325 t_1^{1} p_1$	Sthene, x,, for       10stwald Coefficient         1       10stwald Coefficient         1       101.325       L/cm ³ gas (cm ³ solvent)
20 293.15 0.00950	0.00956 2.52
25 298.15 0.00864	0.00871 2.32
atures 293.15 K, and 298.15 K, respec 101.325 kPa when calculating $L$ . It was confirmed by private communica for a total pressure of one atmospher	ation with Dr. Nageshwar that $x$ , was
AUXILIARY	
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based on a design given in reference 1.	
The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Butanol was treated for the removal of aldehydes and ketones and then distilled</li> </ul>
The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Butanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column.</li> </ul>

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COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2H_4$ ; [74-85-1]	Narasimhan, S.; Natarajan, G.S.;
2. 1-Pentanol; C ₅ H ₁₂ O; [71-41-0]	Nageshwar, G.D.
	Indian J. Technol. <u>1981</u> , 19,
	298-299.
VARIABLES: T/K = 293.15, 298.15	PREPARED BY:
P/kPa = 101.325	W. Hayduk
· / / / / = 101.525	· .
EXPERIMENTAL VALUES:	
Mole Fraction H	Sthene, $x_1$ , for
$t/C$ $T/K$ $P = 101.325$ ${}^{1}P_{1}$	= 101.325 L/cm ³ gas(cm ³ solvent) ⁷
20 293.15 0.01082	0.01083 2.42
25 298.15 0.00995	0.00996 2.25
for a total pressure of one atmospher	·e.
AUXILIARY	INFORMATION
AUXILIARY	INFORMATION SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead-	······································
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter-	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Pentanol was treated for the</li> </ul>
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Pentanol was treated for the removal of aldehydes and ketones and then distilled</li> </ul>
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given.</li> <li>2. 1-Pentanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	SOURCE AND PURITY OF MATERIALS: 1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at $350-400^{\circ}C$ and analyzed by chromatography. Purity not given. 2. 1-Pentanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column. ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 3\%$
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	SOURCE AND PURITY OF MATERIALS: 1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at $350-400^{\circ}C$ and analyzed by chromatography. Purity not given. 2. 1-Pentanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 3\%$ (Estimated by compiler)
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	SOURCE AND PURITY OF MATERIALS: 1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at $350-400$ °C and analyzed by chromatography. Purity not given. 2. 1-Pentanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column. ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 3 \%$ (Estimated by compiler) REFERENCES:
METHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature water was circulated through the jacket. Gas was bubbled through the solvent until saturated. The dissolved gas content was deter- mined by an electrometric dead- stop titration technique which yielded the bromine number. The electrometric titrator was based	SOURCE AND PURITY OF MATERIALS: 1. Ethene prepared by catalytic dehydration of ethanol over activated alumina at 350-400°C and analyzed by chromatography. Purity not given. 2. 1-Pentanol was treated for the removal of aldehydes and ketones and then distilled twice in a packed column. ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 3\%$ (Estimated by compiler) REFERENCES: 1. Dubois, H.D.; Skoog, D.A.

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COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Ethene; C ₂ H ₄ ; [74-85-1]	Boyer, F. L.; Bircher, L. J.		
(2) 1-Pentanol; C ₅ H ₁₁ OH; [71-41-0]	J. Phys. Chem. <u>1960</u> , 64, 1330 - 1331.		
VARIABLES:	PREPARED BY:		
T/K: 298.15, 308.15 F/kPa: 101.325 (1 atm)	M. E. Derrick H. L. Clever		
EXPERIMENTAL VALUES:	L		
Co	Bunsen Ostwald efficient ¹ Coefficient		
<u>10⁴ x_1</u>	$\frac{\alpha}{L/cm^3 cm^{-3}}$		
298.15 100.4	2.04 2.23 ± 0.03		
308.15 88.7	1.82 2.05 ± 0.01		
$1 \alpha/cm^3$ (STP) $cm^{-3}$ atm ⁻¹			
The Bunsen coefficients were calculat	ed by the compiler.		
The mole fraction solubilities were t	aken from Boyer's thesis (1).		
See the methanol data sheet for the e solubility and the number of normal a	quations relating the mole fraction lcohol carbon numbers.		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors.	SOURCE AND PURITY OF MATERIALS: (1) Ethene. Matheson Co. Stated to be 99.5 mol per cent.		
The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was	(2) 1-Pentanol. Source not given. Treated by standard methods to remove aldehydes and ketones, then dried and distilled.		

ESTIMATED ERROR:

 $\delta T/K = \pm 0.01$   $\delta L/cm^3 = \pm 0.03 \text{ (at 298.15 K)}$  $\pm 0.01 \text{ (at 308.15 K)}$  ł

**REFERENCES:** 

process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume

over mercury. See (2) for details

of the extraction procedure.

- 1. Boyer, F. L., Ph.D. thesis, <u>1959</u>, Vanderbilt Univ., Nashville, TN.
- Peters, J. P.; Van Slyke, D. D. *Quantitative Clinical Chemistry* Baltimore, MD, 1932, Volume II.

COMPONENTS:	. [74 05 ]]	ORIGINAL MEAS	1
(1) Ethene; C ₂ H ₄		Boyer, F.	L.; Bircher, L. J.
(2) 1-Hexanol; C	6 ^H 13 ^{OH} ; [111-27-3]	J. Phys. Chem. <u>1960</u> , 64, 1330 - 1331.	
VARIABLES:		PREPARED BY:	
T/K: 29	8.15 1.325 (l atm)	FREFARED DI:	M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:	<u></u>		
<i>I</i>	YK Mol Fraction	Bunsen	Ostwald
	Co 10 ⁴ <i>x</i> ر	oefficient ¹ α	Coefficient L/cm ³ cm ⁻³
298	.15 106.9	1.91	$2.08 \pm 0.03$
1 a/	cm ³ (STP) cm ⁻³ atm ⁻¹		
	icient was calculated	l by the com	piler.
	n solubility was take		
	_	_	lating the mole fraction
	AUXILIARY	INFORMATION	
ME THOD / APPARATUS / PRO	<u></u>	SOURCE AND PU	JRITY OF MATERIALS: . Matheson Co. Stated

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COMPONENTS:	ORIGINAL MEAS	
(1) Ethene; C ₂ H ₄ ; [74-85-1]	Boyer, F.	L.; Bircher, L. J.
(2) 1-Heptanol; C ₇ H ₁₅ OH; [111-70-6]	J. Phys. C. 1330 - 133	hem. <u>1960</u> , 64, 1.
VARIABLES:	PREPARED BY:	M. E. Derrick
T/K: 298.15 P/kPa: 101.325 (1 atm)		H. L. Clever
EXPERIMENTAL VALUES:		
T/K Mol Fraction Co	Bunsen efficient ¹	Ostwald Coefficient
10"x1	α	$L/cm^3 cm^{-3}$
298.15 117.0	1.88	2.05 ± 0.02
$\frac{1}{\alpha/cm^3(STP)}$ cm ⁻³ atm ⁻¹		
	hee 44	
The Bunsen coefficient was calculated		
The mole fraction solubility was take	n from Boye	r's thesis (1).
See the methanol data sheet for the e solubility and the number of normal a	quations rel	lating the mole fraction
Solubility and the number of normal a	TCOUOT Carb	on numbers.
AUXILIARY		
	INFORMATION	
METHOD/APPARATUS/PROCEDURE:		RITY OF MATERIALS:
A commercial Van Slyke blood gas	SOURCE AND PU (1) Ethene	Matheson Co. Stated
	SOURCE AND PU (1) Ethene to be s	. Matheson Co. Stated 99.5 mol per cent.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors.	SOURCE AND PU (1) Ethene to be (2) 1-Hepta	. Matheson Co. Stated 99.5 mol per cent. anol. Source not given.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution	SOURCE AND PU (1) Ethene to be (2) 1-Hepta Treated remove	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones,
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure	SOURCE AND PU (1) Ethene to be (2) 1-Hepta Treated remove	. Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution	SOURCE AND PU (1) Ethene to be (2) (2) 1-Hepta Treated remove then d	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones,
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was	SOURCE AND PU (1) Ethene to be 9 (2) 1-Hepta Treated remove then d:	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones,
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and	SOURCE AND PU (1) Ethene to be (2) 1-Hepta Treated remove then d	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones,
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent	SOURCE AND PU (1) Ethene to be (2) (2) 1-Hepta Treated remove then d: ESTIMATED ER	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and	SOURCE AND PU (1) Ethene to be (2) (2) 1-Hepta Treated remove then d: ESTIMATED ER	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume	SOURCE AND PU (1) Ethene to be (2) (2) 1-Hepta Treated remove then d: ESTIMATED ER	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details	SOURCE AND PL (1) Ethene to be 9 (2) 1-Hept: Treated remove then d: ESTIMATED ERI δ L	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details	SOURCE AND PU (1) Ethene to be 9 (2) 1-Hepta Treated remove then d: ESTIMATED ERI & L REFERENCES:	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled. ROR: $5 T/K = \pm 0.01$ /cm ³ = $\pm 0.02$
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details	SOURCE AND PL (1) Ethene to be 9 (2) 1-Hept: Treated remove then d: ESTIMATED ERI δ L REFERENCES: 1. Boyer,	Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled.
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details	SOURCE AND PL (1) Ethene to be 9 (2) 1-Hepta Treated remove then do ESTIMATED ER δ L REFERENCES: 1. Boyer, Vander 2. Peters	<pre>Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled. ROR: 5 T/K = ± 0.01 /cm³ = ± 0.02 F. L., Ph.D. thesis, <u>1959</u>, pilt Univ., Nashville, TN. , J. P.; Van Slyke, D. D.</pre>
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details	SOURCE AND PL (1) Ethene to be 9 (2) 1-Hepta Treated remove then di ESTIMATED ER δ L REFERENCES: 1. Boyer, Vanderl 2. Peters <i>Quanti</i>	<pre>Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled. ROR: 5 T/K = ± 0.01 /cm³ = ± 0.02 F. L., Ph.D. thesis, <u>1959</u>, pilt Univ., Nashville, TN. , J. P.; Van Slyke, D. D. tative Clinical Chemistry</pre>
A commercial Van Slyke blood gas apparatus (E. H. Sargent Co.) was modified by the authors. The total pressure of the gas and the solvent vapor in the solution chamber was adjusted to a pressure of one atm. The pressure was main- tained at one atm during the solution process. The saturated solution was transferred to a bulb below the lower stopcock of the extraction vessel and sealed off. The gas and solvent vapor were then brought to volume over mercury. See (2) for details	SOURCE AND PL (1) Ethene to be 9 (2) 1-Hepta Treated remove then di ESTIMATED ER δ L REFERENCES: 1. Boyer, Vanderl 2. Peters <i>Quanti</i>	<pre>Matheson Co. Stated 99.5 mol per cent. anol. Source not given. d by standard methods to aldehydes and ketones, ried and distilled. ROR: 5 T/K = ± 0.01 /cm³ = ± 0.02 F. L., Ph.D. thesis, <u>1959</u>, pilt Univ., Nashville, TN. , J. P.; Van Slyke, D. D.</pre>

COMPONENTS: (1) Ethene; (	C ₂ H ₄ ; [74	-85-1]	ORIGINAL MEASU Boyer, F. I	JREMENTS: L.; Bircher, L. J.	
(2) 1-Octanol; C ₈ H ₁₇ OH; [111-87-5]		J. Phys. CH 1330 - 1331	nem. <u>1960</u> , 64,		
	298.15, 101.325		PREPARED BY:	M. E. Derrick H. L. Clever	<u> </u>
EXPERIMENTAL VAL	UES:				
	<i>T /</i> K		Bunsen Coefficient ¹	Ostwald Coefficient L/cm ³ cm ⁻³	
		<u> </u>	α		
	298.15	129.0	1.75	1.91 ± 0.03	
-	308.15	110.0	1.56	1.76 ± 0.02	
1	$\alpha/cm^3$ (	STP) $cm^{-3} atm^{-1}$			
The Bunsen co	efficient	ts were calculat	ed by the co	mpiler.	v
See the metha solubility an	d the nur	nber of normal a	alcohol carbo	on numbers.	
solubility an	d the nur	nber of normal a	wÎcohol carbo	on numbers.	
solubility an	d the nur	nber of normal a	ICohol carbo	on numbers.	
solubility an	d the nur	nber of normal a	ICOhOl Carbo	n numbers.	
METHOD/APPARATUS A commercial apparatus (E. modified by t The total pre the solvent v chamber was a of one atm. tained at one process. The	/PROCEDURE: Van Slyke H. Sarge the author essure of djusted f The press atm dur: saturate	AUXILIARY AUXILIARY be blood gas ent Co.) was rs. the gas and	INFORMATION SOURCE AND PU (1) Ethene. be 99.5 (2) 1-Octar Treated remove then dr	on numbers.	tated to iven. ods to ones,

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2 MPONENTS:			AL MEASUREMENTS:
1. Ethene; $C_2H_4$ ; [74-85-1]			gal, A.; La, H.M.; Hayduk, W.
2. 2-Propanol; $C_{3}H_{8}O$ ; [67-63-0]			. J. Chem. Eng. <u>1978</u> , 56,
2. 2-FLO <u>F</u>	anor, C ₃ n ₆ 0, [0		
		354	-357.
RIABLES: 1	'/K = 273-323	PREPAR	ED BY:
P/}	Pa = 101.325		W. Hayduk
PERIMENTAL	VALUES:		-
		Mole Fraction	Ostwald Coefficient
t/C	Т /К	Ethene, $x_1$	$L / \text{cm}^3\text{gas} (\text{cm}^3 \text{ solvent})^{-1}$
0	273.15	0.0101	3.02
25	298.15	0.00673	2.14
50	323.15	0.00473	1.58
Mole fi	caction ethene,	x ₁ , is for a gas g	artial pressure of 101.325 kPa.
Mole fi	raction ethene,	$x_1$ , is for a gas p	Partial pressure of 101.325 kPa.
Mole fi	raction ethene,		
	raction ethene,	AUXILIARY INFORM	
ETHOD /APPAR	ATUS / PROCEDURE :	AUXILIARY INFORM	ATION ATION OF MATERIALS;
ETHOD/APPAR A glass a a gas sto	ATUS/PROCEDURE: apparatus equipp orage burette, a	AUXILIARY INFORM SOURCE bed with 1.	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole %
THOD/APPAR A glass a a gas sto tube for ture inte	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer	AUXILIARY INFORM bed with 1. spiral a minia- and a	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity.
ETHOD/APPAR A glass a a gas sto tube for ture inte solution Degassed	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was inj	AUXILIARY INFORM bed with 1. spiral a minia- and a was used. 2. ected at	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole %
A glass a a gas sto tube for ture inte solution Degassed a constar	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the	AUXILIARY INFORM ped with 1. spiral a minia- and a was used. 2. ected at absorption	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker
THOD/APPAR A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the	ATUS/PROCEDURE: apparatus equipporage burette, a gas absorption, ernal manometer storage burette solvent was inj it rate into the means of a syr e gas was displa	AUXILIARY INFORM bed with 1. a spiral a minia- and a was used. 2. ected at absorption inge-pump ced by	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker
THOD/APPAR A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the means of a syr e gas was displa sing a mechanic ce for a mercur	AUXILIARY INFORM bed with 1. spiral a minia- and a was used. 2. ected at absorption inge-pump ced by al eleva- y bottle, absorption	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker of 99.9 mole % purity.
ETHOD/APPAR A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press	ATUS/PROCEDURE: apparatus equipp brage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the means of a syr a gas was displa using a mechanic ce for a mercur a required to ke sure constant.	AUXILIARY INFORM Ded with 1. spiral a minia- and a was used. 2. ected at absorption inge-pump ced by sal eleva- y bottle, ep the Readings	ATION ATION AND PURITY OF MATERIALS; Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker
ETHOD/APPAR A glass at a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury t ting devi at a rate gas press of the vo consumed	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the means of a syr e gas was displa using a mechanic ce for a mercur e required to ke oure constant.	AUXILIARY INFORM Source a minia- and a a was used. ected at absorption inge-pump ced by al eleva- y bottle, ep the Readings ree gas olvent	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker of 99.9 mole % purity.
ETHOD/APPAR A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed required were obta	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the means of a syr e gas was displa using a mechanic ce for a mercur e required to ke sure constant. olume of vapor-f and volume of s to achieve satu	AUXILIARY INFORM ped with 1. spiral a minia- and a was used. 2. ected at absorption inge-pump ced by al eleva- y bottle, ep the Readings olvent ration the	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker of 99.9 mole % purity. MTED ERROR: $\pi_1/\pi_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
ETHOD/APPAR A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed required were obta solubilit	ATUS/PROCEDURE: apparatus equipp prage burette, a gas absorption, ernal manometer storage burette solvent was inj it rate into the means of a syr e gas was displa using a mechanic ce for a mercur e required to ke sure constant. olume of vapor-f and volume of s to achieve satu ined from which y was calculate re fluid was ci	AUXILIARY INFORM SOURCE a minia- and a a was used. ected at absorption inge-pump ced by al eleva- y bottle, ep the Readings ree gas olvent ration the Constant REFERI	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker of 99.9 mole % purity. MTED ERROR: $\pi_1/\pi_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
ETHOD/APPAR A glass a a gas sto tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed were obta solubilit temperatu through a	ATUS/PROCEDURE: apparatus equipp orage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the means of a syr e gas was displa using a mechanic ce for a mercur e required to ke sure constant. olume of vapor-f and volume of satu ined from which y was calculate	AUXILIARY INFORM SOURCE a minia- and a a was used. ected at absorption inge-pump ced by al eleva- y bottle, ep the Readings ree gas olvent ration the Constant REFERM	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker of 99.9 mole % purity. MTED ERROR: $\pi_1/\pi_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
ETHOD/APPAR a glass a tube for ture inte solution Degassed a constar spiral by while the mercury u ting devi at a rate gas press of the vo consumed were obta solubilit temperatu through a	ATUS/PROCEDURE: apparatus equipp prage burette, a gas absorption, ernal manometer storage burette solvent was inj at rate into the means of a syr e gas was displa using a mechanic ce for a mercur e required to ke sure constant. olume of vapor-f and volume of s to achieve satu ined from which by was calculate re fluid was ci jacket enclosi	AUXILIARY INFORM SOURCE a minia- and a a was used. ected at absorption inge-pump ced by al eleva- y bottle, ep the Readings ree gas olvent ration the Constant REFERM	ATION ATION AND PURITY OF MATERIALS: Ethene was CP grade from Matheson, 99.5 mole % minimum purity. 2-Propanol was from J.T. Baker of 99.9 mole % purity. MTED ERROR: $\pi_1/\pi_1 = \pm 2\%$ $\delta T/K = \pm 0.05$

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	Cauquil, G.
(2) Cyclohexanol; C ₆ H ₁₂ O; [108-93-0]	J. Chim. Phys. <u>1927</u> , 24, 53-55.
VARIABLES: T/K = 299 $p_1/kPa = 102$	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
The author states that one lite $301 \text{ cm}^3$ ethene at 26 ⁰ C and 76	er of cyclohexanol absorbs 6 mmHg.
The compiler calculates a Ostu = 0.301 and a mole fraction so 299 K and a gas partial pressu	lubility of $x_7 = 1.27 \times 10^{-3}$ at
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
The apparatus appears to be of the Bunsen type.	
The initial and final volumes of gas in contact with the liquid were measured. The vapor pressure of the liquid was ignored.	(2) Cyclohexanol. Distilled, boiling point 160.9 [°] C at 766 mmHg. Degassed and tested to be air free.
	ESTIMATED ERROR:
	$\delta L/L = \pm 0.05$ (compiler)
	REFERENCES :

204	
COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Sahgal, A.; La, H.M.; Hayduk, W.
<pre>2. 1,2-Ethanediol (ethylene glycol); C₂H₅O₂; [107-21-1]</pre>	Can. J. Chem. Eng. <u>1978</u> , 56, 354–357.
VARIABLES: $T/K = 298.15$	PREPARED BY:
P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	
	·
Mole Frac	
t/C T/K Ethene,1	$0^{4}x_{1}$ L/ cm ³ gas (cm ³ solvent) ⁻¹
25 298.15 7.15	0.312
Mole fraction ethene, $x_1$ , is for a	gas partial pressure of 101.325 kPa.
AUXILIARI	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A glass apparatus equipped with	1. Ethene was CP grade from
a gas storage burette, a spiral	Matheson, 99.5 mole %
tube for gas absorption, a minia- ture internal manometer and a	minimum purity.
solution storage burette was used.	2. 1,2-Ethanediol was from Fisher
Degassed solvent was injected at a constant rate into the absorption	Chemicals of 99.8 mole % purity.
spiral by means of a syringe-pump	purrey.
while the gas was displaced by mercury using a mechanical eleva-	
ting device for a mercury bottle,	
at a rate required to keep the gas pressure constant. Readings	ESTIMATED ERROR:
of the volume of vapor-free gas	$\delta x_1/x_1 = \pm 2\%$
consumed and volume of solvent required to achieve saturation	$\delta T/K = \pm 0.05$
were obtained from which the	REFERENCES:
solubility was calculated. Constant temperature fluid was circulated	
through a jacket enclosing the	
burettes and absorption spiral.	
· · ·	
	4

IGINAL MEASUREMENTS: Hannaert, H.; Haccuria, M.; Mathieu, M.P. Ind. Chim. Belge 1967, 32, 156-164. EPARED BY: W. Hayduk ¹ Mole Fraction Ethene, $x_1$ 0.000313 compiler for a gas partial
Mathieu, M.P. Ind. Chim. Belge <u>1967</u> , 32, 156-164. EPARED BY: W. Hayduk ¹ Mole Fraction Ethene, $x_1$ 0.000313
156-164. EPARED BY: W. Hayduk ¹ Mole Fraction Ethene, x ₁ 0.000313
W. Hayduk ¹ Mole Fraction Ethene, x ₁ 0.000313
W. Hayduk ¹ Mole Fraction Ethene, x ₁ 0.000313
¹ Mole Fraction Ethene, x ₁ 0.000313
0.000313
0.000313
0.000313
compiler for a gas partial
a Henry's constant in the form and fugacity.
ORMATION
URCE AND PURITY OF MATERIALS:
1. Ethene. Air Liquide. Specified purity 99.9%.
2. 1,2-Ethanediol. No information.
TIMATED ERROR:
11

i.

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COMPONENTS:	<u> </u>		ORIGINAL MEASUREMENTS:
1. Ethene;	C ₂ H ₄ ; [74-85-1]	,	Hannaert, H.; Haccuria, M.; Mathieu, M.P.
(oxy)] h (triethy	2-Ethanediylbis bis-ethanol, ylene glycol); ; [112-27-6]		Ind. Chim. Belge <u>1967</u> , 32, 1 <b>56–164</b> .
VARIABLES:	T/K = 303.15		PREPARED BY:
p	'kPa = 101.3		W. Hayduk
EXPERIMENTAL V	ALUES:		
<i>t/</i> C	т /к		¹ Mole Fraction Ethene, $x_1$
30	303.15	550	0.00182
The functio	v = coefficien	ssure nt of fuga quivalent	to a Henry's constant in the form
		AUXILIARY	INFORMATION
methods use case is the method. The stat column was known mass was used for volume of or Various con for dead vo detector as outlet pres the method	nors describe seven ad; the one used a gas chromatograp tionary phase of the impregnated with of solvent. Nit: or determining the gas in the column trections were empolumes in the tub s well as for inle ssures. Unfortuna could only be use the seven sev	in this phic the a rogen e free ployed ing and et and ately	SOURCE AND PURITY OF MATERIALS: 1. Ethene. Air Liquide. Specified purity 99.9%. 2. Triethylene glycol. No information. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 2$ to 5% (authors) REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Lenoir, J-Y.; Renault, P.; Renon, H.
2. Propanol, oxybis-, (Dipropyl glycol); C ₆ H ₁₄ O ₃ ; [25265-7	ene $I$ them Free Data 1971 16 240-2
/ARIABLES:	PREPARED BY:
P/kPa = 101.3	C. L. Young
EXPERIMENTAL VALUES:	
	constant Mole fraction at 1 atm* $/atm$ $C_2H_4$
298.2       20         323.2       25         343.2       29	0.00394
A	UXILIARY INFORMATION
	UXILIARY INFORMATION SOURCE AND PURITY OF MATERIALS:
ÆTHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used.	source AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or
ÆTHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used. Carrier gas was helium. The va Henry's law constant was calcul from the retention time. The va applies to very low partial pre of gas and there may be a subst difference from that measured a l atm. pressure. There is also considerable uncertainty in the	source AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. essures tantial at b at bo e value
ÆTHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used. Carrier gas was helium. The va Henry's law constant was calcul from the retention time. The va applies to very low partial pre- of gas and there may be a subst lifference from that measured a l atm. pressure. There is also considerable uncertainty in the of Henry's constant since surfar adsorption was not allowed for	SOURCE AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. essures tantial at b b c e value ace ESTIMATED EREOR.
ÆTHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used. Carrier gas was helium. The va- Henry's law constant was calcul from the retention time. The va- applies to very low partial pre- of gas and there may be a subst difference from that measured a lifference from that measured a latm. pressure. There is also considerable uncertainty in the of Henry's constant since surfa adsorption was not allowed for although its possible existence	SOURCE AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. essures tantial at b b c e value ace ESTIMATED EREOR.
METHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used. carrier gas was helium. The va Henry's law constant was calcul from the retention time. The va applies to very low partial pre- of gas and there may be a subst difference from that measured a l atm. pressure. There is also considerable uncertainty in the of Henry's constant since surfa adsorption was not allowed for although its possible existence	SOURCE AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. Servalue essures tantial at o a value ace ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/atm = \pm 6\%$
METHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used. carrier gas was helium. The va Henry's law constant was calcul from the retention time. The v applies to very low partial pre of gas and there may be a subst difference from that measured a	Source AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. Source AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. Servalue Servalue ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/atm = \pm 6\%$ (estimated by compiler).
METHOD/APPARATUS/PROCEDURE: A conventional gas-liquid chrom graphic unit fitted with a ther conductivity detector was used. carrier gas was helium. The va Henry's law constant was calcul from the retention time. The va applies to very low partial pre- of gas and there may be a subst difference from that measured a l atm. pressure. There is also considerable uncertainty in the of Henry's constant since surfa adsorption was not allowed for although its possible existence	Source AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. Source AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. Servalue Servalue ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/atm = \pm 6\%$ (estimated by compiler).

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COMPONENTS:		ORIGINAL MEASUREMENTS:
1. Ethene; $C_2H_4$	; [74-85-1]	Lenoir, J-Y.; Renault, P.; Renon, H.
2. Phenol; C ₆ H ₆	0; [108-95-2]	J. Chem. Eng. Data <u>1971</u> , 16, 340-2.
VARIABLES:		PREPARED BY:
<i>T</i> /K =		C. L. Young
P/kPa =	101.3	C. II. Toung
EXPERIMENTAL VALUES	:	
· _ /	Henry's constar	nt Mole fraction at 1 atm*
T/K	HC,H,/atm	^x C ₂ H ₄
		- <u></u> , <u>·</u>
323.2	259	0.00386
·	<u></u>	
* Calculated by	compiler assuming a l	Linear function of $H_{C_2H_4}$ vs $x_{C_2H_4}$ '
i.e., x _{C.H.} (1	$atm) = 1/H_{C_2H_1}$	$C_2H_4$ $C_2H_4$
	2 4	
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PR		SOURCE AND PURITY OF MATERIALS;
	gas-liquid chromato- tted with a thermal	(1) L'Air Liquide sample, minimum purity 99.9 mole per cent.
conductivity det	tector was used. The	(2) Tougart and Matignan or
carrier gas was Henry's law cons	helium. The value of stant was calculated	Serlabo sample, purity 99 mole per
from the retent:	ion time. The value low partial pressures	cent.
of gas and there	e may be a substantial	
difference from 1 atm. pressure.	that measured at	
considerable und	certainty in the value	
of Henry's const adsorption was n	tant since surface	
although its pos	ssible existence was	ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/atm = \pm 6\%$
noted.		(estimated by compiler).
		REFERENCES:
1		
		· .

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ORIGINAL MEASUREMENTS:
Lenoir, J-Y.; Renault, P. Renon, H.
J. Chem. Eng. Data <u>1971</u> , 16, 340-2.
PREPARED BY:
C.L. Young
,
· · ·
onstant Mole fraction at 1 atm*
0.00625
inear function of $H_{C_2H_4}$ vs $x_{C_2H_4}$ ,
INFORMATION
SOURCE AND PURITY OF MATERIALS: (1) L'Air Liquide sample, minimum purity 99.9 mole per cent. (2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H/atm = \pm 6$ % (estimated by compiler). REFERENCES:

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COMPONENTS :		ORIGINAL MEASUREMENTS:
l. Ethene; C	2 ₂ H ₄ ; [74-85-1]	Sahgal, A.; Hayduk, W.
2. 1-Butanol;	C ₄ H ₁₀ O; [71-36-3]	J. Chem. Eng. Data <u>1979</u> ,24, 222-227.
3. 1,2-Ethane glycol); C	ediol (ethylene 2 ₂ H ₅ O ₂ ; [107-21-1]	
VARIABLES:	1	PREPARED BY:
P/kPa =	= 298.15 = 101.325 action = 0-1.0	W. Hayduk
EXPERIMENTAL VALU	ES:	
	, , , , , , , , , , , , , , , , , , ,	, 
Co	oncentration of Solvent	Ethene Solubility
<i>t/</i> C <i>T/</i> K	z, Volume z, Mole Fraction ¹ Fraction ²	Mole Fraction Ostwald Coefficient Ethene, z L/cm ³ gas(cm ³ solvent) ⁻¹
mixing. ² Mole fractic	on is shown on a gas-free	0.00834 2.23 0.00611 1.82 0.00570 1.72 0.00456 1.48 0.00384 1.31 0.00334 1.17 0.00151 0.604 0.00106 0.450 0.000715 0.312 of two liquid components before e basis. pusly given (in reference 1).
	AUXILIARY	INFORMATION
METHOD / APPARATUS	PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The apparatus flow of deaus into a glass by means of a pump. The mi prepared volu ated and a a density mea lift device v ously adjust: at constant p storage burge and gas consu- to calculate paper also in densities and as well as effective storage burge	APROCEDURE: s utilized a continuous rated solvent injected absorption spiral tube a calibrated syringe ixed solvent was umetrically then deaer- sample analyzed by asurement. A mercury was used for continu- ing the residual volume pressure in a gas tte. Solvent injection umption rates were used solubilities. This ncludes solution d refractive indices thene molecular s in the solutions.	SOURCE AND PURITY OF MATERIALS: 1. Ethene was CP grade from Matheson with minimum purity of 99.5 mole %. Molar volume used at 298.15 K and 101.325 kPa was 24,326 cm ³ /mole. 2. 1-Butanol was from Fisher; purity 99.0 mole %. 3. 1,2-Ethanediol was from Fisher; purity 99.8 mole %. ESTIMATED ERROR: $T/K = \pm 0.05$ $\delta P/P = \pm 0.01$ $\delta z_3 = \pm 0.001$ $\delta x_1/x_1 = \pm 0.02$ REFERENCES: 1. Sahgal, A.; La, H.M.; Hayduk, W.
		Can. J. Chem. Eng. <u>1978</u> , 56, 354.

COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

2. Alkanols, pressures greater than 0.2 MPa (2 atm)

EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5

November, 1993

#### CRITICAL EVALUATION:

#### Critical Evaluation of Ethene Solubilities in Alkanol Solvents for

## Pressures greater than 0.2 MPa (2 atm)

Four groups of researchers (1-4) reported solubilities of ethene in methanol, ethanol, 1-propanol and 1-octanol for temperatures ranging from 228.15 K to 498.15 K and pressures ranging from 0.10 MPa to 10.9 MPa. No data are available for the numerous other alkanols and alcohols.

The data of Konobeev and Lyapin (1) for three of the alkanols are listed for <u>total</u> pressures of their experiments; hence, it was necessary to use the solvent vapor pressure to estimate the corresponding ethene partial pressure. Further, these data are entirely self-consistent so that the effect of both temperature and pressure can be expressed by a simple equation of the form:

$$\log x_p = A/(T/K) + B \log (p/MPa) - C$$
 (1)

The above equation is useful over small temperature ranges when  $\log x_p$  is proportional to the inverse of absolute temperature, and when Henry's law is obeyed or therefore, when  $\log x_p$  is proportional to  $\log p$  with the constant, B, being approximately equal to one.

Ethene solubilities in the individual solvents are discussed in detail below:

## Methanol; CH4O; [67-56-1]

Konobeev and Lyapin (1) reported ethene solubilities for a range of pressures in methanol at temperatures of 293.15 K, 313.15 K and 333.15 K, and Shenderei et al. (2) reported solubilities at low temperatures, 248.15 K, 238.15 K and 228.05 K. Both of these sets of data obey Henry's law for mole fraction solubilities of less than 0.08. The data of Shenderei et al. are approximately consistent with low pressure data (at 0.1013 MPa) and are classified as tentative. On the other hand, when extrapolated to a pressure of 0.1013 MPa, the data of Konobeev and Lyapin fall below those of other workers by about 16%. With this caution concerning the data of Konobeev and Lyapin, these data are also classified as tentative.

The data of Konobeev and Lyapin are described by the following equation up to an ethene partial pressure of 2 MPa with an average deviation from the data of 2.1% and a maximum deviation of 8.0%:

$$\log x_p = 538.17/(T/K) - 3.2071 + 1.026 \log (p/MPa)$$

The data of Shenderei et al. are described by the following equation with average, and maximum deviations, of 3.0%, and 8.9%, respectively, and to a maximum pressure of 0.6 MPa:

$$\log x_{p} = 810.59/(T/K) - 4.2434 + 1.032 \log (p/MPa)$$
(3)

The temperature effects expressed in the above two equations are sufficiently different so that a single, simple equation cannot successfully describe the data from both sources. Nor should the equations be used outside the temperature and pressure ranges for which they were developed. Figure 1 shows the experimental data and the equations discussed above.

#### Ethanol; C₂H₆O; [64-17-5]

Ellis et al. (3) reported solubilities of ethene in ethanol at 348.15 K (75°C) and for gas partial pressures from 1.46 MPa to 10.9 MPa. When

(2)

COMPONENTS:	EVALUATOR:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Walter Hayduk
	Department of Chemical Engineering
2. Alkanols, pressures greater	University of Ottawa
than 0.2 MPa (2 atm)	Ottawa, ON
	Canada K1N 6N5
1	November, 1993

CRITICAL EVALUATION:

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the data were plotted on log-log coordinates, the relationship between mole fraction solubility and ethene partial pressure was found to be consistent and linear up to a pressure of 7 MPa. For this linear subset of data, the equation of the line best representing the data is:

$$\log x_{\rm p} = 1.0094 \log (p/MPa) - 1.5067$$
 (4)

In the above equation p represents the ethene partial pressure in MPa. This equation represents the reduced data (4 points) with an average deviation of 1.8%, and a maximum deviation of 3.0%.

The data of Ellis et al. (3) are classified as tentative.

#### 1-Propanol; C₃H₈O; [71-23-8]

Two groups of researchers have reported solubilities of ethene in 1propanol at high pressures; these are Konobeev and Lyapin (1) for the temperatures 293.15 K, 313.15 K and 333.15 K, and Pryanikova et al. (4) for temperatures from 373.15 K to 498.15 K. The latter researchers reported their results only in graphical form. The results of the former researchers will be discussed first.

The data of Konobeev and Lyapin cover a pressure range from 0.29 MPa to 3.26 MPa. The conventional temperature dependence for the solubility is observed, and at the same time, the relatively simple dependence for varying gas partial pressures is also observed.

These solubility data for 1-propanol are represented by the following equation:

 $\log x_p = 487.93/(T/K) + 1.051 \log (p/MPa) - 2.8356$ 

(5)

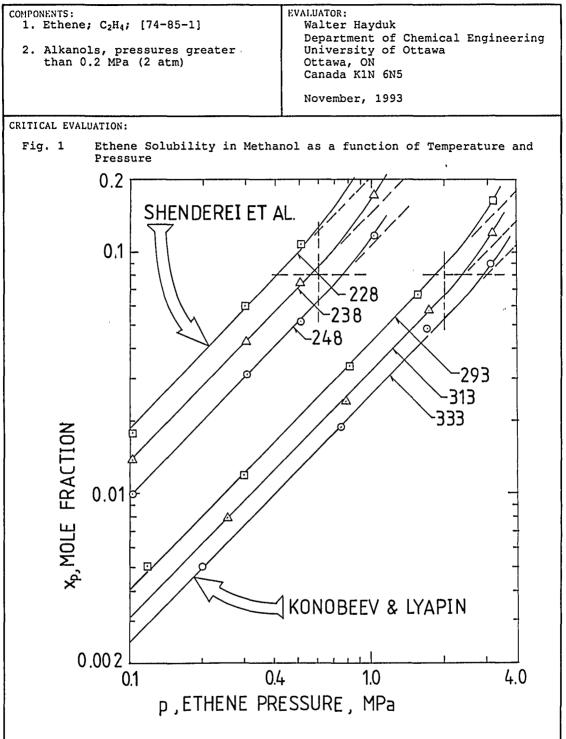
Equation (5) represents the solubility data with an average deviation of 3.1% and a maximum deviation of 10.0%. It is cautioned, however, that while the equation and data are self-consistent, when the equation is extrapolated to 0.1013 MPa pressure, a value much lower (about 25%) than that actually measured at that lower pressure is obtained. Hence, extrapolation beyond the indicated temperatures and pressures is liable to produce large errors.

The graphical, high temperature, high pressure results of Pryanikova et al. (4) were enlarged and readings obtained from the enlargement. Hence, these results are not equivalent to the data formerly discussed. However, when the results of the two research groups are compared directly it is found that the solubilities at 373.15 K of Pryanikova et al. correspond approximately, and even exceed in magnitude the results of Konobeev and Lyapin at 333.15 K, a most unlikely event. The mole fraction solubilities are expected to <u>decrease</u> with an increase in temperature. It is considered, therefore, that the results of Pryanikova et al. are somewhat too high and/or those of Konobeev and Lyapin are somewhat too low. It is not possible to unequivocally indicate which data are the more reliable although the latter data appear self-consistent and numerical values are reported.

Both sets of results are classified as tentative.

### 1-Octanol; C8H18O; [111-87-5]

Only the data of Konobeev and Lyapin (1) are available for solubilities at high pressure in 1-octanol and these are for the temperatures 293.15 K, 313.15 K and 333.15 K and for a pressure range from 0.28 MPa to 3.24 MPa. As for the previous solvent, 1-propanol, the temperature and



pressure dependence for these data are well represented by the following equation:

log x_p = 489.62/(T/K) + 1.002 log (p/MPa) - 2.6590

The above equation represents the solubility data with an average deviation of 3.0% and a maximum deviation of the 12 data points of 6.1%. It is cautioned for this solvent also, that while the equation and data are self-consistent, when the equation is extrapolated to 0.1013 MPa pressure, a value much lower (about 33%) than that actually measured at that lower pressure is obtained. Hence, extrapolation beyond the indicated temperature and pressure ranges is liable to produce large errors.

(6)

COMPONENTS: 1. Ethene; C ₂ H ₄ ; [74-85-1] 2. Alkanols, pressures greater	EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa
than 0.2 MPa (2 atm)	Ottawa, ON Canada K1N 6N5

# November, 1993

# CRITICAL EVALUATION:

The data of Konobeev and Lyapin for 1-octanol solvent are classified as tentative.

### References

- 1. Konobeev, B.I.; Lyapin, V.V. Khim. Prom. 1967, 43, 114-6.
- Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P. Russian J. Appl. Chem. <u>1962</u>, 35, 669-672. (Zhur. Prikl. Khim. <u>1962</u>, 690-693).
- 3. Ellis, S.R.M.; Valteris, R.L.; Harris, G.J. Chem. Eng. Prog. Symp. Ser., <u>1968</u>, 64, 16-21.
- Pryanikova, R.O.; Efremova, G.D.; Malikov, D.A.; Zagorets, P.A.; Shostenko, A.G.; Dodonov, A.M. Tr. Mosk. Khim. Theknol. Inst. <u>1973</u>, 75, 78-80.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Ethene; C₂H₄; [74-85-1]</pre>	Konobeev, B.I.; Lyapin, V.V.
2. Methanol; CH ₃ OH; [67-56-1]	Khim. Prom. <u>1967</u> , 43,114-6.
VARIABLES: T/K = 293.15 - 333.15	PREPARED BY:
₽/M₽a =-0.13 - 3.22	C. L. Young
EXPERIMENTAL VALUES:	
<i>T/K P/</i> 10 ⁵ Pa	Mole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$
293.15 1.317 3.080 8.197 15.71	0.005 0.012 0.034 0.067
32.12 313.15 8.248 17.83 32.22	0.165 0.008 0.024 0.057 0.120
333.15 2.888 8.288 17.93 32.22	0.005 0.019 0.048 0.089
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Static equilibrium cell fitted with magnetic stirrer. Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent.
by gas chromatography. Details in source.	2. No details given.
	ESTIMATED ERROR:
	$\delta T/K = \frac{+}{0.1}; \ \delta P = \frac{+}{0.5} \delta x_{C_2 H_4} = \frac{+}{0.002}$
	$\delta T/K = \pm 0.1;  \delta P = \pm 0.5 \ \delta x_{C_2 H_4} = \pm 0.002$ (estimated by compiler)
	$\delta T/K = \pm 0.1;  \delta P = \pm 0.5 \ \delta x_{C_2 H_4} = \pm 0.002$ (estimated by compiler)

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COMPONENTS:					ÆASUREMENTS:	
1. Ethene	; C ₂ H ₄ ; [7	4-85-1]		Shender	ei, E.R.; Zel'ven	skii,
2. Methan	ol; CH ₄ O:	[67-56-1]		Ya.D.;	Ivanovskii, F.P.	
				Russian	J. Appl. Chem. <u>196</u>	<u>2</u> , ³⁵ ,
				669-672	. ( Zhur. Prikl. Khi	m.,690-693.)
VARIABLES:				PREPARED I	BY:	·····
T/K = 22					W. Hayduk	4
		(1-18 atm)				
EXPERIMENTAL T ¹ /K	VALUES: t/C	Total P <i>P</i> /Atm		re MPa	Solubil Mole fraction,	$\frac{ity^2}{x_1} s / \text{cm}^3(g)^{-1}$
248.15	-25.0	1 3 5 10 12 15 18	0. 0. 1. 1.	1013 3040 5066 013 216 520 824	0.0100 0.0311 0.0520 0.1181 0.1552 0.2163 0.3103	7.74 22.29 38.23 92.81 127.85 192.11 313.10
238.15	-35.0	1 3 5 10 12 15	0. 0. 1. 1.	1013 3040 5066 013 216 520	0.0138 0.0430 0.0751 0.1750 0.2265 0.3631	9.75 31.32 56.51 147.84 203.51 397.19
228.05	-	1 3 5 10 12	0. 0. 1.	1013 3040 5066 013 216	0.0177 0.0600 0.1100 0.3051 0.5700	10.39 44.48 86.14 305.87 920.11
'Calculat	ed by comp	iler.				
² Solubili	ty, s, exp	ressed as cm	³ eth	ene at NI	PP per g of solven	t.
101.3 kP	a using a	low pressure	appa	ratus are	s paper for a pres e up to 9% higher low pressure data	than
		AUX	ILIARY	INFORMATIC	)N	
METHOD /APPARA	ATUS/PROCEDUR	Æ:		SOURCE AN	D PURITY OF MATERIALS	•
with a ma measured Samples o stripping bilities pressures Henry's o	gnetic sti with a Bou of liquid a out ethen were measu below atm	red at sever ospheric and s determined	- al	by tic cup wer was der 2. Dis Act ESTIMATED $\delta \pi_1$ (I REFERENCE	s regenerated at 6 hsed, and analyzed stilled. cual purities not $P_{x_1} = \pm 2$ Estimated by compi	<pre>mplex forma- essure in mpurities The ethylene 0°C, con- by GC. given. ler)</pre>
				Ya	enderei, E.R.; Zel .D.; Ivanovskii, F <i>m. Prom.</i> <u>1960</u> , <i>5</i> , 3	·.P.

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COMPONENTS: 1. Ethene; C ₂ H; [74-85-1]	ORIGINAL MEASUREMENTS: Ellis, S.R.M.; Valteris, R.L.;
2. Ethanol; $C_{2}H_{6}O;$ [64-17-5]	Harris, G.J.
	Chem. Eng. Prog. Symp. Ser.,
	<u>1968</u> , <i>64</i> , 16-21.
VARIABLES: T/K = 348.15	PREPARED BY:
P/MPa = 1.5 - 10.9 (14-108 atm)	W. Hayduk
EXPERIMENTAL VALUES:	·
P/atm Partial pressure ¹	Mole fraction ethene
p/atm p/MPa	in liquid, $x_1$ in vapor, $y_1$
15.1 14.4 1.46	0.045 0.956
27.2 26.2 2.65 40.1 38.9 3.94	0.084 0.962 0.128 0.970
40.1 38.9 3.94 62.9 61.2 6.20	0.192 0.973
88.1 85.0 8.61 106.5 99.8 10.1	0.297 0.965 0.373 0.937
119.7 107.8 10.9	0.458 0.901
	·
AUXILIAR	Y INFORMATION
METHOD/APPARATUS/PROCEDURE: A static method with a 500 cm stainless steel vessel equipped with a plunger, perforated-cup stirrer was used. The perforated cup was attached to a soft iron rod which was raised up by means of an electromagnet, and dropped downward under its own weight. Ethylene was displaced from a reservoir by mer- cury using a volumetric piston pump to the desired pressure. After equilibration, samples of gas and liquid were withdrawn for analysis. During the sampling process, an equivalent volume of mercury was allowed to flow from the sample bomb back to the equilibration vessel. The liquid portion of the samples was condensed at atmospher- ic pressure using dry-ice and acetone whereas the gas portion was aspirated volumetrically over water. Analysis was by gas chromatography.	ESTIMATED ERROR: $ \begin{array}{l} \delta x / x &= \pm 0.03  T/K = \pm 2 \\ 1 & 1 \\ \delta P/P = \pm 0.01 \end{array} $ REFERENCES:

COMPONENTS:		•		ORIGINAL N	<b>EASUREMENTS</b>	:	
	ne; $C_2 H_4$ ; opanol; $C_3$	[74-85-1] H ₈ 0; [71-23-8]		Maliko	ov, D.A.;	.; Efremova, G.D Zagorets, P.A.; ; Dodonov, A.M.	• 7
				<i>Tr. Mo.</i> 78-80		ueknol. Inst. <u>1973</u> , 1	75 ,
VARIABLES:	<i>π</i> / κ =	448.15 - 498.1	5	PREPARED	BY:		
	-	1.19 - 4.98	5		W. Ha	yduk	
EXPERIMENTAL	. VALUES:						
		Ethene Partial	C	ompositio	n	² Henry's Constant	+-
E	Pressure P/atm	Pressure P ₁ /MPa P	Mo	le Fract:	ion	H/MPa (mol fractio	onγ'
498.15	65.2	4.32	0.	85	0.15	28.8	
(225 C)	52.5	2.90	0.	90	0.10	(0.00352)	
	39.5	1.44	0.		0.05		
473.15 (200 C)		4.98 3.73	0. 0.		0.20 0.15	24.8 (0.00408)	
(200 C)	39.3	2.46	Ο.	90	0.10	(0:00400)	
	28.0	1.23	0.	95	0.05		
448.15 (175 C)		4.83 3.59	0. 0.		0.20 0.15	23.9 (0.00424)	
(175 C)	43.7 32.4	2.39	0.		0.15	(0.00424)	
	21.0	1.19	0.	06	0.05		
pressure read fro ² The eth	raphical r e (P) as a om an enla nene parti	function of m rged graph by al pressure ()	esentiole f the c $p_1$ ) wa	ed in th: raction p ompiler. s estimat	is paper i propanol ( ted using	n the form of to $x_3$ ). Values were Raoult's law, and	e đ
pressure read fro ² The eth the Henr	raphical r e (P) as a om an enla nene parti cy's law c ne partial	function of m rged graph by al pressure (j onstant (H) as	esent nole f the c $p_1$ ) wa well	ed in the raction p ompiler. s estimates as the p	is paper i propanol ( ted using nole fract	$x_3$ ). Values were	e d or
pressure read fro ² The eth the Henr an ether	raphical r e (P) as a om an enla nene parti cy's law c ne partial	function of m rged graph by al pressure ( j onstant (H) as pressure of 0	resent the f the $c_p_1$ ) wa well .1013	ed in the raction p ompiler. s estimates as the p	is paper i propanol ( ted using mole fract $x_1$ ) were	$x_3$ ). Values were Raoult's law, and ion solubility for calculated by the	e d or
pressure read fro ² The eth the Henr an ether compiler	raphical r e (P) as a om an enla nene parti cy's law c ne partial	function of m rged graph by al pressure ( ; onstant (H) as pressure of 0	resent the f the $c_p_1$ ) wa well .1013	ed in th: raction p ompiler. s estimat as the p 25 MPa ( INFORMATIO	is paper i propanol ( ted using mole fract $x_1$ ) were	<pre>x₃). Values were Raoult's law, and ion solubility for calculated by the continued</pre>	e d or
pressure read fro ² The eth the Henr an ether compiler METHOD/APPA The appa describe equilibr lary tuk mixer wh by means driven m tube is position and liqu pressure	raphical r e (P) as a om an enla nene parti cy's law c ne partial c. RATUS/PROCEN aratus and ed in refe ration dev be contain hich is mo s of an ex sealed in sealed in a and conn id chargi e gauges,	function of m rged graph by al pressure ( ) onstant (H) as pressure of 0 AUXI DURE: procedure are rence 1. The ice is a capil ing an interna ved up and dow ternal, motor- he capillary a vertical ected to a gas ng system, as well as a	resent hole f the c p ₁ ) wa well 0.1013 ILLIARY	ed in th: raction p ompiler. s estimat as the p 25 MPa ( INFORMATION SOURCE AN	is paper i propanol ( ted using nole fract $x_1$ ) were N D PURITY OF es and pur	<pre>x₃). Values were Raoult's law, and ion solubility for calculated by the continued</pre> MATERIALS:	e d or
pressure read fro ² The eth the Henr an ether compiler METHOD/APPA The appa describe equilibr lary tuk mixer wh by means driven n tube is positior and liqu pressure volume n	raphical r e (P) as a om an enla nene partial cy's law c ne partial c. RATUS/PROCEI aratus and ed in refe ration dev be contain nich is mo s of an ex magnet. T sealed in n and connu id chargi e gauges, regulator	function of m rged graph by al pressure ( ; onstant (H) as pressure of 0 AUX: DURE: procedure are rence 1. The ice is a capil ing an interna ved up and dow ternal, motor- he capillary a vertical ected to a gas ng system,	resent nole f the c p ₁ ) was well . 1013 ILLIARY	ed in th: raction ; ompiler. s estima: as the r 25 MPa ( INFORMATIO SOURCE AN SOURCE AN Source speci:	is paper i propanol ( ted using mole fract $x_1$ ) were N D PURITY OF es and pur fied.	<pre>x₃). Values were Raoult's law, and ion solubility for calculated by the continued MATERIALS: ities not</pre>	e d or
pressure read fro ² The eth the Henr an ether compiler METHOD/APPA The appa describe equilibr lary tuk mixer wh by means driven m tube is position and liqu pressure volume the Molar vo are also	raphical r e (P) as a om an enla cy's law c ne partial c' RATUS/PROCEN aratus and ed in refe ration dev be contain nich is mo s of an ex magnet. T sealed in n and connu id chargi e gauges, regulator t pressure e volume of o given as	function of m rged graph by al pressure ( ) onstant (H) as pressure of 0 AUX: DURE: procedure are rence 1. The ice is a capil ing an interna ved up and dow ternal, motor- he capillary a vertical ected to a gas ng system, as well as a to maintain a a and to deter- f gas charged. liquid solution	resent nole f the c p ₁ ) was well .1013 ILLIARY 	ed in th: raction j ompiler. s estimat as the r 25 MPa ( INFORMATIO SOURCE AN SOURCE AN SOURCE AN Source speci: T δx1/2	is paper i propanol ( ted using mole fract $x_1$ ) were DN D PURITY OF es and pur fied. D ERROR: /K = $\pm$ 1.0 $x_1 = \pm 3$ .	<pre>x₃). Values were Raoult's law, and ion solubility for calculated by the continued MATERIALS: ities not</pre>	e d or
pressure read fro ² The eth the Henr an ether compiler METHOD/APPA The appa describe equilibr lary tuk mixer wh by means driven m tube is position and liqu pressure volume r constant mine the Molar vo are also solution	raphical r e (P) as a om an enla cy's law c ne partial c' RATUS/PROCEN aratus and ed in refe ration dev be contain nich is mo s of an ex magnet. T sealed in n and connu id chargi e gauges, regulator t pressure e volume of o given as	function of m rged graph by al pressure ( ) onstant (H) as pressure of 0 AUXI DURE: procedure are rence 1. The ice is a capil ing an interna ved up and dow ternal, motor- he capillary a vertical ected to a gas ng system, as well as a to maintain a and to deter- f gas charged. liquid solutio a function of ions, tempera-	resent nole f the c p ₁ ) was well .1013 ILLIARY 	ed in th: raction ; ompiler. s estima: as the r 25 MPa ( INFORMATIO SOURCE AN SOURCE AN	is paper i propanol ( ted using mole fract $x_1$ ) were DN D PURITY OF es and pur fied. D ERROR: $/K = \pm 1.0$ $x_1 = \pm 3$ . 2S: itchevskii	<pre>x₃). Values were Raoult's law, and ion solubility for calculated by the continued MATERIALS: ities not</pre>	e d or e

219 COMPONENTS: ORIGINAL MEASUREMENTS: Pryanikova, R.O.; Efremova, G.D.; Malikov, D.A.; Zagorets, P.A.; 1. Ethene; C, H, ; [74-85-1] Shostenko, A.G.; Dodonov, A.M. 2. 1-Propanol; C₃H₈O; [71-23-8] Tr. Mosk. Khim. Theknol. Inst. 1973, 75, 78-80. VARIABLES: PREPARED BY: T/K = 373.15 - 423.15W. Hayduk  $p_1$ /MPa = 1.08 - 4.68 EXPERIMENTAL VALUES: ....continued ² Henry's Constant H/MPa(mol fraction)⁻¹ ¹ Total ² Ethene Partial Composition Mole Fraction Pressure Pressure  $p_1/MPa$ T/K P/atm Propanol,  $x_3$  Ethene,  $x_1$ (x 1) 0.20 50.5 4.68 0.80 23.4 423.15 0.15 (150 C) 39.1 3.51 0.85 (0.00434)0.10 27.7 2.32 0.90 1.15 0.95 0.05 16.5 4.37 0.20 373.15 43.0 0.80 21.4 32.6 (100 C) 0.15 (0.00473)3.21 0.85 2.14 0.90 0.10 22.1 1.08 0.95 0.05 11.7 ¹Only graphical results were presented in this paper in the form of total pressure (P) as a function of mole fraction propanol  $(x_3)$ . Values were read from an enlarged graph by the compiler. ²The ethene partial pressure  $(p_1)$  was estimated using Raoult's law, and the Henry's law constant (H) as well as the mole fraction solubility for an ethene partial pressure of 0.101325 MPa  $(x_1)$  were calculated by the compiler. AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS: The apparatus and procedure are Sources and purities not specified. described in reference 1. The equilibration device is a capillary tube containing an internal mixer which is moved up and down by means of an external, motor-The capillary driven magnet. tube is sealed in a vertical position and connected to a gas and liquid charging system, pressure gauges, as well as a volume regulator to maintain a **ESTIMATED ERROR:** constant pressure and to determine the volume of gas charged.  $T/K = \pm 1.0$  $\delta x_1/x_1 = \pm 3.0$ % (compiler) Molar volumes of liquid solutions are also given as a function of solution compositions, tempera-**REFERENCES:** tures and pressures. 1. Kritchevskii, I.R.; Efremova, G.D. Zhur. Fiz. Chim. 1956, 30, 1877.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Konobeev, B.I.; Lyapin, V.V.
2. 1-Propanol; C ₃ H ₇ OH; [71-23-8]	Khim. Prom. <u>1967</u> ,43,114-6.
VARIABLES: T/K = 293.15 - 333.15	PREPARED BY:
P/MPa = 0.29 - 3.26	C. L. Young
EVERDINGNEAT UNITED.	
EXPERIMENTAL VALUES:	
<i>T/K P/</i> 10 ⁵ Pa	Mole fraction of ethene in liquid ^x C ₂ H ₄
293.15 3.090	0.019
8.167	0.055
15.81 32.32	0.109 0.237
313.15 2.888 8.288	0.012 0.042
17.93	0.094
32.63 333.15 2.888	0.180 0.011
8.309	0.034
17.93 32.63	0.082 0.147
AUXILIAR	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Static equilibrium cell fitted with magnetic stirrer. Samples analysed by gas chromatography. Details in	1. Purity better than 99.6 mole per cent.
source.	2. No details given.
	, , , , , , , , , , , , , , , , , , ,
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \ \delta P = \pm 0.5\%; \ \delta x_{C_2H_4} = \pm 0.002$
	(estimated by compiler)
	REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:
L. Ethene; $C_2H_4$	; [74-85-1]	Konobeev, B.I.; Lyapin, V.V.
2. 1-Octanol; C	2 ₈ H ₁₇ OH; [111-87-5]	Khim. Prom. <u>1967</u> , 43, 114-6.
/ARIABLES: T/K = 2	293.15 - 333.15	PREPARED BY:
-	).28 - 3.24	C. L. Young
XPERIMENTAL VALUES	2	
<i>T</i> /K	P/10 ⁵ ₽a	Mole fraction of ethene in liquid
		^x C ₂ H ₄
293.15	3.131 8.288 13.88	0.034 0.083 0.141
313.15	32.22 2.837 8.258 17.73	0.344 0.022 0.066 0.138
333.15	32.42 2.857 8.278 17.83	0.253 0.018 0.052 0.121
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PF	····	INFORMATION SOURCE AND PURITY OF MATERIALS:
magnetic stirre	····	
Static equilibr: magnetic stirre by gas chromatog	ROCEDURE: ium cell fitted with r. Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent.
Static equilibr: magnetic stirred by gas chromatog	ROCEDURE: ium cell fitted with r. Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given. ESTIMATED ERROR:
Static equilibr: magnetic stirred by gas chromatog	ROCEDURE: ium cell fitted with r. Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given. ESTIMATED ERROR: $\delta T/K=\pm 0.1; \ \delta P=\pm 0.5\%; \ \delta x_{C_2H_{4}}=\pm 0.002$ (estimated by compiler)
Static equilibr: magnetic stirre by gas chromatog	ROCEDURE: ium cell fitted with r. Samples analysed	SOURCE AND PURITY OF MATERIALS: 1. Purity better than 99.6 mole per cent. 2. No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta P = \pm 0.5\%; \ \delta x_{C_2H_4} = \pm 0.002$

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COMPONENTS:

1. Ethene; C₂H₄; [74-85-1]

2. Organic halides

EVALUATOR:

Peter G.T. Fogg School of Applied Chemistry University of North London Holloway Road, London, N7 8DB, U.K.

November, 1993

## CRITICAL EVALUATION:

## <u>Critical evaluation of the solubility of ethene at a partial pressure not</u>

greater than 101.3 kPa in organic halides

In general mole fraction solubility in organic halides is lower than in alkanes but higher than in solvents containing oxygen or nitrogen. Consistent measurements in several organic halides have been obtained by more than one group. This enables a more reliable characterisation of the solubility pattern in organic halides than in oxygen or nitrogen compounds.

### Tetrachloromethane; CCl,; [56-23-5]

Solubility in tetrachloromethane at a partial pressure of 101.3 kPa has been reported by Horiuti (1), Narasimhan and Nageshwar (2), Sahgal et al.(3), Leites and Ivanovskii (4), Hannaert et al.(5), Brückl and Kim (6), and by Jadot (7). From the information available the single measurement by Narasimhan appears to be inconsistent with other measurements and must be ignored. The 19 data points from other sources can be fitted to the equation

ln  $x_1 = -20.598 + 1773.8/(T/K) + 1.8277 \ln(T/K)$ where  $x_1$  is the mole fraction solubility at  $p_1 = 1.013$  kPa standard deviation in values of  $x_1 = 3.1 \times 10^{-4}$ This equation is recommended for the temperature range 253-323 K.

# Trichloromethane; CHCl; [67-66-3]

Solubility in trichloromethane was measured by Leites and Ivanovskii (4) at 243.15 K and by Camacho Rubio et al.(8) at 293-308 K. In each case data was presented in graphical form only. Data points from the two graphs fit the equation

the equation  $\ln x_1 = -9.4327 + 1525.5/(T/K)$ where  $x_1$  is the mole fraction solubility at  $p_1 = 1.013$  kPa standard deviation in values of  $x_1 = 3.1 \times 10^{-4}$ This equation is based on 5 data points and corresponds to a solubility curve which differs from the pattern of curves shown by most of the other halocompounds for which corresponding data is available (see fig 1). It should be accepted on a tentative basis for the temperature range 253-323 K pending further measurements on the system.

#### Chloroethene; C,H,Cl; [75-01-4]

Solubility in chloroethene was measured by Hannaert et al.(5) over the temperature range of 213.15-243.15 K. Results were published in the form of an equation for Henry's constant over this temperature range. Mole fraction solubility can be assumed to vary linearly with pressure to at least 101.3 kPa. Extrapolation of the mole fraction solubility to 298.15 K gives a value of 0.0183, close to the solubility in octane and appreciably greater than that in tetrachloro and trichloromethane. There is no reason to doubt Hannaert's measurements but they must be accepted on a tentative basis until they are confirmed by other measurements.

## 1,2-Dichloroethane; C2HCl2; [107-06-2]

Hannaert et al.(5) also measured solubility in 1,2-dichloroethane in the temperature range 273.15-313.15 K. Choudhari and Doraiswami (9) measured solubility in the range 280-300.5 K. There is poor agreement between the two sets of measurements. The mole fraction solubility at 292.5 K from Hannaert's data is 0.00934 compared with Choudhari's value of 0.00804.

COMPONENTS:	EVALUATOR:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Peter G.T. Fogg School of Applied Chemistry
2. Organic halides	University of North London Holloway Road, London, N7 8DB, U.K
	November, 1993
CRITICAL EVALUATION:	
The evaluator cannot determine which measurements. Data from the two sour ln $x_1 = -279.08 + 12799/(T/K) + 4$ where $x_1$ is the mole fraction solubil standard deviation in values of $x_1$	ces can be fitted to the equation 0.604 ln x ₁ ity at p, = 1.013 kPa
The variation in solubility with chan equation is inconsistent with the var halocompounds (see fig.1). This equa temperature range 273-313 K. Further system.	tion should not be used outside the
1,1,2,2-Tetrachloroethane; C ₂ H ₂ Cl ₄ ; [7	9 <u>-34-51</u>
partial pressure range to 101.3 kPa a 298.15 K. Mole fraction solubilities Eit the equation	
$\ln x_1 = -11.562 + 1977.3/(T/K)$ where $x_1$ is the mole fraction solubil. standard deviation in values of x	ity at $p_1 = 1.013$ kPa $r_1 = 5.2 \times 10^{-4}$
nole fraction solubility with change	
Chlorobenzene; C,H ₅ Cl; [108-90-7] Bromobenzene; C,H ₅ Br; [108-86-1]	
Solubility in chlorobenzene at a part measured by Lopez <i>et al.</i> (11), Horiuti Measurements cover the temperature ra consistent with one another. Data ca	(1), and by Sahgal et al.(3) nge 263.15 to 363.15 K and are
$\ln x_1 = -26.1311 + 1950.0/(T/K) +$ where $x_1$ is the mole fraction solubil. standard deviation in values of x	ity at $p_1 = 1.013$ kPa $r_2 = 6.7 \times 10^{-5}$
This equation is recommended by the e 263.15 to 363.15 K.	valuator for the temperature range
Solubility in bromobenzene was also m temperature range 263.15 to 303.15 K. partial pressure of 101.3 kPa may be $\ln x_1 = -25.783 + 1910.4/(T/K) + 12$ where $x_1$ is the mole fraction solubil. standard deviation in values of x	Mole fraction solubility at a fitted to the equation 2.5971 $ln(T/K)$ ity at $p_1 = 1.013$ kPa
This equation fits the experimental d by the authors. There is no reason t measurements but they should be accep confirmed by further measurements.	ata slightly better than the one give o doubt the validity of these

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COMPONENTS:

EVALUATOR:

1. Ethene; C₂H₄; [74-85-1]

2. Organic halides

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November, 1993

CRITICAL EVALUATION:

Chlorocyclohexane; C₆H₁₁Cl; [542-18-7] Bromocyclohexane; C₆H₁₁Br; [108-85-0]

Lopez et al.(12), measured the solubility in chlorocyclohexane and in bromocyclohexane in the temperature range 263.15 to 303.15 K. Mole fraction solubility in chlorocyclohexane is greater than in bromocyclohexane and also greater than in chlorobenzene. Mole fraction solubility in cyclohexylamine is similarly greater than that in benzenamine.

The evaluator has found that the data for solubility in chlorocyclohexane at a partial pressure of gas of 101.3 kPa fits the equation  $\ln x = -9.8501 + 1275 4/(T/K) + 0.2262 \ln(T/K)$ 

ln  $x_1 = -9.8501 + 1275.4/(T/K) + 0.2262 \ln(T/K)$ where  $x_1$  is the mole fraction solubility at  $p_1 = 1.013$  kPa standard deviation in values of  $x_1 = 1.0 \times 10^{-5}$ ; temp. range 263-303 K This equation gives better fit than the one given by the authors.

Data for bromocyclohexane may be fitted to the equation  $\ln x_1 = -28.775 + 2045.2/(T/K) + 3.0748 \ln(T/K)$ 

where  $x_1$  is the mole fraction solubility at  $p_1 = 1.013$  kPa standard deviation in values of  $x_1 = 2.2 \times 10^{-5}$ ; temp. range 263-303 K This equation gives better fit than the one given by the authors.

There is no reason to doubt the measurements of solubility in these two solvents and they can be accepted on a tentative basis until confirmed by other workers.

Mixed solvents

<u>Trichloromethane; CHCl₃; [ 67-66-3] + 2-propanone; C₃H₆O; [67-64-1] methylbenzene; C₇H₈; [108-88-3]</u>

Leites and Ivanovskii (4) measured solubility in mixtures of trichloromethane with 2-propanone and with methylbenzene at 243.15 K. No other data for these mixtures are available for comparison. The solubility in pure trichloromethane is consistent with measurements at higher temperatures. The value of the solubility in pure 2-propanone differs by about 8% from that calculated from Hannaert's data. Data for the mixture of trichloromethane and 2-propanone may be accepted on a tentative basis, bearing in mind the uncertainty in the data for pure 2-propanone. Leites and Ivanovskii also measured solubility in pure methylbenzene at 213.15, 223.15 and 243.15 K. The value at 243.15 K differs by about 6% from the value calculated from an equation published by Hannaert et al.(5). The solubility in mixtures of trichloromethane and methylbenzene may be accepted on a tentative basis.

Tetrachloromethane; CCl₄; [56-23-5] + heptane; C₇H₁₆; [142-82-5]

Leites and Ivanovskii measured solubility in mixtures of tetrachloromethane and heptane at 253.15 K. Their value for the solubility in pure tetrachloromethane at 253.15 K is consistent with data at higher temperatures from other workers. In addition their measurements of solubility in pure heptane from 213.15 to 253.15 K are consistent with measurements by other workers (3,7) at higher temperatures. The data for solubility in mixtures of tetrachloromethane and heptane may be accepted on a tentative basis. COMPONENTS:

1. Ethene; C₂H₄; [74-85-1]

2. Organic halides

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November, 1993

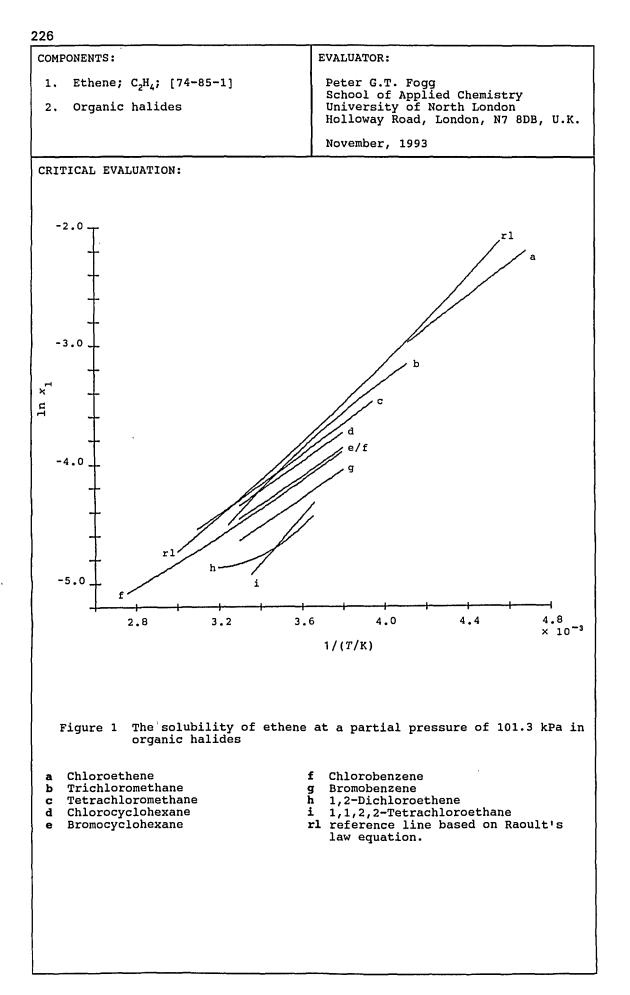
#### CRITICAL EVALUATION:

#### Tetrachloromethane; CCl; [56-23-5] + benzene; C,H; [71-43-2]

Narasimham & Nageshwar (2) measured solubility in mixtures of tetrachloromethane and benzene at 293.15 K. Mole fraction solubilities corrected to a partial pressure of 101.3 kPa vary linearly with mole fraction of benzene. There is some uncertainty concerning corrections for the partial pressure of solvent (see compilation sheet). The solubility in pure tetrachloromethane at a partial pressure of 101.3 kPa, as estimated by the compiler from data reported in the same paper, has been rejected by the evaluator in favour of measurements by other workers. The value of the solubility in pure benzene which they reported is about 4% greater than that reported by Horiuti (1).

#### <u>References</u>

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- Narasimhan, S.; Nageshwar, G.W. Chem. Petro-Chem. J. (India) <u>1979</u>, 10, 13-15.
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- Camacho Rubio, F.; Delgado Diaz, A.; Alvaro Alvarez, R. Revista Ing. Quim. (Spain) <u>1980</u>, 12, 83-87.
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- 12. Lopez, M.C.; Gallardo, M.A.; Urieta, J.S.; Gutierrez Losa, C. J. Chem. Eng. Data <u>1989</u>, 34, 198-200.



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COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	Horiuti, J.
	Sci. Pap. Inst. Phys. Chem. Res.
(2) Tetrachloromethane or carbon	(Jpn) <u>1931/32</u> , 17, 125 - 256.
tetrachloride; CCl ₄ ; [56-23-5]	
-	
VARIABLES: T/K: 273.15 - 313.15	PREPARED BY: M. E. Derrick
$p_1/kPa: 101.325 (1 atm)$	H. L. Clever
	,
EXPERIMENTAL VALUES:	
	sen Ostwald
$\frac{10^2 x_1}{\alpha/\text{cm}^3}$	$\frac{\text{icient}}{\text{TP})\text{cm}^{-3}\text{atm}^{-1}} \xrightarrow{\text{Coefficient}} \frac{L/\text{cm}^3\text{cm}^{-3}}{L/\text{cm}^{-3}}$
2/3.15 2.069 5.0	2/ 5.02/
278.15 1.910 4.6 283.15 1.779 4.2	
288.15 1.659 3.9	
293.15 1.549 3.6	
298.15 1.451 3.4	
303.15 1.360 3.1	64 3.511
308.15 1.282 2.9	
<u> </u>	
The mole fraction and Bunsen coefficipiler with the assumption the gas is	ent values were calculated by the com-
Smoothed Data: For use between 273.1	5 and 313.15 K.
$\ln x_{1} = -8.0980 + 11.$	5219/(T/100K)
	regression line is 2.62 x $10^{-5}$ .
T/K Mol	Fraction
1	$0^2 x_{1}$
	.065
	.780
	.658
	.549
	.450 .361
	.205
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas buret,	
a solvent reservoir, and an absorp-	ethanol into orthophosphoric
tion pipet. The volume of the pipet	acid. The gas was cooled, passed
is determined at various meniscus	through several wash solutions,
heights by weighing a quantity of	dried, and fractionated from
water. The meniscus height is read with a cathetometer.	liquid air several times. (2) Tetrachloromethane. Kahlbaum.
with a cathetometer.	Dried over P ₂ O ₅ and distilled.
The dry gas is introduced into the	Boiling point (760 mmHg) 76.74°C
degassed solvent. The gas and solvent	y,
are mixed with a magnetic stirrer	
until saturation. Care is taken to	
prevent solvent vapor from mixing	ESTIMATED ERROR:
with the solute gas in the gas buret.	$\delta T/K = 0.05$
The volume of gas is determined from the gas burgt readings the volume	$\delta x_{1}/x_{1} = 0.01$
the gas buret readings, the volume of solvent is determined from the	1. 1
meniscus height in the absorption	
pipet.	REFERENCES:
	1

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Narasimhan, S.; Nageshwar, G.W.
2. Tetrachloromethane; CC14;	Chem. Petro-Chem. J. (India)
[56-23-5]	1979, <i>10</i> , 13–15.
VARIABLES: T/K = 293.15	PREPARED BY: W. Hayduk
P/kPa = 101.325	
EXPERIMENTAL VALUES:	
Mole Fraction Ethe $t/C$ $T/K$ ${}^{1}P/kPa = 101.325 {}^{2}P_{I}/k$	ne for: Pa =101.325 $L/cm^3$ gas(cm ³ solvent) ⁻¹
20 293.15 0.01612 0	.01827 4.613
¹ Although not specifically stated in t mole fraction solubility is for a tot	he paper, it is assumed that the al pressure of 101.325 kPa.
² Calculated by compiler; a gas molar v at 293.15 K and 101.325 kPa for the c was assumed to apply for the calculat	alculation of $L$ , and Henry's law
It was confirmed by personal communic	•
measured at atmospheric pressure.	
	INFORMATION
	y
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The solvent was held in a jacketed burette. Constant temperature	1. Ethene prepared by catalytic dehydration of ethanol over
water was circulated through the jacket. Gas was bubbled through	activated alumina at 350-400°C and analyzed by chromatography.
the solvent until saturated. The	Purity not given.
dissolved gas content was deter- mined by an electrometric dead-	2. Tetrachloromethane was
stop titration technique which yielded the bromine number. The	distilled twice in a laboratory packed column.
electrometric titrator was based	packed column.
on a design given in reference l.	
	ESTIMATED ERROR:
	$\delta x_1/x_1 = \pm 3\%$ (Estimated by compiler)
· · ·	REFERENCES:
	1. Dubois, H.D.; Skoog, D.Á.
	Anal. Chem. <u>1948</u> , 20, 624.

	ORIGINAL	MEASUREMENTS:
C ₂ H ₄ ; [74-85-1]		al, A.; La, H.M.; Hayduk, W.
loromethane; CCI		J. Chem. Eng. 1978, 56,
5]	+	
	PREPARED	) BY:
		W. Hayduk
a = 101.325		
ALUES:		
	Mole Fraction	Ostwald Coefficient
Т /К	Ethene, x	$L/ \text{ cm}^3 \text{gas} (\text{cm}^3 \text{ solvent})^{-1}$
273.15	0.0208	5.02
		3.72
		2.74
525.15	0:0105	2.174
	AUXILIARY INFORMAT	ION
US/PROCEDURE:		ION AND PURITY OF MATERIALS:
	SOURCE A	AND PURITY OF MATERIALS:
paratus equipped age burette, a s	d with l. Espiral M	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole %
paratus equipped age burette, a s as absorption, a nal manometer ar	d with l. E spiral M a minia- m nd a	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity.
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paratus equipped age burette, a s as absorption, a nal manometer ar torage burette v colvent was injed rate into the a means of a syrin	d with l. E spiral M a minia- m was used. 2. T cted at J absorption p nge-pump	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity. etrachloromethane was from
paratus equipped age burette, a s as absorption, a nal manometer an torage burette v olvent was injec rate into the a means of a syrin gas was displace	d with l. E spiral M a minia- m nd a was used. 2. T cted at J absorption p nge-pump ed by	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity. etrachloromethane was from .T. Baker of 99.9 mole %
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paratus equipped age burette, a s as absorption, a nal manometer an torage burette v olvent was inject rate into the a means of a syrin gas was displace ing a mechanical ce for a mercury required to keep are constant. Ref	d with spiral a minia- md a was used. ted at absorption nge-pump ed by l eleva- bottle, p the eadings	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity. etrachloromethane was from .T. Baker of 99.9 mole % urity.
paratus equipped age burette, a s as absorption, a nal manometer an torage burette w olvent was inject rate into the a means of a syrin gas was displace ing a mechanical ce for a mercury required to keep the constant. Re ume of vapor-fre- and volume of sol	d with spiral M a minia- M a minia- M nd a was used. 2. T cted at J absorption p nge-pump ed by l eleva- bottle, p p the ESTIMAT cadings of compared boxtle, bottle, b	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity. etrachloromethane was from .T. Baker of 99.9 mole %
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paratus equipped age burette, a s as absorption, a nal manometer an torage burette v olvent was injec rate into the a means of a syrin gas was displace ing a mechanical e for a mercury required to keep the constant. Re ume of vapor-fre and volume of sol o achieve satura was calculated	d with spiral a minia- md a was used. cted at absorption nge-pump ed by l eleva- bottle, p the e gas lvent ation the . Constant SOURCE A M M 2. T J 2. T J SOURCE A M M SOURCE A M M SOURCE A M M SOURCE A M M M M M M M M M M M M M M M M M M M	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity. etrachloromethane was from .T. Baker of 99.9 mole % urity. ED ERROR: $1/x_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
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paratus equipped age burette, a s as absorption, a nal manometer an torage burette w olvent was inject rate into the a means of a syrin gas was displace ing a mechanical e for a mercury required to keep the constant. Re- ume of vapor-fre- ind volume of sol co achieve satura ned from which to was calculated to the constant of the constant of the constant the constant of the constant the constant of the constant of the constant of the constant of the constant of the constant of the constant of the constant of the constant of the constant of the constant	d with 1. E spiral M a minia- md a was used. 2. T cted at J absorption p nge-pump ed by 1 eleva- bottle, p the ESTIMAT ee gas lvent ation the REFEREN culated g the	AND PURITY OF MATERIALS: thene was CP grade from atheson, 99.5 mole % inimum purity. etrachloromethane was from .T. Baker of 99.9 mole % urity. ED ERROR: $1/x_1 = \pm 2\%$ $\delta T/K = \pm 0.05$
	loromethane; CC 5] K = 273-323 a = 101.325 ALUES: T/K 273.15 298.15 323.15	$2^{-1}$ Can. $5^{-1}$ $354^{-1}$ $K = 273 - 323$ PREPARED $a = 101.325$ PREPARED         ALUES:       Mole Fraction $T/K$ Ethene, $x_1$ 273.15       0.0208         298.15       0.0146

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2H_4$ ; [74-85-1]	Leites, I.L.; Ivanovskii, F.P.
2. Tetrachloromethane (carbon	Khim. Prom. <u>1962</u> , 9, 653-657.
tetrachloride); CCl ₄ ; [56-23-5]	
VARIABLES: $T/K = 253.15$ ,	PREPARED BY:
_R /kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	1
$t/C$ $T/K$ $1 \log_{10} (H/nmHg)$	² Henry's Constant, ² Mole Fraction H/atm (mole fraction) ⁻¹ Ethene, $x_1$
-20 253.15 4.391	32.37 0.0309
This result was part of a study for t two-component solvent solutions.	he behavior of solubilities in
¹ Only graphical results were available Henry's constant (H') was read from a	e in this paper; a value of log of n enlarged graph by the compiler.
² Henry's constant (H) and mole fracti- the compiler.	on solubility $(x_1)$ were calculated by
Che Compilei.	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
A metal cryostat was cooled with dry-ice and acetone and controlled	1. Ethene purity was stated to be 99.9%.
to a temperature to $\pm$ 0.05 K. The equilibrium cell was mounted	2. Tetrachloromethane was distilled
in the cryostat. The solvent was	and analyzed by chromatography.
purified by fractional distil- lation and analyzed by chromato-	Actual purity not given.
graphy. Details were not given.	
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.05$
	$\delta x_1 / x_1 = \pm 0.01 \text{ (Authors)}$
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_4$ ; [74-85-1]	Hannaert, H.; Haccuria, M.; Mathieu, M.P.
2. Tetrachloromethane; CCl ₄ ;	Ind. Chim. Belge <u>1967</u> , 32,
[56-23-5]	156-164.
VARIABLES: TAX DED 15 202 15	PREPARED BY:
T / K = 258.15 - 293.15	W. Hayduk
$p_1 / kPa = 101.3$	H.L. Clever
EXPERIMENTAL VALUES:	]
t/c T/K	¹ Mole Fraction Ethene, $x_1$
-15 258.15	0.0285
-10 263.15	0.0259
10 283.15 20 293.15	0.0184 0.0158
¹ Mole fraction solubility calculated pressure of 101.3 kPa using the equation $v = 1$ , for the applicable temperature	tion developed by the authors with
$\log (K\pi v) = 3.69 - (\Delta H/calma)$	$ol^{-1})/(2.3R(T/K))$
The authors' definitions are:	
$\Delta H = 2,530 \text{ cal mol}^{1}, \text{ E}$	nthalpy of dissolution
$K = y_1 / x_1 = \frac{\text{mole fract}}{\text{mole fract}}$	<u>ion gas in gas phase</u> ion gas in liquid phase
$\pi$ / atm = total pressure	
v = coefficient of fuga	acity
The function, $k\pi\nu/atm$ , is equivalent H _{1,2} /atm = $(f_1/atm)/x_1$ where $f_1$ is t	to a Henry's constant in the form
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The authors describe several	1. Ethene. Air Liquide.
methods used; the one used in this	Specified purity 99.9%
case is the least accurate. The apparatus is of glass and	2. Tetrachloromethane. Merck.
consists of a burette in which the	Vapor pressures at -15 °C and
gas is confined over mercury, two bulbs for the solvent, one	20 °C are 14 and 90 mm Hg. Purity not given.
above the other, a mercury	
manometer and a constant temper- ature bath. A measured volume of	
ature bath. A measured volume of solvent is degassed in the top	
bulb at ambient temperature and	ESTIMATED ERROR:
charged to the absorption bulb in the bath. Gas is charged to the	$\delta x_1 / x_1 = + 10 \text{ to } 15\%$
desired pressure. The quantity of	(authors)
gas added at constant pressure is measured. Agitation is manual.	
	REFERENCES:
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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Brückl, N.; Kim, J. I.
2. Tetrachloromethane (Carbon	Z. Phys. Chem. (Wiesbaden)
tetrachloride); CCl ₄ ; [56-23-5]	1 <u>981</u> , <i>126</i> , 133-150.
VARIABLES: $T/K = 298.2$	PREPARED BY:
P/kPa = 101.3	C. L. Young
-	
EXPERIMENTAL VALUES:	
ln H/atm Mole fraction of	ethene in liquid, $\pi$
	Concise in 114010 / "C ₂ H ₄
	مېر مېر د د د د د د د د د د د د د د د د د د د
4.23	0.01455
[†] at a partial pressure of 1 atmosp	pere, calculated by compiler.
assuming $x_{C_2H_4} = 1/H$ .	
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	, · · ·
	1.
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AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
	<ol> <li>Linde Co. sample, purity 99.8 volume per cent.</li> </ol>
	Volume per centr
Solubilities were determined by a	2. Uvasol or analytical grade.
volumetric method described as "the Ostwald method". No other details	
given.	
5	
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1;  \delta H = \pm 1.25$ %.
	REFERENCES :

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Jadot, R.
<pre>2. Tetrachloromethane; CCl₄; [56-23-5]</pre>	J. Chim. Phys. <u>1972</u> ,69,1036-40
VARIABLES: T/K = 298.15	PREPARED BY:
P/kPa = 101.3	C.L. Young
EXPERIMENTAL VALUES:	·
T/K Henry's Law Constant, H/atm	Mole fraction ⁺ $\#\Delta H\infty$ at partial pressure /cal mol ⁻¹ of 101.3 kPa, $x_{C_2H_4}$ (/J mol ⁻¹ )
298.15 67.55	0.01480 598 (2502)
+ Calculated by compiler assuming	ng $x_{C_2H_4} = 1/H.$
# Excess partial molar enthalpy	of solution at infinite dilution.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The conventional gas chromatographic technique was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at l atm. pressure. There is also considerable uncertainty in the value of Henry's constant since no allowance was made for surface adsorption.	No details given.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_4$ ; [74-85-1]	Leites, I.L.; Ivanovskii, F.P.
2. Trichloromethane (chloroform);	Khim. Prom. <u>1962</u> , 9, 653-657.
CHCl ₃ ; [67-66-3]	
VARIABLES: $T/K = 243.15$ ,	PREPARED BY:
$p_1 / kPa = 101.325$	W. Hayduk
EXPERIMENTAL VALUES:	
t/C $T/K$	² Henry's Constant, ² Mole Fraction H/atm (mole fraction) ⁻¹ Ethene, $x_1$
-30 243.15 4.257	23.67 0.0422
This result was part of a study for two-component solvent solutions.	the behavior of solubilities in
¹ Only graphical results were availab Henry's constant (H') was read from	le in this paper; a value of log of an enlarged graph by the compiler.
² Henry's constant (H) and mole fract the compiler.	ion solubility ( $x_1$ ) were calculated by
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF 'MATERIALS:
A metal cryostat was cooled with	1. Ethene purity was stated to
dry-ice and acetone and controlled to a temperature to $\pm$ 0.05 K.	be 99.9%.
The equilibrium cell was mounted in the cryostat. The solvent was	2. Trichloromethane was distilled and analyzed by chromatography.
purified by fractional distil- lation and analyzed by chromato-	Actual purity not given.
graphy. Details were not given.	
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.05$
	$\delta x_1 / x_1 = \pm 0.01$ (Authors)
· · · ·	REFERENCES :

OMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Ethene	e; C ₂ H ₄ ;	[74-85-1]	Camacho Rubio, F.; D	elgado Diaz,
2. Trichl	lorometh	ane (chloroform);	S.; Alvaro Alvarez,	R.
CHCl ₃ ; [67-66-3]		Revista Ing. Quim. (Spai	n) <u>1980</u> , 12,	
			83-87.	
ARIABLES:	T/K =	293.15 - 308.15	PREPARED BY:	r
1	p,/kPa =	101.325	W. Hayduk	
XPERIMENTAL		<u></u>	Ĺ	•
		,	•	•
t/C T	/K	$\frac{1 \log_{10} K_{S}}{K_{S} / \text{mm Hg} (\text{mol/l})^{-1}}$	² Henry's Constant, H/atm (mol fraction) ¹	² Ethene Mole Fraction, x
20 29	93.15	3.602	66.62	0.0150
25 29	98.15	3.651	74.07	• 0.0135
30 30	03.15	3.699	82.10	0.0122
35 30	08.15	3.746	90.66	0.0110
293.15 to ¹ Values of equation ² A more of	o 308.15 of log K by the log ₁₀ K _s K _s	K. s were taken from an compiler as follows: = 6.5583 - 866.67 ( = a form of Henry's cenry's constant (H)	T/K) ⁻¹ constant, mm Hg pressu and mole fraction ethen	ted to an re (mol/1) ⁻¹ . e solubility
293.15 to ¹ Values of equation ² A more of	o 308.15 of log K by the log ₁₀ K _s K _s	K. s were taken from an compiler as follows: = 6.5583 - 866.67 ( = a form of Henry's cenry's constant (H)	enlarged graph and fit T/K) ⁻¹ constant, mm Hg pressu	ted to an re (mol/1) ⁻¹ . e solubility
293.15 to ¹ Values of equation ² A more of	o 308.15 of log K by the log ₁₀ K _s K _s	K. s were taken from an compiler as follows: = 6.5583 - 866.67 ( = a form of Henry's enry's constant (H) essure of 101.3 kPa	enlarged graph and fit T/K) ⁻¹ constant, mm Hg pressu and mole fraction ethen	ted to an re (mol/1) ⁻¹ . e solubility
293.15 to ¹ Values of equation ² A more of	o 308.15 of log K by the log ₁₀ K _s K _s common H ctial pr	K. Sompiler as follows: = 6.5583 - 866.67 ( = a form of Henry's Senry's constant (H) ressure of 101.3 kPa AUXILIARY	enlarged graph and fit $T/K$ ⁻¹ constant, mm Hg pressuant mole fraction ethenwere calculated by the function of the function	ted to an re (mol/1) ⁻¹ . e solubility compiler.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
<ol> <li>Ethene; C₂H₄; [74-85-1]</li> <li>Chloroethene (vinyl chloride); C₂H₃Cl; [75-01-4]</li> </ol>	Hannaert, H.; Haccuria, M.; Mathieu, M.P. Ind. Chim. Belge <u>1967</u> , 32, 156-164.
VARIABLES: $T/K = 213.15 - 243.15$	PREPARED BY: W. Hayduk
$p_1/kPa = 101.3$	H.L. Clever
EXPERIMENTAL VALUES: t/C T/K	¹ Mole Fraction Ethene, $x_1$
-60213.15-50223.15-40233.15-30243.15	0.110 0.0829 0.0641 0.0507
¹ Mole fraction solubility calculated pressure of 101.3 kPa using the equat v = 1, for the applicable temperature	cion developed by the authors with
log ( $K\pi\nu$ ) = 3.68 - ( $\Delta H$ /cal mo	$D1^{-1}$ )/(2.3R(T/K))
The authors' definitions are:	
$\Delta H = 2,650 \text{ cal mol}^{-1}, \text{ Er}$	nthalpy of dissolution
$K = Y_1 / x_1 = \frac{\text{mole fract:}}{\text{mole fract:}}$	lon qas in qas phase lon gas in liquid phase
$\pi/$ atm = total pressure	
v = coefficient of fuga	acity
The function, $K\pi\nu/atm$ , is equivalent $H_{1,2}/atm = (f_1/atm)/x_1$ where $f_1$ is the	to a Henry's constant in the form ne fugacity.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The authors described several methods used; the one used in this case was considered the most accurate. The apparatus was of glass and consisted of a burette in which the gas was confined over mercury, an absorption vessel agitated electromagnetically, a turbine for circulating the gas, a mercury manometer and a constant temper- ature bath. The exposed tubing was minimized. The quantity of gas introduced into the absorption vessel was measured volumetrically. Solvent was degassed by repeated freezing and evacuation.	1. Ethene. Air Liquide. Specified purity 99.9% 2. Chloroethene. BASF. Densities at -40°C and -60°C reported as 1.016 and 1.0485 g cm ⁻³ . Specified purity 99.9%. ESTIMATED ERROR: $T/K = \pm 0.2$ $\delta x_1/x_1 = \pm 2$ to 5% $p/mm$ Hg = $\pm$ 0.1 (authors) REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_{2}H_{4}$ ; [74-85-1]	Hannaert, H.; Haccuria, M.; Mathieu, M.P.
2. 1,2-Dichloroethane; C ₂ H ₄ Cl ₂ ;	Ind. Chim. Belge <u>1967</u> ,32,
[107-06-2]	156-164.
VARIABLES: T/K = 273.15 - 313.15	PREPARED BY:
p ₁ /kPa = 101.3	W. Hayduk H.L. Clever
EXPERIMENTAL VALUES: t/C T/K	¹ Mole Fraction Ethene, $x_1$
0 273.15 10 283.15 20 293.15 25 298.15 40 313.15	0.0113 0.0102 0.0093 0.0089 0.0079
¹ Mole fraction solubility calculated pressure of 101.3 kPa using the equat v = 1, for the applicable temperature	tion developed by the authors with a range:
$\log (K_{\rm TTV}) = 3.166 - (\Delta H / cal r$	nol ')/(2.3R(T/K))
The authors' definitions are: $\Delta H = 1,520 \text{ cal mol}^{-1}, \text{ End}$	the less of discolution
$x = y_1 / x_1 = \frac{\text{mole fract}}{\text{mole fract}}$	ion gas in gas phase ion gas in liquid phase
$\pi$ / atm = total pressure	
v = coefficient of fuga	acity
The function, $K_{\pi\nu}$ /atm, is equivalent H _{1,2} /atm = $(f_1/atm)/x_1$ where $f_1$ is the	to a Henry's constant in the form ne fugacity.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The authors describe several	1. Ethene. Air Liquide.
methods used; the one used in this case was considered the most	Specified purity 99.9%
accurate. The apparatus was of glass and consisted of a burette in which the gas was confined over mercury, an absorption vessel agitated electromagnetically, a turbine for circulating the gas, a mercury manometer and a constant temper- ature bath. The exposed tubing was	<pre>2. 1,2-Dichloroethane. Produced by synthesis. Distilled and fractionally crystallized. Density at 20°C is 1.2627 g cm . Purity &gt; 99.9% by spectroscopy and gas chromatography.</pre>
minimized. The quantity of gas introduced into the absorption vessel was measured volumetrically.	ESTIMATED ERROR: $T/K = \pm 0.2$ $\delta x_1/x_1 = \pm 2 \text{ to } 5\%$ $p/\text{mm Hg} = \pm 0.1 \text{ (authors)}$
	REFERENCES:
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238 COMPONENTS:		ORIGINAL ME	ASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-1]			Choudhari, R.V.; Doraiswami, L.K.		
2. Ethane, (Ethyle	<pre>1,2-Dichloro- nedichloride); ; [107-06-2]</pre>		Eng. Data <u>1972</u> ,17, 428-432.		
VARIABLES:		PREPARED BY	······································		
-•	K = 280.0-300.5	w.	Hayduk		
<i>P/k</i> P EXPERIMENTAL V	a = 94.23		-		
	ALUES.				
<i>Т/</i> К	Solubility at P = 94.23  (0.93  atm) $s / g(1)^1$	¹ Solubility a p = 101.325 k Mole Fraction	Pa ¹ Henry's Constant		
280	3.67	0.01139	87.8		
287	2.66	0.00854	117.1		
292.5	2.43	0.00804	124.4		
300.5	2.05	0.00718	139.2		
¹ Calculate	d by compiler; ¤ ₁ is	for a gas parti	al pressure of 101.325 kPa.		
¹ Calculate	d by compiler; $x_1$ is	for a gas parti	al pressure of 101.325 kPa.		
¹ Calculate		for a gas parti Illary INFORMATION			
METHOD /APPARAT	AUX TUS / PROCEDURE :	ILIARY INFORMATION SOURCE AND			
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was	ILIARY INFORMATION SOURCE AND 1. Ethe ich 2. 1,2- 99.0 the	PURITY OF MATERIALS: ene purity 99.0%. Dichloroethane purity		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis for	AUX US/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content	ILIARY INFORMATION SOURCE AND 1. Ethe ich 2. 1,2- 99.0 0 the b- les ter- cal	PURITY OF MATERIALS: ene purity 99.0%. Dichloroethane purity %.		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis f When the c. constant,	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content oncentrations remaine equilibrium was consi	ILIARY INFORMATION SOURCE AND 1. Ethe ich 2. 1,2- 99.0 the b- les ter- cal d d ESTIMATED	PURITY OF MATERIALS: one purity 99.0%. Dichloroethane purity %.		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis for When the co constant, ed establi taken to e	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content oncentrations remaine equilibrium was consi shed. Precautions we xclude water vapor fr	ILIARY INFORMATION SOURCE AND 1. Ethe 2. 1,2- 99.0 0 the b- les ter- cal d der- re T/K	PURITY OF MATERIALS: ene purity 99.0%. Dichloroethane purity %. ERROR: = ± 0.05		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis f When the c constant, ed establi taken to e the air fr Experiment	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content oncentrations remaine equilibrium was consi shed. Precautions we xclude water vapor fr om entering the vesse s were performed at	ILIARY INFORMATION SOURCE AND 1. Ethe 2. 1,2- 99.0 0 the b- les ter- cal d der- re T/K	<pre>PURITY OF MATERIALS: ene purity 99.0%. Dichloroethane purity %. ERROR: = ± 0.05 = ± 2%</pre>		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis f When the c constant, ed establi taken to e the air fr Experiment atmospheri (at Poona,	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content oncentrations remaine equilibrium was consi shed. Precautions we xclude water vapor fr om entering the vesse s were performed at c pressure, 0.93 atm India). Reference 1	ILIARY INFORMATION SOURCE AND 1. Ethe ich 2. 1,2- 99.0 0 the b- les ter- cal d der- re T/K om 1. & s/s REFERENCES	<pre>PURITY OF MATERIALS: ene purity 99.0%. Dichloroethane purity %. ERROR: = ± 0.05 = ± 2%</pre>		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis f When the c constant, ed establi taken to e the air fr Experiment atmospheri (at Poona,	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content oncentrations remaine equilibrium was consi shed. Precautions we xclude water vapor fr om entering the vesse s were performed at c pressure, 0.93 atm	ILIARY INFORMATIONSOURCE AND1. Etheich2. 1,2-99.00theb-lester-cal.der-reom1. $\delta s / s$ REFERENCES1. Thom	PURITY OF MATERIALS: one purity 99.0%. Dichloroethane purity %. ERROR: = ± 0.05 = ± 2% :		
METHOD/APPARAT The glass equipped w stirrer an constant t circulated cm ³ of sol vessel, th establishe bled throu were withd vals for a analysis f When the c constant, ed establi taken to e the air fr Experiment atmospheri (at Poona, refers to	AUX TUS/PROCEDURE: absorption vessel was ith a stainless steel d a jacket through wh emperature water was . A volume of 400-50 vent was charged into ermal equilibrium was d and then gas was bu gh the solvent. Samp rawn at 10-15 min. in nalysis using a chemi or the olefin content oncentrations remaine equilibrium was consi shed. Precautions we xclude water vapor fr om entering the vesse s were performed at c pressure, 0.93 atm India). Reference 1	ILIARY INFORMATION SOURCE AND 1. Ethe 2. 1,2- 99.0 0 the b- les ter- cal d der- re om 1. ESTIMATED T / K S $s / s$ REFERENCES 1. Thom Hock	<pre>PURITY OF MATERIALS: ene purity 99.0%. Dichloroethane purity %. ERROR: = ± 0.05 = ± 2% ; as, C.L.; Block, H.S.;</pre>		

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OMPONENTS	S:	,	ORIGINAL MEASURE	MENTS:
	ene; $C_2 H_4;$		Velichko, S. Flid, R.M.	.M.; Treger, Yu.A.;
2. 1,1,2,2-Tetrachloroethane;			s. Chem. 1973, 47,	
C ₂ H ₂	2Cl ₄ ; [79-34	4-5]	1620-1621.	
ARIABLES	:/K = :	273.15 - 298.15	PREPARED BY:	¥7
$p_1/kPa = 101.325$		w.	. Hayduk	
XPERIMEN	TAL VALUES:			
t/C	<i>т  </i> к	¹ Solubility, c, Moles per ² litre	Mole Fraction Ethene, $x_1$	² Ostwald Coefficient L/cm ³ gas(cm ³ solvent)
0	273.15	0.250	0.0137	5.56
10	283.15	0.250		4.04
25	283.15	0.175	0.0097 0.0074	3.21
23	290.13	Ve 132	0.0074	3.41
	mpiler.		were read from	an enlarged graph by
	mpiler.		were read from	an enlarged graph by
	mpiler.	e compiler.	Y INFORMATION	
² Calcul METHOD/AP	mpiler. lated by the	e compiler. AUXILIAR DURE:	Y INFORMATION SOURCE AND PURI	TY OF MATERIALS;
² Calcul ² Calcul ⁴ ETHOD/AP A known charged saturat mechania admixed flow in at a co position by chro the sol content leaving was the was by using a detector solution of a sy	PPARATUS/PROCE n quantity of d into a the tion vessel ical mixer. d with argon nto the saturation on of the ga on of the ga on of the ga on a thermal co or. Samples on were with yringe and a	AUXILIAN DURE: of solvent was ermostated attached to a Ethene gas n was allowed to uration vessel ate. The com- as was monitored . Saturation of nued until the entering and ation vessel e gas analysis hromatography	Y INFORMATION SOURCE AND PURI Sources and given.	TY OF MATERIALS: purities not

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COMPONENTS:		ORIGINAL MEASURE	MENTS:
1. Ethene; $C_2 H_4$ ; [	74-85-1]	Lopez, M.C.	; Gallardo, M.A.;
2. Chlorobenzene; C ₆ H ₅ Cl		Urieta, J.S.	; Gutierrez Losa,C.
[108-90-7]		Rev. Acad. Ci	enc. (Zaragoza)
		<u>1988</u> , 43, 18	33-189.
ARIABLES:	263.15 - 303.15	PREPARED BY:	
-		W	. Hayduk
$p_i / kPa = 1$			
AFERIMENTAL VALUES:			
<i>т</i> /к	Mole Fraction	¹ Ostwald	¹ Bunsen
	104	Coefficient	Coefficient $\alpha/cm^{3}(STP) cm^{-3}atm^{-1}$
	10 ⁴ <i>x</i> ₁	$L/cm^{3} cm^{-3}$	α/cm [°] (STP) cm [°] atm [°]
263.15	202	4.46	4.63
273.15 283.15	171 146	3.88 3.39	3.88 3.27
203.15	126.5	3.01	2.80
303.15	110.5	2.69	2.42
•	0.1836 + 1274.115	(T/K)+ 0.2581 li	
$\ln x_1 = -1$	20.1836 + 1274.115 ad $\Delta H/kJ$ mol ⁻¹ = -9. The mole of ethene f	(T/K)+ 0.2581 ln .95 and $\Delta S/J$ K ⁻¹ from the gas photon	$mol^{-1} = -70$ for
$\ln x_1 = -1$ They also obtainet the transfer of or	0.1836 + 1274.115 ad $\Delta H/kJ \mod^{-1} = -9$ be mole of ethene f al unit mole fraction	(T/K)+ 0.2581 ln .95 and $\Delta S/J$ K ⁻¹ from the gas photon	$mol^{-1} = -70$ for
$\ln x_1 = -1$ They also obtaine the transfer of or to the hypothetica	0.1836 + 1274.115 ad $\Delta H/kJ \text{ mol}^{-1} = -9$ he mole of ethene f al unit mole fraction AUXILIAR	(T/K)+ 0.2581 ln .95 and $\Delta S/J K^{-1}$ from the gas photon solution.	mol ⁻¹ = -70 for ase at 101.32 kPa
<pre>ln x₁ = - 1 They also obtaine the transfer of on to the hypothetica METHOD/APPARATUS/PROCEI The apparatus was that used by Ben N (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete</pre>	10.1836 + 1274.115 $AH/kJ mol-1 = -9.$ $AUXILIAR$ $AUXILIAR$ $AUXILIAR$ $DURE:$ $similar to$ Naim and Baer scribed in atus consists em for the gas, er and a solu-	(T/K)+ 0.2581 ln .95 and $\Delta S/J$ K ⁻¹ From the gas phy ton solution. Y INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Chlorober	mol ⁻¹ = -70 for ase at 101.32 kPa Y OF MATERIALS: Sociedad Español del Specified purity nzene. Merck.
<pre>ln x₁ = - 1 They also obtaine the transfer of on to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben N (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas d the volume change pressure of satura burettes, and the</pre>	AUXILIAR AUXILIAR DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction is estimated from at constant ated gas in the mass of the	(T/K)+ 0.2581 ln .95 and $\Delta S/J$ K ⁻¹ From the gas phy ton solution. Y INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Chlorober	mol ⁻¹ = -70 for ase at 101.32 kPa Y OF MATERIALS: Sociedad Español del Specified purity
<pre>ln x₁ = - 1 They also obtaine the transfer of on to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben N (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas d the volume change pressure of satura burettes, and the solvent in the sol</pre>	AUXILIAR AUXILIAR DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction ls estimated from at constant ated gas in the mass of the lution vessel	(T/K)+ 0.2581 ln .95 and $\Delta S/J$ K ⁻¹ From the gas phy ton solution. Y INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Chlorober	mol ⁻¹ = -70 for ase at 101.32 kPa Y OF MATERIALS: Sociedad Español del Specified purity nzene. Merck. d purity 99.5%
<pre>ln x₁ = - 1 They also obtaine the transfer of on to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben N (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas d the volume change pressure of satura burettes, and the</pre>	AUXILIAR AUXILIAR DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction ls estimated from at constant ated gas in the mass of the lution vessel	<ul> <li>(T/K)+ 0.2581 In</li> <li>95 and \$\Delta S/J K^{-1}</li> <li>From the gas physical set of the set of</li></ul>	<pre>mol⁻¹ = -70 for ase at 101.32 kPa Y OF MATERIALS: Sociedad Español del Specified purity nzene. Merck. d purity 99.5%</pre>
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEI The apparatus was that used by Ben N (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas i the volume change pressure of satura burettes, and the solvent in the sol</pre>	AUXILIAR AUXILIAR DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction ls estimated from at constant ated gas in the mass of the lution vessel	<ul> <li>(T/K)+ 0.2581 In</li> <li>95 and \$\Delta S/J K^{-1}</li> <li>From the gas physical set of the set of</li></ul>	<pre>mol⁻¹ = -70 for ase at 101.32 kPa Y OF MATERIALS: Sociedad Español del Specified purity nzene. Merck. d purity 99.5%</pre>
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEI The apparatus was that used by Ben N (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas i the volume change pressure of satura burettes, and the solvent in the sol</pre>	AUXILIAR AUXILIAR DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction ls estimated from at constant ated gas in the mass of the lution vessel	$(T/K) + 0.2581 lm 95 and \Delta S/J K^{-1}From the gas philonFrom the gas philonSolution.Y INFORMATIONSOURCE AND PURIT1. Ethene.Oxigeno.99.9%.2. ChlorobenSpecified\delta x_1REFERENCES:1. Ben Naim$	<pre>mol⁻¹ = -70 for ase at 101.32 kPa Y OF MATERIALS: Sociedad Español del Specified purity nzene. Merck. d purity 99.5%</pre>

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ;	Horiuti, J.
[74-85-1] 2 4 (2) Chlorobenzene; C ₆ H ₅ Cl; [108-90-7]	Sci. Pap. Inst. Phys. Chem. Res. (Jpn) <u>1931/32</u> , 17, 125 – 256.
VARIABLES:	PREPARED BY:
T/K: 273.15 - 363.15 $p_1/kPa: 101.325 (1 atm)$	M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:	
See following page	
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AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas buret,	(1) Ethene. Prepared by dropping
a solvent reservoir, and an absorp-	ethanol into orthophosphoric
tion pipet. The volume of the pipet	acid. The gas was cooled, passed
is determined at various meniscus	through several wash solutions,
heights by weighing a quantity of water. The meniscus height is read	dried, and fractionated from liquid air several times.
with a cathetometer.	(2) Chlorobenzene. Kahlbaum. Dried
	and distilled. Boiling point
The dry gas is introduced into the	(760 mmHg) 131.96°C.
degassed solvent. The gas and solvent	
are mixed with a magnetic stirrer	
until saturation. Care is taken to	
prevent solvent vapor from mixing	ESTIMATED ERROR:
with the solute gas in the gas buret. The volume of gas is determined from	$\delta T/K = 0.05$
the gas buret readings, the volume	$\delta x_1 / x_1 = 0.01$
of solvent is determined from the	
meniscus height in the absorption	DEDER DUALA
pipet.	REFERENCES:
	1
	1
1	1
	1
	1

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COMPONENTS: (1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	ORIGINAL MEASUREMENTS: Horiuti, J.
(2) Chlorobenzene; C ₆ H ₅ Cl;	Sci. Pap. Inst. Phys. Chem. Res.
[108-90-7]	(Jpn) <u>1931/32</u> , 17, 125 - 256.

# EXPERIMENTAL VALUES:

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	T/K	Mol Fraction $10^3 x_{1}$	Bunsen Coefficient	Ostwald Coefficient	
			$\alpha/cm^3$ (STP) $cm^{-3} atm^{-1}$	$L/cm^3 cm^{-3}$	7 J F F F F F
	273.15	16.99	3.882	3.882	
	278.15	15.74	3.575	3.640	
	283.15	14.63	3.304	3.425	1
	288.15	13.60	3.053	3.221	
	293.15	12.60	2.812	3.018	
	298.15	11.92	2.645	2.887	
	303.15	11.08	2.445	2.714	
	308.15	10.41	2.283	2.576	
	313.15	9.838	2.146	2.460	
	318.15	9.339	2.026	2.360	
	323.15	8.876	1.915	2.265	
	328.15	8.380	1.798	2.160	
	333.15	8.009	1.709	2.084	
	338.15	7.639	1.621	2.007	
	343.15	7.288	1.538	1.932	
	348.15	6.989	1.467	1.870	
	353.15	6.725	1.404	1.815	
1	358.15	6.459	1.341	1.758	
	363.15	6.218	1.284	1.707	

The mole fraction and Bunsen coefficient values were calculated by the compiler with the assumption the gas is ideal and that Henry's law is obeyed.

Smoothed Data: For use between 273.15 and 363.16 K.

 $\ln x_7 = -13.9824 + 19.6322/(T/100K) + 2.7104 \ln (T/100K)$ 

The standard error about the regression line is  $3.75 \times 10^{-5}$ .

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<i>т/</i> к	Mol Fraction
	10 ³ <i>x</i> ₁
273.15	17.05
2/3.15	1/.05
288.15	13.56
298.15	11.83
308.15	10.45
318.15	9.33
333.15	8.00
348.15	7.00
363.15	6.21
303.TD	0.21

MPONENTS :	•		MEASUREMENTS:
	; C ₂ H ₄ ; [74-85-1		1, A.; La, H.M.; Hayduk, W.
2. Chlorob [108-90	<pre>benzene; C₆ H₅ Cl; 0-7]</pre>	Can. J	I. Chem. Eng. <u>1978</u> , 56,
-	-	354-3	57.
ARIABLES: T/	/K = 273-323	PREPARED	BY: W. Hayduk
P/kI	Pa = 101.325		w. nayuuk
XPERIMENTAL	VALUES:		
		Mole Fraction	Ostwald Coefficient
+ /0	m / 17		$L/ \text{ cm}^3 \text{gas }/\text{cm}^3 \text{ solvent}$
t /C	<i>T/</i> K	Ethene, x	L/ cm ⁻ gas /cm ⁻ solvent
0	273.15	0.0173	3.92
25	298.15	0.0120	2.90
50	323.15	0.00893	2.27
	action ethene, $x$	•	-
	action ethene, w	•	-
		AUXILIARY INFORMATI	
	ATUS/PROCEDURE:	AUXILIARY INFORMATI	
ETHOD/APPARA	TUS/PROCEDURE:	AUXILIARY INFORMATI SOURCE A	ION ND PURITY OF MATERIALS:
ETHOD/APPARA A glass ap a gas stol	TUS/PROCEDURE: pparatus equippe rage burette, a	AUXILIARY INFORMATI SOURCE A spiral 1. Et Ma	ND PURITY OF MATERIALS; Thene was CP grade from Atheson, 99.5 mole %
ETHOD/APPARA A glass ap a gas stor tube for o ture inter	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a	AUXILIARY INFORMATI Source A source A l. Et spiral a minia- mi	ND PURITY OF MATERIALS: Thene was CP grade from Theson, 99.5 mole % .nimum purity.
ETHOD/APPARA A glass and a gas stor tube for of ture inter solution so Degassed so	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje	AUXILIARY INFORMATI a winia- was used. cted at	ND PURITY OF MATERIALS; Thene was CP grade from Atheson, 99.5 mole %
ETHOD/APPARA A glass ap a gas stor tube for g ture inter solution s Degassed s a constant spiral by	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri	AUXILIARY INFORMATI source A spiral 1. Et a minia- und a was used. scted at of absorption .nge-pump	ND PURITY OF MATERIALS; Thene was CP grade from Theson, 99.5 mole % .nimum purity.
ETHOD/APPARA A glass and a gas stor tube for of ture inter solution s Degassed s a constant spiral by while the	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the	AUXILIARY INFORMATI SOURCE A spiral 1. Et spiral Ma a minia- ind a mi was used. 2. Ch of absorption .nge-pump red by	ND PURITY OF MATERIALS; Thene was CP grade from Theson, 99.5 mole % .nimum purity.
ETHOD/APPARA A glass ap a gas stor tube for o ture inter solution s Degassed s a constant spiral by while the mercury us ting devic	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury	AUXILIARY INFORMATI SOURCE A spiral l. Et spiral mi a minia- und a was used. cted at of absorption .nge-pump red by l eleva- bottle,	ION ND PURITY OF MATERIALS: Thene was CP grade from Theson, 99.5 mole % .nimum purity. Plorobenzene was from Fisher 99.9 mole % purity.
ETHOD/APPARA A glass and a gas stor tube for g ture inter solution s Degassed s a constant spiral by while the mercury us ting device at a rate gas pressu	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R	AUXILIARY INFORMATI Source A spiral a minia- ind a was used. ected at absorption nge-pump ied by l eleva- bottle, p the eadings	ION ND PURITY OF MATERIALS: Thene was CP grade from Theson, 99.5 mole % .nimum purity. Plorobenzene was from Fisher 99.9 mole % purity.
ETHOD/APPARA A glass and a gas stor tube for of ture inter solution s Degassed s a constant spiral by while the mercury us ting devic at a rate gas pressu of the vol consumed a	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R lume of vapor-fr and volume of so	AUXILIARY INFORMATI a minia- mi a was used. cted at absorption nge-pump ed by l eleva- bottle, p the teadings iee gas lvent	ND PURITY OF MATERIALS: Thene was CP grade from theson, 99.5 mole % .nimum purity. Plorobenzene was from Fisher 99.9 mole % purity. D ERROR:
ETHOD/APPARA A glass and a gas stor tube for of ture inter solution s Degassed s a constant spiral by while the mercury us ting device at a rate gas press of the vol consumed a required to were obtai	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R lume of vapor-fr and volume of so to achieve satur ined from which	AUXILIARY INFORMATI Source A source A source A source A l. Et Ma a minia- ind a was used. source A l. Et Ma a minia- ind a was used. source A 2. Ch of absorption inge-pump ied by l eleva- bottle, pothe teadings iee gas blyent the DEFERENCE	ND PURITY OF MATERIALS: Thene was CP grade from theson, 99.5 mole % nimum purity. Plorobenzene was from Fisher 99.9 mole % purity. CD ERROR: $/x_1 = \pm 2\%$ $\delta_T/K = \pm 0.05$
ETHOD/APPARA A glass and a gas stor tube for of ture inter solution s Degassed s a constant spiral by while the mercury us ting device at a rate gas presses of the vol consumed a required t were obtai solubility	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R lume of vapor-fr and volume of so to achieve satur ined from which y was calculated	AUXILIARY INFORMATI SOURCE A solution a minia- a minia- a minia- a minia- a minia- mind a was used. absorption nge-pump red by 1 eleva- bottle, po the teadings ree gas olvent the constant REFERENC	ND PURITY OF MATERIALS: Thene was CP grade from theson, 99.5 mole % nimum purity. Plorobenzene was from Fisher 99.9 mole % purity. CD ERROR: $/x_1 = \pm 2\%$ $\delta_T/K = \pm 0.05$
ETHOD/APPARA A glass and tube for of ture inter solution s Degassed s a constant spiral by while the mercury us ting devic at a rate gas press of the vol consumed a required to were obtained solubility temperatum	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R lume of vapor-fr and volume of so to achieve satur ined from which y was calculated re fluid was cir jacket enclosin	AUXILIARY INFORMATI Source A source A spiral a minia- a minia- was used. sected at absorption nge-pump red by 1 eleva- bottle, p the teadings ree gas livent constant constant culated g the Source A 1. Et Ma a mi 2. Ch of $\delta x_1$ REFERENC	ND PURITY OF MATERIALS: Thene was CP grade from theson, 99.5 mole % nimum purity. Plorobenzene was from Fisher 99.9 mole % purity. CD ERROR: $/x_1 = \pm 2\%$ $\delta_T/K = \pm 0.05$
ETHOD/APPARA A glass and tube for of ture inter solution s Degassed s a constant spiral by while the mercury us ting devic at a rate gas press of the vol consumed a required to were obtained solubility temperatum	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R lume of vapor-fr and volume of so to achieve satur ined from which y was calculated re fluid was cir	AUXILIARY INFORMATI Source A source A spiral a minia- a minia- was used. sected at absorption nge-pump red by 1 eleva- bottle, p the teadings ree gas livent constant constant culated g the Source A 1. Et Ma a mi 2. Ch of $\delta x_1$ REFERENC	ND PURITY OF MATERIALS: Thene was CP grade from theson, 99.5 mole % nimum purity. Plorobenzene was from Fisher 99.9 mole % purity. CD ERROR: $/x_1 = \pm 2\%$ $\delta_T/K = \pm 0.05$
ETHOD/APPARA A glass and tube for of ture inter solution s Degassed s a constant spiral by while the mercury us ting devic at a rate gas press of the vol consumed a required to were obtained solubility temperatum	TUS/PROCEDURE: pparatus equippe rage burette, a gas absorption, rnal manometer a storage burette solvent was inje t rate into the means of a syri gas was displac sing a mechanica ce for a mercury required to kee ure constant. R lume of vapor-fr and volume of so to achieve satur ined from which y was calculated re fluid was cir jacket enclosin	AUXILIARY INFORMATI Source A source A spiral a minia- a minia- was used. sected at absorption nge-pump red by 1 eleva- bottle, p the teadings ree gas livent constant constant culated g the Source A 1. Et Ma a mi 2. Ch of $\delta x_1$ REFERENC	ND PURITY OF MATERIALS: Thene was CP grade from theson, 99.5 mole % nimum purity. Plorobenzene was from Fisher 99.9 mole % purity. CD ERROR: $/x_1 = \pm 2\%$ $\delta_T/K = \pm 0.05$

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COMPONENTS:		ORIGINAL MEASURE	MENTS:	
1. Ethene; $C_2 H_4$ ;	Ethene; $C_{2}H_{4}$ ; [74-85-1]		Lopez, M.C.; Gallardo, M.A.;	
2. Bromobenzene; C ₆ H ₅ Br;		Urieta, J.S.	.; Gutierrez Losa,C.	
[108-86-1]		Rev. Acad. Cie <u>1988</u> , 43, 18	enc. (Zaragoza) 83—189.	
VARIABLES:		PREPARED BY:		
T/K = 263.15 - 303.15 p/kPa = 101.32		W. Hayduk		
EXPERIMENTAL VALUES:				
<i>T</i> <b>/</b> K	Mole Fraction $10^4 x_1$	¹ Ostwald Coefficient L/cm ³ cm ⁻³	¹ Bunsen Coefficient $\alpha/cm^{3}(STP) cm^{-3}atm^{-1}$	
263.15	174	3.70	3.84	
273.15	147	3.21	3.21	
283.15	126.2	2.83	2.73	
293.15 303.15	109.4 96.5	2.52	2.34 2.05	
They also obtaine the transfer of or	I their data to the 17.9492 + 1581.0929 ed $\Delta H / kJ \text{ mol}^{-1} = -9.4$ he mole of ethene find al unit mole fraction	$(T/K)^{-1} + 1.4156$ 64 and $\Delta S/J K^{-1}$ rom the gas pha	$1  \text{mol}^{-1} = -70  \text{for}$	
$\ln x_1 = -1$ They also obtained the transfer of or	17.9492 + 1581.0929 ed $\Delta H / kJ$ mol ⁻¹ = -9.0 ne mole of ethene fr	$(T/K)^{-1} + 1.4156$ 64 and $\Delta S/J K^{-1}$ rom the gas pha	$1  \text{mol}^{-1} = -70  \text{for}$	
$\ln x_1 = -1$ They also obtained the transfer of or	17.9492 + 1581.0929 ed $\Delta H / kJ \mod^{-1} = -9.0$ ne mole of ethene fr al unit mole fraction	$(T/K)^{-1} + 1.4156$ 64 and $\Delta S/J K^{-1}$ rom the gas pha	$1  \text{mol}^{-1} = -70  \text{for}$	
$\ln x_1 = -1$ They also obtained the transfer of or	17.9492 + 1581.0929 ed $\Delta H / kJ$ mol ⁻¹ = -9. ne mole of ethene fr al unit mole fraction AUXILIARY	$(T/K)^{-1}$ + 1.4156 64 and $\Delta S/J$ K ⁻¹ rom the gas pha on solution.	¹ mol ⁻¹ = -70 for ase at 101.32 kPa	
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben M (ref.1) and is des ref.2. The appara</pre>	17.9492 + 1581.0929 ed $\Delta H / kJ \text{ mol}^{-1} = -9.0$ ne mole of ethene fr al unit mole fraction AUXILIARY DURE: similar to Naim and Baer scribed in atus consists	(T/K) ⁻¹ + 1.4156 64 and $\Delta S/J$ K ⁻¹ rom the gas pha on solution. INFORMATION SOURCE AND PURIT 1. Ethene.	¹ mol ⁻¹ = -70 for ase at 101.32 kPa TY OF MATERIALS:	
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEI The apparatus was that used by Ben M (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas i the volume change pressure of satura burettes, and the</pre>	I7.9492 + 1581.0929 $I7.9492 + 1581.0929$ $IT = -9.0$ In mole of ethene find the mole of ethene find the mole fraction and Baer scribed in a for the gas, er and a solumole fraction is estimated from a for the gas in the mass of the for the gas in the for the gas in the mass of the for the gas in the mass of the for the gas in the for the gas in the mass of the for the gas in the for the gas in the mass of the for the gas in the g	(T/K) ⁻¹ + 1.4156 64 and $\Delta S/J$ K ⁻¹ rom the gas pha- on solution. INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromoben:	¹ mol ⁻¹ = -70 for ase at 101.32 kPa TY OF MATERIALS: Sociedad Espanol del	
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben M (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas i the volume change pressure of satura burettes, and the solvent in the solume in the solume</pre>	17.9492 + 1581.0929 ad $\Delta H / kJ \text{ mol}^{-1} = -9.4$ the mole of ethene find al unit mole fraction AUXILIARY DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction is estimated from at constant ated gas in the mass of the lution vessel	(T/K) ⁻¹ + 1.4156 64 and $\Delta S/J$ K ⁻¹ rom the gas pha- on solution. INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromoben:	¹ mol ⁻¹ = -70 for ase at 101.32 kPa TY OF MATERIALS: Sociedad Espanol del Specified purity zene. Fluka. d purity 99.5%	
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben M (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas i the volume change pressure of satura burettes, and the</pre>	17.9492 + 1581.0929 ad $\Delta H / kJ \text{ mol}^{-1} = -9.4$ the mole of ethene find al unit mole fraction AUXILIARY DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction is estimated from at constant ated gas in the mass of the lution vessel	(T/K) ⁻¹ + 1.4156 64 and $\Delta S/J$ K ⁻¹ rom the gas pha on solution. INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromoben: Specified	<pre>¹mol⁻¹= -70 for ase at 101.32 kPa TY OF MATERIALS: Sociedad Espanol del Specified purity zene. Fluka. d purity 99.5%</pre>	
<pre>ln x₁ = - 1 They also obtaine the transfer of or to the hypothetica METHOD/APPARATUS/PROCEN The apparatus was that used by Ben M (ref.1) and is des ref.2. The appara of a burette syste a mercury manomete tion vessel. The of dissolved gas i the volume change pressure of satura burettes, and the solvent in the so.</pre>	17.9492 + 1581.0929 ad $\Delta H / kJ \text{ mol}^{-1} = -9.4$ the mole of ethene find al unit mole fraction AUXILIARY DURE: similar to Naim and Baer scribed in atus consists em for the gas, er and a solu- mole fraction is estimated from at constant ated gas in the mass of the lution vessel	$(T/K)^{-1} + 1.4156$ 64 and $\Delta S/J K^{-1}$ rom the gas pha- on solution. INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromoben: Specified $\delta x_1 A$ REFERENCES: 1. Ben Naim	<pre>¹mol⁻¹= -70 for ase at 101.32 kPa TY OF MATERIALS: Sociedad Espanol del Specified purity zene. Fluka. d purity 99.5%</pre>	

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COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Lopez, M.C.; Gallardo, M.A.;
2. Chlorocyclohexane; C ₆ H ₁₁ Cl;	Urieta, J.S.; Gutierrez Losa, C.
[542-18-7]	J. Chem. Eng. Data <u>1987</u> , ³² , <b>472-474</b> .
VARIABLES: I/K = 263.15 - 303.15	PREPARED BY:
p/kPa = 101.32	W. Hayduk
EXPERIMENTAL VALUES:	,
T/K Mole Fraction $10^4 x_1$	¹ Ostwald ¹ Bunsen Coefficient Coefficient $L/cm^{3} cm^{-3}$ $\alpha/cm^{3} (STP) cm^{-3} atm^{-1}$
263.15 237	4.51 4.68
263.15 237 273.15 200	3.90 3.90
283.15 171	3.42 3.30
293.15 148 303.15 129	3.03 2.82 2.70 2.43
They also obtained $\triangle H/kJ \mod^{-1} = -9.96$ the transfer of one mole of ethene for to the hypothetical unit mole fraction	com the gas phase at 101.32 kPa
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus used is similar to that used by Ben Naim and Baer (ref.1) and is described in detail elsewhere (ref.2). It consists of a system of burettes, a mercury manometer and a solution vessel. The mole fraction of the dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes, and the mass of solvent in the solution vessel determined	<ol> <li>Ethene. Sociedad Español del Oxigeno. Specified purity 99.9%.</li> <li>Chlorocyclohexane. Merck. Purity checked by GLC to be</li></ol>
by weighing. Density and vapor pressure of the	ESTIMATED ERROR: $\delta T/K = \pm 0.1 \text{ (authors)}$ $\delta x_1/x_1 = \pm 2\% \text{ (compiler)}$
solvent were measured:	
$\rho/g \text{ cm}^{-3} = 1.2856 - 0.000977.T/K$ ln( $p_2/kPa$ ) = -5240.7 ( $T/K$ ) ¹ + 13.07	REFERENCES: 1. Ben Naim, A.; Baer, S.F.; <i>Trans. Far. Soc.</i> <u>1963</u> , ⁵⁹ , 2735
	2. Carnicer, J.; Gibanel, F.; Urieta, J.S.; Gutierrez Losa, C Rev. Acad. Cienc. (Zaragoza) 1979, 34, 115.

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COMPONENTS:				
1. Ethenet C H + IS		ORIGINAL MEASUREM	ENTS:	
1. Ethene; $C_{2}H_{4}$ ; [7]	74-85-1]	Lopez, M.C.; Gallardo, M.A.;		
2. Bromocyclohexane	e; C ₆ H ₁₁ Br;	Urieta, J.S.; Gutierrez Losa,C.		
[108-85-0]		J. Chem. Eng. 198–200.	Data <u>1989</u> , 34,	
VARIABLES: $T/K = 26$	53.15 - 303.15	PREPARED BY:	······································	
$p_{\rm t}/kPa = 10$		W. Hayduk		
EXPERIMENTAL VALUES:	<u></u>			
	- <u></u>			
T/K	Mole Fraction	¹ Ostwald Coefficient	¹ Bunsen Coefficient	
• •	10 ⁴ x ₁	$L/cm^3 cm^{-3}$		
263.15	209	3.84	3.99	
273.15	176	3.32	3.32	
283.15 293.15	151 131.7	2.92 2.61	2.82 2.43	
303.15	115.6	2.43	2.11	
to the hypothetical	L UNIT MOLE HACE.	ion boracion.		
	AUXILIAR	Y INFORMATION		
METHOD /APPARATUS / PROCEDU		Y INFORMATION SOURCE AND PURIT	Y OF MATERIALS:	
The solubility appropriate the solubility appropriate the service of the service of the solution versel. Solution versel, and the volume character of saturation the solution verse saturation verse sat	JRE: aratus is e (ref.1); t proposed by (ref.2). The a burette manometer and Mole fraction as is estimated ange at constant ted gas in the mass of liquid	SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromocycl Purity ch >99%.	Sociedad Español del Specified purity ohexane. Fluka. hecked by GLC to be	
The solubility appropriate the solubility appropriate the service of the service of the solution description of the dissolved gathered from the volume characteristics of saturate burettes, and the solution the sol	JRE: aratus is e (ref.1); t proposed by (ref.2). The a burette manometer and Mole fraction as is estimated ange at constant ted gas in the mass of liquid	SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromocycl Purity ch >99%. ESTIMATED ERROR:	Sociedad Español del Specified purity ohexane. Fluka. hecked by GLC to be	
The solubility appropriate the solubility appropriate the service of the service of the solution versel. Solution versel, and the solution the solution the solution the solution the solution the solution versel the solution versel the solution the solution versel th	JRE: aratus is e (ref.1); t proposed by (ref.2). The a burette manometer and Mole fraction as is estimated ange at constant ted gas in the mass of liquid ssel determined pressure of the	SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Bromocycl Purity ch >99%. ESTIMATED ERROR: §7	Sociedad Español del Specified purity ohexane. Fluka. hecked by GLC to be	

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COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Ethene; C ₂ H ₄ ; [74-85-1]	Leites, I.L.; Ivanovsk	ii, F.P.
<pre>2. Trichloromethane (chloroform); CHCl₃; [67-66-3]</pre>	Khim. Prom. <u>1962</u> , 9, 65	3-657.
<pre>3. 2-Propanone (acetone); C₃H₆O; [67-64-1]</pre>		
VARIABLES: $T/K = 243.15$ ,	PREPARED BY:	
$p_1 / kPa = 101.325$ $x_1 = 0 - 1.0$	W. Hayduk	
EXPERIMENTAL VALUES:		
¹ Solvent Composition, ² log ₁₀ ^x ₃ , Mole Fraction H'/mm t/C T/K Toluene	H', ³ Henry's Constant ³ M Hg H/atm (mole fraction) ⁻¹	ole Fraction Ethene, ^x 1
-30 243.15 0 (chloroform) 4.257	23.78	0.0421
0.25 4.384		0.0421 0.0314
0.50 4.439		0.0277
0.75 4.446 1.0 (acetone) 4.423		0.0272 0.0287
³ Values of Henry's constant (H) and m calculated by the compiler.	ole fraction solubility	(x ₁ ) were
AUXILIARY		
	INFORMATION	·····
METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIA	LS :
A metal cryostat was cooled with	SOURCE AND PURITY OF MATERIA 1. Ethene purity was s	
A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to $\pm$ 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil-	SOURCE AND PURITY OF MATERIA	tated to s distilled omatography.
A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to $\pm$ 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were	<ul> <li>SOURCE AND PURITY OF MATERIA</li> <li>1. Ethene purity was a be 99.9%.</li> <li>2. Trichloromethane wa and analyzed by chr</li> </ul>	tated to s distilled omatography. d. lled and ography.
A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to $\pm$ 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIA</li> <li>1. Ethene purity was a be 99.9%.</li> <li>2. Trichloromethane wa and analyzed by chr Purity not specifie</li> <li>3. Propanone was disti analyzed by chromat</li> </ul>	tated to s distilled omatography. d. lled and ography.
A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to $\pm$ 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIA</li> <li>1. Ethene purity was a be 99.9%.</li> <li>2. Trichloromethane wa and analyzed by chr Purity not specifie</li> <li>3. Propanone was disti analyzed by chromat Purity not specifie</li> <li>ESTIMATED ERROR:</li> </ul>	tated to s distilled omatography. d. lled and ography. d.
dry-ice and acetone and the temper- ature was controlled to + 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIA</li> <li>1. Ethene purity was a be 99.9%.</li> <li>2. Trichloromethane wa and analyzed by chr Purity not specifie</li> <li>3. Propanone was disti analyzed by chromat Purity not specifie</li> <li>ESTIMATED ERROR: 67/K = ± 0.05</li> </ul>	tated to s distilled omatography. d. lled and ography. d.
A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to $\pm$ 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	SOURCE AND PURITY OF MATERIA 1. Ethene purity was a be 99.9%. 2. Trichloromethane wa and analyzed by chr Purity not specifie 3. Propanone was disti analyzed by chromat Purity not specifie ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Auth	tated to s distilled omatography. d. lled and ography. d.
A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to $\pm$ 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	SOURCE AND PURITY OF MATERIA 1. Ethene purity was a be 99.9%. 2. Trichloromethane wa and analyzed by chr Purity not specifie 3. Propanone was disti analyzed by chromat Purity not specifie ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Auth	tated to s distilled omatography. d. lled and ography. d.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Leites, I.L.; Ivanovskii, F.P.
<pre>2. Trichloromethane (chloroform); CHCl₃; [67-66-3]</pre>	Khim. Prom. <u>1962</u> , 9, 653-657.
3. Methylbenzene (toluene); C ₇ H ₈ ; [108-88-3]	•
VARIABLES: $T/K = 243.15$ ,	PREPARED BY:
$p_1/kPa = 101.325$ $x_3 = 0 - 1.0$	W. Hayduk
EXPERIMENTAL VALUES:	
¹ Solvent Composition, ² log x ₃ , Mole Fraction H'/mm t/C T/K Toluene	H', ³ Henry's Constant ³ Mole Fraction Hg H/atm Ethene, $x_1$ (mole fraction) ⁻¹
-30 243.15 0 (chloroform) 4.257 0.25 4.295	25.95 0.0385
0.50 4.319 0.75 4.324	
1.0 (toluene) 4.324	
³ Values of Henry's constant (H) and m calculated by the compiler.	by the compiler. ole fraction solubility $(x_1)$ were
³ Values of Henry's constant (H) and m calculated by the compiler.	
calculated by the compiler.	
calculated by the compiler.	ole fraction solubility $(x_1)$ were
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper-	ole fraction solubility (x ₁ ) were INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>ole fraction solubility (x₁) were INFORMATION SOURCE AND FURITY OF MATERIALS: 1. Ethene purity was stated to be 99.9%. 2. Trichloromethane was distilled and analyzed by chromatography. Purity not specified.</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil-	<pre>ole fraction solubility (x₁) were INFORMATION SOURCE AND FURITY OF MATERIALS: 1. Ethene purity was stated to     be 99.9%. 2. Trichloromethane was distilled     and analyzed by chromatography.</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stated to     be 99.9%. 2. Trichloromethane was distilled     and analyzed by chromatography.     Purity not specified. 3. Methylbenzene was distilled     and analyzed by chromatography.</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>ole fraction solubility (x₁) were INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stated to be 99.9%. 2. Trichloromethane was distilled and analyzed by chromatography. Purity not specified. 3. Methylbenzene was distilled and analyzed by chromatography. Purity not specified.</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>ole fraction solubility (x₁) were INFORMATION SOURCE AND FURITY OF MATERIALS: 1. Ethene purity was stated to be 99.9%. 2. Trichloromethane was distilled and analyzed by chromatography. Purity not specified. 3. Methylbenzene was distilled and analyzed by chromatography. Purity not specified. ESTIMATED ERROR:</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>ole fraction solubility (x₁) were INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stated to be 99.9%. 2. Trichloromethane was distilled and analyzed by chromatography. Purity not specified. 3. Methylbenzene was distilled and analyzed by chromatography. Purity not specified. ESTIMATED ERROR:</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>INFORMATION INFORMATION SOURCE AND FURITY OF MATERIALS: 1. Ethene purity was stated to     be 99.9%. 2. Trichloromethane was distilled     and analyzed by chromatography.     Purity not specified. 3. Methylbenzene was distilled     and analyzed by chromatography.     Purity not specified. ESTIMATED ERROR:</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>INFORMATION INFORMATION SOURCE AND FURITY OF MATERIALS: 1. Ethene purity was stated to     be 99.9%. 2. Trichloromethane was distilled     and analyzed by chromatography.     Purity not specified. 3. Methylbenzene was distilled     and analyzed by chromatography.     Purity not specified. ESTIMATED ERROR:</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<pre>INFORMATION INFORMATION SOURCE AND FURITY OF MATERIALS: 1. Ethene purity was stated to     be 99.9%. 2. Trichloromethane was distilled     and analyzed by chromatography.     Purity not specified. 3. Methylbenzene was distilled     and analyzed by chromatography.     Purity not specified. ESTIMATED ERROR:</pre>

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COMPONENTS :	ORIGINAL MEASUREMENTS:	
1. Ethene; C ₂ H ₄ ; [74-85-1]	Leites, I.L.; Ivanovskii	, F.P.
<pre>2. Tetrachloromethane (carbon tetrachloride); CCl₄; [56-23-5]</pre>	Khim. Prom. <u>1962</u> , 9, 653-	657.
3. Heptane; C ₇ H ₁₆ ; [142-82-5]		
VARIABLES: $T/K = 253.15$ ,	PREPARED BY:	
$p_1/kPa = 101.325$ $x_3 = 0 - 1.0$	W. Hayduk	
EXPERIMENTAL VALUES:		
¹ Solvent Composition, ² log ₁ x ₃ , Mole Fraction H'/mm t/C T/K	H', ³ Henry's Constant ³ Mol Hg H/atm E (mole fraction) ⁻¹	e Fraction thene, $x_1$
$-20 253.15 0 (CCl_{b}) 4.39^{\circ}$	1 32.37	0.0309
0.25 4.31	9 27.43	0.0365
0.50 4.28		0.0397
0.75 4.25 1.0 (heptane) 4.24	-	0.0420 0.0434
	an a	
·······	INFORMATION	
AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:	
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was sta	
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K.	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was sta be 99.9%.	ted to
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil-	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was sta	nted to as dis- by chroma-
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene purity was stabe 99.9%.</li> <li>2. Tetrachloromethane watilled and analyzed k</li> </ul>	ated to as dis- by chroma- c specified. d and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene purity was stabe 99.9%.</li> <li>2. Tetrachloromethane was tilled and analyzed by tography. Purity not</li> <li>3. Heptane was distilled analyzed by chromatog</li> </ul>	ated to as dis- by chroma- c specified. d and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene purity was stabe 99.9%.</li> <li>2. Tetrachloromethane watilled and analyzed htography. Purity not</li> <li>3. Heptane was distilled analyzed by chromatog Purity not specified.</li> </ul>	ated to as dis- by chroma- c specified. d and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene purity was stabe 99.9%.</li> <li>2. Tetrachloromethane was tilled and analyzed herography. Purity not</li> <li>3. Heptane was distilled analyzed by chromatog Purity not specified.</li> <li>ESTIMATED ERROR:</li> </ul>	ated to by chroma- specified. and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Ethene purity was stabe 99.9%.</li> <li>2. Tetrachloromethane was tilled and analyzed her tography. Purity not</li> <li>3. Heptane was distilled analyzed by chromatog Purity not specified.</li> <li>ESTIMATED ERROR:</li> <li>δT/K = ± 0.05</li> </ul>	ated to as dis- by chroma- specified. and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stabe be 99.9%. 2. Tetrachloromethane was tilled and analyzed kan tography. Purity not 3. Heptane was distilled analyzed by chromatog Purity not specified. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Author	ated to as dis- by chroma- specified. and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stabe be 99.9%. 2. Tetrachloromethane was tilled and analyzed kan tography. Purity not 3. Heptane was distilled analyzed by chromatog Purity not specified. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Author	ated to as dis- by chroma- specified. and graphy.
METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and the temper- ature was controlled to <u>+</u> 0.05 K. The equilibration cell was mounted in the cryostat. The solvents were purified by fractional distil- lation and analyzed by chromato-	SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stabe be 99.9%. 2. Tetrachloromethane was tilled and analyzed kan tography. Purity not 3. Heptane was distilled analyzed by chromatog Purity not specified. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta x_1/x_1 = \pm 0.01$ (Author	ated to as dis- by chroma- specified. and graphy.

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OMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Ethene; C ₂ H ₄ ; [74-85-1]	Narasimhan, S.; N	ageshwar, G.W.	
2. Benzene; $C_6 H_6$ ; [71-43-2]	Chem. Petro-Chem. J. (India)		
3. Tetrachloromethane; CCl ₄ ;	<u>1979</u> , <i>10</i> , 13-15.		
[56-23-5]			
ARIABLES: $T/K = 293.15$	PREPARED BY:	· · · · · · · · · · · · · · · · · · ·	
P/kPa = 101.325 Concentration/ $x_3 = 0.1-0.9$	W. Hayduk	,	
XPERIMENTAL VALUES:	<u> </u>		
······································	<u></u>		
Mole Fraction CC14 Ethene Sc /C in Mixed Solvent, $x_3$ ¹ P/kPa=101.3	lubility for: ² 0st 25 ² p/kPa=101.325 <i>L</i> /	wald Coefficient cm ³ gas/cm ³ solve	
20 0.1059 0.01266	0,01406	3.80	
0.2054 0.01279	0.01444	3.87	
0.3030 0.01332 0.4141 0.01366	0.01486 0.01528	3.96 4.03	
0.5006 0.01308	0.01572	4.03	
0.6201 0.01446		4.22	
0.7002 0.01480	0.01666	4.29	
•         0.8107         0.01521           •         0.01570         0.01570	0.01717	4.38	
0.9046 0.01570	0.01776	4.51	
at 293.15 K and 101.325 kPa for the was assumed to apply for the calcula It was confirmed by personal communi	calculation of $L$ , a tion of $x_1$ .	mole was used nd Henry's law	
at 293.15 K and 101.325 kPa for the	volume of 23910 cm ³ / calculation of $L$ , a tion of $x_1$ .	mole was used nd Henry's law	
at 293.15 K and 101.325 kPa for the was assumed to apply for the calcula It was confirmed by personal communi measured at atmospheric pressure.	volume of 23910 cm ³ / calculation of $L$ , a tion of $x_1$ .	mole was used nd Henry's law	
was assumed to apply for the calcula It was confirmed by personal communi measured at atmospheric pressure.	volume of 23910 cm ³ /r calculation of $L$ , a tion of $x_1$ . cation that the solu	mole was used nd Henry's law bilities were	
at 293.15 K and 101.325 kPa for the was assumed to apply for the calcula It was confirmed by personal communi measured at atmospheric pressure. AUXILIAR ÆTHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed	volume of 23910 cm $^{3}/_{1}$ calculation of $L$ , a tion of $x_{1}$ . .cation that the solu (INFORMATION SOURCE AND PURITY OF MA 1. Ethene prepare	mole was used nd Henry's law bilities were MTERIALS; d by catalytic	
at 293.15 K and 101.325 kPa for the was assumed to apply for the calcula It was confirmed by personal communi measured at atmospheric pressure. AUXILIAR ETHOD/APPARATUS/PROCEDURE: The solvent was held in a jacketed burette. Constant temperature	volume of 23910 cm $^{3}/_{1}$ calculation of $L$ , a tion of $x_{1}$ . cation that the solu INFORMATION SOURCE AND PURITY OF M 1. Ethene prepare dehydration of	mole was used nd Henry's law bilities were MTERIALS: d by catalytic ethanol over	
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COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

 Organic halides, pressures greater than 0.2 MPa (2 atm)

January, 1994

#### CRITICAL EVALUATION:

# Critical Evaluation of Ethene Solubilities in Organic Halides (mainly

## Alkyl Halides) for Pressures greater than 0.20 MPa

Ethene solubilities in organic halide solvents were reported by seven groups of researchers (1-7) for pressures ranging from 0.2 MPa to 11.7 MPa. For these data, in every case, only one research group reported their results for any one solvent; hence, a comparison of data from two or more sources was not possible. Instead, it was only possible to check the consistency of the data. For that purpose graphs of log x (mole fraction solubility) versus log p (gas partial pressure) were drawn with the solubilities shown as a function of temperature as a parameter. For several of the solvents it was possible to express the data, especially for relatively low pressures, using an equation of the form shown below, with the constant C being nearly equal to one when Henry's law applied:

 $\log x_p = A + B/T + C \log p$ 

The solubilities in the individual solvents will now be considered.

#### Bromochloromethane; CH₂BrCl; [74-97-5]

Lebedeva et al. (1) reported ethene solubilities in bromochloromethane at 323.15 K, 373.15 K and 423.15 K at pressures ranging from 1.013 MPa to 11.73 MPa. At the lower pressures, up to 10 MPa, Henry's law is approximately obeyed and the corresponding Henry's constants have been tabulated on the data sheet. There are a number of apparently anomalous results.

These data are classified as tentative.

#### Trichloromethane (chloroform); CHCl₃; [67-66-3]

The solubilities of ethene in trichloromethane were reported by Shim and Kohn (2) for pressures ranging from 1.013 MPa to the critical pressures and for five temperatures ranging from 273.15 K to 373.15 K. Except for one result at a temperature of 373.15 K and a pressure of 1.013 MPa, the data appear consistent. They are well represented by the following correlating equation which relates the mole fraction ethene at equilibrium, the temperature, and ethene partial pressure:

$$\log x_{\rm p} = 522.32 \, (T/{\rm K})^{-1} + 0.9600 \, \log \, (p/{\rm MPa}) - 2.5371 \tag{2}$$

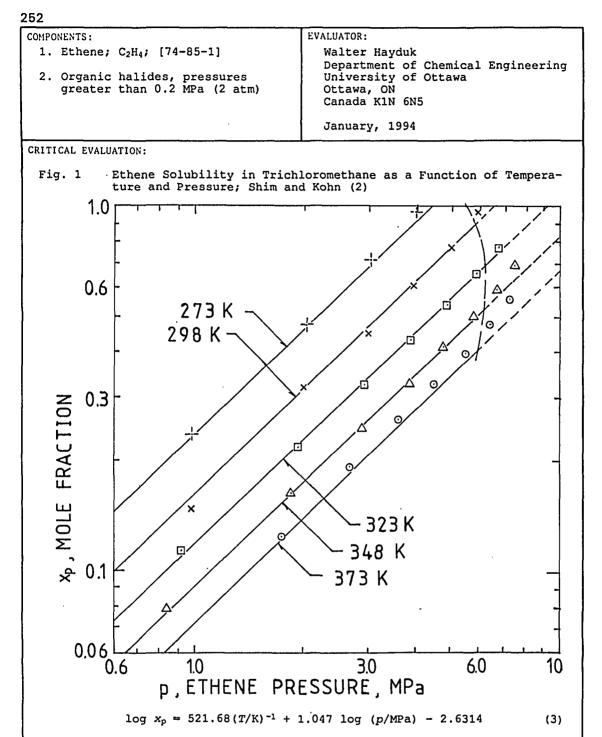
Equation (2) is limited to pressures 0.6 MPa < p < 6.0 MPa. For the indicated pressure range it yields an average, and a maximum deviation from the data of 3.1%, and 9.2%, respectively. Equation (2) and the data on which it is based, are shown in Figure 1. It is noted that equation (2) yields a value about 35% too high when extrapolated to 0,1013 MPa pressure at 298.15 K; hence, it is evident that this equation cannot be used outside the range of the data on which it is based.

The results of Shim and Kohn (2) are classified as tentative.

#### Tetrachloromethane (carbon tetrachloride); CCl₄; [56-23-5]

Konobeev and Lyapin (3) reported solubility data for ethene in tetrachloromethane at 293.15 K, 313.15 K and 333.15 K and pressures from 0.29 MPa to 3.18 MPa. For the purpose of estimating the partial pressure of ethene in the gas phase, Raoult's law was assumed and the pure solvent vapor pressures of 0.0122, 0.0284 and 0.059 MPa were used for the temperatures of 293.15, 313.15 and 333.15 K, respectively. The solubilities over the temperature and pressure range of the data are then well represented by the following equation:

(1)



Equation (3) has average, and maximum deviations from the experimental results of 3.9%, and 9.9%, respectively. Here also, it is cautioned that equation (3) cannot be accurately extrapolated for solubilities at 0.1013 MPa pressure; deviations of approximately 20% are observed.

The data of Konobeev and Lyapin for solubilities in tetrachloromethane are classified as tentative.

## 1,2-Dichloroethane; C₂H₄Cl₂; [107-06-2]

Konobeev and Lyapin (3) also provided ethene solubilities in 1,2dichloroethane for pressures ranging from 0.29 MPa to 3.11 MPa and for the temperatures 293.15 K, 313.15 K and 333.15 K. As for the solvent tetrachloromethane, the pure solvent vapor pressures were used along with Raoult's law to estimate ethene partial pressures. The resulting relation between ethene partial pressure, (p), temperature, T, and the mole

COMPONENTS :	EVALUATOR:
1. Ethene; $C_{2}H_{4}$ ; [74-85-1]	Walter Hayduk
	Department of Chemical Engineering
2. Organic halides, pressures	University of Ottawa
greater than 0.2 MPa (2 atm)	Ottawa, ON
	Canada K1N 6N5
	January, 1994

CRITICAL EVALUATION:

fraction,  $x_p$ , is entirely consistent and is well expressed by the following equation:

 $\log x_{p} = 446.77 (T/K)^{-1} + 1.052 \log (p/MPa) - 2.5285$ (4)

The average, and maximum deviations of the data from the correlating equation are 2.1%, and 4.5%, respectively.

The data of Konobeev and Lyapin for solubilities in 1,2-dichloroethane are classified as tentative.

### Ethane, 1,1,2-trichloro- 1,2,2-trifluoro-(Freon 113); C2Cl₃F₃; [76-13-1]

Sokolov and Konshin (4) reported data for ethene solubilities in Freon 113 at the temperatures, 300.15 K, 343.15 K and 363.15 K for pressures ranging from 0.20 MPa to 1.11 MPa. No gas phase compositions were available; hence, Raoult's law was used to estimate the solvent partial pressure in the gas phase. It became apparent that the gas contained significant concentrations of solvent vapor especially at the two higher temperatures, estimated to be more than 50% for a number of the results. Thus, because highly accurate results are difficult to obtain with volatile solvents there are some inconsistencies in these results.

Omitting the data point corresponding to a total pressure of 0.31 MPa at 343.15 K, an equation for the remaining data was derived:

 $\log x_{\rm p} = 531.24 \ (T/{\rm K})^{-1} + 1.070 \ \log \ (p/{\rm MPa}) - 2.4376 \tag{5}$ 

The average, and maximum deviations of the data from equation (5) are 3.4%, and 10%, respectively. It is cautioned that the application of Raoult's law is unlikely to be accurate at high vapor concentrations, so that equation (5) is approximate only.

The data of Sokolov and Konshin for ethene solubilities in Freon 113 are classified as tentative.

#### 3,3,3-Trifluoro, 1-propene (trifluoropropylene); C₃H₃F₃; [677-21-4]

Zernov et al. (5) reported solubilities in 3,3,3-trifluoro 1-propene at temperatures from 283.1 K to 363.1 K and pressures from 0.393 MPa to 5.88 MPa. Henry's law is only approximately obeyed for the temperatures below 333.1 K. The data at the higher temperatures (at 353.1 K and 363.1 K) appear to be inconsistent with those at the lower temperature.

These data are classified as tentative.

## Acetic acid, trichloro-ethyl ester (ethyltrichloroacetate); C₄H₅Cl₃O₂; [515-84-4]

The results of Kristesashvili et al. (6) for solubilities in acetic acid, trichloro-ethyl ester were shown for the temperatures 363.15 K and 373.15 K and pressures up to 8.1 MPa only in graphical form. Approximate Henry's constants were obtained from the graphs.

These data for acetic acid, trichloro-ethyl ester are classified as tentative.

 $\frac{1-\text{Propene,1,1,2,3,3-pentafluoro-3 trifluoroethenyloxy-(perfluoropropylene}{\text{vinyl ether}); C_5F_8O; [64080-43-9]}$ 

Sokolov and Konshin (4) reported solubilities of ethene in 1,1,2,3,3pentafluoro-3 trifluoroethenyloxy-1-propene at temperatures ranging from

COMPONENTS:	EVALUATOR:
<ol> <li>Ethene; C₂H₄; [74-85-1]</li> <li>Organic halides, pressures greater than 0.2 MPa (2 atm)</li> </ol>	Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5
	January, 1994

### CRITICAL EVALUATION:

298.15 K to 353.15 K and pressures from 0.20 MPa to 1.11 MPa. These data were reported as distribution constants in the form of ratios of concentrations in the liquid phase to those in the gas phase. In addition, the solubilities were expressed in moles per litre and as Henry's constants. It was not possible to calculate mole fraction solubilities because neither solution densities nor gas phase compositions could be estimated. Nor could the tabulated results be checked for consistency.

These data are classified as tentative.

Propane, 1,1,1,3- Tetrachloro-; C₃H₄Cl₄; [1070-78-6] Pentane, 1,1,1,5- Tetrachloro-; C₅H₈Cl₄; [2467-10-9] Heptane, 1,1,1,7- Tetrachloro-; C₇H₁₂Cl₄; [3922-36-9] Nonane, 1,1,1,9- Tetrachloro-; C₉H₁₆Cl₄; [1561-48-4]

Efremova and Kovpakova (7) reported ethene solubilities in the four tetrachloroalkanes in graphical form only, for temperatures ranging from 273.35 K to 373.15 K and for pressures from about 1 MPa to the critical pressures. From these graphs approximate Henry's constants were estimated because Henry's law was obeyed for ethene concentrations of up to about 0.4 mole fraction. When tested for consistency with respect to temperature, it was noted that the ethene solubility in tetrachloropropane solvent was only marginally different than that in tetrachloropentane. It is not clear whether or not this is anomolous because no clear consistency test is available. One might have expected lower solubilities in tetrachloropropane to be consistent with those of the other three solvents.

These approximate results for solubilities in the tetrachloroalkanes are classified as tentative.

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	S:			ORIGINAL ME	ASUREMENTS:		
1. Eth	ene; $C_2 H_4$ ;	[74-85-1]		Lebedev	va, E.S.;	Kashirina	, A.S.;
2. Bromochloromethane; CH ₂ BrCl;				Grokhol	.skaya, V.	Ρ.	
[74-97-5]				Ref. Zh. Khim. Abstr. <u>1971</u> , No.138777, 92-100.			
ARIABLES	: <i>"/</i> × -	323 15 - 4	23 15	PREPARED BY	<: :		
T/K = 323.15 - 423.15 P/MPa = 1.013 - 11.73				W. Hayduk			
XPERIMEN	TAL VALUES:	<u> </u>					
Pres	sure	Mo 5	le Fractio	on Ethene	in Liquid °C		$x_1, y_1$
P/atm	¹ /MPa	<i>x</i> 1	$y_1$	<i>x</i> 1	<i>y</i> 1	<i>x</i> ₁	y ₁
10 20 30 40 50	1.013 2.027 3.040 4.053 5.066	0.005 0.010 0.015 0.040 0.280	0.920 0.940 0.950 0.955 0.945	0.020 0.040 0.065 0.110 0.160	0.740 0.835 0.885 0.890 0.900	0.005 0.040 0.065 0.100 0.130	0.410 0.410 0.595 0.670 0.725
² 56.2 60 70 80 90	5.694 6.080 7.093 8.106 9.119	0.900		0.210 0.250 0.310 0.380 0.500	0.905 0.900 0.895 0.880 0.845	0.165 0.205 0.250 0.305 0.375	0.750 0.775 0.790 0.790 0.780
100 106.5 110 116 Only 1	10.32 10.79 11.15 11.73 		ed data al	0.770 Dove, give	n in this	0.470 0.620 paper.	0.725
100 106.5 110 116 0nly in 1 Calcu	10.79 11.15 11.73 nterpolated	mpiler.		pove, give		0.620	0.725
100 106.5 110 116 Only in ¹ Calcu ² Criti	10.79 11.15 11.73 nterpolated lated by co	mpiler. ons.		DOVE, give		0.620 paper.	0.725
100 106.5 110 116 Only in Calcul Critic Critic Experin ence 1 along y stat and ing th Henry' bilitic pressur 5.0 MP t/C	10.79 11.15 11.73 nterpolated lated by co cal conditi	mpiler. ons. DURE: escribed i vessel was ing block, gauge for data. Ap and ethen onding to of 101.3 k compiler MPa at 50° and 150°C. 100	AUXILIARY n refer- used thermo- measur- proximate e solu- a gas Pa were for C, and 150	Dove, give INFORMATION SOURCE AND 1. Ethe not 2. Brom puri ties in p for base log (P/ ESTIMATED	PURITY OF M ne. Sour specified ochlorome ty not sp and vapo aper. Ap vapor pre d on data atm) = 4. ERROR:	0.620 paper. AATERIALS: ce and pur- thane. So ecified. r pressure proximate ssures (co	rity ource and Densi- es given equation ompiler)

256							
COMPONEN					ORIGINAL MEASUREMENTS:		
1. Et	hene; C ₂ H	1 ₄ ; [74-8	35-1]	:	Shim, J.; Kohn, J.P.		
<pre>2. Trichloromethane (chloroform); CHCl₃; [67-66-3]</pre>					J. C	hem. Eng. Data <u>196</u>	<u>54</u> , 9, 1-2.
VARIABLES: $T/K = 273 - 373$					PREPARED BY:		
P/MPa = 1.0-10.2 (10-100  atm)						W. Hayduk	
EXPERIME	ENTAL VALUES				tial	Liquid Phase	Gas Phase Ethene Mole
t/C	<i>т/</i> К	Total Pi /atm	¹ P/MPa		ssure /MPa	Ethene Mole Fraction, $x_1$	Fraction, $y_1$
0	273.15	10 20 30 40	1.013 2.027 3.040 4.053	2. 3.	013 027 040 053	0.236 0.475 0.708 0.964	1 1 1 1
25	298.15	10 20 30 40 50 60 60.2 ³	1.013 2.027 3.040 4.053 5.066 6.080 6.100	2. 3. 4. 5.	9859 000 018 050 061 946 911	0.148 0.297 0.448 0.606 0.771 0.968 0.969	0.973 0.987 0.993 0.999 0.999 ² 0.978 0.969
50	323.15	10 20 30 40 50 60 70 76.8 ³	1.013 2.027 3.040 4.053 5.066 6.080 7.093 7.782	1. 2. 3. 4. 5.	9150 929 936 931 924 909 802 957	0.114 0.220 0.324 0.431 0.539 0.654 0.777 0.894	0.903 0.952 0.966 0.970 0.972 0.972 ² 0.959 ² 0.894
³ Criti	llated by cal condi d phase a	tions as	s indicate bhase mola	d by r vol	autĥors	so given in this	s paper. continued
100 million la							
Calib were for p cell with solve tial Gas w a hig place sorpt	used in t pressures was initi solvent t nt vapor solvent v as volume h pressur ment with ion was	osilicat wo sizes to 70 at from 70- ally alm hen evac pressure olume wa trically e reserv mercury facilita	e glass co : 12-cm ³ :m and 5-cm ³ :most fille : ost fille : The in: : obtained : charged : otr by dis : Gas ab- ted using stainless	m ³ The d the i- d. from s-	1. E P a s 2. C g B	AND PURITY OF MATER thene was from M urity 99.5%. Ga t 50 atm pressur ilica gel. hloroform was th rade from Mathes ell; no purity g	Matheson; as dried re using ne spectro son Coleman
steel sure plete chang with corre tions exper volum satur	ball. A the cell ly filled e in solu each incr sponding were obt	t the hi was esse with so tion vol ement of gas phas ained us d measur ent nece	ghest pres ntially co- lution. " ume was no gas. The e composi- ing separa ing the sm ssary to	om- The oted e ate	$\delta P / \delta x_1 / x_1$ REFEREN 1. SI	ED ERROR: $P = \pm 0.01 \qquad \delta T$ $= \pm 0.01$ CES: nim, J.; Kohn, J Chem. Eng. Data,	.P.

COMPONEN	TS:				ORIGINAL	MEASUREMENTS :	2
1. Et	chene; C.H	; [74-8	5-1]		Shim, J.; Kohn, J.P.		
2. Tr	<ol> <li>Ethene; C₂H₄; [74-85-1]</li> <li>Trichloromethane (chloroform); CHCl₃; [67-66-3]</li> </ol>					em. Eng. Data <u>19</u>	
VARIABLE	S: $T/K =$	273-373			PREPARED	BY:	<u> </u>
	P/MPa =	1.0-10.2	(10-100 a	atm)		W. Hayduk	•
EXPERIME	NTAL VALUES:			Pa	rtial	Liquid Phase	Gas Phase
t/C	T/K	Total P: /atm	ressure ¹ P/MPa	ıPr 1 _{p/}	essure 'MPa	Ethene Mole Fraction, $x_1$	Ethene Mole Fraction, $y_1$
75	348.15	10 20 30 40 50 60 70 80 90 90.9 ³	1.013 2.027 3.040 4.053 5.066 6.080 7.093 8.106 9.119 9.210	1. 2. 3. 4. 5. 7. 7.	8390 834 845 838 813 776 688 506 97 645	0.078 0.164 0.247 0.328 0.412 0.500 0.594 0.694 0.816 0.830	$\begin{array}{c} 0.828 \\ 0.905 \\ 0.936 \\ 0.947 \\ 0.950 \\ 0.950 \\ 0.943^2 \\ 0.926^2 \\ 0.874^2 \\ 0.830 \end{array}$
³ Criti	373.15	compiler. tions as	indicated	1. 2. 3. 4. 5. 6. 7. 8. 8. 8. 8. 2 In 1 by	authors.		0.658 0.833 0.870 0.886 0.902 0.904 ² 0.902 ² 0.888 ² 0.837 ² 0.797
Lıquı	d phase an	nd has pl	<del>., .</del> .		INFORMATIO	o given in this 	s paper.
METHOD/A	PPARATUS/PRO	CEDURE:			<b></b>	D PURITY OF MATER	IALS:
METHOD/APPARATUS/PROCEDURE: Calibrated borosilicate glass cells were used in two sizes: 12-cm ³ for pressures to 70 atm and 5-cm ³ for pressures from 70-100 atm. The cell was initially almost filled with solvent then evacuated to the solvent vapor pressure. The ini- tial solvent volume was obtained. Gas was volumetrically charged from a high pressure reservoir by dis- placement with mercury. Gas ab- sorption was facilitated using a magnetically actuated stainless steel ball. At the highest pres- sure the cell was essentially com-			<ol> <li>Eth pun at sil</li> <li>Chl gra Bel</li> </ol>	hene was from M rity 99.5%. Ga 50 atm pressur Lica gel. Loroform was th ade from Mathes L1; no purity g	atheson; s dried e using e spectro on Coleman iven.		
pletel change with e corres tions experi volume satura	the cell will by filled will each increase aponding ga were obtained iments and e of solves ate the gas ate the gas	with solu ion volum ment of o as phase ined usin measurin nt neces	ution. The me was not gas. The composi- ng separat ng the sma sary to	ne ted te	$\frac{\delta x_1 / x_1}{\text{REFERENCE}}$ 1. Shi	= ±0.01	.P.

(

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COMPONENTS:	· · · · ·	ORIGINAL MEASUREMENTS:		
1. Ethene; $C_2H_4$ ;	[74-85-1]	Konobeev, B.I.; Lyapin, V.V.		
2. Tetrachloromethane(Carbon Tetrachloride); CCl ₄ ; [56-23-5]		Khim. Prom. <u>1967</u> , 43, 114-6.		
VARIABLES:	93.15 - 333.15	PREPARED BY:		
	.29 - 3.18	C. L. Young		
EXPERIMENTAL VALUES:		I		
т/к	<i>P/</i> 10 ⁵ Pa	Nole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$		
293.15	2.857 8.299 12.77 17.02 17.63 25.33	0.036 0.117 0.187 0.254 0.250 0.372		
313.15	31.11 2.878 8.217 14.19 17.63 18.95 28.37	0.642 0.026 0.089 0.158 0.188 0.216 0.317		
333.15	31.61 2.998 8.248 15.20 17.73 28.27 31.82	0.342 0.020 0.070 0.139 0.154 0.254 0.276		
		'INFORMATION		
METHOD/APPARATUS/PROC	EDURE :	SOURCE AND PURITY OF MATERIALS;		
magnetic stirrer.	m cell fitted with Samples analysed aphy. Details in	<ol> <li>Purity better than 99.6 mole per cent.</li> <li>No details given.</li> </ol>		
		ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta P = \pm 0.5\%; \ \delta x_{C_2H_4} = \pm 0.002$ (estimated by compiler) REFERENCES:		

CONDONENTES -	259		
COMPONENTS:	ORIGINAL MEASUREMENTS:		
<pre>1. Ethene; C₂H₄; [74-85-1]</pre>	Konobeev, B.I.; Lyapin, V.V.		
<pre>2. 1,2-Dichloroethane; C₂H₄Cl₂; [107-06-2]</pre>	Khim. Prom. <u>1967</u> ,43, 114-6.		
VARIABLES: T/K = 293.15 - 333.15	PREPARED BY:		
<i>P/M</i> Pa = 0.29 - 3.11	C. L. Young		
EXPERIMENTAL VALUES:	· ·		
т/К <i>Р</i> /10 ⁵ Ра	Mole fraction of ethene in liquid ${}^{x}C_{2}H_{4}$		
293.15 8.177 15.60 17.53	0.028 0.078 0.154 0.179		
30.80 313.15 2.878 8.217 17.63 31.11	0.337 0.020 0.060 0.140 0.267		
333.15 8.238 17.83	0.015 0.048 0.116		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Static equilibrium cell fitted with , magnetic stirrer. Samples analysed by gas chromatography. Details in	1. Purity better than 99.6 mole per cent.		
source.	2. No details given.		
	ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta P = \pm 0.58;  \delta x_{C_2 H_4} = \pm 0.002$		
	(estimated by compiler) REFERENCES:		

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COMPONEN	TS:			ORIGINAL MEASUREMENTS:			
1. Eth	ene; C ₂ H	i <b>₁;</b> [74-8	35–1]	Sokolov, Yu. P.; Konshin, A.I. Zh. Prikl. Khim. <u>1989</u> ,62,			
			loro-1,2,2-				
	fluoro- 1,F,; [7		13);	1395-1398.			
2	3 3						
VARIABLE	S: m/y	- 200 1	5 262 15	PREPARED BY:	<u></u>		
		. <u>≖</u> 300. . ≖ 0.20	5 - 363.15 - 1.11	W. Hay	/duk		
EXPERIME	INTAL VALUE	ES:			_		
		Pressure	Sol	ubility	² Henry's Constant		
t/°C	¹ <i>T</i> /K	P/MPa	C ₁ , mol/litre	$x_1$ , mol fraction	H/MPa(mol fraction)		
27	300.15	0.20	0.25	0.029	5.33		
		0.31	0.47 0.87	0.054 0.095	· · -		
		0.51	1.51	0.154			
70	343.15	0.31	0.08	0.010	7.91		
70	343.13	0.51	0.29	0.037	1.51		
		0.71 0.91	0.51 0.79	0.064 0.097			
		1.11	1.01	0.123			
90	363.15	0.51	0.11	0.015	9.15		
		0.71	0.30	0.040			
				A			
	lated by d by aut	0.91 1.11 Compile	0.47 0.64 er. be lim $(p_1/x_1)$	$\begin{array}{r} 0.062\\ 0.083 \end{array}$ for $p_1$ = partial p	pressure of gas.		
		0.91 1.11 Compile	0.47 0.64	0.083	pressure of gas.		
		0.91 1.11 Compile	0.47 0.64 er. be lim $(p_1/x_1)$	0.083 for p ₁ = partial p	pressure of gas.		
² State		0.91 1.11 Compile hors to	0.47 0.64 er. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I	0.083 for p ₁ = partial p			
² State METHOD/A The so: using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample	d by aut PPARATUS/F lubilitic a stirred ic drive and a su ature co ng system of 100-: t was cha uilibrate chamber	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm ³ arged to ed. A s was use	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of of th a pressure g jacket for Gas and sample attached. A of deaerated the reactor mall liquid d to confine a	0.083 for p ₁ = partial p NFORMATION	MATERIALS: ubout gas and		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known	d by aut PPARATUS/ lubilition a stirred ic drive and a su ature con of 100- t was cha uilibrate chamber volume o	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm ³ arged to ed. A s was use f satura	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of of th a pressure g jacket for Gas and sample attached. A of deaerated of the reactor mall liquid d to confine a ted solution.	0.083 for p ₁ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of	MATERIALS: ubout gas and		
² State METHOD/A The so: using a 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora	A by aut APPARATUS/F lubilitie a stirred ic drive ³ and equ and a su ature con ng system of 100-: t was cha uilibratd chamber volume o: mple was ated into	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm 3 arged to ed. A se f satura then co o a much	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of ith a pressure g jacket for Gas and sample attached. A of deaerated the reactor mall liquid d to confine a ted solution. mpletely larger vessel.	0.083 for p ₁ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied.	MATERIALS: about gas and or purity was		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora Helium increas	PPARATUS/ Iubilitie a stirredic drive a stirredic drive a and a su ature con ng system of 100- t was cha uilibrate chamber volume of mple was ated inte carrier se the pr	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundinn ntrol. ms were 200 cm ³ arged to ed. A s was use f satura then coo o a much gas was ressure	0.47 0.64 or. be lim $(p_1/x_1)$ $x_{1\rightarrow0}$ AUXILIARY I AUXILIARY I measured or with a a volume of with a pressure g jacket for Gas and sample attached. A of deaerated the reactor mall liquid d to confine a ted solution. mpletely larger vessel. used to of the vapor-	0.083 for p ₁ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied.	MATERIALS: ubout gas and		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora Helium increas gas mix	d by aut PPARATUS/F lubilitic a stirree ic drive a and a sui ature con ng system of 100-: t was cha uilibrato chamber volume on mple was ated into carrier se the po xture to	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundinn ntrol. ms were 200 cm arged to ed. A s was use f satura then co o a much gas was ressure about 0	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of dith a pressure g jacket for Gas and sample attached. A of deaerated the reactor mall liquid d to confine a ted solution. mpletely larger vessel. used to of the vapor- .12 MPa. The	0.083 for $p_1$ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied. ESTIMATED ERROR: $\delta C_1 = \pm 3$	MATERIALS: about gas and or purity was		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora Helium increas gas min sample chromat	d by aut PPARATUS/F lubilitic a stirred ic drive and a suir and a suir and a suir ature con ng system of 100-: t was cha uilibrate chamber volume or mple was ated inte carrier se the pr xture to was then	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm arged to ed. A s was use f satura then co o a much gas was ressure about 0 hanalyz	0.47 0.64 or. be lim $(p_1/x_1)$ $x_{1\rightarrow0}$ AUXILIARY I AUXILIARY I measured or with a a volume of with a pressure g jacket for Gas and sample attached. A of deaerated the reactor mall liquid d to confine a ted solution. mpletely larger vessel. used to of the vapor-	0.083 for $p_1$ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied. ESTIMATED ERROR: $\delta C_1 = \pm 3$ REFERENCES:	MATERIALS: about gas and or purity was		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora Helium increas gas mix sample	d by aut PPARATUS/F lubilitic a stirred ic drive and a suir and a suir and a suir ature con ng system of 100-: t was cha uilibrate chamber volume or mple was ated inte carrier se the pr xture to was then	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm arged to ed. A s was use f satura then co o a much gas was ressure about 0 hanalyz	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of dith a pressure g jacket for Gas and sample attached. A of deaerated of the reactor mall liquid d to confine a ted solution. mpletely larger vessel. used to of the vapor 12 MPa. The ed by gas	0.083 for $p_1$ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied. ESTIMATED ERROR: $\delta C_1 = \pm 3$ REFERENCES:	MATERIALS: about gas and or purity was		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora Helium increas gas min sample chromat	d by aut PPARATUS/F lubilitic a stirred ic drive and a suir and a suir and a suir ature con ng system of 100-: t was cha uilibrate chamber volume or mple was ated inte carrier se the pr xture to was then	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm arged to ed. A s was use f satura then co o a much gas was ressure about 0 hanalyz	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of dith a pressure g jacket for Gas and sample attached. A of deaerated of the reactor mall liquid d to confine a ted solution. mpletely larger vessel. used to of the vapor 12 MPa. The ed by gas	0.083 for $p_1$ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied. ESTIMATED ERROR: $\delta C_1 = \pm 3$ REFERENCES: 1. Sokolov, Yu.	MATERIALS: about gas and or purity was		
² State METHOD/A The so using a magnet: 250 cm gauge a tempera handlin volume solvent and equ sample known v The sam evapora Helium increas gas min sample chromat	d by aut PPARATUS/F lubilitic a stirred ic drive and a suir and a suir and a suir ature con ng system of 100-: t was cha uilibrate chamber volume or mple was ated inte carrier se the pr xture to was then	0.91 1.11 Compile hors to PROCEDURE: es were d reactor having uipped w rroundin ntrol. ms were 200 cm arged to ed. A s was use f satura then co o a much gas was ressure about 0 hanalyz	0.47 0.64 or. be lim $(p_1/x_1)$ $x_1 \rightarrow 0$ AUXILIARY I measured or with a a volume of dith a pressure g jacket for Gas and sample attached. A of deaerated of the reactor mall liquid d to confine a ted solution. mpletely larger vessel. used to of the vapor 12 MPa. The ed by gas	0.083 for $p_1$ = partial p NFORMATION SOURCE AND PURITY OF No information a solvent source of supplied. ESTIMATED ERROR: $\delta C_1 = \pm 3$ REFERENCES: 1. Sokolov, Yu.	MATERIALS: about gas and or purity was % (Compiler) A.; Konshin, A.I.		

OMPONENTS	5:		· · ·	ORIGIN	AL MEASUREMENT	S:	2(
1. Eth	ene; C _{,H} ;	[74-85-1]		Zer	nov, V.S.; 1	Kogan, V.B.	;
2.3,3	<pre>2. 3,3,3-Trifluoro, l-Propene (Trifluoropropylene); C,H,F;;</pre>			Lyubetskii, S.G.; Duntov, F.I.			
(Tr [67	ifluoroprop 7-21-4]	pylene); C ₃ H ₃ F ₃ ;	;	Zh.	Prikl. Khim.	<u>1971</u> , 44,	683-686,
				(J. Ap	p. Chem. USS.	R <u>1971</u> , 44,	693-696)
VARIABLES	T/K = 28	3.1-363.1		PREPAR	ED BY:		
		.88, (3.9-58.0 a	atm)		W. Hayduk		,
XPERIMEN	TAL VALUES:					•	
		¹ Ethene Partial		LEthe	ne	Molar	3
Т /К	Pressure P/Mpa	$\frac{p_{p_s}}{MPa}$	Ma Liqu		action Gas,y _i	Volume/cm Liquid	Gas
283.1	0.393	0			0	100.6	5280
	0.980	0.483		.065	0.493	100.9	1960
	1.57 2.94	0.989 2.558		.133 .364	0.630 0.870	101.2 102.0	1120 510
	3.92	3.783		600	0.965	102.0	350
	4.90	4.753		902	0.970	113.5	160
293.1		0	0		0	100.9	3870
	0.980	0.392		.044	0.400	101.1	2050
	1.57 2.94	0.879 2.387		.102	0.560 0.812	101.5 102.4	1175 542
	3.92	3.783		600	0.965	102.4	375
	4.90	4.655		695	0.950	105.0	240
303.1		0	0		0	101.7	2860
	0.980 1.57	0.294 0.735	0	.020 .068	0.300 0.468	101.9 102.3	2120 1230
	rst pressu	Mole percent so re for each diff				he solvent	vapor inued
			TTADY	TNEODW	MTON		
TETUOD /AD	PARATUS/PROCI		LIARY	INFORM/	AND PURITY OF	MATERIALC	<u> </u>
		nsisted of two		1	Ethene was		pure.
		walled glass tub	bes	1			-
5 mm i length contro be ind	n diameter sealed in lled jacke ependently	and 60 cm in a temperature- t. Mercury coul charged to the	ld		Trifluoropro pure and had point of 248	a normal	99.96% boiling
tion t electr in the	ube was eq omagnetic mercury t	ube. The satura uipped with an vibrator immerse o aid in equili-	ed -				
bratio mercur	n of the p y reservoi	hases. A separa r was pressurize	ate ed				
with n	itrogen wh	ose pressure cou thylene was stor	uld	ESTIMA	TED ERROR: δ	$T/K = \pm 0.0$	5
in one	tube, whi	le the solvent v equilibration	was	}		$x = \pm 0.0$	
tube.	The ethyl	ene was transfer ube as required.	rred			1´_1 (co	mpiler)
The so	lubility m	ethod was thus a	a	REFERE	NCES:		
The de	tric one. Insities of	the liquefied	nor-				
ties o	t as well of the solu in the pap	as critical prop tions are also er.	her				
grven	TH CHE bab						
	· ·			<u> </u>			

$\begin{array}{c} (Trifluoropropylene); C_{3}H_{3}F_{3}; \\ [677-21-4] \\ \\ \hline \\ [677-21-4] \\ \hline \\ [677-21-4] \\ \hline \\ \\ \hline \\ [677-21-4] \\ \hline \\ \hline \\ \hline \\ $	MPONENT	S:	1		ORIGINAL MEASUREMENTS:				
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	l. Eth	ene; $C_2 H_4$ ;	[74-85-1]		Zernov, V.S.; Kogan, V.B.;				
(J. App. Chem. USGR 1971, 44, 693-69(AMDLES: TYK = 283.1-363.1//MPa 0.393-5.88, (3.9-58.0 atm)PREPARED BY: W. HaydukW. HaydukNois Fraction PressurePressure PressurePressure PressurePressure PressureNois Fraction PressureNois Fraction	<pre>2. 3,3,3-Trifluoro, 1-Propene (Trifluoropropylene); C₃H₃F₃; [677-21-4]</pre>								
//PRa = 0.393-5.88, (3.9-58.0 atm)W. HaydukRIMENTAL VALUES: Tressurecontinued Total 'Ethene Partial 'Ethene Partial Nole Fraction Pressure'Volume/cn³(mole) = Volume/cn³(mole) = Liquid Gas3.12.942.1810.2220.742103.35603.12.942.1810.2220.742103.35603.10.960000102.921201.570.6060.0420.386103.412902.941.9020.1700.647104.73503.10.9800000.2921203.41.9020.1700.647104.75703.923.1160.3080.795106.23964.904.1900.4900.855107.92785.885.0270.7100.855113.01503.11.60000108.612301.990.6250.1284.2340.525110.96203.922.4500.1930.625112.84024.903.5280.3300.720116.12905.884.2340.5250.720135.0162Iculated by compiler; ethene partial pressure is based on the gas phasmposition, $y_1$ . Mole percent solvent was given in the paper.2AUXILIARY INFORMATIONSource AND FURITY OF MATERIALS:Iculated in a cupit- regulated.<									
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	ercur; ith n; e reg n one onden; ube. o the he so olumet	itrogen who ulated. Et tube, whil sed in the The ethyle solvent tu lubility me tric one.	was pressurize se pressure cou hylene was stor e the solvent w equilibration ne was transfer be as required. thod was thus a	ed eld ed vas red		٥ ۵ شي	$/x_{1} = \pm 0.03$	2	
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COMPONENT				ORIGINAL MEASUREMENTS:			
1. Eth	nene; $C_2 H_4$ ;	[74-85-1]		Zernov, V.S.; Kogan, V.B.;			
<pre>2. 3,3,3-Trifluoro, 1-Propene (Trifluoropropylene); C₃H₃F₃; [677-21-4]</pre>						.G.; Duntov, <u>1971</u> , 44,	
				(J. Ap	p. Chem. U	SSR <u>1971</u> , #4	, 693-696
ARIABLES	s: 1/K = 28	3.1-363.1		PREPAR	ED BY: W. Haydul		
P/MPa	a = 0.393-5	.88, (3.9-58.0	atm)		w. nayuur	, ,	
EXPERIMEN	NTAL VALUES:	continued	,				
<u>т/к</u>	Total Pressure P/MPa	¹ Ethene Partial Pressure $p_1$ /MPa	Mo		ie iction Gas, y,	Molar Volume/cm ³ Liquid	(mole)-1 Gas
		F 1			/01		
353.1	2.50	0	0		0	118.5	725
	2.94 3.92	0.867 1.646		028 093	0.295 0.420	119.5 122.1	640 415
	4.90	2.646		195	0.420	122.1	300
	5.88	3.263		350	0.555	139.0	172
363.1	2.92	0	0		0	127.7	570
	3.38	0.862		030	0.255	129.5	520
	3.92	1.250		060	0.319	131.4	422
	4.90 5.88	2.132 2.56		155	0.435 0.435	$138.0 \\ 153.5$	305 180
compos	sition, y ₁ . .rst pressu	mpiler; ethene Mole percent s re for each dif	partia colvent	l pres was g	sure is ba iven in th	used on the g ne paper.	
compos The fi	sition, y ₁ . .rst pressu	Mole percent s	partia colvent	l pres was g	sure is ba iven in th	used on the g ne paper.	
compos The fi	sition, y ₁ . .rst pressu	Mole percent s re for each dif	partia colvent	l pres was g	sure is ba iven in th crature is	used on the g ne paper.	
compos The fi pressu METHOD/AN The ap	PPARATUS/PROC	Mole percent s re for each dif AUX CEDURE: nsisted of two	partia olvent ferent (ILIARY	il pres was g tempe INFORMA	sure is ba iven in th erature is TION AND PURITY C	used on the g ne paper.	vapor
Compos The fi pressu METHOD/AI The ap gradua 5 mm i length contro be ind bottom tion t electr in the bratio	PPARATUS/PROO paratus co ted thick- in diameter h sealed in plied jacke dependently n of each t tube was eq comagnetic e mercury t on of the p	Mole percent s re for each dif AUX CEDURE:	partia olvent ferent (ILIARY bes lld a- aed -	INFORMA SOURCE 1. I 2. T	sure is ba iven in the rature is TION AND PURITY C Chene was Crifluoropr	or the solvent DF MATERIALS: 99.3 mole % or ylene was ad a normal b	vapor pure. 99.96%
Compos The fi pressu AETHOD/AI The ap gradua 5 mm i length contro be ind bottom tion t electr in the bratio with n	PPARATUS/PROD paratus conted thick- In diameter is sealed in plied jacked in of each t tube was equipation comagnetic e mercury t on of the p ry reservoi	Mole percent s re for each dif AUX ZEDURE: nsisted of two walled glass tu and 60 cm in a temperature- t. Mercury cou charged to the ube. The satur uipped with an vibrator immers o aid in equili hases. A separ r was pressuriz ose pressure co	partia olvent ferent (ILIARY ibes ild a- act ate ate	INFORMA SOURCE 1. H 2. T	sure is ba liven in the erature is TION AND PURITY C Thene was Crifluoropr bure and ha coint of 24	ased on the g ne paper. the solvent OF MATERIALS: 99.3 mole % ropylene was ad a normal b 8 K.	vapor pure. 99.96% oiling
Compos The fi pressu #ETHOD/AI The ap gradua 5 mm i length contro be ind bottom tion t electr in the bratio mercur with n be reg in one	PPARATUS/PROO paratus conted thick- in diameter in sealed in bled jacke dependently of each t tube was eq comagnetic e mercury t of the p cy reservoi hitrogen wh gulated. E e tube, whi	Mole percent s re for each dif AUX ZEDURE: nsisted of two walled glass tu and 60 cm in a temperature- t. Mercury cou charged to the ube. The satur uipped with an vibrator immers o aid in equili hases. A separ r was pressuriz ose pressure co thylene was sto le the solvent	partia ferent ferent (ILIARY ibes ild a- aced ored	INFORMA SOURCE 1. H 2. T	sure is ba iven in the rature is TION AND PURITY Of Thene was Crifluoroproure and has ooint of 24 TED ERROR: 6	DF MATERIALS: 99.3 mole % or opylene was ad a normal b 8 K. 27/K = ± 0.05	vapor pure. 99.96% oiling
Compos The fi pressu The fi pressu The ap gradua 5 mm i length contro be ind bottom tion tr electr in the bratio mercur with n be reg in one conden tube.	PPARATUS/PROO paratus conted thick- in diameter belied thick- in diameter belied jacke dependently of each t tube was eq comagnetic e mercury t on of the p ry reservoi ditrogen wh gulated. E tube, whi is tube thy	Mole percent s re for each dif AUX CEDURE: nsisted of two walled glass tu and 60 cm in a temperature- t. Mercury cou charged to the ube. The satur uipped with an vibrator immers o aid in equili hases. A separ r was pressuriz ose pressure co thylene was sto le the solvent equilibration ene was transfe	partia solvent ferent (ILIARY ubes a- aed a- ate ced ored was erred	INFORMA SOURCE 1. H 2. T	sure is ba iven in the rature is TION AND PURITY Of Thene was Crifluoroproure and has obint of 24 TED ERROR: 6	ased on the g ne paper. the solvent OF MATERIALS: 99.3 mole % ropylene was ad a normal b 8 K. GT/K = ± 0.05 c, /x, = ± 0.02	vapor pure. 99.96% oiling
Compos The fi pressu AETHOD/AI The ap gradua 5 mm i length contro be ind bottom tion t electr in the bratio mercur with n be reg in one conden tube. to the solven	PPARATUS/PROO oparatus co ted thick- in diameter in sealed in olled jacke dependently of each t cube was eq comagnetic e mercury t on of the p ry reservoi ditrogen wh gulated. E tube, whi ised in the The ethyl solvent t olubility m etric one.	Mole percent s re for each dif AUX CEDURE: nsisted of two walled glass tu and 60 cm in a temperature- t. Mercury cou charged to the ube. The satur uipped with an vibrator immers o aid in equili hases. A separ r was pressuriz ose pressure co thylene was sto le the solvent equilibration ene was transfe ube as required ethod was thus the liquefied as critical pro	partia olvent ferent (ILIARY bes d d a- ade ate ced was erred a	INFORMA SOURCE 1. H 2. T	sure is ba liven in the rature is TION AND PURITY O Thene was Crifluoroproure and he point of 24 TED ERROR: 6	ased on the g ne paper. the solvent OF MATERIALS: 99.3 mole % ropylene was ad a normal b 8 K. GT/K = ± 0.05 c, /x, = ± 0.02	vapor pure. 99.96% oiling
compos The fi pressu ÆTHOD/AI The ap gradua 5 mm i length contro be ind bottom tion t electr in the bration mercur with n be reg in one conden tube. to the The solven ties o	PPARATUS/PROO oparatus co ted thick- in diameter in sealed in olled jacke dependently of each t cube was eq comagnetic e mercury t on of the p ry reservoi ditrogen wh gulated. E tube, whi ised in the The ethyl solvent t olubility m etric one.	Mole percent s re for each dif AUX ZEDURE: nsisted of two walled glass tu and 60 cm in a temperature- t. Mercury cou charged to the ube. The satur uipped with an vibrator immers o aid in equili hases. A separ r was pressuriz ose pressure co thylene was sto le the solvent equilibration ene was transfe ube as required ethod was thus the liquefied as critical pro tions are also	partia olvent ferent (ILIARY bes d d a- ade ate ced was erred a	INFORMA SOURCE 1. I 2. T ESTIMA	sure is ba liven in the rature is TION AND PURITY O Thene was Crifluoroproure and he point of 24 TED ERROR: 6	ased on the g ne paper. the solvent OF MATERIALS: 99.3 mole % ropylene was ad a normal b 8 K. GT/K = ± 0.05 c, /x, = ± 0.02	vapor pure. 99.96% oiling

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COMPONENTS:	d		ORIGINAL MEASUREMENTS:		
1. Ethene; $C_2 H$	4; [74-85-1]		Sokolov, Yu. P.;	Konshin, A.I.	
	,1,2,3,3-pentafluor		Zh. Prikl. Khim	. <u>1989</u> , 62,	
	ethenyloxy- or per- pylene vinyl) ether 80-43-9]		1395-1398.		
VARIABLES:			PREPARED BY:	· · · · · · · · · · · · · · · · · · ·	
T/K	= 298.15 - 353.15 = 0.20 - 1.32		W. Hay	yđuk	
EXPERIMENTAL VALU	ES:	I	<u></u>		
<i>t/°C ¹T/K</i>	Pressure <u>Solubili</u> <i>P</i> /MPa <i>C</i> ₁ /mol/lit		² Distribution Constant, K _d	³ Henry's Constant H/MPa/mol fraction	
25 298.15	0.20 0.08 0.31 0.23		3.40	5.79	
	0.51 0.52	2			
	0.71 0.80 0.91 0.97				
	1.11 1.34 1.32 1.62				
50 323.15	0.51 0.31		2.76	7.11	
	0.71 0.47 0.91 0.71				
	1.11 0.87 1.32 1.12				
70 343.15	0.71 0.37	1	2.64	8.58	
	0.91 0.51 1.11 0.76				
80 353 15	1.32 0.95	5	1 66	11 20	
80 353.15	0.71 0.23 0.91 0.32 1.11 0.46	2	1.66	11.30	
	constant K = $C_{1}/C_{1}$				
	AUXILI	IARY INF	FORMATION		
METHOD/APPARATUS/	PROCEDURE :		SOURCE AND PURITY OF	F MATERIALS:	
using a stirre magnetic drive 250 cm ³ and eq gauge and a su temperature co handling syste volume of 100- solvent was ch and equilibrat sample chamber	200 cm ³ of deaerate arged to the reacto ed. A small liquid was used to confin	aure or Aple A ed or I ae a	No information a solvent source o supplied.		
The sample was evaporated int Helium carrier increase the p gas mixture to sample was the	n analyzed by gas	ssel.	ESTIMATED ERROR: $\delta C_1 = \pm 3$ REFERENCES:	3% (Compiler)	
	. Details are in R	lef.		A.; Konshin, A.I.	
			Zh. Prikl. KH	nim. <u>1987</u> , 60, 2720.	
	5e @1		· · · · · · · · · · · · · · · · · · ·		

COMPONENTS:	26
	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_4$ ; [74-85-1]	Efremova, G.D.; Kovpakova, P.F.
2. Propane, 1,1,1,3-Tetrachloro-;	Zhur. Fiz. Khim. <u>1958</u> , 32, 1231-1240.
C ₃ H ₄ Cl ₄ ; [1070-78-6]	
VARIABLES: T/K = 273.35 - 373.15	PREPARED BY:
<i>p</i> ₁ /MPa = 1.013 - 10.13	W. Hayduk
EXPERIMENTAL VALUES:	
¹ Henry's Co t/C T/K H/Atm (mole f	$p_{1} = 101.3 \text{ kPa}$
0.2 273.35 70	0.0143
25 298.15 104	0.0096
50 323.15 133	0.0075
75 348.15 160	0.0063
100 373.15 188	0.0053
reported for high concentrations of e	chene at high pressures.
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The apparatus and procedure are	1. Ethene purity 97.5% by analysis.
described in ref. 1. The equili- bration device is a capillary tube 1 mm in diameter containing an internal mixer which is moved up and down by means of an external, motor-driven magnet. The capillary tube is sealed in a vertical position and connected to a gas and liquid charging system, pressure gauges, as well as a volume regulator to maintain a constant pressure and to determine the volume of gas charged. Graphs of liquid solution molar volumes are also given as a function of solution compositions, including those for critical values at high pressures.	2. Tetrachloro-propane vacuum distilled. Actual purity not given. Density and refractive index at 20°C: $\rho = 1.4325 \text{ g cm}^{-3}$ , $n_D = 1.4806$ ESTIMATED ERROR: $\delta x_1/x_1 = \pm 4$ % (compiler) REFERENCES: 1. Kritchevskii, I.R.; Efremova, G.D.
· · · · · · · · · · · · · · · · · · ·	Zhur. Fiz. Khim. <u>1956</u> , 30, 1877.

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1]. achloro-; - 373.15 10.13 ¹ Henry's C H/Atm (mole 74 108	Efremova, G.D.; Kovpakova, P.F. Zhur. Fiz. Khim. <u>1958</u> , 32, 1231-1240 PREPARED BY: W. Hayduk onstant, ¹ Mole Fraction Ethene, $x_1$ fraction) ⁻¹ for $P_1 = 101.3$ kPa 0.0135
- 373.15 10.13 ¹ Henry's C H/Atm (mole 74 108	PREPARED BY: W. Hayduk Onstant, ¹ Mole Fraction Ethene, $x_1$ fraction) ⁻¹ for $P_1 = 101.3$ kPa
- 373.15 10.13 ¹ Henry's C H/Atm (mole 74 108	PREPARED BY: W. Hayduk Onstant, ¹ Mole Fraction Ethene, $x_1$ fraction) ⁻¹ for $P_1 = 101.3$ kPa
10.13 ¹ Henry's C H/Atm (mole 74 108	W. Hayduk Constant, ¹ Mole Fraction Ethene, $x_1$ fraction) ⁻¹ for $p_1 = 101.3$ kPa
10.13 ¹ Henry's C H/Atm (mole 74 108	W. Hayduk Constant, ¹ Mole Fraction Ethene, $x_1$ fraction) ⁻¹ for $p_1 = 101.3$ kPa
10.13 ¹ Henry's C H/Atm (mole 74 108	onstant, ¹ Mole Fraction Ethene, $x_1$ fraction) ⁻¹ for $p_1 = 101.3$ kPa
¹ Henry's C H/Atm (mole 74 108	fraction) ⁻¹ for $p_1 = 101.3$ kPa
H/Atm (mole 74 108	fraction) ⁻¹ for $p_1 = 101.3$ kPa
H/Atm (mole 74 108	fraction) ⁻¹ for $p_1 = 101.3$ kPa
108	0.0135
4.3.2	0.0093
133	0.0075
162	0.0062
192	0.0052
AUXILIARY	INFORMATION
	SOURCE AND PURITY OF MATERIALS;
a equili- llary ntaining is moved an external, e capillary ical o a gas em, as a volume constant e the n molar s a positions, ical values	$\rho = 1.3455 \text{ g cm}^{-3}$ , n _p = 1.4879
	are are e equili- llary ntaining is moved an external, e capillary ical o a gas em, as a volume constant e the n molar a a ositions,

COMPONENTS :			ORIGINAL MEAS	UREMENTS :
1. Ethene; C ₂ H ₄ ; [74-85-1]			(	G.D.; Kovpakova, P.F.
2. Heptane, 1,1,1,7-Tetrachloro-;				. Khim. <u>1958</u> , 32, 1231-1240
-	_; [3922-36-9]		Dint, FDN	. Know. <u>1990</u> , 02 ; 1291-1240
07112 01	4 F [3522-30-3]			
/ARIABLES:			PREPARED BY:	
	T/K = 273.35 - 100	373.15		W. Hayduk
	01/MPa = 1.013 - 1	0.13		H. nayuux
EXPERIMENTAL '	VALUES:			
			,	
t/C	1 T/K H/2	Henry's Co Atm (mole f	pnstant, Fraction) ⁻¹	¹ Mole Fraction Ethene, $x$ for $p_1 = 101.3$ kPa
0.2	273.35	70		0.0143
25	298.15	93		0.0108
50	323.15	117		0.0085
75	348.15	139		0.0072
100	373.15	164		0.0061
evaluated numerical closely up Phase equi graphicall compositio	aw constants and by the compiler solubility data. to about 0.40 m librium composit y shown as a fun on range to 99 mo	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent	yed graphs o law was obse on ethene fo nene in liqu cessure over ethene. Cr	tities at 101.3 kPa were only; there were no erved to fit the data or all temperatures. And solutions are the complete ethene citical phenomena are
evaluated numerical closely up Phase equi graphicall compositio	aw constants and by the compiler solubility data. to about 0.40 m librium composit y shown as a fund	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent	yed graphs o law was obse on ethene fo nene in liqu cessure over ethene. Cr	only; there were no prved to fit the data or all temperatures. did solutions are the complete ethene citical phenomena are
evaluated numerical closely up Phase equi graphicall compositio	aw constants and by the compiler solubility data. to about 0.40 m librium composit y shown as a fun on range to 99 mo	from enlarg Henry's l ole fractio ions of eth ction of pr le percent ations of e	yed graphs o law was obse on ethene fo nene in liqu cessure over ethene. Cr	only; there were no prved to fit the data or all temperatures. did solutions are the complete ethene citical phenomena are
evaluated numerical closely up Phase equi graphicall compositic reported f	aw constants and by the compiler solubility data. to about 0.40 m librium composit y shown as a fun on range to 99 mo	from enlarg Henry's l ole fractio ions of eth ction of pr le percent ations of e	yed graphs o Law was obse on ethene fo mene in liqu ressure over ethene. Cr athene at hi INFORMATION	only; there were no prved to fit the data or all temperatures. did solutions are the complete ethene citical phenomena are
evaluated numerical closely up Phase equi graphicall compositic reported f	aw constants and by the compiler : solubility data. to about 0.40 me librium composit y shown as a fun- on range to 99 mo for high concentration TUS/PROCEDURE:	from enlarg Henry's l ole fractio ions of eth ction of pr le percent ations of e AUXILIARY	yed graphs of law was observed on ethene for thene in lique cessure over ethene. Cr athene at hi INFORMATION	URITY OF MATERIALS:
evaluated numerical closely up Phase equi graphicall compositic reported f	aw constants and by the compiler : solubility data. to about 0.40 m librium composit. y shown as a fun- on range to 99 mo for high concentra TUS/PROCEDURE:	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY	yed graphs of law was observed on ethene for mene in lique cessure over ethene. Cr athene at hi INFORMATION SOURCE AND PR 1. Ethene	only; there were no erved to fit the data or all temperatures. And solutions are the complete ethene citical phenomena are ogh pressures. URITY OF MATERIALS:
evaluated numerical closely up Phase equi graphicall compositic reported f	aw constants and by the compiler solubility data. to about 0.40 m librium composit y shown as a func- on range to 99 mo for high concentra TUS/PROCEDURE:	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary	yed graphs of Law was observed on ethene for thene in lique tessure over ethene. Cr thene at his INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distil	only; there were no erved to fit the data or all temperatures. And solutions are the complete ethene titical phenomena are ogh pressures. URITY OF MATERIALS: Purity 97.5% by analysis chloro-heptane, vacuum thed. Actual purity not
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna	aw constants and by the compiler : solubility data. to about 0.40 me librium composit y shown as a func- on range to 99 mo for high concentration for high concentration TUS/PROCEDURE: thus and procedur in ref. 1. The spice is a capill in diameter cont l mixer which is	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved	yed graphs of Law was observed on ethene for thene in lique ressure over ethene. Cr ethene at hist INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distil given.	only; there were no erved to fit the data or all temperatures. And solutions are the complete ethene titical phenomena are ogh pressures. URITY OF MATERIALS: Purity 97.5% by analysis chloro-heptane, vacuum
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv	aw constants and by the compiler : solubility data. to about 0.40 me librium composit. y shown as a fun- on range to 99 mo for high concentration for high conce	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved external, capillary	yed graphs of law was observed on ethene for thene in lique ressure over ethene. Cr athene at hi INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distil given. index	<pre>only; there were no erved to fit the data or all temperatures. did solutions are the complete ethene ditical phenomena are gh pressures. URITY OF MATERIALS: e purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not bensity and refractive at 20°C:</pre>
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv tube is se position a	aw constants and by the compiler : solubility data. to about 0.40 m librium composit. y shown as a func- on range to 99 mo for high concentration for high conce	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved external, capillary al a gas	yed graphs of law was observed on ethene for thene in lique ressure over ethene. Cr athene at his INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distill given. index ρ = 1	<pre>only; there were no erved to fit the data or all temperatures. did solutions are the complete ethene titical phenomena are gh pressures. URITY OF MATERIALS: e purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not Density and refractive at 20°C: .2509 g cm⁻³,</pre>
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv tube is se position a and liquid pressure g	aw constants and by the compiler : solubility data. to about 0.40 mm librium composit. y shown as a fun- on range to 99 mo for high concentration for high conce	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved external, capillary al a gas s a volume	yed graphs of law was observed on ethene for thene in lique ressure over ethene. Cr athene at hi INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distil given. index	<pre>only; there were no erved to fit the data or all temperatures. id solutions are the complete ethene citical phenomena are .gh pressures. URITY OF MATERIALS: o purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not . Density and refractive at 20°C: .2509 g cm⁻³, .4843</pre>
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv tube is se position a and liquid pressure a	aw constants and by the compiler : solubility data. to about 0.40 me librium composit y shown as a func- on range to 99 mo for high concentration for high conce	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved external, capillary al a gas s a volume nstant	yed graphs of law was observed on ethene for thene in lique ressure over ethene. Cr thene at hi INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distingiven. index $\rho = 1$ $n_D = 1$ ESTIMATED ER	<pre>only; there were no erved to fit the data or all temperatures. did solutions are the complete ethene titical phenomena are of pressures. URITY OF MATERIALS: o purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not . Density and refractive at 20°C: .2509 g cm⁻³, .4843 ROR:</pre>
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv tube is se position a and liquid pressure g regulator pressure a volume of	aw constants and by the compiler : solubility data. to about 0.40 me librium composit. y shown as a fun- on range to 99 mo for high concentration for high conce	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary anning moved external, capillary al a gas , s a volume nstant the	yed graphs of law was observed on ethene for thene in lique ressure over ethene. Cr thene at hi INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distingiven. index $\rho = 1$ $n_D = 1$ ESTIMATED ER	<pre>only; there were no erved to fit the data or all temperatures. id solutions are the complete ethene citical phenomena are .gh pressures. URITY OF MATERIALS: o purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not . Density and refractive at 20°C: .2509 g cm⁻³, .4843</pre>
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv tube is se position a and liquid pressure g regulator pressure a volume of Graphs of volumes ar	aw constants and by the compiler : solubility data. to about 0.40 me librium composit. y shown as a fum on range to 99 mo for high concentration for high concen	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved external, capillary al a gas s a volume nstant the molar a	yed graphs of law was observed on ethene for thene in lique ressure over ethene. Cr thene at hi INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distingiven. index $\rho = 1$ $n_D = 1$ ESTIMATED ER	<pre>only; there were no erved to fit the data or all temperatures. did solutions are the complete ethene titical phenomena are of pressures. URITY OF MATERIALS: o purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not . Density and refractive at 20°C: .2509 g cm⁻³, .4843 ROR:</pre>
evaluated numerical closely up Phase equi graphicall compositic reported f METHOD/APPARA The appara described bration de tube 1 mm an interna up and dow motor-driv tube is se position a and liquid pressure g regulator pressure a volume of Graphs of volumes ar function of	aw constants and by the compiler : solubility data. to about 0.40 me librium composit. y shown as a fun- on range to 99 mo for high concentration for high conce	from enlarg Henry's 1 ole fractio ions of eth ction of pr le percent ations of e AUXILIARY e are equili- ary aining moved external, capillary al a gas s a volume nstant the molar a sitions,	yed graphs of law was observed on ethene for thene in liquities essure over ethene. Cr athene at hi INFORMATION SOURCE AND PR 1. Ethene 2. Tetrace distil given. index $\rho = 1$ $n_D = 1$ ESTIMATED ER $\delta x_1/x_1$ REFERENCES:	<pre>only; there were no erved to fit the data or all temperatures. did solutions are the complete ethene titical phenomena are of pressures. URITY OF MATERIALS: o purity 97.5% by analysis chloro-heptane, vacuum led. Actual purity not . Density and refractive at 20°C: .2509 g cm⁻³, .4843 ROR:</pre>

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COMPONENTS:			ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]			Efremova, G.D.; Kovpakova, P.F.
2. Nonane, 1,1,1,9-Tetrachloro-;			Zhur. Fiz. Khim. <u>1958</u> , 32, 1231-1240.
C ₉ H ₁₆ C]	L ₄ ; [1561-48-4]		
VARIABLES:			PREPARED BY:
	T/K = 273.35 -	373.15	W. Hayduk
<i>P</i> 1	/MPa = 1.013 - 1	0.13	w. nayuux
EXPERIMENTAL	VALUES:		
<i>t /</i> C	<i>т</i> /к н/	¹ Henry's Co Atm (mole i	$p_{1} = \frac{1}{1} Mole Fraction Ethene, x_{1}$ fraction) ⁻¹ for $p_{1} = 101.3$ kPa
0.2	273.35	63	0.0159
25	298.15	82	0.0122
50	323.15	105	0.0095
75	348.15	129	0.0078
100	373.15	154	0.0065
100	575+15	154	0.0005
evaluated numerical closely up Phase equi graphicall	by the compiler solubility data. to about 0.40 m librium composit y shown as a fun	from enlarg Henry's J ole fractio ions of eth ction of pr	tion solubilities at 101.3 kPa were ged graphs only; there were no law was observed to fit the data on ethene for all temperatures. Thene in liquid solutions are ressure over the complete ethene
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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2H_4$ ; [74-85-1] 2. Acetic acid, trichloro-ethyl	Kristesashvili, L.V.; Chkhubianishvili, N.G ; Tatenashvili, M.Kh.
ester (ethyltrichloroacetate); C ₄ H ₅ Cl ₃ O ₂ ; [515-84-4]	Soobshch. Akad. Nauk. Gruz. SSR <u>1979</u> , ^g 3, 365-368.
VARIABLES: $T/K = 363.15, 373.15$	PREPARED BY:
<i>p</i> ₁ /MPa = 0.1 - 8.1	W. Hayduk
	·
EXPERIMENTAL VALUES:	
¹ Henry's Co	nstants
$t/C T/K H'/atm (mole fraction)^{-1}$	¹ Mole Fraction H/MPa (mol fraction) ¹ Ethene, $x_1$
90 363.15 117.5	11.9 0.0085
100 373.15 140	14.2 0.0071
pressure of 101.3 kPa $(x_1)$ were calcu enlarged graph showing the data.	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The equipment consisted of a stainless steel autoclave containing a magnetic stirrer and immersed in a constant temperature bath. The autoclave was attached to a second stainless steel vessel, in a constant temperature bath, used as a gas supply vessel. Attached also was a vacuum system and a pressure gauge. A known quantity of solvent was degassed. The drop in pressure in	Sources and purities not specified.
the second vessel was used as a	ESTIMATED ERROR:
measure of the quantity of ethene dissolved.	$\delta x_1 / x_1 = \pm 3\% \text{ (compiler)}$
	REFERENCES:

COMPONENTS:

- Ethene; C₂H₄; [74-85-1] 1.
- Solvents, other than alcohols, 2. containing carbon, oxygen and hydrogen

EVALUATOR:

Peter G.T. Fogg School of Applied Chemistry University of North London Holloway Road, London, N7 8DB, U.K.

November, 1993

### CRITICAL EVALUATION:

## Critical evaluation of the solubility of ethene at a partial pressure not

### greater than 101.3 kPa in solvents, other than alcohols, containing carbon,

# oxygen and hydrogen.

It is often helpful to compare experimental values of mole fraction solubilities  $x_1$ , of a gas at a particular temperature with reference values from the Raoult's law equation

where  $p_0$  is the vapour pressure of liquefied gas at the temperature in question. The variation with temperature of  $p_1/p_0$  provides a reference line for comparison of solubilities. The critical temperature of ethene is 282.4 K but it is convenient to extrapolate the vapour pressure of ethene to temperatures above the critical temperature to calculate a reference line and hence facilitate qualitative comparison of experimental solubilities. Mole fraction solubilities in most solvents containing oxygen fall below the reference line and are low compared with solubility in straight chain hydrocarbons.

# 2-Propanone; C₃H₆O; [67-64-1]

Solubility in 2-propanone has been measured by Horiuti (1), Hannaert et al.(2), Leites and Ivanovskii (3), and by McDaniel (4). McDaniel's values for a partial pressure of 101.3 kPa fall appreciably below those given by Horiuti and can be disregarded because other measurements by McDaniel have been found to be significantly lower than measurements carried out more recently. Solubility values calculated from equations given by Hannaert for 283.15 K and 293.15 K are, respectively, about 18% and 14% above values given by Horiuti. Horiuti's data for the temperature range of 273.15 to 313.15 K are likely to be the more reliable. Measurements carried out by this author on other systems is often in close agreement with more recent precision measurements. Horiuti's data can be fitted to the equation:

precision measurements. Normal is detering to the one of the first precision measurements. Normal is the first precision of the first pr This equation may be accepted on a tentative basis.

The following equation is based upon Horiuti's measurements from 273.15 to 313.15 K, on Hannaert's measurements from 243.15 to 293.15 K and on the single value at 243.15 K given by Leites and Ivanovskii.

 $\ln x_1 = -8.5070 + 1195.3/(T/K)$ 

standard deviation in values of  $x_1 = 8.5 \times 10^{-4}$  temp. range 243-313 K This equation is recommended on a tentative basis for temperatures below 273 K.

### Methyl acetate; C₃H₆O₂; [79-20-9]

Horiuti (1) also measured solubility in methyl acetate. Mole fraction solubilities at a partial pressure of 101.3 kPa fit the equation

ln  $x_1 = 3.2620 + 569.63/(T/K) - 1.6935 \ln(T/K)$ standard deviation in values of  $x_1 = 3.4 \times 10^{-5}$  temp. range 273-313 K Horiuti's data for methyl acetate are classified as tentative.

Cyclopentanone; C₅H₈O; [120-92-3] Cyclohexanone; C₆H₁₀O; [108-94-1] 2-Methylcyclohexanone; C₇H₁₂O; [583-60-8] 2,6-Dimethylcyclohexanone; C₈H₁₄O; [2816-57-1] <u>Cycloheptanone; C₇H₁₂O; [502-42-1]</u>

Solubility in cyclic ketones has been measured by Gallardo and co-workers (5-9) at a partial pressure of ethene of 101.3 kPa in the temperature range 273.15 to 303.15 K. Mole fraction solubilities at the same temperature in

271 COMPONENTS: EVALUATOR: Peter G.T. Fogg Ethene; C₂H₄; [74-85-1] 1. School of Applied Chemistry University of North London Solvents, other than Alcohols, 2. containing Carbon, Oxygen and Holloway Road, London, N7 8DB, U.K. Hydrogen November, 1993 CRITICAL EVALUATION: these solvents are in the order 2,6-dimethylcyclohexanone > 2-methylcyclohexanone > cycloheptanone > cyclohexanone > cyclopentanone. Sets of measurements are consistent with each other (see fig. 1) and all fall below the reference line based on Raoult's law in this temperature range. Solubilities at a partial pressure of gas of 101.3 kPa may be fitted to the following equations derived by the evaluator. These give slightly better fit than equations given by the authors. 2,6-dimethylcyclohexanone  $\ln x_1 = -8.5574 + 1294.9/(T/K)$ standard deviation in values of  $x_1 = 3.4 \times 10^{-5}$ 2-methylcyclohexanone ln  $x_1 = 41.885 - 980.94/(T/K) - 7.5339 \ln(T/K)$ standard deviation in values of  $x_1 = 5.9 \times 10^{-5}$ <u>cycloheptanone</u>  $\ln x_1 = -22.106 + 1764.3/(T/K) + 2.0544 \ln(T/K)$ standard deviation in values of  $x_1 = 2.4 \times 10^{-1}$ <u>cyclohexanone</u>  $\ln x_1 = 35.451 - 773.66/(T/K) - 6.5627 \ln(T/K)$ standard deviation in values of  $x_1 = 2.9 \times 10^{-5}$ cyclopentanone  $\ln x_1 = 25.679 - 337.58/(T/K) - 5.1162 \ln(T/K)$ standard deviation in values of  $x_1 = 1.4 \times 10^{-5}$ These equations may be accepted on a tentative basis for the temperature range 273.15 to 303.15 K. 4-Methyl-1, 3-dioxolan-2-one (propylene carbonate); C,H,O; [108-32-7] Henry's constants for dissolution of ethene in 4-methyl-1,3-dioxolan-2-one was measured by a chromatographic method at 298.2-343.2 K by Lenoir et al. (10). Mole fraction solubility at 298.2 K and a partial pressure of 101.3 kPa, calculated on the assumption of a linear variation of mole fraction solubility with partial pressure, is 0.00521 compared with 0.00421 from measurements by Brückl and Kim (11). Solubilities reported by

Lenoir et al. for some of the other systems which they have studied are high compared with measurements by other groups. This is probably due to limitations of the chromatographic method. Further measurements on this system are required.

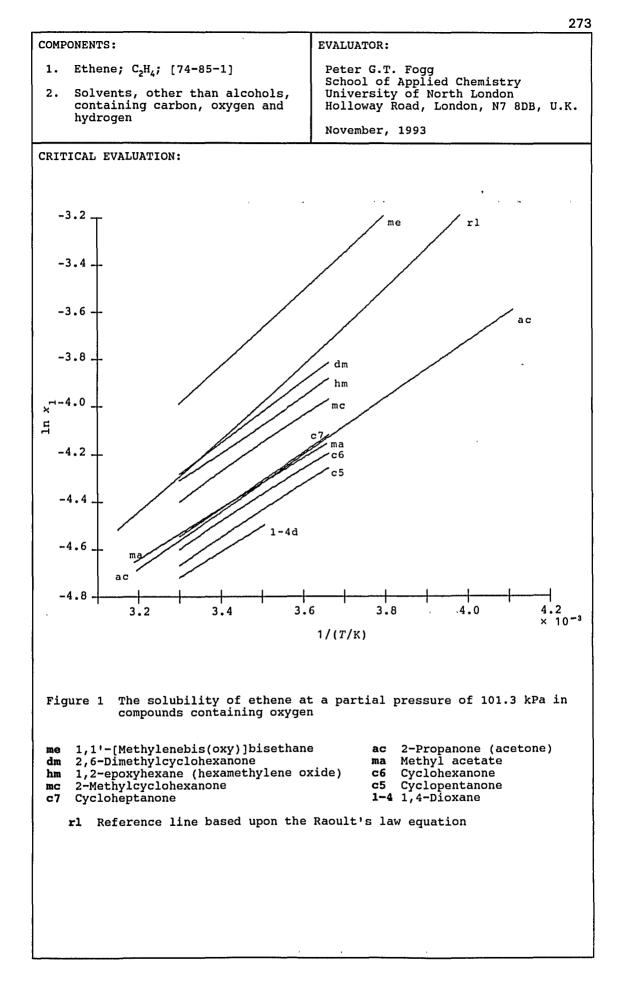
### 1,2-Epoxyhexane; C₆H₁₂O; [592-90-5]

Mole fraction solubilities measured by Gibanel et al.(12) at a partial pressure of 101.3 kPa in 1,2-epoxyhexane fall in between solubilities in 2methylcyclohexanone and 2,6-dimethylcyclohexanone. The data may be fitted to the equation

 $\ln x_1 = -50.928 + 3025.0/(T/K) + 6.4117 \ln(T/K)$ standard deviation in values of  $x_1 = 2.9 \times 10^{-5}$  temp. range 273-303 K

This equation may be accepted on a tentative basis.

272 EVALUATOR: COMPONENTS: Peter G.T. Fogg Ethene; C₂H₄; [74-85-1] 1. School of Applied Chemistry University of North London Solvents, other than Alcohols, 2. containing Carbon, Oxygen and Holloway Road, London, N7 8DB, U.K. Hydrogen November, 1993 CRITICAL EVALUATION: 1,4-Dioxane; C,H₈O₂; [123-91-1] Solubility in the cyclic diether, 1,4-dioxane is low compared with that in cyclic ketones. Solubilities at a partial pressure of ethene of 101.3 kPa reported by Gallardo et al.(13) for the temperature range 285.15 to 303.15 K fit the equation ln  $x_1 = -1.2404 + 763.88/(T/K) - 1.0499 \ln(T/K)$ standard deviation in values of  $x_1 = 1.7 \times 10^{-5}$ This equation fits the data better than the one given by the authors and may be accepted on a tentative basis. 1,1'-[Methylenebis(oxy)]-bisethane; C,H,O, The mole fraction solubility reported by Lizano et al.(14) at a partial pressure of 101.3 kPa in the acetal, 1,1'-[methylenebis(oxy)]-bisethane, is higher than that in the cyclic ketones (see fig. 1). Values lie above the reference line based upon the Raoult's law equation. The data may be fitted to the equation  $\ln x_1 = -17.138 + 1927.7/(T/K) + 1.1882 \ln(T/K)$ standard deviation in values of  $x_1 = 2.6 \times 10^{-5}$ ; temp. range 263-303 K This equation may be accepted on a tentative basis References Horiuti, J. Sci. Pap. Inst. Phys. Chem. Res. (Jpn) 1931/32, 17, 125-1. 256. Hannaert, H.; Haccuria, M.; Mathieu, M.P. Ind. Chim. Belge 1967, 32, 2. 156-164. Leites, I.L.; Ivanovskii, F.P. Khim. Prom. 1962, 9, 653-657. 3. McDaniel, A.S. J. Phys. Chem. 1911, 15, 587-610. 4. Gallardo, M.A.; Lopez, M.C.; Urieta, J.S.; Gutierrez Losa, C. Fluid Phase Equil. <u>1989</u>, 50, 223-233. 5. Gallardo, M.A.; Melendo, J.M.; Urieta, J.S.; Gutierrez Losa, C. 6. Can. J. Chem. 1987, 65, 2198-2202. 7. Gallardo, M.A.; Carmen Lopez, M.; Urieta, J.S.; Gutierrez Losa, C. Can. J. Chem. 1989, 67, 809-811. Gallardo, M.A.; Lopez, M.C.; Urieta, J.S.; Gutierrez Losa, C. 8. Can. J. Chem. 1990, 68, 435-439. Gallardo, M.A.; Lopez, M.C.; Urieta, J.S.; Gutierrez Losa, C. Fluid Phase Equil. 1990, 58, 159-172. 10. Lenoir, J-Y.; Renault, P.; Renon, H. J. Chem. Eng. Data 1971, 16, 340-342. 11. Brückl, N.; Kim, J.I. Z. Phys. Chem. (Wiesbaden) 1981, 126, 133-150. 12. Gibanel, F.; Lopez, M.C.; Gallardo, M.A.; Urieta, J.S.; Gutierrez Losa, C. Fluid Phase Equil. 1988, 42, 261-268. 13. Gallardo, M.A.; Urieta, J.S.; Gutierrez Losa, C. J. Chim. Phys. Phys.-Chim. Biol. 1983, 80, 621-625. 14. Lizano, L.P.; Lopez, M.C.; Royo, F.M.; Urieta, J.S. J. Soln. Chem. <u>1990</u>, 19, 721-728.



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	ORIGINAL MEASUREMENTS:
<pre>(1) Ethene or ethylene; C₂H₄; [74-85-1]</pre>	Horiuti, J.
(2) 2-Propanone or acetone; C ₃ H ₆ O; [67-64-1]	Sci. Pap. Inst. Phys. Chem. Res. (Jpn) <u>1931/32</u> , 17, 125 - 256.
VARIABLES:	PREPARED BY:
T/K: 273.15 - 313.15 $p_1/kPa: 101.325 (1 atm)$	M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction Buns	en Ostwald
$10^2 x_1$ Coeffic $10^2 x_1 \alpha/cm^3$ (ST)	cient Coefficient P) cm ⁻³ atm ⁻¹ $\frac{L/cm^3 cm^{-3}}{4RA3}$
273.15 1.520 4.84	3 4.843
278.15 1.420 4.49	
283.15 1.325 4.15	
288.15 1.240 3.863	
293.15 1.160 3.58	
298.15 1.088 3.33	
303.15 1.028 3.12	
308.15 0.9641 2.91	
313.15 0.9144 2.74	1 3.142
piler with the assumption the gas is :	
Smoothed Data: For use between 273.1	5 and 313.15 K.
$\ln x_7 = -8.1906 + 10.9$	9452/(T/100K)
*	-
	regression line is 2.67 x $10^{-5}$ .
	Fraction
	$10^{2}x_{1}$
273.15	1.524
	1.323
	1.237
	1.160
	1.089
	1.025
	0.914
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas buret,	
a solvent reservoir, and an absorp-	ethanol into orthophosphoric
tion pipet. The volume of the pipet	acid. The gas was cooled, passed
is determined at various meniscus	through several wash solutions,
heights by weighing a quantity of	dried, and fractionated from
water. The meniscus height is read	liquid air several times.
with a cathetometer.	(2) Acetone. Nippon Pure Chemical Co.
	or Merck. Extra pure grade.
The dry gas is introduced into the	Recrystallized with sodium
degassed solvent. The gas and solvent	sulfite and stored over calcium
are mixed with a magnetic stirrer	chloride. Fractionated, boiling
until saturation. Care is taken to	point (760 mmHg) 56.09°C.
prevent solvent vapor from mixing	ESTIMATED ERROR:
with the solute gas in the gas buret.	$\delta T/K = 0.05$
The volume of gas is determined from	$\delta x_1/x_1 = 0.01$
the gas buret readings, the volume	
of solvent is determined from the	
meniscus height in the absorption	
pipet.	REFERENCES:
	1
1	1

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Hannaert, H.; Haccuria, M.; Mathieu, M.P.
2. 2-Propanone, (acetone); C ₃ H ₆ O; [67-64-1]	Ind. Chim. Belge <u>1967</u> , 32, 156–164.
VARIABLES: $T/K = 243.15 - 293.15$	PREPARED BY:
p/kPa = 101.3	W. Hayduk H.L. Clever
EXPERIMENTAL VALUES: t/C T/K	¹ Mole fraction Ethene, $x_1$
-30 243.15 -10 263.15 10 283.15 20 293.15	0.0264 0.0196 0.0152 0.0135
¹ Mole fraction solubility calculated pressure of 101.3 kPa using the equation $v = 1$ , for the applicable temperature	tion developed by the authors with
log ( $K\pi\nu$ ) = 3.28 - ( $\Delta H/calma$	$D1^{-1}$ )/(2.3R(T/K))
The authors' definitions are:	
$\Delta H = 1,890 \text{ cal mol}^{-1}, \text{ Example 1}$	nthalpy of dissolution
$K = y_1 / x_1 = \frac{\text{mole fract}}{\text{mole fract}}$	<u>ion gas in gas phase</u> ion gas in liquid phase
$\pi$ / atm = total pressure	
v = coefficient of fuga	acity
The function, $K\pi\nu/atm$ , is equivalent $H_{1,2}/atm = (f_1/atm)/x_1$ where $f_1$ is the	to a Henry's constant in the form he fugacity.
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The authors describe several methods used; the one used in this case is the least accurate. The apparatus is of glass and consists of a burette in which the gas is confined over mercury, two bulbs for the solvent, one above the other, a mercury manometer and a constant temper- ature bath. A measured volume of	<ol> <li>Ethene. Air Liquide. For narcosis, 99.9 per cent.</li> <li>2-Propanone. Merck and Co. Vapor pressure, p/mm Hg = 11 at -30°C and 184 at 20°C as specified by authors.</li> </ol>
solvent is degassed in the top bulb at ambient temperature and charged to the absorption bulb in the bath. Gas is charged to the desired pressure. The quantity of gas added at constant pressure is measured. Agitation is manual.	ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 10$ to 15% (authors) REFERENCES:

COMPONENTS:	
	ORIGINAL MEASUREMENTS:
1. Ethene; $C_2 H_4$ ; [74-85-1]	Leites, I.L.; Ivanovskii, F.P.
2. 2-Propanone (acetone);	Khim. Prom. 1962, 9, 653-657.
$C_{3}H_{6}O;$ [67-64-1]	
VARIABLES: $T/K = 243.15$ ,	PREPARED BY:
p/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	I
	)
$t/C$ $T/K$ $log_{10}(H'/mmHg)$	² Henry's Constant, ² Mole Fraction H/atm (mole fraction) ⁻¹ Ethene, $x_1$
-30 243.15 4.423	34.85 0.0287
This result was part of a study for two-component solvent solutions.	the behavior of solubilities in
¹ Only graphical results were availab Henry's constant (H') was read from	le in this paper; a value of log of an enlarged graph by the compiler.
² Henry's constant (H) and mole fract the compiler.	ion solubility $(x_1)$ were calculated by
	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE: A metal cryostat was cooled with dry-ice and acetone and controlled to a temperature to ± 0.05 K. The equilibrium cell was mounted in the cryostat. The solvent was purified by fractional distil- lation and analyzed by chromato- graphy. Details were not given.	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene purity was stated to     be 99.9%. 2. 2-Propanone was distilled and     analyzed by chromatography.     Actual purity not given.</pre>

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	McDaniel, A. S.
(2) 2-Propanone or acetone; C ₃ H ₆ O; [67-64-1]	J. Phys. Chem. <u>1911</u> , 15, 587-610.
VARIABLES:	PREPARED BY:
T/K = 293.15 - 308.15 $p_1/kPa = 101.3$ (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	
Temperature Mol Fraction	Bunsen Ostwald
со t/°С Т/К 10 ² ж ₁	efficient ^a Coefficient ^b $\alpha$ $L/cm^3 cm^{-3}$
20.0 293.15 0.780 25.0 298.15 0.746	2.2900 2.5709 2.2752 2.4834 ^C
35.0 308.15 0.681	2.0460 2.3084
^a Bunsen coefficient, α/cm ³ (STP)	cm ⁻³ atm ⁻¹ .
^b Listed as absorption coefficien Interpreted to be equivalent to	t in the original paper. Ostwald coefficient by compiler.
^C Ostwald coefficient (absorption 298.15 K value by author.	coefficient) estimated as
d Mole fraction values calculated gas behavior.	by compiler assuming ideal
EVALUATOR'S COMMENT: McDaniel's His values are often 20 percent o with more reliable data. The values of the Bunsen Coeffici	r more too small when compared ent and Ostwald Coefficient
(Absorption Coefficient) given by incompatible. The mole fraction calculated from the Ostwald Coeff	solubility given above has been
AUXILIARY	INFORMATION
ME THOD /AP PARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The apparatus is all glass. It con- sists of a gas buret connected to a contacting vessel. The solvent is degassed by boiling under reduced pressure. Gas pressure or volume is adjusted using mercury displacement. Equilibration is achieved at atm pressure by hand shaking, and incre- mentally adding gas to the contacting chamber. Solubility measured by	
obtaining total uptake of gas by known volume of the solvent.	
	ESTIMATED ERROR:
	$\delta L/L \geq -0.20$
	REFERENCES :
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COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>(1) Ethene or ethylene; C₂H₄; [74-85-1]</pre>	Horiuti, J.
(2) Acetic acid, methyl ester or methyl acetate; C ₃ H ₆ O ₂ ; [79-20-9]	Sci. Pap. Inst. Phys. Chem. Res. (Jpn) <u>1931/32</u> , 17, 125 - 256.
VARIABLES: T/K: 273.15 - 313.15	PREPARED BY: M. E. Derrick
$p_1/kPa: 101.325 (1 atm)$	H. L. Clever
EXPERIMENTAL VALUES:	
	nsen Ostwald
$10^2 x_1$ Coef	ficient Coefficient STP)cm ⁻³ atm ⁻¹ L/cm ³ cm ⁻³
	4.618
	300 4.379
	009 4.156
	710 3.914
293.15 1.208 3.	
	226 3.521
	017 3.348 823 3.185
	660 3.049
	ent values were calculated by the com- ideal and that Henry's law is obeyed.
$\ln x_{\tau} = -8.0481 + 10.0$	5457/( <i>m</i> /100K)
ł – – – – – – – – – – – – – – – – – – –	_
	regression line is 4.61 x $10^{-5}$ .
T/K Mol I	Fraction
	0 ² <i>x</i> ₁
273.15 1	.575
283.15 1	. 373
	.286
	. 208
	.136
	.071
	. 958
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas buret,	(1) Ethene. Prepared by dropping
a solvent reservoir, and an absorp-	ethanol into orthophosphoric
tion pipet. The volume of the pipet	acid. The gas was cooled, passed
is determined at various meniscus	through several wash solutions,
heights by weighing a quantity of	dried, and fractionated from
water. The meniscus height is read	liquid air several times.
with a cathetometer.	(2) Methyl acetate. Merck. Extra
The dry and is introduced into the	pure grade. Dried with $P_2O_5$ .
The dry gas is introduced into the degassed solvent. The gas and solvent	Distilled several times. Boiling point (760 mmHg)
are mixed with a magnetic stirrer	57.12°C.
until saturation. Care is taken to	57.12 0.
prevent solvent vapor from mixing	
with the solute gas in the gas buret.	ESTIMATED ERROR:
The volume of gas is determined from	$\delta T/K = 0.05$
the gas buret readings, the volume	$\delta x_1 / x_1 = 0.01$
of solvent is determined from the	
meniscus height in the absorption	
pipet.	REFERENCES:
1	1
]	
	1

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components :	ORIGINAL MEASUREMENTS:
<pre>1. Ethene; C₂H₄; [74-85-1]</pre>	Brückl, N.; Kim, J. I.
2. 1,3-Dioxolan-2-one,4-methyl- (Propylene carbonate); C ₄ H ₆ O ₃ ;	Z. Phys. Chem. (Wiesbaden)
[108-32-7]	<u>1981</u> , <i>126</i> , 133-150.
VARIABLES: T/K = 298.2	PREPARED BY:
<i>P/</i> kPa = 101.3	C. L. Young
EXPERIMENTAL VALUES:	
T/K =	298.2
$\ln H$ 10 ³ × Mole fraction of	ethene in liquid [†] , $10^{3}x_{C_2H_4}$
5.47	4.211
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
	1. Linde Co. sample, purity 99.8
Solubilities were determined by a	volume per cent.
volumetric method described as "the Ostwald method". No other details given.	2. Uvasol and analytical grade.
	ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta H = \pm 1.25\%.$
	$01/X - 10.1;  0 \ a = 11.255.$
	REFERENCES:
	REFERENCED;

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COMPONENTS:			ORIGINAL MEASUREMENTS:
1. Ethene;	C ₂ H ₄ ; [7	4-85-1]	Lenoir, J-Y.; Renault, P.; Renon, H.
2. 1,3-Diox (Propyle [108-32-	ne carbona	$(,4-methyl-); C_4H_6O_3;$	J. Chem. Eng. Data, <u>1971</u> , 16, 340-2.
VARIABLES:			PREPARED BY:
	/K = 298.2	- 343.2 (low pressures)	C. L. Young
		(IOW PIEssures)	
EXPERIMENTAL \	ALUES:		
	<i>T</i> /K	Henry's constar ^H C ₂ H ₄ /atm	Mole fraction at 1 atm* ${}^{\infty}C_{2}H_{4}$
	298.2 323.2 343.2	192 235 271	0.00521 0.00426 0.00369
		AUXILIARY	INFORMATION
METHOD/APPARA	• • • • • • • • • • • • • • • • • • • •		SOURCE AND PURITY OF MATERIALS:
		quid chromato- vith a thermal	(1) L'Air Liquide sample, minimum purity 99.9 mole per cent.
conductivit carrier gas Henry's law from the re applies to of gas and difference l atm. pres considerabl of Henry's	y detector was helin constant tention to very low p there may from that sure. The e uncertai constant s	was used. The m. The value of was calculated me. The value partial pressures be a substantial measured at ere is also nty in the value since surface	(2) Touzart and Matignon or Serlabo sample, purity 99 mole per cent.
adsorption although it	was not al s possible	lowed for existence was	ESTIMATED ERROR:
noted.	- FOOTNIC	SHADDONG WOD	$\delta T/K = \pm 0.1;  \delta H/\text{atm} = \pm 6\%$ (estimated by compiler).
			REFERENCES:
			REFERENCES:
			REFERENCES :

COMPONENTS:	ORIGINAL MEASUREM	ENTS:
(1) Ethene; C ₂ H ₄ ; [74-85-1]		A.; Urieta, J. S.;
(2) 1,4-Dioxane; C ₄ H ₈ O ₂ ; [123-91-1]		PhysChim. Biol.
VARIABLES:	PREPARED BY:	
T/K = 285.15 - 303.15 $p_1/kPa = 101$	н. 1	L. Clever
EXPERIMENTAL VALUES:	_1	······································
T/K Mol Fraction	Bunsen	Ostwald
	coefficient / m ³ (STP)cm ⁻³ atm ⁻¹	Coefficient L/cm ³ cm ⁻³
· •·····		
285.15 111.6	2.995	3.125
289.15 105.6	2.820	2.985
293.15 100.7	2.675	2.870
298.15 94.81	2.505	2.730
303.15 89.08	2.335	2.595
of one mole of ethene from the one hypothetical unit mole fraction		kPa to the
AUXILIARY	INFORMATION	
	INFORMATION SOURCE AND PURITY	OF MATERIALS:
IETHOD/APPARATUS/PROCEDURE: The apparatus is similar to that of Ben-Naim and Baer (ref 1). It was	SOURCE AND PURITY (1) Ethene.	OF MATERIALS: Sociedad Espanola del Stated to be 99.90 %.
The apparatus is similar to that of Ben-Naim and Baer (ref 1). It was described in detail in an earlier paper (ref 2). The apparatus consists of a gas buret, mercury manometer, and solu- tion vessel. The solvent is degassed in the solution vessel. Measurements were carried out on the solvent vapor saturated gas.	SOURCE AND PURITY (1) Ethene. S Oxigeno. S (2) 1,4-Dioxa	Sociedad Espanola del stated to be 99.90 %.
METHOD/APPARATUS/PROCEDURE: The apparatus is similar to that of Ben-Naim and Baer (ref 1). It was described in detail in an earlier paper (ref 2). The apparatus consists of a gas buret, mercury manometer, and solu- tion vessel. The solvent is degassed in the solution vessel. Measurements were carried out on	SOURCE AND PURITY (1) Ethene. (1) Oxigeno. S (2) 1,4-Dioxa Purity che	Sociedad Espanola del Stated to be 99.90 %. Ane. Merck and Co. Acked by GLC to be

ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows: $\ln(P/kPa) = -5067.57(T/K)^{-1} + 17.449$ Oxigeno. Specified purity 99.9%. 2. Cyclopentanone. Fluka. Specified purity 99.5% Purity also checked with GLC and refractive index measurements. ESTIMATED ERROR: $\delta x_1/x_1 = \pm 0.7$ % (authors) REFERENCES:	MPONENTS:			
2. Cyclopentanone; C H O; [120-92-3] T/K = 273.15 - 303.15 R/KPa = 101.32 T/K ¹ Mole Fraction T/K ¹ Mole Fraction 10 ⁴ $x_1$ T/K ¹ Mole Fraction T/K ¹ Mole Fraction T/K ¹ Mole Fraction T/K ¹ Mole Fraction 20 Stwald Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient Coefficient		ORIGINAL MEASUREM	ENTS:	
Fluid Phase Equil. 1989, $\delta^0$ , 223-23ARIABLES: $T/K = 273.15 - 303.15$ $PREPARED BY:$ $g/kFa = 101.32$ $PREPARED BY:$ $T/K$ ¹ Mole Fraction $Coefficient$ $T/K$ $10^4 x_1$ $3.67$ $233.15$ $123.1$ $3.28$ $233.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $293.15$ $107.1$ $2.92$ $233.15$ $93.83$ $2.62$ $233.15$ $93.83$ $2.62$ $2.36$ $2.36$ ¹ For a gas partial pressure of 101.325 kPa. ² The Bunsen and Ostwald coefficients were calculated by the compiler.In H = $8.4036 - 1132.98(T/K)^{-1}$ They also obtained $\Delta B/KJ$ mol ⁻¹ = $-9.42$ and $\Delta S/JK^{-1}$ mol ⁻¹ = $-70$ forthe transfer of one mole of ethene from the gas phase at 101.32 kPato the hypothetical unit mole fraction of $\Delta UXILIARY$ INFORMATIONAUXILIARY INFORMATIONAUXILIARY INFORMATIONColopentanone. Fluka. <td colsp<="" td=""><td>I. Ethene; $C_{2}H_{4}$; [74-85-1]</td><td>Gallardo, M.</td><td>A.; Lopez, M.C.;</td></td>	<td>I. Ethene; $C_{2}H_{4}$; [74-85-1]</td> <td>Gallardo, M.</td> <td>A.; Lopez, M.C.;</td>	I. Ethene; $C_{2}H_{4}$ ; [74-85-1]	Gallardo, M.	A.; Lopez, M.C.;
ARHABLES: $T/K = 273.15 - 303.15$ $R/KPA = 101.32$ PREPARED BY:T/K 1 Mole Fraction 2 Ostwald 2 Bunsen Coefficient $L/cm^3 cm^{-3} a/cm^3 (STP) cm^3 atm^3$ T/K 1 Mole Fraction 2 Ostwald Coefficient $L/cm^3 cm^{-3} a/cm^3 (STP) cm^3 atm^3$ 773.15141.3 (23.15) 2 Ostwald Coefficient $L/cm^3 cm^{-3} a/cm^3 (STP) cm^3 atm^3$ 273.15141.3 (23.15) 2 Ostwald Coefficient $L/cm^3 cm^{-3} a/cm^3 (STP) cm^3 atm^3$ 273.15141.3 (23.15) 2 Ostwald Coefficient $L/cm^3 cm^{-3} a/cm^3 (STP) cm^3 atm^3$ 273.15100.1 (2.76) 2 Sumsen (2.236)293.15100.1 (2.76) 2 Cs293.15100.1 (2.76) 2 Cs293.1593.83 2 .622.36 1 For a gas partial pressure of 101.325 kPa.The authors fitted their data as a Henry's constant, H/atm mole fraction', to the following equation:In H = 8.4036 - 1132.98(T/K)^1The y also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPaAUXILLARY INFORMATIONAUXILLARY INFORMATIONAUXILLA	<pre>2. Cyclopentanone; C₅H₈O;</pre>	Urieta, J.S.	; Gutierrez Losa,C.	
$T/K = 273.15 - 303.15$ $\frac{p}{k}Ra = 101.32$ W. Hayduk $\frac{p}{k}Ra = 101.32$ Function of the following equation: In H = 8.4036 - 1132.98(T/K)^{-1} The also obtained $\Delta H/k$ mole fraction solution. $\frac{p}{k}Ra = 101.32$ MUXILIARY INFORMATION $\frac{p}{k}Ra = 101.32$ Function $\frac{p}{k}Ra = 101.32$ $\frac{p}{k}Ra = 101.32$ Function $\frac{p}{k}Ra = 101.32$ $\frac{p}{k}Ra = 101.32$ Function $\frac{p}{k}Ra = 101.32$ $\frac{p}{k}Ra = 100$ $\frac{p}{k}Ra = 100.26$ $\frac{p}{k}Ra = 101.32$ $\frac{p}{k}Ra = 100$ $\frac{p}{k}Ra = 100$ $\frac{p}{k}Ra = 100$ $\frac{p}{k}Ra = 10.78$ $p$	[120-92-3]	Fluid Phase Eq	uil. <u>1989</u> , ⁵⁰ , 223-233.	
W. HaydukW. HaydukXPERIMENTAL VALUES:T/K ¹ Mole Fraction ² Ostwald ² Bunsen Coefficient $L/cm^3 cm^{-3}$ T/K ¹ Mole Fraction10" $x_1$ $L/cm^3 cm^{-3}$ 273.15141.33.673.67273.15141.32.72298.15100.12.762.53303.1593.832.622.36 ¹ For a gas partial pressure of 101.325 kPa. ² The Bunsen and Ostwald coefficients were calculated by the compiler.The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation:In H = 8.4036 - 1132.98(T/K) ⁻¹ They also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution.AUXILIARY INFORMATIONXUXILIARY INFORMATIONAUXILIARY INFORMATIONETHEOD/AFPARATUS/PROCEDURE:The apparatus is described in ref.1. It consists of a system of bureties for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the bureties and the mass of solvent in the solution vessel determined by weighing.Source AND PURITY OF MATERIALS;The		PREPARED BY:		
XTERIMENTAL VALUES: $T/K$ ¹ Mole Fraction ² Ostwald ² Bunsen Coefficient $L/m^3$ cm ⁻¹ $273.15$ 141.3 $3.67$ $3.67$ $283.15$ 123.1 $3.28$ $3.16$ $293.15$ 107.1 $2.92$ $2.72$ $298.15$ 100.1 $2.76$ $2.53$ $303.15$ 93.83 $2.62$ $2.36$ ¹ For a gas partial pressure of 101.325 kPa. 2 The Bunsen and Ostwald coefficients were calculated by the compiler.The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation:In H = 8.4036 - 1132.98(T/K) ⁻¹ They also obtained $\Delta B/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution.AUXILLARY INFORMATIONAUXILLARY INFORMATIONESTIMATED ERROR: The obluction vessel determined by weighing. <t< td=""><td></td><td>Ψ.</td><td>Hayduk</td></t<>		Ψ.	Hayduk	
$T/K$ ^1 Mole Fraction^2 Ostwald Coefficient $L/cm^3 cm^{-3}$ ^2 Bunsen Coefficient $\alpha/cm^3 (STP) cm^{-3} atm^{-3}$ 273.15141.33.673.67283.15123.13.283.16293.15100.12.922.72298.15100.12.762.53303.1593.632.622.36^1For a gas partial pressure of 101.325 kPa.2.622.36^1For a gas partial pressure of a liso obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 forThe yalso obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 forThe transfer of one mole of ethene from the gas phase at 101.32 kPato the hypothetical unit mole fraction solution.AUXILLARY INFORMATIONAUXILLARY INFORMATIONAUXILLARY INFORMATIONAUXILLARY INFORMATIONETHOD/APPARATUS/PROCEDURE:The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solutionSource AND PURITY OF MATERIALS:The solvent waso of solvent in the solution ve	p ₁ /kPa = 101.32			
$10^{\circ} x_1 \qquad Coefficient Coefficient a d/cm3 (STP) cm-3 atm-2 a/cm3 (STP) cm-3 atm-2 atm$	PERIMENTAL VALUES:			
$10^{4} x_{1}$ $\frac{10^{4} x_{1}}{L/cm^{3} cm^{-3}} \frac{cc^{2}}{a/cm^{3}} (STP) cm^{-3} atm^{-3}}{a/cm^{3}} (STP) cm^{-3} atm^{-3}}$ $\frac{273.15}{262.15}$ $\frac{122.1}{32.1}$ $\frac{3.67}{3.28}$ $\frac{3.67}{2.53}$ $\frac{2.52}{2.36}$ $\frac{2.52}{2.36}$ $\frac{1}{10}$ The subsen and Ostwald coefficients were calculated by the compiler. $In H = 8.4036 - 1132.98(T/K)^{-1}$ $In H = 8.4036$	T/K ¹ Mole Fraction	² Ostwald	² Bunsen	
273.15141.33.673.67283.15123.13.283.16293.15107.12.922.72298.15100.12.762.53303.1593.832.622.36 ¹ For a gas partial pressure of 101.325 kPa. ² The Bunsen and Ostwald coefficients were calculated by the compiler.The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation:In H = 8.4036 - 1132.98(T/K) ⁻¹ They also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution.AUXILIARY INFORMATIONMETHOD/APPARATUS/PROCEDURE:The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing.SOURCE AND PURITY OF MATERIALS: Specified purity 99.5% Purity also checked with GLC and refractive index measurements.The solvent vapor pressure was also measured and correlated as follows:ESTIMATED ERROR: $x_1/x_1 = \pm 0.7$ % (authors)REFERENCES:		Coefficient	Coefficient	
283.15123.13.283.16293.15107.12.922.72298.15100.12.762.53303.1593.832.622.36 ¹ For a gas partial pressure of 101.325 kPa. ² The Bunsen and Ostwald coefficients were calculated by the compiler.The authors fitted their data as a Henry's constant, H/atm molefraction ⁻¹ , to the following equation:In H = 8.4036 - 1132.98(T/K) ⁻¹ They also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 forthe transfer of one mole of ethene from the gas phase at 101.32 kPato the hypothetical unit mole fraction solution.AUXILIARY INFORMATIONMUXILIARY INFORMATIONETHOD/APPARATUS/PROCEDURE:Source AND PURITY OF MATERIALS:The apparatus is described in ref.1. Tt consits of a system of burettes for the gas, a mercury manometer and a solutionSource AND PURITY OF MATERIALS:The solvent yapor pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing.The solvent vapor pressure was also measured and correlated as follows:In(P/kPa) = -5067.57(T/K) ⁻¹ + 17.449ESTIMATED ERROR: $T/K = \pm 0.7$ (authors)REFERENCES:	10 <i>x</i> ₁			
293.15107.12.922.72298.15100.12.762.53303.1593.832.622.36 ¹ For a gas partial pressure of 101.325 kPa. ² The Bunsen and Ostwald coefficients were calculated by the compiler.The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation:In H = 8.4036 - 1132.98( $T/K$ ) ⁻¹ They also obtained $\Delta H/KJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution.AUXILIARY INFORMATIONAUXILIARY INFORMATION <td c<="" td=""><td>273.15 141.3</td><td>3.67</td><td>3.67</td></td>	<td>273.15 141.3</td> <td>3.67</td> <td>3.67</td>	273.15 141.3	3.67	3.67
298.15100.12.762.53303.1593.832.622.361For a gas partial pressure of 101.325 kPa.22The Bunsen and Ostwald coefficients were calculated by the compiler.The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation:In H = 8.4036 - 1132.98( $T/K$ ) ⁻¹ They also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution.AUXILIARY INFORMATIONAUXILIARY INFORMATIONAUXILIARY INFORMATIONETHOD/APPARATUS/PROCEDURE:Source AND PURITY OF MATERIALS:1. Ethene. Sociedad Espanol del Oxigeno. Specified purity 99.9%.2. Cyclopentanone. Fluka. Specified purity 99.5%Purity also checked with GLC and refractive index measurements.The solvent vapor pressure was also measured and correlated as follows:In (P/kPa) = -5067.57(T/K) ⁻¹ + 17.449REFERENCES:				
¹ For a gas partial pressure of 101.325 kPa. ² The Bunsen and Ostwald coefficients were calculated by the compiler. The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation: In H = 8.4036 - 1132.98( $T/K$ ) ⁻¹ They also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution. AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows: $ln(P/kPa) = -5067.57(T/K)^{-1} + 17.449$				
² The Bunsen and Ostwald coefficients were calculated by the compiler. The authors fitted their data as a Henry's constant, H/atm mole fraction ⁻¹ , to the following equation: In H = 8.4036 - 1132.98( $T/K$ ) ⁻¹ They also obtained $\Delta H/kJ$ mol ⁻¹ = -9.42 and $\Delta S/JK^{-1}$ mol ⁻¹ = -70 for the transfer of one mole of ethene from the gas phase at 101.32 kPa to the hypothetical unit mole fraction solution. AUXILIARY INFORMATION EETHOD/APPARATUS/PROCEDURE: The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows: $ln(P/kPa) = -5067.57(T/K)^{-1} + 17.449$ REFERENCES:	303.15 93.83	2.62	2.36	
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The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows: $\ln(P/kPa) = -5067.57(T/K)^{-1}$ + 17.449 The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows: $\delta x_1/x_1 = \pm 0.7$ (authors) REFERENCES:		ion solution.	se at 101.32 kPa	
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by weighing. The solvent vapor pressure was also measured and correlated as follows: $\ln(P/kPa) = -5067.57(T/K)^{-1} + 17.449$ REFERENCES:		Y INFORMATION		
The solvent vapor pressure was also measured and correlated as follows: $\ln(P/kPa) = -5067.57(T/K)^{-1} + 17.449$ REFERENCES:	ETHOD/APPARATUS/PROCEDURE: The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the	Y INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Cyclopent Specified Purity al and refra	Y OF MATERIALS: Sociedad Espanol del Specified purity anone. Fluka. purity 99.5% so checked with GLC ctive index	
$\ln(P/kPa) = -5067.57(T/K)^{-1} + 17.449$ REFERENCES:	The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined	Y INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Cyclopent Specified Purity al and refra	Y OF MATERIALS: Sociedad Espanol del Specified purity anone. Fluka. purity 99.5% so checked with GLC ctive index	
	The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as	Y INFORMATION SOURCE AND PURITY 1. Ethene. Oxigeno. 99.9%. 2. Cyclopent Specified Purity al and refra measureme ESTIMATED ERROR: T/K	Y OF MATERIALS: Sociedad Espanol del Specified purity anone. Fluka. purity 99.5% so checked with GLC ctive index nts.	
Gutierrez Losa, C.	ETHOD/APPARATUS/PROCEDURE: The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows:	Y INFORMATION SOURCE AND PURITY 1. Ethene. Oxigeno. 99.9%. 2. Cyclopent Specified Purity al and refra measureme ESTIMATED ERROR: T/K $\delta x_1/c$ REFERENCES:	Y OF MATERIALS: Sociedad Espanol del Specified purity anone. Fluka. purity 99.5% so checked with GLC ctive index nts. $t = \pm 0.2$ $c_1 = \pm 0.7$ % (authors)	
J. Chim. Phys. <u>1983</u> , 80, 621.	ETHOD/APPARATUS/PROCEDURE: The apparatus is described in ref.1. It consists of a system of burettes for the gas, a mercury manometer and a solution vessel. The mole fraction of dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes and the mass of solvent in the solution vessel determined by weighing. The solvent vapor pressure was also measured and correlated as follows:	Y INFORMATION SOURCE AND PURIT 1. Ethene. Oxigeno. 99.9%. 2. Cyclopent Specified Purity al and refra measureme ESTIMATED ERROR: T/K $\delta x_1/c$ REFERENCES: 1. Gallardo,	Y OF MATERIALS: Sociedad Espanol del Specified purity anone. Fluka. purity 99.5% so checked with GLC ctive index nts. $x = \pm 0.2$ $c_1 = \pm 0.7$ % (authors) M.A.; Urieta, J.S.;	

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; $C_{2}H_{4}$ ; [74-85-1] 2. Hexane, 1,2-epoxy-, (Hexane, 1,2-epoxy-,	Gibanel, F.; Lopez, M.C.; Gallardo, M.A.; Urieta, J.S.; Gutierrez Losa, C.
(Hexamethylene oxide) C H O; [592-90-5] ^{6 12}	Fluid Phase Equil. <u>1988</u> , 42, 261–268.
VARIABLES: $T/K = 273.15 - 303.15$	PREPARED BY:
	W. Hayduk
$p_1/kPa = 101.32$	·
EXPERIMENTAL VALUES:	
T/K Mole Fraction 10 ⁴ $x_1$	¹ Ostwald ¹ Bunsen Coefficient Coefficient L/cm ³ cm ⁻³ α/cm ³ (STP) cm ⁻³ atm ⁻¹
273.15 206	4.24 4.24
283.15 175	3.68 3.55
293.15 152 298.15 143	3.28 3.05 3.12 2.85
303 <b>.</b> 15 134	2.96 2.66
The authors fitted their data to the $-\ln x_1 = 8.2306 + 1186.82$ (T/K They also obtained $\Delta H/kJ \text{ mol}^{-1} = -9$ . the transfer of one mole of ethene f to the hypothetical unit mole fracts	$(5)^{-1}$ 87 and $\Delta s/J K^{-1} mol^{-1} = -68$ for from the gas phase at 101.32 kPa
- ln $x_1 = 8.2306 + 1186.82$ (T/K They also obtained $\Delta H/kJ \mod^{-1} = -9$ .	$(5)^{-1}$ 87 and $\Delta s/J K^{-1} mol^{-1} = -68$ for from the gas phase at 101.32 kPa
- ln $x_1 = 8.2306 + 1186.82$ (T/K They also obtained $\Delta H/kJ \text{ mol}^{-1} = -9$ . the transfer of one mole of ethene f to the hypothetical unit mole fracti	$(5)^{-1}$ 87 and $\Delta s/J K^{-1} mol^{-1} = -68$ for from the gas phase at 101.32 kPa
- $\ln x_1 = 8.2306 - 1186.82$ (T/K They also obtained $\Delta H/kJ \mod^{-1} = -9$ . the transfer of one mole of ethene f to the hypothetical unit mole fracti	() ⁻¹ 87 and $\Delta S / J K^{-1} \text{ mol}^{-1} = -68$ for from the gas phase at 101.32 kPa ion solution.
- ln x ₁ = 8.2306 - 1186.82 (T/K They also obtained AH/kJ mol ⁻¹ = -9. the transfer of one mole of ethene f to the hypothetical unit mole fraction AUXILIARY METHOD/APPARATUS/PROCEDURE: The solubility apparatus is described elsewhere (ref.1); it is based on that proposed by Ben Naim and Baer (ref.2). The set-up consists of a burette system, a mercury manometer and a solution vessel. Mole fraction of the dissolved gas is estimated from the volume change at constant pressure of saturated gas in the	() ⁻¹ 87 and $\Delta S / J K^{-1} mol^{-1} = -68$ for from the gas phase at 101.32 kPa on solution.
- ln x ₁ = 8.2306 + 1186.82 (T/K They also obtained AH/kJ mol ⁻¹ = -9. the transfer of one mole of ethene f to the hypothetical unit mole fraction AUXILIARY METHOD/APPARATUS/PROCEDURE: The solubility apparatus is described elsewhere (ref.1); it is based on that proposed by Ben Naim and Baer (ref.2). The set-up consists of a burette system, a mercury manometer and a solution vessel. Mole fraction of the dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes, and the mass of liquid	<pre>System = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =</pre>
- ln x ₁ = 8.2306 + 1186.82 (T/K They also obtained AH/kJ mol ⁻¹ = -9. the transfer of one mole of ethene f to the hypothetical unit mole fraction AUXILIARY METHOD/APPARATUS/PROCEDURE: The solubility apparatus is described elsewhere (ref.1); it is based on that proposed by Ben Naim and Baer (ref.2). The set-up consists of a burette system, a mercury manometer and a solution vessel. Mole fraction of the dissolved gas is estimated from the volume change at constant pressure of saturated gas in the	<pre>System = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =</pre>
- ln x ₁ = 8.2306 + 1186.82 (T/K They also obtained LH/kJ mol ⁻¹ = -9. the transfer of one mole of ethene f to the hypothetical unit mole fraction AUXILIARY METHOD/APPARATUS/PROCEDURE: The solubility apparatus is described elsewhere (ref.1); it is based on that proposed by Ben Naim and Baer (ref.2). The set-up consists of a burette system, a mercury manometer and a solution vessel. Mole fraction of the dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes, and the mass of liquid in the solution vessel by	() ⁻¹ 87 and $\Delta S / J K^{-1} \mod^{-1} = -68$ for From the gas phase at 101.32 kPa INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene. Sociedad Español del Oxigeno. Specified purity 99.9%. 2. Hexamethylene oxide. Merck. Specified purity 99%. ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 0.01$ (authors)
<pre>- ln x₁ = 8.2306 + 1186.82 (T/K They also obtained AH/kJ mol⁻¹ = -9. the transfer of one mole of ethene f to the hypothetical unit mole fraction AUXILIARY METHOD/APPARATUS/PROCEDURE: The solubility apparatus is described elsewhere (ref.1); it is based on that proposed by Ben Naim and Baer (ref.2). The set-up consists of a burette system, a mercury manometer and a solution vessel. Mole fraction of the dissolved gas is estimated from the volume change at constant pressure of saturated gas in the burettes, and the mass of liquid in the solution vessel by weighing. The solvent vapor pressure was determined and fitted to the</pre>	<pre>System = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =</pre>

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COMPONENTS:		ORIGINAL MEASURE	MENTS:
1. Ethene; $C_2 H_4$ ;	[74-85-1]	Gallardo, M	A.; Melendo, J.M.;
2. Cyclohexanone;	C, H, O;	Urieta, J.S.	.; Gutierrez Losa, C.
[108-94-1]		Can. J. Che	m. <u>1987</u> , 65 , 2198-2202.
VARIABLES:	273.15 - 303.15	PREPARED BY:	,
p/kPa =	н н. н.	W.	. Hayduk
EXPERIMENTAL VALUES:			
<u></u>			
T/K	Mole Fraction	¹ Ostwald	¹ Bunsen Coefficient ₃
· `	10 ⁴ <i>x</i> ₁	Coefficient L/cm ³ cm ⁻³	$\alpha/cm^{3}(STP) cm^{3} atm^{-1}$
273.15	150	3.33	3.33
283.15 293.15	131.5 114.5	2.99 2.67	2.88 2.49
298.15	106.9	2.52	2.31
303.15	100.5	2.40	2.16
- ln x ₁ They also obtaine the transfer of o	In their data to the = 3.8489 ln $T$ - 17.39 and $\Delta H/kJ$ mol ⁻¹ = -9.54 one mole of ethene fr al unit mole fraction	and $\Delta S/J K^{-1}$ com the gas phase	$mol^{-1} = -70$ for ase at 101.32 kPa
- ln x ₁ They also obtaine the transfer of o	= 3.8489 $\ln T - 17.39$ ad $\Lambda H/kJ \text{ mol}^{-1} = -9.54$ one mole of ethene for	and $\Delta S/J K^{-1}$ com the gas phase	$mol^{-1} = -70$ for ase at 101.32 kPa
- ln x ₁ They also obtaine the transfer of o	= 3.8489 $\ln T - 17.39$ ed $\Delta H/kJ$ mol ⁻¹ = -9.54 ne mole of ethene fr cal unit mole fraction	and $\Delta S/J K^{-1}$ com the gas phase	$mol^{-1} = -70$ for ase at 101.32 kPa
- $\ln x_1$ They also obtaine the transfer of o	= 3.8489 $\ln T - 17.39$ ed $\Lambda H/kJ$ mol ⁻¹ = -9.54 one mole of ethene fr al unit mole fraction AUXILIARY	and $\Delta S/J K^{-1}$ from the gas phone solution.	mol ⁻¹ = -70 for ase at 101.32 kPa TY OF MATERIALS:
- ln x ₁ They also obtaine the transfer of o to the hypothetic METHOD/APPARATUS/PROCH The solubility ap described in an e (ref. 1). It com	= 3.8489 $\ln T - 17.39$ od $\Lambda H/kJ$ mol ⁻¹ = -9.54 one mole of ethene fr al unit mole fraction AUXILIARY EDURE: oparatus is arlier paper mists of a sys-	<ul> <li>and ΔS/J K⁻¹</li> <li>com the gas phone solution.</li> <li>INFORMATION</li> <li>SOURCE AND PURIT</li> <li>1. Ethene.</li> </ul>	ase at 101.32 kPa
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OMPONENTS :		ORIGINAL MEASUR	EMENTS:
1. Ethene; C _g H _g ;	: [74-85-1]	Gallardo. M	I.A.; Carmen Lopez, M.;
2. 2-Methylcyclo	phexanone;	Urieta, J.S	.; Gutierrez Losa, C.
C ₇ H ₁₂ O; [583-	-60-8]	Can. J. Chem.	<u>1989</u> , <i>67</i> , 809-811.
ARIABLES:	<b>273.15 - 303.15</b>	PREPARED BY:	
-	101.32	Ŵ	. Hayduk
XPERIMENTAL VALUES:			
т/к	Mole Fraction $10^4 x_{i}$	¹ Ostwald Coefficient L/cm ³ cm ⁻³	¹ Bunsen Coefficient α/cm³(STP) cm-3 atm-1
		3 500	2 500
273.15 283.15	188 164	3.580 3.205	3.580 3.090
293.15	140.7	2.815	2.620
298.15 303.15	131.5 122.8	2.660 2.515	2.435 2.265
- $\ln x_1 = 8$ They also obtain the transfer of	ted their data to the 3.3232 - 1190.24 (T/T) $AH/kJ mol^{-1} = -9$ one mole of ethene to ical unit mole fract:	K) ⁻¹ .9 and <i>AS</i> /J K ⁻¹ Erom the gas ph	mol ⁻¹ = -69 for hase at 101.32 kPa
- $\ln x_1 = 8$ They also obtain the transfer of	3.3232 - 1190.24 ( $T/2$ ined $\Delta H/kJ$ mol ⁻¹ = -9 one mole of ethene :	K) ⁻¹ .9 and <i>AS</i> /J K ⁻¹ Erom the gas ph	mol ⁻¹ = -69 for hase at 101.32 kPa
- $\ln x_1 = 8$ They also obtain the transfer of	3.3232 - 1190.24 $(T/T)$ ined $\Delta H/kJ \text{ mol}^{-1} = -9$ one mole of ethene : ical unit mole fract:	K) ⁻¹ .9 and <i>AS</i> /J K ⁻¹ Erom the gas ph	mol ⁻¹ = -69 for hase at 101.32 kPa
- $\ln x_1 = 8$ They also obtain the transfer of to the hypothetic	3.3232 - 1190.24 (T/1) ined $\Delta H/kJ \text{ mol}^{-1} = -9$ one mole of ethene : ical unit mole fract: AUXILIAR	K) ⁻¹ .9 and ΔS/J K ⁻¹ from the gas ph lon solution. Y INFORMATION	mol ⁻¹ = -69 for hase at 101.32 kPa
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COMPONENTS: (1) Ethene; C ₂ H ₄ ;		ORIGINAL MEASU	REMENTS .		
• •	[74-85-1]	Gallardo, M. A	Gallardo, M. A.; Lopez, M. C.; Urieta, J. S.; Gutierrez-Losa, C. Can. J. Chem. 1990, 68, 435-439.		
(2) 2,6-Dimethyl C ₈ H ₁₄ O; [2816-57-1]	cyclohexanone;	Can. J. Chem.			
VARIABLES:		PREPARED BY:			
T/K = 273.1 $p_1/kPa = 102$		C. L. Y	C. L. Young		
EXPERIMENTAL VALU	JES:				
T/K	Mole Fraction 10 ⁴ x ₁ α	Bunsen Coefficient /cm ³ (STP) cm ⁻³ atm ⁻¹	Ostwald Coefficient L/cm ³ cm ⁻³		
273.15	220	3.72	3.72		
283.15	186	3.10	3.22		
293.15	159	2.62	2.81		
298.15	148.4	2.43	2.66		
303.15	137.3	2.24	2.48		
data were calcul behavior was ass The authors fitt	ated from the equ- umed. ed the solubility	data to the equation	source and ideal gas		
data were calcul behavior was ass The authors fitt $-\ln x_1 = 0$ The enthalpy and of 101.32 kPa we	ated from the equ umed. ed the solubility 8.5532 - 1293.69/4 l entropy of solut re:	ation given in the data to the equati (T/K).	source and ideal gas on: d a partial pressure		
data were calcul behavior was ass The authors fitt $-\ln x_1 = 0$ The enthalpy and of 101.32 kPa we	ated from the equa umed. ed the solubility 8.5532 - 1293.69/4 entropy of solut re: 76 kJ mol ⁻¹ and As	ation given in the data to the equati (T/K). tion at 298.15 K and	source and ideal gas on: d a partial pressure		

COMPONENTS: (1) Ethene; C ₂ H ₄ ; [74-85-1] (2) Cycloheptanone; C ₇ H ₁₂ O; [502-42-1]	ORIGINAL MEASUREMENTS: Gallardo, M. A.; Lopez, M. C.; Urieta, J. S.; Gutierrez-Losa, C. Fluid Phase Equil. <u>1990</u> , 58, 159-172.
VARIABLES:	PREPARED BY:
T/K = 273.15 - 303.15 p/kPa = 101.32	C. L. Young

EXPERIMENTAL VALUES:

т/к	Mole Fraction 10'x ₁	Bunsen Coefficient α/cm ³ (STP) cm ⁻³ atm ⁻¹	Ostwald Coefficient L/cm ³ cm ⁻³
273.15	162.4	32.00	32.00
283.15	138.7	27.03	28.02
293.15	120.9	23.31	25.01
298.15	113.2	21.71	23.69
303.15	105.9	20.20	22.42

The compiler calculated the Bunsen and Ostwald coefficients. Density data were calculated from the equation given in the source and ideal gas behavior was assumed.

The authors fitted the solubility data to the equation:  $\ln x_1 = -8.4142 + 1172.26/(T/K)$ .

The enthalpy and entropy of solution at 298.15 K and a partial pressure of 101.32 kPa were:

 $\Delta H = -9.75 \text{ kJ mol}^{-1} \text{ and } \Delta S = -0.070 \text{ J K}^{-1} \text{ mol}^{-1}.$ 

# AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus, based on the design of Ben-Naim and Baer, was described earlier (ref 1). The essential parts were a gas buret, mercury manometer, and	(1) Sociedad Española del Oxigeno sample; purity 99.90 mole per cent.
solution vessel. The solvent was degassed in the solution vessel. The saturation and volumetric measurements were carried out using solvent saturated gas. It appears that the mole fraction	<pre>(2) Merck and Co. sample; purity 99.2 mole per cent.</pre>
solubility at one atm was estimated from the raw data by	ESTIMATED ERROR:
assuming Henry's law is obeyed and that the partial pressure of the	$\delta T/K = \pm 0.05;$ $\delta x/x = \pm 0.007.$
solvent is given by Raoult's law.	REFERENCES:
	<ol> <li>Carnicer, J.; Gibanel, F.; Urieta, J. S.; Gutierrez- Losa, C. Rev. Acad. Ciencias Zaragoza 1979, 1340, 115.</li> </ol>

COMPONENTS:		ORIGINAL MEASUREMENTS:
(1) Ethene; C	H ₄ ; [74-85-1]	Lizano, L. P.; Lopez, M. C.; Royo, F. M.; Urieta, J. S.
	ylenebis(oxy)]bi rmaldehyde dietl C ₅ H ₁₂ O ₂ ;	s-
VARIABLES:		PREPARED BY:
T/K = 263 p/kPa = 1	.15 - 303.15 01.32	C. L. Young
EXPERIMENTAL V	ALUES:	¶, , , , , , , , , , , , , , , , , , ,
T/K	Mole Fraction 10 ⁴ x ₁	Bunsen Ostwald Coefficient Coefficient α/cm ³ (STP) cm ⁻³ atm ⁻¹ L/cm ³ cm ⁻³

	a the second			
263.15	411	79.59	76.68	
273.15	329	62.41	62.41	
283.15	267	49.71	51.54	
 293.15	221	40.45	43.42	
303.15	185	33.32	36.98	

The compiler calculated the Bunsen and Ostwald coefficients. Density data were calculated from the equation given in the source and ideal gas behavior was assumed.

The authors fitted the solubility data to the equation:  $\ln x_1 = -9.2184 + 1585.23/(T/K)$ .

The enthalpy and entropy of solution at 298.15 K and a partial pressure of 101.32 kPa were:

 $\Delta H = -13.18 \text{ kJ mol}^{-1} \text{ and } \Delta S = -0.077 \text{ kJ K}^{-1} \text{ mol}^{-1}$ .

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: The solubility apparatus, based on the design of Ben-Naim and Baer, was described earlier (ref 1). The essential parts were a gas buret, mercury manometer, and solution vessel. The solvent was degassed in the solution vessel. The saturation and volumetric measurements were carried out using solvent saturated gas.	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Sociedad Española del Oxigeno sample; purity 99.90 mole per cent.</li> <li>(2) Aldrich sample; purity better than 99 mole per cent.</li> </ul>
	ESTIMATED ERROR: $\delta T/K = \pm 0.05;$ $\delta x/x = \pm 0.002.$ REFERENCES: 1. Carnicer, J.; Gibanel, F.; Urieta, J. S.; Gutierrez- Losa, C. Rev. Acad. Ciencias Zaragoza <u>1979</u> , 1340, 115.

COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

 Solvents containing oxygen excluding water and alcohols; pressures greater than 0.20 MPa (2 atm) EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5

February, 1994

CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubilities in Oxygen-Containing Solvents

#### excluding Water and Alcohols for Pressures greater than 0.20 MPa

Ethene solubilities were reported for elevated pressures in five solvents containing oxygen which are generally described as ketones, an organic carbonate, ester, and an organic acid. When possible, the consistency of the data was tested by plotting  $\log x$  (mole fraction solubility) versus  $\log p$  (ethene partial pressure) expecting to observe a linear relation for relatively low concentrations of ethene and for relatively low gas partial pressures. The simplest equation describing the effects of both temperature and pressure has been observed to have the following form:

$$\log x_{p} = A + B(T/K)^{-1} + C \log (p/MPa)$$
(1)

For a wider range in temperature, a more accurate description of the temperature effect involving two terms has been sometimes used. Furthermore, when there is a consistent curvature in the  $\log x_p - \log p$  relation, a correction to equation (1) is introduced, thus describing the data over a larger range of pressure. With these modifications equation (1) becomes:

 $\log x_{p} = A + B (T/K)^{-1} + C \log (p/MPa) + D \log (T/K) + E(p/MPa)$ (2)

Equation (2) is warranted only when solubility data cover wide ranges of temperature and pressure.

The solubilities in the individual solvents will now be considered.

#### 2-Propanone (acetone); C3H6O; [67-64-1]

Four research groups reported ethene solubilities in 2-propanone (1-4): Kiss et al. (1) and Shenderei et al. (2) for low temperatures, 228.15 K to 248.15 K and a range of pressures, and Voronkov et al.(3) and Hronec et al.(4) for a wide range of temperatures and pressures. Unfortunately, only the data of the former two groups are self-consistent and consistent with each other. On the other hand, the data of the latter two groups are entirely inconsistent and do not check one another even approximately for comparable temperatures and pressures. To be more specific, the data of Hronec et al. (4) do not even approximately approach Henry's law for low pressures, whereas the data for the other three groups of researchers do. The data of Voronkov et al. (3) cover a larger pressure range than the other data (to approximately 4 MPa). Unfortunately, the solubilities as recorded for Voronkov et al. for the temperatures of 323.15 K, 353.15 K and 373.15 K all are of the same order of magnitude, especially at higher pressures, a most unlikely possibility. Also the data for the lower temperature (263.15 K) does not even approach the higher values of Kiss et al. (1) and Shenderei et al. (2). It is considered that some serious errors were incorporated in the data of Voronkov et al. (3) and those of Hronec et al. (4) and, therefore, they are both rejected. Hence, there are no reliable solubility data at elevated pressures for 2propanone at ambient and higher temperatures.

For low temperatures the data of Kiss et al. (1) and Shenderei et al. (2) are consistent and have been used to develop an equation to represent the data. It should be mentioned that the data of Kiss et al. as obtained for method B gave solubilities somewhat lower than those for method A, and hence were considered less accurate and were not used in the development of equation (3):

 $\log x_{p} = 716.29 (T/K)^{-1} + 1.0053 \log (p/MPa) + 0.050 p - 3.502$ (3)

<pre>COMPONENTS: 1. Ethene; C₂H₄; [74-85-1] 2. Solvents containing oxygen     excluding water and alcohols;     pressures greater than 0.20</pre>	EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5
MPa (2 atm)	February, 1994

#### CRITICAL EVALUATION:

In this case the combined data of both research groups were reasonably well represented for pressures from 0.1 MPa to 1.0 MPa with an average, and a maximum difference of 2.8%, and 7.0%, respectively. It is noted that a factor for the slight curvature in the log  $x_p$  - log p lines is included in equation (3).

These data for solubilities in 2- propanone at 228.15 K, 238.15 K, and 248.15 K are classified as tentative.

#### Propanoic acid (propionic acid); C₃H₆O₃; [79-09-4]

Ethene solubilities in propionic acid were reported only as Henry's constant by Efremova and Sokolova (5) for the temperatures of 323.15 K, 373.15 K and 423.15 K, although the pressure range for the measurements was reported to be from 2.53 MPa to 12.41 MPa. It is noted that one of the values on the data sheet (for ethene solubility at 423.15 K) is for a temperature above the normal boiling point of the solvent, or above 414 K.

These solubility results are classified as tentative.

### Acetic acid, ethenyl ester (vinyl acetate); C4H6O2; [108-5-4]

Only the data of Zernov et al. (6) are available for ethene solubilities in the ethenyl ester of acetic acid (vinyl acetate). When the consistency of these data is tested using the relation between  $\log x$  and  $\log p$ , three inconsistencies appear. First, at low pressures and for temperatures from 293.1 K to 353.1 K, the solubilities are all of the same order of magnitude, which appears to be a most unlikely behavior. Next, at pressures greater than 1 MPa for some of the data the solubilities form large irregular inflections in the solubility-pressure relation; again this appears most unlikely. Finally, the composition of the gas phase at equilibrium indicates a relatively constant vapor content of the gas phase with changing pressures over large pressure ranges. This also, appears unlikely.

Only because no other solubility results are available in this solvent for comparison, these solubility data are classified as tentative.

#### 1,3-Dioxolan-2-one, 4-methyl-(propylene carbonate); C₄H₆O₃; [108-32-7]

Ethene solubilities in 1,3-dioxolan-2-one, 4-methyl (propylene carbonate) as reported by Shakhova et al. (7) are entirely consistent. An equation based on all the data for the complete pressure range was developed as follows:

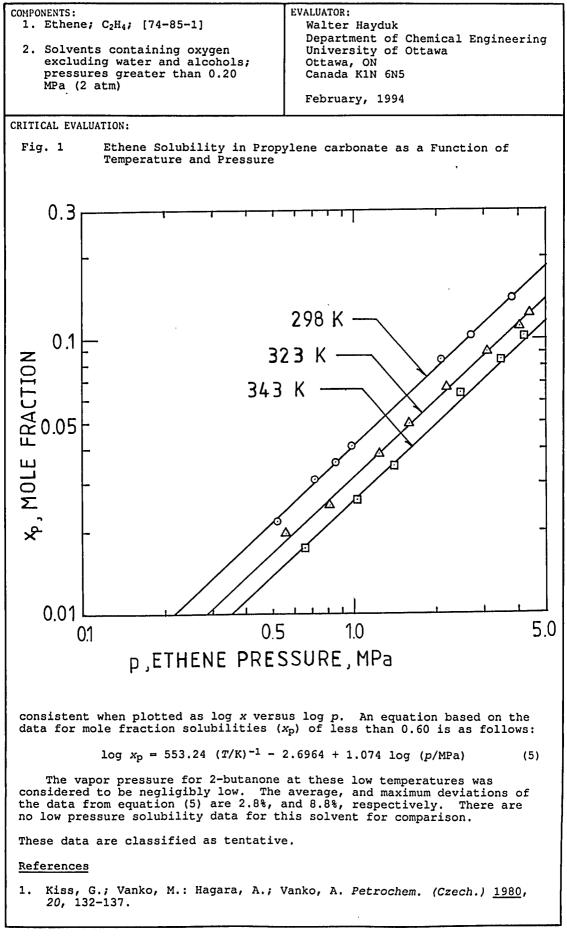
$$\log x_{p} = 442.90 \ (T/K)^{-1} + 0.9260 \ \log \ (p/MPa) - 2.8703 \tag{4}$$

Vapor pressures for this solvent are not readily available but believed to be low. In the development of equation (4) it was assumed that the solvent vapor pressure was negligible. The average, and maximum, deviations for the data from the equation are 2.3%, and 6.4%, respectively. When extrapolated to 0.1013 MPa for a temperature of 298.15 K, a value of the ethene solubility of 0.00495 mole fraction ethene, is obtained.

Figure 1 shows these data for propylene carbonate solvent and the lines representing equation (4). These data are classified as tentative.

## 2-Butanone (methyl ethyl ketone); C4H8O; [74-93-3]

Ethene solubilities in 2-butanone for varying pressures at 223.15 K 238.15 K and 248.15 K as reported by Shenderei et al. (2) are entirely



COMPON	NENTS:	EVALUATOR:
1.	Ethene; $C_{2}H_{4}$ ; [74-85-1]	Walter Hayduk
2.	Solvents containing oxygen excluding water and alcohols; pressures greater than 0.20 MPa (2 atm)	Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5 February, 1994
	and the second	residary, 1994
CRITI	CAL EVALUATION:	
2.	Shenderei, E.R.; Zel'venskii, Ya <u>1962</u> , <i>36</i> , 801-808.	. D.; Ivanovskii, F.P. Zhur. Fiz Khim
з.	Voronkov, A.P.; Mislavskaya, V.S Prikl. Khim. <u>1979</u> , 52, 2642; VIN.	.; Mushii, R. Ya.; Drygina, V.V. Zh. ITI No. 458-79.
4.	Hronec, M.; Hagara, A.; Ilavsky, 115.	J. Petrochem. (Czech.) <u>1983</u> , 23, 111-
5.	Efremova, G.D.; Sokolova, E.S. Z. No. 6067-73.	h. Fiz. Khim. <u>1973</u> , 47, 1228-9; VINIT.
6.	Zernov, V.S.; Kogan, V.B.; Lyubet <u>1971</u> , 44, 1837-1840. or Zhur. Pr.	tskii, S.G. <i>J. Appl. Chem. (USSR)</i> ikl. Khim. <u>1971</u> , 44, 1819–1823.
		; Rezina, O.A. <i>Khim. Prom.</i> <u>1973</u> , 49,

COMPONENTS :		· · · · · · · · · · · · · · · · · · ·	ORIGINAL MEASUREMEN	29 NTS:	
1. Ethene;	С, Н_; [74-8	5-1]		ko, M.; Hagara, A.;	
	none (acetone		Vanko, A.	· · ·	
_	[67-64-1]		Petrochemia (Czechoslovakia), <u>1980</u> , 20, 132–137.		
VARIABLES:	T/K = 238.15	.248.15	PREPARED BY:		
p	/MPa = 0.101-	-	W. Hayd	uk	
EXPERIMENTAL V				· · · · · · · · · · · · · · · · · · ·	
<b>e</b>					
t/C T/K	Partial Pressure p/MPa	Solubility s/cm ³ gas at NTP(g solvent	Fraction	¹ Henry's Constant H/atm(mole fraction)	
-35.0 238	.15	<u></u>			
By method .	A: 0.152 0.203 0.304 0.405 0.507 0.608 0.709 0.811 0.912 1.013	20.08 27.21 42.38 58.55 77.21 100.80 126.85 166.87 197.88 242.87	0.0495 0.0659 0.0990 0.1318 0.1667 0.2071 0.2474 0.3019 0.3390 0.3863	30.33 30.36 30.32 30.36 30.00 28.97 28.30 26.50 26.55 25.89	
By method 3	B: 0.101 0.203 0.405	11.8 24.8 58.3	0.0297 0.0604 0.1313	33.70 33.12 30.48	
Mole frac	d by compiler tion ethylene 5 K is x ₁ = 0.	e at a gas part 0333 as estima		l atm assuming Henry's law.	
		AUXILIARY	INFORMATION		
placed in a by a cooli liquid nit at the top pling of t a pressure is initial of solvent with gas b tribution holes. The	The solubility a metal block ng coil suppl rogen. Septu and bottom he solution h microsyringe ly charged wi which is the y bubbling the ring contains e gas is cont	s surrounded lied by m stoppers permit sam- by means of a. The cell th 2.5 cm ³ en saturated prough a dis- .ng 0.1 mm		n about the source gas or solvent is	
Tereaseu c	eter. The te	mperature is hermocouple.	δ T/1 δ p / MPa	K = ± 0.1 a = ± 0.001 = ± 0.02(Compiler)	
measured by Analysis is Method B:	Apart from t a static meth	the explana- od was used,	REFERENCES:		

294				
COMPONENTS :			ORIGINAL MEASUREME	NTS:
1. Ethene; C ₂	H ₄ ; [74-85-	-1]	Kiss, G.; Vanl	ko, M.; Hagara, A.;
2. 2-Propanon	e (acetone)	);	Vanko, A.	
С ₃ н ₆ 0; [67	-64-1]		Petrochemia (Cze 132–137.	choslovakia), <u>1980</u> , ²⁰ ,
VARIABLES:	K = 238.15	,248.15	PREPARED BY:	
<i>P</i> /MP	a = 0.101-1	1.013	W. Haydı	uk
EXPERIMENTAL VALU	JES:			· · · · · · · · · · · · · · · · · · ·
••	.continued			
t/C T/K	Partial Pressure p/MPa	Solubility s/cm³ gas at NTP(g solvent	Fraction	¹ Henry's Constant H/atm(mole fraction) ⁻¹
-25.0 248.15	;			
By method A:	0.152 0.203 0.304 0.405 0.507 0.608 0.709 0.811 0.912 1.013	15.40 21.80 32.20 44.57 56.66 75.11 88.48 110.69 125.49 153.73	0.0384 0.0535 0.0770 0.1035 0.1280 0.1629 0.1865 0.2229 0.2454 0.2849	39.09 37.40 38.95 38.63 30.05 36.83 37.53 35.89 36.68 35.10
By method B: ¹ Calculated b Mole fractio	n ethylene	at a gas part	0.0243 0.0486 0.1011	41.20 41.18 39.57 l atm and 248.15 K
is 0.0256 as	estimated	by compiler a	ssuming Henry's	law.
		AUXILIARY	INFORMATION	
METHOD/APPARATUS, Method A: Th placed in a m by a cooling liquid nitrog at the top an pling of the a pressure mi is initially of solvent wh with gas by b tribution rin holes. The g released thro ling manomete measured by m Analysis is b Method B: Ap. tion that a <u>s</u>	e solubilit etal block coil suppli en. Septum d bottom p solution by crosyringe. charged wit ich is ther ubbling the g containing as is conti- ugh a press r. The tem iniature the y gas chrom art from the	surrounded led by a stoppers permit sam- y means of . The cell th 2.5 cm ³ a saturated cough a dis- ag 0.1 mm Inuously sure control- aperature is hermocouple. hatography.	and purity of provided. ESTIMATED ERROR: δT/1 δp/MPa	OF MATERIALS: n about the source gas or solvent is K = ± 0.1 a = ± 0.001 = ± 0.02(Compiler)
no further de	scription i	s provided.		

							29
COMPOI	NENTS:				ORIGINAL MEA	SUREMENTS:	
1. E	Ethene;	C ₂ H ₄ ; [74-	85-1]		Hronec,	M.; Hagara,	A.; Ilavsky, J.
2. 2	2-Propan	one (aceto	ne);		Petrochemi	a, (Czechoslo	vakia), <u>1983</u> ,23,
C	C ₃ H ₆ O; [	67-64-1]			111-115.		
VARIA	BLES:	/K = 238.	15.308.15		PREPARED BY		
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EXPER	IMENTAL VA	ALUES:					•
t/C	т /к	Total Pressure P/kPa	¹ Partial Pressure p/kPa 1	s/cm	ubility ³ gas at g solvent) ⁻¹	¹ Mole Fraction ^x 1	¹ Henry's Constant H/atm (mole fraction)
-35	238.15	150	148.9		5.5	0.0141	104.6
		201	199.9		11.8	0.0300	66.5
		302 504	300.9 502.9		24.8 58.3	0.0604 0.1311	49.2 37.8
-25	248.15		148.0		4.2	0.0108	135.7
		201	199.0		9.6	0.0243	80.9
		302	300.0		19.7	0.0486	61.0
-15	258.15	504 150	502.0 146.2		43.4 2.6	0.1011 0.0067	49.0 215.6
	200110	201	197.2		6.6	0.0168	115.7
		302	298.3		15.8	0.0393	74.8
5	170 15	504	500.5		34.1	0.0812	60.8
5	278.15	150 201	137.9 189.0		0.9 3.0	0.0023 0.0077	585 242
		302	290.2		8.4	0.0213	134
		504	492.5		19.8	0.0488	99.6
25	200 16						
It	is noted	504 by compile 1 by the co	ompiler that	t the	1.5 8.9 results ta		652 201 re appear to be
¹ Cal It incc from	culated is noted	504 by compile d by the co t and in se ne laborato	458.5 er. ompiler that erious disa	t the greem	1.5 8.9 results ta ent with re	0.0225	201 re appear to be ished earlier
¹ Cal It incc from	culated is noted onsistent the sam	504 by compile d by the co t and in se ne laborato	458.5 er. ompiler that erious disac ory: Kiss,	t the greem Vanko	1.5 8.9 results ta ent with re	0.0225 abulated heresults puble	201 re appear to be ished earlier
¹ Cal It incc from 1980	culated is noted onsistent the san 2, 20 , 13	504 by compile d by the co t and in se ne laborato	458.5 er. ompiler that erious disatory: Kiss, " AUXI	t the greem Vanko	1.5 8.9 results ta ent with ro , Hagara an INFORMATION	0.0225 abulated heresults puble	201 re appear to be ished earlier trochemia,
¹ Cal It incc from 1980 METHO The	culated is noted onsistent the san 2, 20 , 13	504 by compile d by the co t and in se ne laborato 32-137. US/PROCEDURE us consiste	458.5 er. ompiler that erious disatory: Kiss, AUXI ed of an ab	t the greem Vanko ILIARY	1.5 8.9 results ta ent with re , Hagara an INFORMATION	0.0225 abulated heresults publ: nd Vanko, Per	201 re appear to be ished earlier trochemia,
¹ Cal It incc from 1980 METHO The sorb	culated is noted onsistent the san 2, 20 , 13 DD/APPARATE apparate per, 10-0	504 by compile d by the co t and in se ne laborato 32-137. US/PROCEDURE us consiste cm ³ in volu	458.5 er. ompiler that erious disatory: Kiss, AUXI AUXI ed of an about a	t the greem Vanko ILIARY	1.5 8.9 results ta ent with re , Hagara an INFORMATION SOURCE AND 1 1. Ethene	0.0225 abulated heresults publ: nd Vanko, Per PURITY OF MATE	201 re appear to be ished earlier trochemia, ERIALS: 5 99.8%.
¹ Cal It inco from <u>1980</u> METHO The sorb comp	culated is noted onsistent the sam 2, 20, 13 D/APPARATT apparatu per, 10-co plex syst acts in	504 by compile by the contract and in set ne laborato 32-137. US/PROCEDURE us consiste cm ³ in volution tem using e a tube for	458.5 er. ompiler that erious disates ory: Kiss, ' AUXI ed of an ab- ime, and a electrical r maintaining	t the greemo Vanko (LIARY -	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated heresults publ: nd Vanko, Per PURITY OF MATE	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with
¹ Cal It inco from <u>1980</u> METHO The sorb comp cont a co the	culated is noted onsistent the sam 2, 20, 13 0D/APPARATH apparatu per, 10-c clex syst acts in onstant c absorbed	504 by compile by the contract by the contract	458.5 er. ompiler that erious disatory: Kiss, AUXI add of an ab- ime, and a electrical c maintainin pressure in htacts were	t the greem Vanko (LIARY - ng n	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated heresults public nd Vanko, Per PURITY OF MATE a purity was ne was reage	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with
¹ Cal It inco from <u>1980</u> METHO The sorb cont a co the used	D/APPARATI apparatu postant of acts in absorber to stant	504 by compile by the contract by the contract	458.5 ar. ompiler that arious disac bry: Kiss, AUXI and a and a alectrical c maintaining pressure in htacts were b a gear pure	t the greem Vanko (LIARY - ng n	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated heresults public nd Vanko, Per PURITY OF MATE a purity was ne was reage	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with
¹ Cal It inco from <u>1980</u> METHO The sorb comp cont a co the used whic	culated is noted onsistent the sam , 20 , 13 D/APPARATI apparatu per, 10-co lex syst acts in onstant co absorbed to stan th pumped	504 by compile by the contract by the contract	458.5 er. ompiler that erious disatory: Kiss, " AUXI advised of an ab- ime, and a electrical pressure in htacts were o a gear pur oil as an	t the greem Vanko ILIARY - ng n	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated heresults public nd Vanko, Per PURITY OF MATE a purity was ne was reage	201 re appear to be ished earlier trochemia, ERIALS: 5 99.8%. ent grade with
¹ Cal It inco from <u>1980</u> METHO The sorb comp cont a co the used whic "ine	culated is noted onsistent the sam , 20 , 13 D/APPARATI apparatu per, 10-co lex syst acts in onstant co absorbed to star th pumped ert" med	504 by compile by the contract by the contract	458.5 er. ompiler that erious disatory: Kiss, ' AUXI ed of an ab- ime, and a electrical pressure in ntacts were o a gear pur oil as an place gas fi	t the greem Vanko ILIARY - ng n mp rom	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated heresults public nd Vanko, Per PURITY OF MATE a purity was ne was reage	201 re appear to be ished earlier trochemia, ERIALS: 5 99.8%. ent grade with
¹ Cal It inco from 1980 METHO The sorb cont a co the used whic a ga in v	D/APPARATI apparatu postant of absorber to stant of absorber to stant constant of absorber to stant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant constant const	504 by compile by the co t and in se ne laborato 32-137. US/PROCEDURE us consiste cm ³ in volution tem using e a tube for gas supply r. The con rt and stop d silicone ium to disp ge vessel.	458.5 ar. pmpiler that prove disates pry: Kiss, and AUXI and of an ab- and a and alectrical pressure in thacts were a gear pun oil as an place gas fin The change oil utilized	t the greem Vanko ILIARY - ng n mp rom e ed	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated heresults public nd Vanko, Per PURITY OF MATE a purity was ne was reage	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with
¹ Cal It incc from 1980 METHO The sorb cont a co the used whic "ine a ga in v was	D/APPARATI apparatu ber, 10-co absorber to stant co absorber to stant co absorber to stant co absorber th pumped s storaco colume of read on	504 by compile by the contract by the contract by the contract by the contract by the contract by the contract by consister by consister by consister by consister contract of the contract by consister contract of the contract by consister contract of the contract by consister contract of the contract by consister contract of the contract contract of the contract of the contract contract of the contract of the contract contract of the contract of the contract of the contract contract of the contract of the contract of the contract contract of the contract of the contract of the contract contract of the contract of the cont	458.5 ar. ompiler that prove disates pry: Kiss, and AUXI and of an ab- able of	t the greeme Vanko ILIARY - ng n mp e e ed n-	1.5 8.9 results ta ent with re , Hagara an INFORMATION SOURCE AND 1. Ethene 2. Acetor water	0.0225 abulated here sults publ: ad Vanko, Per PURITY OF MATE purity was ne was reage content < (	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with
¹ Cal It inco from <u>1980</u> METHO The somp conto the used whic "ine a ga in v was side	D/APPARATI apparatu obsorber absorber to stant absorber to stant colex syst acts in absorber to stant colex syst acts in absorber to stant colex syst acts in acts in absorber to stant colex syst acts in acts in a stant colex syst acts in acts in a stant colex syst acts in a stant colex syst ac	504 by compile by the contract by the contract	458.5 ar. ompiler that arious disactory: Kiss, AUXI and a alectrical pressure in tacts were a gear pur- oil as an place gas f: The change oil utilized and was con- the volume of the second and was con-	t the greem Vanko (LIARY - ng n mp rom e ed n- of	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1 1. Ethene 2. Acetor	0.0225 abulated here sults publ: ad Vanko, Per PURITY OF MATE purity was ne was reage content < (	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with 0.5%.
¹ Cal It inco from <u>1980</u> METHO The somp conto the used whic a ga used side gas cont	Culated is noted onsistent the sam the sam 2, 20, 13 OD/APPARATI apparatu per, 10-c lex syst acts in onstant of absorben to stant to stant to stant storad on stant of read on ered to n used. 7 ained 3-	504 by compile by the contract by the contract	458.5 ar. ompiler that arious disactory arious disactory arious disactory arious disactory AUXI advectory and a alectrical pressure in tacts were a gear pur- oil as an blace gas find and was con- con- con- and was con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- con- c	t the greem Vanko (LIARY - ng n mp rom e ed n- of	1.5 8.9 results ta ent with re , Hagara an INFORMATION SOURCE AND 1. Ethene 2. Acetor water	0.0225 abulated here sults publ: ad Vanko, Per PURITY OF MATE a purity was ne was reage content < ( RROR: δ P/kPa = ±	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with 0.5%.
¹ Cal It incc from <u>1980</u> METHO The sorb cont a co used whic a gas in v was gas cont fine	Culated is noted onsistent the same the same 2, 20, 13 OD/APPARATE apparatu per, 10-c clex syst acts in onstant of absorber to start to start to start cats in onstant of read on ered to r used. T ained 3- d in a t	504 by compile by the contract by the contract	458.5 ar. ompiler that arious disatory arious disatory arious disatory arious disatory arious disatory AUXI and a alectrical pressure in tacts were a gear pur oil as an olace gas fi The change oil utilized and was con the volume of arious disatory arious di	t the greem Vanko (LIARY - ng n mp rom e ed n- of y	1.5 8.9 results ta ent with re , Hagara an INFORMATION SOURCE AND 1. Ethene 2. Acetor water	0.0225 abulated here sults publ: ad Vanko, Per PURITY OF MATE a purity was ne was reage content < ( RROR: δ P/kPa = ±	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with 0.5%.
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¹ Cal It inco from <u>1980</u> METHO The sorb comp ta co the used whice a gas cont a in v was gas fine ain v was gas fine appendent	culated is noted onsistend the sam 2, 20, 13 ob/APPARATI apparatu per, 10-co blex syst acts in onstant co absorbed to stan ch pumped ert" med to stan th pumped ort" med to stan colume of read on ered to n used. The stimed 3- d in a to oule. The with gas	504 by compile by the contrast by the contrest by the contrest by the contrest by the contrest	458.5 ar. appiler that arious disact pry: Kiss, and AUXI and of an ab- and a and alectrical c maintaining pressure in tacts were a gear pun- oil as an ariotace gas fin- the change oil utilized and was con- the con- solvent con- d glass was pressure and the change oil utilized and was con- the con- d glass	t the greem Vanko ILIARY - ng n mp rom e ed n- of y - r-	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1. Ethend 2. Acetor water ESTIMATED E	0.0225 abulated here soults public ad Vanko, Per PURITY OF MATH a purity was ne was reage content < () RROR: $\delta P/kPa = \pm \delta s/s = \pm$	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with 0.5%.
¹ Cal inco from <u>1980</u> METHO The sorb compt a co the used whice a gas cont fine a gas fine a gas fine fine a gas fine fine fine fine fine fine fine fine fine fine fine fine fine	culated is noted onsistend the sam 2, 20, 13 ob/APPARATI apparatu per, 10-co blex syst acts in onstant co absorbed to stan ch pumped ert" med to stan th pumped ort" med to stan colume of read on ered to n used. The stimed 3- d in a to oule. The with gas	504 by compile by the contrast by the contrest by the contrest by the contrest by the contrest	458.5 ar. appiler that arious disact pry: Kiss, and AUXI and of an ab- and a and alectrical c maintaining pressure in tacts were a gear pun- oil as an ariotace gas fin- the change oil utilized and was con- the con- solvent con- d glass was pressure and the change oil utilized and was con- the con- d glass	t the greem Vanko ILIARY - ng n mp rom e ed n- of y - r-	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1. Ethend 2. Acetor water ESTIMATED E	0.0225 abulated here soults public ad Vanko, Per PURITY OF MATH a purity was ne was reage content < () RROR: $\delta P/kPa = \pm \delta s/s = \pm$	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with 0.5%.
¹ Cal inco from <u>1980</u> METHO The sorb compt a co the used whice a gas cont fine a gas fine a gas fine fine a gas fine fine fine fine fine fine fine fine fine fine fine fine fine	culated is noted onsistend the sam 2, 20, 13 ob/APPARATI apparatu per, 10-co blex syst acts in onstant co absorbed to stan ch pumped ert" med to stan th pumped ort" med to stan colume of read on ered to n used. The stimed 3- d in a to oule. The with gas	504 by compile by the contrast by the contrest by the contrest by the contrest by the contrest	458.5 ar. appiler that arious disact pry: Kiss, and AUXI and of an ab- and a and alectrical c maintaining pressure in tacts were a gear pun- oil as an ariotace gas fin- the change oil utilized and was con- the con- solvent con- d glass was pressure and the change oil utilized and was con- the con- d glass	t the greem Vanko ILIARY - ng n mp rom e ed n- of y - r-	1.5 8.9 results ta ent with ro , Hagara an INFORMATION SOURCE AND 1. Ethend 2. Acetor water ESTIMATED E	0.0225 abulated here soults public ad Vanko, Per PURITY OF MATH a purity was ne was reage content < () RROR: $\delta P/kPa = \pm \delta s/s = \pm$	201 re appear to be ished earlier trochemia, ERIALS: s 99.8%. ent grade with 0.5%.

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OMPONENTS:			ORTGINAT	MEASUREME	INTS :	L.	
1. Ethene; $C_2 H_4$ ; [74-85-1]							
-	·		Voronkov, A.P.; Mislavskaya, V.S.; Mushii, R. Ya.; Drygina, V.V.				
<pre>2. 2-Propanone (acetone); C₃H₆O; [67-64-1]</pre>			Zh.	Prikl. K	him. 1979, 52,	2642;	
			VINI	TI NO. 4	58-79.		
ARIABLES:			PREPARED BY:				
T/	'K = 263.15	- 373.15		-	Hayduk		
<i>P</i> /MP	Pa = 0.101 -	7.60			•		
PERIMENTAL VALUE	ES:	Mole Fr	actions		<u></u>		
	Acetone	¹ Ethene	Acetone	Ethene	¹ Partial	Total	
Temperatures	in Liquid			in Gas	Pressure	Pressure	
<i>t</i> /°C <i>T</i> /K	$1 - x_1$	<i>w</i> 1	$1 - y_1$	¥ 1	Ethene, $p_1/atm$	P/atm	
-10 263.15	0.990	0.010	0.606	0.9494	0.9494	1	
	0.976	0.024	0.0180	0.9820	2.95	3	
	0.960	0.040	0.0101	0.9899	4.95	5	
	0.922	0.078		0.9952	9.95	10	
	0.878	0.122		0.9968		15	
	0.844 0.786	0.156 0.214	0.0021	0.9979 0.9986	19.96 24.96	20 25	
	0.680	0.320		0.9991	29.97	30	
10 283.15	0.995	0.005		0.6017	0.6017	1	
	0.984	0.016		0.9235	2.77	3	
	0.973	0.027	0.0385	0.9616	4.81	5	
	0.953	0.047		0.9843	9.84	10	
	0.934	0.066		0.9898	14.85	15	
	0.914 0.898	0.086 0.102		0.9930 0.9947	19.86 24.87	20 25	
	0.870	0.130		0.9957	29.87	30	
	0.822	0.178	0.0037	0.9963	34.87	35	
¹ Calculated b Henry's law i	s obeyed up	to about 2	5 atm (2	.53 MPa)	•		
¹ Calculated b Henry's law i The data were	from the p	aper deposi	ted in V	INITI, M	• oscow. continued.	•••	
Henry's law i The data were	from the p	aper deposi	ted in V	INITI, M	oscow. continued.	•••	
Henry's law i The data were ETHOD/APPARATUS/H	From the particular pa	AUXILIAR	ted in V	INITI, M	OF MATERIALS;		
Henry's law i The data were	PROCEDURE: essentiall an autoclave constant ath and a membrane	aper deposi AUXILIARY	ted in V INFORMAT	INITI, M TION AND PURITY SOURCES	oscow. continued.	fgas	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the	AUXILIAR AUXILIAR Y e i the ure of	INFORMAT	INITI, M	oscow. continued OF MATERIALS: and purities of were not specif	fgas	
Henry's law i The data were The data were The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are:	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a presse mated by the	AUXILIAR AUXILIAR Y e l the ire of	INFORMAT	INITI, M TION AND PURITY sources solvent ED ERROR:	oscow. continued. OF MATERIALS: and purities of were not specif δT/K = ± 0.2	fgas	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x,	AUXILIAR AUXILIAR Y e i the ure of	INFORMAT SOURCE The and ESTIMAT	TION AND PURITY sources solvent ED ERROR:	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are: T/K H, atm fract	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac	AUXILIARY AUXILIARY e d the ure of e mole	INFORMAT SOURCE The and ESTIMAT	TION AND PURITY sources solvent ED ERROR:	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressure solubilities 1 atm as estin compiler are: T/K H, atm fract: 263.15 125 283.15 225	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac 0.0	AUXILIARY AUXILIARY AUXILIARY Se d the ure of e mole ction	ted in V INFORMAT SOURCE The and ESTIMAT $\delta x/s$	INITI, M TION AND PURITY sources solvent ED ERROR: of mole frac	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are: T/K H, atm fract 263.15 125 283.15 225 303.15 244	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac 0.0	AUXILIAR AUXILIAR Y e d the ure of e tion 00800 00444 00410	INFORMAT SOURCE The and ESTIMAT	INITI, M TION AND PURITY sources solvent ED ERROR: of mole frac	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are: T/K H, atm fract 263.15 125 283.15 225 303.15 244 323.15 286	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac 0.0 0.0 0.0	AUXILIAR AUXILIAR Y e d the ure of e tion 00800 00444 00410 00351	ted in V INFORMAT SOURCE The and ESTIMAT $\delta x/s$	INITI, M TION AND PURITY sources solvent ED ERROR: of mole frac	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are: T/K H, atm fract: 263.15 125 283.15 225 303.15 244 323.15 286 353.15 300	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac 0.0 0.0 0.0	AUXILIAR AUXILIAR AUXILIAR Y e d the ure of e ction 00800 00444 00410 00351 00333	ted in V INFORMAT SOURCE The and ESTIMAT $\delta x/s$	INITI, M TION AND PURITY sources solvent ED ERROR: of mole frac	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are: T/K H, atm fract 263.15 125 283.15 225 303.15 244 323.15 286	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac 0.0 0.0 0.0	AUXILIAR AUXILIAR Y e d the ure of e tion 00800 00444 00410 00351	ted in V INFORMAT SOURCE The and ESTIMAT $\delta x/s$	INITI, M TION AND PURITY sources solvent ED ERROR: of mole frac	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	
Henry's law i The data were ETHOD/APPARATUS/F The equipment consisted of immersed in a temperature b connected to pressure gaug Henry's const lower pressur solubilities 1 atm as estin compiler are: T/K H, atm. fract: 263.15 125 283.15 225 303.15 244 323.15 286 353.15 300	PROCEDURE: essentially an autoclave constant ath and a membrane e. ants for the e region and for a press mated by the /mole x, ion frac 0.0 0.0 0.0	AUXILIAR AUXILIAR AUXILIAR Y e d the ure of e ction 00800 00444 00410 00351 00333	ted in V INFORMAT SOURCE The and ESTIMAT $\delta x/s$	INITI, M TION AND PURITY sources solvent ED ERROR: of mole frac	oscow. continued. OF MATERIALS: and purities of were not specified were not specified $\delta T/K = \pm 0.2$ $o/atm = \pm 0.05$ ction = $\pm 0.002$	f gas fied.	

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COMPONENTS :		1	ORIGINA	L MEASUREM	ENTS:	
1. Ethene; $C_2$			Voronkov, A.P.; Mislavskaya, V.S.; Mushii, R. Ya.; Drygina, V.V.			
2. 2-Propanone (acetone); C ₃ H ₆ O;					Khim. <u>1979</u> , 52	, 2642;
[67-64-1]			VINI	TI No. 4	58-79.	
VARIABLES:		· · · · · · · · · · · · · · · · · · ·	PREPARE	D BY:		
	K = 263.15 a = 0.101 -			W.	Hayduk	
EXPERIMENTAL VALUE			<u> </u>		• •	
	Acetone	Mole Fr	the second s	Ethene	¹ Partial	Total
Temperatures	in Liquid				Pressure	Pressure
t/°C T/K	$1 - x_1$	x ₁	$1 - y_1$	y ₁	Ethene, $p/at$	
30 303.15	0.997	0.003	0.4240	0.5760	0.576	1
	0.984	0.016	0.0744	0.9256	2.78	3
	0.978	0.022	0.0410	0.9590	4.80	5
	0.960	0.040	0.0194	0,9806	9.81	10
	0.946 0.924	0.054 0.076	0.0115	0.9885 0.9904	14.83 19.81	15
	0.896	0.104	0.0078	0.9922	24.81	25
	0.878	0.122		0,9936	29.81	30
	0.854	0.146	0.0056	0.9944	34.80	35
	0.824 0.794	0.176 0.206		0.9952	39.81 44.82	40 45
	0.764	0.236	0.0040 0.0036	0.9960 0.9964	49.82	45 50
50 323.15	0.993	0.007	0.1518	0.8482	2.54	3
	0.985	0.015	0.0867	0.9133	4.57	5
	0.968	0.032	0.0421	0.9579 0.9720	9.58 14.58	10 15
	0.951 0.930	0.049 0.070	0.0280	0.9831	19.58	20
	0.914	0.086	0.0169	0.9880	24.58	25
¹ Calculated by Henry's law in The data were	s obeyed up	aper deposi		INITI, M		inued
METHOD/APPARATUS/P	PROCEDURE:		SOURCE	AND PURITY	OF MATERIALS:	
The equipment consisted of a immersed in a temperature ba connected to a pressure gauge	an autoclave constant ath and a membrane				and purities were not spec	
Henry's consta lower pressure solubilities of 1 atm as estin compiler are:	e region and for a pressu	l the ure of	ESTIMAT	ED ERROR:	5m / w	
T/K H, atm, fract:		mole	ôx /	δ	$\delta T / K = \pm 0.2$ $p/atm = \pm 0.0$ ction = $\pm 0.0$ (Au	5
263.15       125         283.15       225         303.15       244         323.15       286         353.15       300         373.15       313	0.( 0.( 0.( 0.(	00800 00444 00410 00351 00333 00319	REFEREN	ICES ;	<u>_</u>	

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COMPONENTS :						
			ORIGINAL	MEASUREME	ENTS:	4 4 ² 2
1. Ethene; C ₂			Voronkov, A.P.; Mislavskaya, V.S.; Mushii, R. Ya.; Drygina, V.V.			
2. 2-Propanone (acetone); C ₃ H ₆ O;			Zh.	Prikl. K	chim. 1979, 52,	2642;
[67-64-1]	VINI	TI NO. 4	58-79.			
VARIABLES:	K = 263.15	- 373.15	PREPAREI	D BY:	···	
	Pa = 0.101 -			Ψ.	Hayduk	
EXPERIMENTAL VALUE			<u></u>	·		
	Acetone	Mole Fr	actions	Ethene	¹ Partial	Total
Temperatures					Pressure	Pressure
<i>t</i> /°Ĉ <i>T</i> /K	$1 - x_1$	<i>x</i> ₁	$1 - y_1$	¥ 1	Ethene, p/atm	p/atm
50 323.15	0.896	0.104	0.0140	0.9860	29.58	30
50 525115	0.872	0.128		0.9880	34.58	35
	0.858	0.142	0.0106	0.9894	39,58	40
	0.832	0.168		0.9904	44.57	45
	0.812	0.188		0.9913	49.57	50
	0.788 0.764	0.212 0.236		0.9920 0.9926	54.56 59.56	55 60
80 353.15	0.988	0.012		0.7029	3.51	5
	0.974	0.026		0.8661	8.66	10
	0.956 0.940	0.044 0.060		0.9110 0.9347	13.67 18.69	15 20
	0.920					25
	0.904	0.096	0.0440	0.9468 0.9560 0.9621	28.68	30
	0.886	0.114	0.0379	0.9621	33.67	35
	0.864	0.136		0.9674	38.70	40
	0.854	0.146	0.0298	0.9702	43.66	45
	0.832 0.812	0.168	0.0270	0.9730 0.9758	48.65 53.67	50
¹ Calculated b Henry's law i The data were	s obeyed up	to about 2 aper deposi	5 atm (2 ted in V	.53 MPa) INITI, M	oscow. cont:	inued
		AUXILIARY	INFORMAT	'ION		
METHOD/APPARATUS/F	ROCEDURE:		SOURCE	AND PURITY	OF MATERIALS:	
The equipment consisted of immersed in a temperature b connected to pressure gauge	an autoclavo constant ath and a membrane				and purities o: were not speci:	
Henry's const lower pressur solubilities 1 atm as estin compiler are:	e region and for a pressu	l the ure of	ESTIMAT	ED ERROR:	ε <i>π (γ</i> - 4 0 2	
T/K H, atm, fract		mole ction	δ <i>x</i> /	δ	$\delta T / K = \pm 0.2$ $p/atm = \pm 0.05$ ction = $\pm 0.002$ (Aut)	2 nors)
263.15         125           283.15         225           303.15         244           323.15         286           353.15         300           373.15         313	0.0 0.0 0.0	00800 00444 00410 00351 00333 00319	REFEREN	CES:		

COMPONENTS	•	· · · · · · · · · · · · · · · · · · ·		<b>IORICINA</b>	L MEASUREM	ENTC .	29	
COMPONENTS	•			OKIGINA	L MEASUREM	CN 15 :		
	-	H ₄ ; [74-85- e (acetone)		Mush	nii, R. Y	P.; Mislavskay a.; Drygina, V him. <u>1979</u> , 52,	.V.	
	[67-64-1]			VINI	VINITI NO. 458-79.			
VARIABLES:			000 45	PREPARE	D BY:			
		K = 263.15			W.	Hayduk		
EXPERIMENT		a = 0.101 -				•		
		•••Cont.	Mole Fr	actions				
, 		Acetone	¹ Ethene	Acetone	Ethene		Total	
	atures					Pressure	Pressure	
t/°C	т/к	$1 - x_1$	<i>x</i> 1	$1 - y_1$	<i>y</i> ₁	Ethene, $\frac{p}{l}$ atm	P/atm	
80 3	353.15	0.800	0.200	0.0228	0.9772	58.63	60	
		0.772	0.228	0.0212		63.62	65	
		0.766	0.234	0.0197	0.9803	68.62	70	
		0.748	0.252	0.0185	0.9815	73.61	75	
100 3	373.15	0.997	0.003	0.6280	0.3720	1.86	5	
		0.980	0.020		0.7366	7.37	Ŭ 10	
		0.962	0.038	0.1676	0.8324	12.49	15	
		0.946	0.054		0.8766	17.53	20	
		0.928	0.072		0.8910	22.28	25	
		0.912	0.088		0.9178	27.53	30	
		0.894	0.106		0.9290	32.52	35	
		0.876	0.124		0.9379 0.9447	37.52 42.51	40 45	
		0.856 0.844	0.144 0.156		0.9447	47.50	45 50	
		0.832	0.168		0.9542	52.48	55	
		0.812	0.188	0.0423	0.9577	57.46	60	
		0.790	0.210	0.0392	0.9608	62.45	65	
		0.776	0.224	0.0366	0.9634	67.44	70	
Henry's The dat	s law is ta were	s obeyed up from the pa	aper deposi	5 atm (2 ted in V ( INFORMAT	INITI, M	oscow.		
METHOD/APP	PARATUS/P	ROCEDURE :		SOURCE	AND PURITY	OF MATERIALS:		
consist immerse tempera connect	ted of a ed in a ature ba	a membrane				and purities of were not specif		
lower p solubil	pressure Lities i as estin	ants for the e region and for a pressunated by the	l the ire of	ESTIMAT	ED ERROR:	$\delta T/K = + 0.2$		
<i>т/к</i>	H, atm, fracti		mole tion	δ æ /		$p/atm = \pm 0.02$ $p/atm = \pm 0.05$ $ction = \pm 0.002$ (Auth		
263.15 283.15 303.15 323.15 353.15 373.15	225 244 286	0.0 0.0 0.0 0.0	00800 00444 00410 00351 00333 00319	REFEREN	CES:			
						·		

300						
1.	<pre>MPONENTS: 1. Ethene; C₂H₄; [74-85-1] 2. 2-Propanone, (Acetone); C₃H₆O; [67-64-1]</pre>			ORIGINAL MEASUREMENTS: Shenderei, E.R.; Zel'venskii, Ya.D.; Ivanovskii, F.P. Zhur.Fiz.Khim. <u>1962</u> ,36,801-808.		
VARIA	-	228.05 - 0.101 - 3		PREPARED BY: C.L. Young.		
EXPEI	RIMENTAL VALUE	S:				
	Т /К	p/atm	p/bar	Mole fraction of ethene in liquid, ^x C ₂ H ₄	Solubility, ⁺	
	248.15	1 3 5 10 12 15 18	1.0 3.0 5.1 10.1 12.2 15.2 18.2	0.0255 0.0750 0.1300 0.2825 0.3500 0.4680 0.6100	10.02 30.98 57.09 150.55 205.75 336.13 597.65	
	238.15	1 3 5 10 12 15	1.0 3.0 5.1 10.1 12.2 15.2	0.0320 0.1000 0.1650 0.3825 0.5125 0.8100	12.61 42.46 75.51 236.88 402.11 1628.0	
	228.05	1 3 5 10	1.0 3.0 5.0 10.1	0.0410 0.1275 0.2230 0.6050	16.35 55.87 109.66 515.50	
	+ cm ³ g ⁻¹	at $P = 10$	)1.325 kPa.			
			AUXILIARY	INFORMATION		
Gla mag wit lig	OD/APPARATUS/F netic stirr h Bourdon g uid analyse ene. Detai	ium cell : er. Press auge. Sar d by strig	sure measured mples of oping out	ion and purifie	TERIALS: thanol by dehydrat- d by absorption in e under pressure.	
				REFERENCES:	ated by compiler.) Zel'venskii,Ya.D.;	

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OMPONENTS:		ORIGINAL MEASUREMENTS:
	ne; C,H_; [74-85-1]	Efremova, G.D.; Sokolova, E.S.
	noic acid (propionic acid	
-		
C ³ H ⁰	02; [79-09-4]	VINITI NO. 6067-73.
ARIABLES:	T/K = 323.15 - 423.15	PREPARED BY:
P /MPa	= 2.53 - 12.41	W. Hayduk
XPERIMENTAI	L VALUES:	
<i>t /</i> C	Henry's C T/K H/atm (mole	$x_1^{1}$ mole Fraction Ethene, fraction) ⁻¹ $x_1$
50	323.15 133	0.00752
100	373.15 178	0.00562
150	423.15 257	0.00389
-	-	not given here. ortion of the paper deposited in VINITI,
- The data	-	
- The data	were obtained from the p	
The data Moscow.	were obtained from the p	ortion of the paper deposited in VINITI,
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	were obtained from the p	ARY INFORMATION SOURCE AND PURITY OF MATERIALS:  1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	ARY INFORMATION SOURCE AND PURITY OF MATERIALS:  1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	ARY INFORMATION SOURCE AND PURITY OF MATERIALS:  1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C compared with reported value of
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	ARY INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C compared with reported value of -20.8°C.
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	<pre>ARY INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C compared with reported value of -20.8°C. ESTIMATED ERROR:</pre>
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	<pre>ARY INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C compared with reported value of -20.8°C. ESTIMATED ERROR:</pre>
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	<pre>ARY INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C compared with reported value of -20.8°C. ESTIMATED ERROR:</pre>
The data Moscow. ETHOD/APPAN A titani volume w used. T equipped pressure thermoco	AUXILI AUXILI RATUS/PROCEDURE: um autoclave whose as calibrated, was whe autoclave was with a membrane gauge along with a uple placed near the	<pre>ARY INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene critical temperature was measured as 9.30°C (reported value 9.60°C). 2. Solvent purified by fractional crystallization; resulting melting point was -21.0°C compared with reported value of -20.8°C. ESTIMATED ERROR:</pre>

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	:			ORIGINAL MEASUREMENTS:	· · · ·		
1. Ethe	ene; C ₂ H	·; [74-85-1]		Zernov, V.S.; Kogan,	V.B.;		
<b>J</b> J	-	athonul art-	~	Lyubetskii, S.G.			
2. Acetic acid, ethenyl ester (vinyl acetate); C _L H ₂ O ₂ ;				J. Appl. Chem. (USSR) <u>1971</u> , 44, 1837-40.			
[108-5-4]				OR Zhur. Prikl. Khim. 1819-23.			
ARIABLES:			<u> </u>	PREPARED BY:	<u> </u>		
		= 293.1 - 423 = 0.20 - 7.09		W. Hayduk			
XPERIMENT	TAL VALUES	:					
m l ve		Mole Fracti					
<i>T</i> / K	P/MPa	Solvent, 2	Solute	, x ₁ Solvent vapor, y	² Solute , y ₁		
293.1		0.989	0.01		0.937		
	0.41	0.975	0.02		0.964		
	0.71 1.01	0.953 0.940	0.04		0.966 0.966		
	2.02	0.760	0.06		0.966		
	3.03	0.593	0.40		0.966		
	4.05	0.530	0.47	• • • • • • •	0.964		
	5.06	0.487	0.51		0.966		
313.1		0.989	0.01		0.850		
	0.44	0.975	0.02		0.925		
	0.67 1.01	0.960	0.04		0.940		
	2.02	0.951 0.839	0.04 0.16		0.953 0.953		
1	3.04	0.657	0.10		0.953		
	4.05	0.582	0.41	8 0.047	0.953		
Liquid	5.06 Lated by and gas	0.541 compiler. molar volumes	0.45 as well	9 0.046 as partial molal volum	0.954		
Liquid dissolv	5.06 Lated by and gas ved ethe	0.541 compiler. molar volumes ne also given	0.45 as well in this	9 0.046 as partial molal volum paper. ately obeyed above 1 MP	0.954 		
Liquid dissolv	5.06 Lated by and gas ved ethe	0.541 compiler. molar volumes ne also given	0.45 as well in this approxim	9 0.046 as partial molal volum paper. ately obeyed above 1 MP	0.954 es of a pressure.		
Liquid dissolv Normal	5.06 Lated by and gas ved ethe	0.541 compiler. molar volumes ne also given law not even	0.45 as well in this approxim	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con	0.954 es of a pressure. tinued		
Liquid dissolv Normal ETHOD/APP A descr	5.06 Lated by and gas yed ethe Henry's PARATUS/PR	0.541 compiler. molar volumes ne also given law not even OCEDURE:	0.45 as well in this approxim AUXILIARY	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION	0.954 es of a pressure. tinued		
Liquid dissolv Normal ÆTHOD/APP A descr found i	5.06 Lated by and gas yed ether Henry's PARATUS/PR ciption of	0.541 compiler. molar volumes ne also given law not even	0.45 as well in this approxim AUXILIARY us is s of	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI	0.954 es of a pressure. tinued ALS:		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes,	5.06 Lated by and gas ved ether Henry's PARATUS/PR ciption in ref. aduated 5 mm in	0.541 compiler. molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled g diameter and	0.45 as well in this approxim AUXILIARY AUXILIARY aus is s of lass 60 cm	9 0.046 as partial molal volum paper. ately obeyed above 1 MP. con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3	0.954 es of a pressure. tinued ALS: Normal 45.4 K and		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng	5.06 Lated by and gas ved ether Henry's PARATUS/PR ciption of in ref. 5 mm in gth seale	0.541 compiler. molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled g diameter and ed in a temper	0.45 as well in this approxim AUXILIARY us is s of lass 60 cm ature-	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index	0.954 es of a pressure. tinued ALS: Normal 45.4 K and $n_{2}^{20} = 1.3953.$		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control	5.06 Lated by and gas ved ether Henry's ARATUS/PR ciption of in ref. 5 mm in 5 mm in gth seale Lled jac	0.541 compiler. molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled g diameter and ed in a temper ket. Mercury	0.45 as well in this approxim AUXILIARY AUXILIARY us is s of lass 60 cm ature- can be	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index i Note: At high ter	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4 K and n ²⁰ = 1.3953. mperatures		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control indepen	5.06 Lated by and gas ved ether Henry's ARATUS/PR ciption of in ref. duated 5 mm in 5th seale Lled jach	0.541 compiler. molar volumes ne also given law not even	0.45 as well in this approxim AUXILIARY aus is s of lass 60 cm ature- can be bot-	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index Note: At high ter and pressures 0.00	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4  K and $n_D^{2^0} = 1.3953.$ mperatures 001 mole %		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control indepen tom of	5.06 Lated by and gas ved ether Henry's ARATUS/PR ription in ref. duated 5 mm in 5th seale Led jack idently each tul	0.541 compiler. molar volumes ne also given law not even	0.45 as well in this approxim AUXILIARY us is s of lass 60 cm ature- can be bot- ation	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index i Note: At high ter	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4  K and $n_D^{2^0} = 1.3953.$ mperatures 001 mole %		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control indepen tom of tube is magneti	5.06 Lated by and gas yed ether Henry's ARATUS/PR ciption In ref. 5 mm in gth seale Led jac idently each tul s equipped c vibrat	0.541 compiler. molar volumes ne also given law not even	0.45 as well in this approxim AUXILIARY AUXILIARY AUXILIARY ature- can be bot- ation ctro- n the	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index Note: At high ter and pressures 0.00 hydroquinone inhil	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4  K and $n_D^{2^0} = 1.3953.$ mperatures 001 mole %		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control indepen tom of tube is magneti mercury	5.06 Lated by and gas ved ether Henry's ARATUS/PR ciption in ref. aduated 5 mm in sth sealed idently of each tul s equipped c vibrat	0.541 compiler. molar volumes ne also given law not even	0.45 as well in this approxim AUXILIARY us is s of lass 60 cm ature- can be bot- ation ctro- n the ion of	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index Note: At high ter and pressures 0.00 hydroquinone inhil	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4  K and $n_D^{2^0} = 1.3953.$ mperatures 001 mole %		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control indepen tom of tube is magneti mercury the pha	5.06 Lated by and gas ved ether Henry's ARATUS/PR ciption in ref. aduated 5 mm in gth sealed led jac deach tul s equipped c vibrat y to aid uses. A	0.541 compiler. molar volumes ne also given law not even law not even OCEDURE: of the apparat 1. It consist thick-walled g diameter and ed in a temper ket. Mercury charged to the be. The satur ed with an ele tor immersed i in equilibrat separate merc	0.45 as well in this approxim AUXILIARY AUXILIARY ature- can be bot- ature- can be bot- ation ctro- n the ion of ury	9 0.046 as partial molal volum paper. ately obeyed above 1 MP con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index Note: At high ter and pressures 0.00 hydroquinone inhil	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4  K and $n_D^{2^0} = 1.3953.$ mperatures 001 mole %		
Liquid dissolv Normal ETHOD/APP A descr found i two gra tubes, in leng control indepen tom of tube is magneti mercury the pha reservo	5.06 Lated by and gas ved ether Henry's PARATUS/PR ciption in ref. aduated 5 mm in gth sealed led jac idently of each tul s equipped c vibrat y to aid uses. A pir is pr	0.541 compiler. molar volumes ne also given law not even law not even OCEDURE: of the apparat 1. It consist thick-walled g diameter and ed in a temper ket. Mercury charged to the be. The satur ed with an ele tor immersed i in equilibrat separate merc ressurized wit	0.45 as well in this approxim AUXILIARY AUXILIARY AUXILIARY ature- can be bot- ature- can be bot- aturo- n the ion of ury h	9 0.046 as partial molal volum paper. ately obeyed above 1 MP. con INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index in Note: At high ten and pressures 0.00 hydroquinone inhil added. ESTIMATED ERROR:	0.954 es of a pressure. tinued ALS: ALS: Normal 45.4  K and $n_D^{2^0} = 1.3953.$ mperatures 001 mole %		
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	S:			ORIGINAL MEASUREMENTS:	1
		; [74-85-1]		Zernov, V.S.; Kogan,	V.B.;
	-	+		Lyubetskii, S.G.	
2. ACe (vi:	nvl acet	<pre>, ethenyl este ate); C_bH_cO_c;</pre>	er	J. Appl. Chem. (USSR) 19 1837-40.	<u>971</u> , 44,
[10	8-5-4]	4 6 2		OR Zhur. Prikl. Khim. 1	971, 44,
				1819-23.	
ARIABLES	5: _ /			PREPARED BY:	
	Т/К	<b>= 293.1 - 42</b> 3	3.1	W. Hayduk	
	P/MPa	= 0.20 - 7.09	)		
XPERIMEN	TAL VALUES	Mole Fracti		uid Mole Fraction	n in Gas
<i>T</i> <b>/</b> K	P/MPa	Solvent, $x_2$	¹ Solute	, $x_1$ Solvent vapor, $y_2$	¹ Solute , $y_1$
333.1	0.22	0.989	0.011	0.165	0.835
	0.49	0.975	0.025		0.830
	0.79	0.952 0.877	0.048	0.080	0.920
	2.02	0.877	0.123		0.932
	3.04	0.698 0.627	0.302		0.932
	4.05	0.627	0.373		0.932
	5.06 6.08	0.588	0.412		0.932
		0.545	0.455		0.932
353.1	0.25	0.989	0.011	0.220	0.780
	0.54	0.975	0.025		0.827
	0.81	0.960	0.040	0.165	0.835
	2.02	0.905	0.195		0.886
	3.04	0.730	0.270		0.905
	4.05	0.651	0.349		0.907
¹ Calcu	5.06 6.08	0.612 0.573	0.388 0.427		0.907 0.907
Liquid dissol	6.08 lated by and gas ved ethe	0.573 compiler. molar volumes ne also given	0.427 s as well in this p	as partial molal volume paper. Ately obeyed above 1 MPa	0.907
Liquid dissol	6.08 lated by and gas ved ethe	0.573 compiler. molar volumes ne also given	0.427 s as well in this p approxima	as partial molal volume paper. Ately obeyed above 1 MPa cont	0.907 es of a pressure.
Liquid dissol Normal	6.08 lated by and gas ved ethe	0.573 compiler. molar volumes ne also given law not even	0.427 s as well in this p approxima	as partial molal volume paper. Ately obeyed above 1 MPa	0.907 es of a pressure. tinued
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Liquid dissol Normal METHOD/AP A desc found two gr. tubes,	6.08 lated by and gas ved ethe Henry's PPARATUS/Pl ription in ref. aduated 5 mm in	0.573 compiler. molar volumes ne also given law not even ROCEDURE: of the apparat 1. It consist thick-walled g diameter and	0.427 s as well in this p approxima AUXILIARY tus is ts of glass 60 cm	<ul> <li>0.093</li> <li>as partial molal volume paper.</li> <li>ately obeyed above 1 MPa cont</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERN</li> <li>1. Purity 99.3%.</li> <li>2. Twice distilled. boiling point = 3</li> </ul>	0.907 es of a pressure. tinued MALS: Normal 45.4 K and
Liquid dissol Normal METHOD/AP A desc found two gr. tubes, in lend	6.08 lated by and gas ved ethe Henry's PPARATUS/P ription in ref. aduated 5 mm in gth seal	0.573 compiler. molar volumes ne also given law not even ROCEDURE: of the apparat 1. It consist thick-walled of diameter and ed in a tempes	0.427 in this p approxima AUXILIARY tus is ts of glass 60 cm rature-	as partial molal volume paper. Ately obeyed above 1 MPa cont INFORMATION SOURCE AND PURITY OF MATERN 1. Purity 99.3%. 2. Twice distilled. boiling point = 3 refractive index i	0.907 es of a pressure. tinued IALS: Normal 45.4 K and n ²⁰ = 1.3953.
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Liquid dissol Normal METHOD/AF A desc found two gr. tubes, in len contro indepe- tom of tube i magnet mercur the ph reserv nitrog regula one tu conden tube.	6.08 lated by and gas ved ethe Henry's PPARATUS/P ription in ref. aduated 5 mm in gth seal lled jac ndently each tu s equipp ic vibra y to aid ases. A oir is p en whose ted. Et be, whil sed in t	0.573 compiler. molar volumes ne also given law not even law not even ROCEDURE: of the apparat thick-walled of diameter and ed in a tempes ket. Mercury charged to the be. The satur ed with an ele tor immersed : in equilibrat separate merc ressurized wit pressure can hylene is stor e the solvent	0.427 s as well in this p approxima AUXILIARY AUXILIARY tus is ts of glass 60 cm rature- can be bot- ration ectro- in the tion of cury th be red in is ion erred	<ul> <li>as partial molal volume paper. Ately obeyed above 1 MPa cont</li> <li>INFORMATION</li> <li>SOURCE AND PURITY OF MATERNING</li> <li>Purity 99.3%.</li> <li>Twice distilled. boiling point = 30 refractive index note: At high ten and pressures 0.00 hydroquinone inhibited.</li> <li>ESTIMATED ERROR: 6T /K = + 0.05</li> </ul>	0.907 es of a pressure. tinued IALS: Normal 45.4 K and n ²⁰ = 1.3953. mperatures 001 mole % bitor was
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OMPONENT	'S:			ORIGINAL MEASUREMENTS:	-
1. Eth	nene; $C_2 H_1$	₄ ; [74-85-1]		Zernov, V.S.; Kogan, V Lyubetskii, S.G.	V.B.;
2. Ace	atic acid	, ethenyl este	er	J. Appl. Chem. (USSR) <u>19</u>	71, 44,
(vi	lnyl aceta	ate); C_H ₂ O ₂ ;	[	1837-40.	
[10	08-5-4]	4 ° 1		OR Zhur. Prikl. Khim. 19	<u>971,44</u> ,
-			-	1819-23.	
ARIABLES	S: т/к	= 293.1 - 423	3.1	PREPARED BY:	
	P/MPa	= 0.20 - 7.09	•	W. Hayduk	
			led l		
XPERIMEN	TAL VALUES	Mole Fract:		Mole Fraction	in Gas
<i>т/</i> к	P/MPa	Solvent, x ₂	¹ Solute	, x ₁ Solvent vapor, y ₂	¹ Solute , y
373.1		0.989	0.011		0.768
	0.62	0.975	0.025		0.782
	1.00	0.960	0.040		0.842
	1.23 3.04	0.941 0.835	0.059		0.860 0.862
	4.05	0.680	0.105		0.862
	5.06	0.639	0.320		0.862
	6.08	0.600	0.400		0.862
	7.09	0.563	0.457		0.861
398.1	0.55 1.04	0.989 0.975	0.011		0.703
	1.42	0.975	0.025		0.703
	3.04	0.865	0.135	-	0.773
	4.05	0.710	0.290		0.775
	5.06	0.665	0.335		0.775
	6.08	0.630	0.370	-	0.775
	7.09	0.589	0.411	0.226	0.774
¹ Calcu	lated by	compiler.			
Liquid dissol	l and gas lved ethe	molar volume: ne also given	in this p approxima	tely obeyed above 1 MPa	
Liquid disso] Normal	l and gas lved ethe	molar volume: ne also given law not even	in this p approxima	paper. Itely obeyed above 1 MPa cont	pressure. inued
Liquid dissol Normal METHOD/AF A desc	d and gas lved ether l Henry's PPARATUS/PR cription	molar volume: ne also given law not even OCEDURE: of the appara	in this p approxima AUXILIARY tus is	paper. Itely obeyed above 1 MPa cont INFORMATION	pressure. inued
Liquid dissol Normal ÆTHOD/AF A desc found	and gas lved ether Henry's PPARATUS/PR cription in ref.	molar volume: ne also given law not even	in this p approxima AUXILIARY tus is ts of	Daper. Ately obeyed above 1 MPa cont INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled.	pressure. inued LS:
Liquid dissol Normal METHOD/AR A desc found two gr tubes,	d and gas lved ether L Henry's PPARATUS/PR cription in ref. raduated , 5 mm in	molar volumes ne also given law not even OCEDURE: of the appara 1. It consist thick-walled diameter and	in this g approxima AUXILIARY tus is ts of glass 60 cm	<pre>paper. ately obeyed above 1 MPa cont INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. 1 boiling point = 34</pre>	pressure. inued LS: Normal 5.4 K and
Liquid dissol Normal METHOD/AF A desc found two gr tubes, in ler	d and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in ngth seale	molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled diameter and ed in a temper	in this p approxima AUXILIARY tus is ts of glass 60 cm rature-	<pre>paper. ately obeyed above 1 MPa cont INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. 1 boiling point = 34 refractive index n</pre>	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953.
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Liquid dissol Normal METHOD/AF A desc found two gr tubes, in ler contro indepe	d and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in ngth seal olled jack	molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled diameter and ed in a tempes ket. Mercury charged to the	AUXILIARY AUXILIARY tus is ts of glass 60 cm cature- can be bot-	<pre>paper. ately obeyed above 1 MPa cont. INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. I boiling point = 34 refractive index n Note: At high tem and pressures 0.00</pre>	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953. peratures 01 mole %
Liquid dissol Normal METHOD/AF A desc found two gr tubes, in ler contro indepentom of	d and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in 1gth seal olled jac endently f each tul	molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled g diameter and ed in a temper ket. Mercury charged to the be. The satur	AUXILIARY AUXILIARY tus is ts of glass 60 cm rature- can be bot- ration	<pre>paper. ately obeyed above 1 MPa cont. INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. I boiling point = 34 refractive index n Note: At high tem</pre>	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953. peratures 01 mole %
Liquid dissol Normal WETHOD/AF A desc found two gr tubes, in ler contro indepe tom of tube j	A and gas lved ether Henry's PPARATUS/PR cription in ref. raduated 5 mm in ogth seal olled jac endently f each tul is equipped	molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled diameter and ed in a tempes ket. Mercury charged to the	AUXILIARY AUXILIARY tus is ts of glass 60 cm rature- can be bot- ration ectro-	<pre>paper. ately obeyed above 1 MPa cont. INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. I boiling point = 34 refractive index n Note: At high tem and pressures 0.00 hydroguinone inhib.</pre>	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953. peratures 01 mole %
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Liquid dissol Normal Attrop/AF A desc found two gr tubes, in ler contro indepe tom of tube i magnet mercur the ph reserv nitrog	A and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in hgth seale olled jac endently t each tul is equippe tic vibra ry to aid hases. A yoir is pi gen whose	molar volumes ne also given law not even OCEDURE: of the apparat 1. It consist thick-walled diameter and ed in a temper ket. Mercury charged to the be. The satur ed with an ele tor immersed in equilibrat separate merc ressurized wit pressure can	AUXILIARY AUXILIARY tus is ts of glass 60 cm rature- can be bot- ration ectro- in the tion of cury th be	<pre>baper. ately obeyed above 1 MPa cont INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. 1 boiling point = 34 refractive index n Note: At high tem and pressures 0.00 hydroquinone inhib added. ESTIMATED ERROR:</pre>	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953. peratures 01 mole %
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Liquid dissol Normal METHOD/AF A desc found two gr tubes, in ler contro indepe tom of tube i magnet mercur the ph reserv nitroo regula one tu conder tube. to the	A and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in ogth seal olled jac endently f each tul is equippetic vibra ry to aid nases. A yoir is p gen whose ated. Eth ibe, while is ethe solvent	molar volumes ne also given law not even law not even OCEDURE: of the apparad 1. It consist thick-walled diameter and ed in a tempes ket. Mercury charged to the be. The satur ed with an ele tor immersed in equilibrat separate mer- ressurized with pressure can hylene is stor e the solvent he equilibrat: ene is transfe tube as requi	AUXILIARY AUXILIARY tus is ts of glass 60 cm cature- can be bot- ration ectro- in the tion of cury th be red in is ion erred ired.	baper. ately obeyed above 1 MPa cont. INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. If boiling point = 34. refractive index n. Note: At high tem and pressures 0.000 hydroquinone inhib added. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta P/P = \pm 0.25$ % $\delta x_1/x_1 = \pm 0.04$ (com) REFERENCES:	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953. peratures 01 mole % itor was
Liquid dissol Normal METHOD/AF A desc found two gr tubes, in ler contro indepe tom of tube i magnet mercur the ph reserv nitrog regula one tu conder.	A and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in ogth seal olled jac endently f each tul is equippetic vibra ry to aid nases. A yoir is p gen whose ated. Eth ibe, while is ethe solvent	molar volumes ne also given law not even law not even OCEDURE: of the apparat 1. It consist thick-walled diameter and ed in a tempes ket. Mercury charged to the be. The satur charged to the be. The satur the equilibrat separate mercor ressurized with pressure can hylene is stor e the solvent he equilibrat ene is transfo tube as requi-	AUXILIARY AUXILIARY tus is ts of glass 60 cm cature- can be bot- ration ectro- in the tion of cury th be red in is ion erred ired.	baper. ately obeyed above 1 MPa cont. INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. If boiling point = 34 refractive index n. Note: At high tem and pressures 0.000 hydroquinone inhib. added. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta P/P = \pm 0.25$ % $\delta x_1/x_1 = \pm 0.04$ (com	pressure. inued LS: Normal 5.4 K and 2 ⁰ = 1.3953. peratures 01 mole % itor was piler)
Liquid dissol Normal METHOD/AF A desc found two gr tubes, in ler contro indepe tom of tube i magnet mercur the ph reserv nitrog regula one tu conder.	and gas lved ether l Henry's PPARATUS/PR cription in ref. raduated , 5 mm in ngth seale oldently of each tul is equipped tic vibra ry to aid nases. A yoir is pi gen whose ated. Ether be, while raduated in the solvent olubility	molar volumes ne also given law not even law not even OCEDURE: of the apparat 1. It consist thick-walled diameter and ed in a tempes ket. Mercury charged to the be. The satur charged to the be. The satur the equilibrat separate mercor ressurized with pressure can hylene is stor e the solvent he equilibrat ene is transfo tube as requi-	in this g approxima AUXILIARY tus is ts of glass 60 cm cature- can be bot- ration ectro- in the tion of cury th be red in is ion erred ired.	baper. ately obeyed above 1 MPa cont. INFORMATION SOURCE AND PURITY OF MATERIA 1. Purity 99.3%. 2. Twice distilled. 1 boiling point = 34. refractive index n. Note: At high tem and pressures 0.000 hydroquinone inhib. added. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta P/P = \pm 0.25$ % $\delta x_1/x_1 = \pm 0.04$ (com) REFERENCES: 1. Zernov, V.S.; Kogan	pressure. inued LS: LS: Normal 5.4 K and 2 ⁰ = 1.3953. Peratures 01 mole % itor was piler) piler)

PONENTS	S:			ORIGINAL MEASUREMENTS:	
. Eth	ene; C ₂ H	[74-85-1]	1	Zernov, V.S.; Kogan, Lyubetskii, S.G.	V.B.;
. Ace	tic acid	, ethenyl ester	r	J. Appl. Chem. (USSR) <u>19</u>	71.44.
		ate); C ₄ H ₆ O ₂ ;	-	1837-40.	
[108-5-4]		OR Zhur.Prikl.Khim. 1	971, 44,		
			1819-23.		
IABLES	:	= 293.1 - 423.		PREPARED BY:	
	<i>T</i> <b>7</b> K	= 293.1 - 423.	• 1	W. Hayduk	
	P/MPa	= 0.20 - 7.09	-	, najaun	
ERIMEN	TAL VALUES	•		<u> </u>	······
		continue	eđ		
		Mole Fractio			
<i>T</i> / K	P/MPa	Solvent, x ₂	'Solute	, $x_1$ Solvent vapor, $y_2$	¹ Solute , y ₁
23.1	0.82	0.989	0.01	1 0.410	0.590
	1.24	0.975	0.02		0.605
	1.82	0.960	0.04		0.617
	3.04	0.917	0.08		0.654
	4.05 5.05	0.765 0.730	0.23	1 77557	0.656
	6.08	0.680	0.27		0.656
	7.09	0.641	0.35		0.655
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THOD/AP A desc Found THOD/AP A desc Found Tubes, In len contro Indepe cond agnet there the ph reserv fitting regula one tu conden tube. Som of there the so	And gas ved ethe Henry's Henry's PARATUS/PH ription in ref. aduated 5 mm in gth seal bled jac ndently each tu s equipp ic vibra y to aid ases. A oir is p en whose ted. Et be, whil sed in t The eth solvent lubility	molar volumes ne also given law not even law not even a law not even the apparate net consist thick-walled g diameter and ed in a temperate thick-walled g diameter and ed in a temperate the saturate to the saturate dwith an elect tor immersed in in equilibrate separate merce ressurized with pressure can hylene is store e the solvent he equilibrate ene is transfer tube as require method is thus	in this approxim AUXILIARY AUXILIARY us is s of lass 60 cm ature- can be bot- ation ctro- n the ion of ury h be ed in is on rred red.	paper. ately obeyed above 1 MPa INFORMATION SOURCE AND PURITY OF MATERI 1. Purity 99.3%. 2. Twice distilled. boiling point = 34 refractive index 1 Note: At high ter and pressures 0.00 hydroquinone inhil added. ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta P/P = \pm 0.25$ % $\delta x_1/x_1 = \pm 0.04$ (cor REFERENCES: 1. Zernov, V.S.; Koga	A pressure. ALS: Normal 45.4 K and h ²⁰ = 1.3953. mperatures D01 mole % bitor was mpiler) an, V.B.; Duntov, F.I.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Shakhova, S.F.; Zubchenko, Yu P.; Rezina, O.A.
<pre>2. 1,3-Dioxolan-2-one,4-methyl- (Propylene carbonate); C₄H₆O₃; [108-32-7]</pre>	Khim. Prom., <u>1973</u> ,49,271.
VARIABLES:	PREPARED BY:
T/K = 298.15 - 343.15	TREFARED BI:
P/MPa = 0.52 - 4.22	C.L. Young.
EXPERIMENTAL VALUES:	fraction of ethene
T/K P/MPa	in liquid, $x_{C_2H_4}$ vol ^{$\alpha+$} /vol
298.15 0.517	0.0216 5.8
0.719 0.861	0.0310 8.4
0.983	0.0356 9.7 0.0409 11.2
2.077	0.0843 24.2
2.695	0.1034 30.3
3.830	0.1423 43.6
323.15 0.557	0.0196 5.25
0.811	0.0250 6.75
1.246	0.0384 10.5
1.600 2.209	0.0492 13.6
3.040	0.0667 18.8 0.0900 26.0
4.021	0.1124 33.3
4.361	0.1246 37.4
343.15 0.661	0.0175 4.68
1.021	0.0258 6.97
1.031	0.0270 7.30
1.401 2.471	0.0345 9.40 0.0641 18.0
3.441	0.0641 18.0 0.0843 24.2
4.171	0.1031 30.2
4.221	0.1034 30.3
+ quoted in original paper, appendix $T/K = 273.15$ and $P = 1$ atmospheric of liquid at room temperature.	here adsorbed by unit volume
AUXILIAR	/ INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Mixture stirred by ball in rocking autoclave. Samples of liquid	1. Purity 99.97 mole per cent.
analysed by volumetric method. Details in ref. (1).	<ol> <li>Distilled, no other details given.</li> </ol>
Henry's constants were listed as follows:	
t/C H/atm mole fraction ⁻¹	
25 235	
	1
50 298	
70 333	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \ \delta P/MPa = \pm 0.01;$ $\delta x_{C_2H_4} = \pm 5\%$
1	(estimated by compiler)
	REFERENCES: 1. Shakhova, S.F.; Zubchenko, Yu.P. Kaplan, L.K.; <i>Khim. Prom.</i> , <u>1973</u> , 5, 108.

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CMETORNES:         Deficiency C_{H,1} [74-85-1]         Deficience (I, E, R. , Zel'venskii, Ya, D. , Ivanovskii, F. P.           2. 2-Buthanne, (methyl ethylketone);         C.L. Young.         Zhur. Fiz. Khim. 1962, 36, 801-808.           MARIABLES: $T/K$ = 223.05 - 248.15 P/MPA = 0.30 - 1.82         PREFARED BY:         C.L. Young.           T/K $p/atm$ $p/bar$ Mole fraction of ethene in liquid. Solubility ⁴ Solubility ⁴ 248.15         3         0         0.9950         32.32           12         12.2         0.4169         220.24           15         15.2         0.511         0.2007         708.29           238.15         3         0         0.1180         41.02           15         15.2         0.6300         1503.32         236.46           15         15.2         0.6300         1503.32         223.05           238.15         3         0         0.180         41.02         3.32           16         12.1         0.4677         246.49         3.32         3.30           16         12.1         0.4677         246.49         3.32         3.30         0.180         41.02           223.05         3         3.0         0.1620 <th></th> <th></th> <th></th> <th></th> <th>307</th>					307	
2. 2-Butanone, (methyl ethylketone): C.H.001 [74-93-3] ARIABLES: T/K = 223.05 - 248.15 P/MPA = 0.30 - 1.82 TYERIMENTAL VALUES: T/K $p/atm$ $p/barT/K$ $p/atm$ $p/barT/K$ $p/atm$ $p/barT/K$ $p/atm$ $p/barT/K$ $p/atm$ $p/barT = \frac{1000}{1000}15$ $15.212$ $10.115$ $15.212$ $10.115$ $15.212$ $10.115$ $15.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $165.216$ $162.015.216$ $162.015.216$ $162.015.216$ $162.0163.00$ $1503.32223.05$ $3$ $3.00.162.0$ $59.5210$ $10.10.663.0$ $1603.42+ cm^3g^{-1} at P = 101.325 KPaAUXILIARY INFORMATIONRETHOD/APPARATUS/PROCEDURE:1.$ Propared from ethanol by dehydration and purified by bacryption in cuprous chloride under pressure. 2. Distilled. REFRENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.						
C,H_{00}[74-93-3]       Zhur. Fiz. Khim. <u>1952</u> , 36, 801-805.         ARIABLES: $T/K = 223.05 - 248.15$ PREPARED BY: $P/MPA = 0.30 - 1.82$ C.L. Young.         Mole fraction of       C.L. Young.         TYK p/atm p/bar       Mole fraction of $T/K = 223.05 - 548.15$ Mole fraction of $T/K = 7/K$ p/atm p/bar       Mole fraction of         248.15       3       0       0.9950         10       10.1       0.4622       55.21         10       10.1       0.4622       55.21         12       12.2       0.4169       220.24         12       12.2       0.4169       220.24         13       16.2       0.5381       352.56         10       10.1       0.4477       249.62         12       12.2       0.6685       404.49         15       15.2       0.6300       1503.32         223.05       3       0       0.1620       59.52         5       10       10.1       0.6630       663.42         +       cm ³ g^{-1} at P = 101.325 kPa       SOURCE AND PURITY OF MATERIALS:       1.         Glass equilibrium cell fitted with magnetic stirrer. Pressure measured w					Zel'venskii, Ya, D.;	
T/K = 223.05 - 248.15 $P/MPA = 0.30 - 1.82$ C.L. Young. C.L. Yo				Zhur. Fiz. Khim. <u>1</u>	<u>1962</u> , <i>36</i> , 801-808.	
T/K = 223.05 - 248.15 $P/MPA = 0.30 - 1.82$ C.L. Young. C.L. Yo	TADTARLES :	<u></u>	<u> </u>	DODLADD DV.		
Pyrket = 0.30 - 1.62           XXPERIMENTAL VALUES:         Mole fraction of ethene in liquid, Solubility ⁺ $7/K$ $p/atm$ $p/bar$ 248.15         3         3.0         0.0950         32.32           10         10.1         0.3349         155.11           12         12.2         0.4169         220.24           15         15.2         0.5381         352.56           18         18.2         0.6070         708.29           238.15         3         3.0         0.1180         41.02           10         10.1         0.4477         249.62           12         12.2         0.5685         404.49           15         15.2         0.8300         1503.32           223.05         3         3.0         0.1620         59.52           10         10.1         0.6630         663.42           +         cm ³ g ⁻¹ at P = 101.325 kPa         18.56         10           Suprise of 10.1           10         10.1         0.6630         663.42           +         cm ³ g ⁻¹ at P = 101.325 kPa         19.70 pare from ethanol by 2.00 pasoption in cuprous chloride 10 pabsoption in cuprous chloride 10 pabsoption in cuprous	T/K			1	Y	
Mole fraction of ethene in liquid, Solubility ⁺ $T/K$ $p/atm$ $p/bar$ Mole fraction of ethene in liquid, Solubility ⁺ 248.15       3       3.0       0.0950       32.32         248.15       3       3.0       0.1622       59.52         10       10.1       0.3349       155.11         12       12.2       0.4169       220.24         13       18.2       0.6070       708.29         238.15       3       3.0       0.1180       41.02         10       10.1       0.4477       249.62         12       12.2       0.5685       404.49         15       15.2       0.8300       1503.32         223.05       3       3.0       0.1620       59.52         10       10.1       0.66830       663.42         +       cm ³ g ⁻¹ at P = 101.325 kPa       SOURCE AND PURITY OF MATERIALS;         SOURCE AND PURITY OF MATERIALS;         Glass equilibrium cell fitted with magnetic stirrer. Pressure measure dunder pressure.       .         Liquid analysed by stripping out ethene. Details in ref. (1).       SOURCE AND PURITY OF MATERIALS;         ISTIMATED ERROR: $dry/k = 10.1, 6g/bar = 10.3; 6x_{C_2H_1} $	P/MPa	= 0.30 - 1	82	ע.י י	roung.	
Mole fraction of ethene in liquid, Solubility ⁺ $T/K$ $p/atm$ $p/bar$ Mole fraction of ethene in liquid, Solubility ⁺ 248.15         3         3.0         0.0950         32.32           10         10.1         0.3349         155.11           12         12.2         0.4169         220.24           13         16.2         0.6070         708.29           238.15         3         3.0         0.1180         41.02           10         10.1         0.4477         249.62           12         12.2         0.5685         404.49           15         15.2         0.8300         1503.32           223.05         3         3.0         0.1620         59.52           10         10.1         0.6630         663.42           +         cm ³ g ⁻¹ at P = 101.325 kPa         SOURCE AND FUNITY OF MATERIALS:           MUNILIARY INFORMATION           MUNILIARY INFORMATION           MUNILIARY INFORMATION           MUNILIARY INFORMATION           MUNILIARY INFORMATION           MUNILIARY INFORMATION           MUNILIARY INFORMATION <td c<="" td=""><td>EXPERIMENTAL VAL</td><td>UES:</td><td>·····</td><td></td><td>······································</td></td>	<td>EXPERIMENTAL VAL</td> <td>UES:</td> <td>·····</td> <td></td> <td>······································</td>	EXPERIMENTAL VAL	UES:	·····		······································
Sinter       5       5.1       0.1622       59.52         10       10.1       0.3349       155.11         12       12.2       0.4169       220.24         15       15.2       0.5381       352.56         18       16.2       0.6070       708.29         238.15       3       0       0.1180       41.02         10       10.1       0.4477       249.62         12       12.2       0.5665       404.49         15       15.2       0.8300       1503.32         223.05       3       3.0       0.1620       59.52         10       10.1       0.6830       663.42         +       cm ³ g ⁻¹ at P = 101.325 kPa       Image by stripping out ethene.       Source AND PURITY OF MATERIALS:         NUXILIARY INFORMATION         MUXILIARY INFORMATION			p/bar	ethene in liquid,	Solubility ⁺	
$\frac{10}{12}  10.1 \\ 12.2 \\ 15  15.2 \\ 15  15.2 \\ 16  10.1 \\ 16  10.2 \\ 16  10.2 \\ 10  10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ 10.1 \\ $	248.15	5	5.1	0.1622	59.52	
$\frac{15}{18}  15.2 \\ 18  18.2 \\ 0.6070 \\ 708.29 \\ 238.15 \\ 3  3.0 \\ 0.1180 \\ 41.02 \\ 708.29 \\ 238.15 \\ 3  3.0 \\ 10  10.1 \\ 12  12.2 \\ 0.5685 \\ 404.49 \\ 15 \\ 15 \\ 15 \\ 15 \\ 15 \\ 10 \\ 10 \\ 10$		10				
$\frac{5}{10}  \frac{5}{10}  \frac{5}{10}  \frac{1}{10}  \frac{1}{10} $		15	15.2	0.5381	352.56	
$\frac{10}{12}  10.1 \\ 12  12.2 \\ 0.5685 \\ 404.49 \\ 15  15.2 \\ 0.8300 \\ 1503.32 \\ 223.05 \\ 3 \\ 5 \\ 5 \\ 10 \\ 10.1 \\ 0.6830 \\ 663.42 \\ + \\ cm^{3}g^{-1} at P = 101.325 kPa \\ \hline$	238.15					
$\frac{12}{15}  15.2 \\ 0.8300 \\ 1503.32 \\ 0.8300 \\ 1503.32 \\ 223.05 \\ 3 \\ 5 \\ 5 \\ 10 \\ 10 \\ 10.1 \\ 0.6830 \\ 663.42 \\ + \\ cm^{3}g^{-1} at P = 101.325 \text{ KPa} $						
223.05 3 3.0 0.1620 59.52 10 10.1 0.6830 663.42 + $cm^3g^{-1}$ at $P = 101.325$ kPa METHOD/APPARATUS/PROCEDURE: Glass equilibrium cell fitted with magnetic stirrer. Pressure measured with Bourdon gauge. Samples of liquid analysed by stripping out ethene. Details in ref. (1). ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta p/bar = \pm 0.3; \delta^{*}_{C_2H_{i}} = \pm 28.$ (estimated by compiler). REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.		12	12.2	0.5685	404.49	
$\frac{5}{10} \frac{5.1}{10.1} \frac{0.2787}{0.6830} \frac{118.56}{663.42}$ + cm ³ g ⁻¹ at P = 101.325 kPa AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: Glass equilibrium cell fitted with magnetic stirrer. Pressure measured with Bourdon gauge. Samples of liquid analysed by stripping out ethene. Details in ref. (1). SOURCE AND PURITY OF MATERIALS: 1. Prepared from ethanol by dehydration and purified by absorption in cuprous chloride under pressure. 2. Distilled. ESTIMATED ERROR: $\frac{57/K = \pm 0.1; \delta_{P}/bar = \pm 0.3; \deltax_{C_2H_4} = \pm 28. (estimated by compiler).$ REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.						
+ $cm^3g^{-1}$ at $P = 101.325$ kPa AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: Glass equilibrium cell fitted with magnetic stirrer. Pressure measured with Bourdon gauge. Samples of liquid analysed by stripping out ethene. Details in ref. (1). ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta p/bar = \pm 0.3; \ \delta x_{C_2H_4} = \pm 28.$ (estimated by compiler). REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.	223.05	5	5.1	0.2787	118.56	
METHOD/APPARATUS/PROCEDURE:SOURCE AND PURITY OF MATERIALS:Glass equilibrium cell fitted with magnetic stirrer. Pressure measured with Bourdon gauge. Samples of liquid analysed by stripping out ethene. Details in ref. (1).I. Prepared from ethanol by dehydration and purified by absorption in cuprous chloride under pressure.2. Distilled.ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta p/bar = \pm 0.3;$ $\delta x_{C_2H_4} = \pm 2$ %. (estimated by compiler).REFERENCES: I. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.		at / - 10				
Glass equilibrium cell fitted with magnetic stirrer. Pressure measured with Bourdon gauge. Samples of liquid analysed by stripping out ethene. Details in ref. (1). $ESTIMATED ERROR:\delta T/K = \pm 0.1; \ \delta p/bar = \pm 0.3; \\\delta x_{C_2H_4} = \pm 2 \&. \\(estimated by compiler).REFERENCES:I. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.$			AUXILIARY	' INFORMATION		
magnetic stirrer. Pressure measured with Bourdon gauge. Samples of liquid analysed by stripping out ethene. Details in ref. (1). ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta p/bar = \pm 0.3;$ $\delta x_{C_2H_4} = \pm 2\%.$ (estimated by compiler). REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.	METHOD/APPARATUS	/PROCEDURE:	<u></u>			
ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta p/bar = \pm 0.3;$ $\delta x_{C_2H_4} = \pm 28.$ (estimated by compiler). REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.	magnetic stir with Bourdon liquid analys	rrer. Pres gauge. Sa sed by stri	ssure measured amples of ipping out	dehydration and absorption in d under pressure	d purified by cuprous chloride	
$\delta T/K = \pm 0.1; \ \delta p/bar = \pm 0.3;$ $\delta x_{C_2H_4} = \pm 2\%.$ (estimated by compiler). REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.				2. Distilled.		
<pre>δx_{C2H4} = ±2%. (estimated by compiler). REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.</pre>				ESTIMATED ERROR:		
REFERENCES: 1. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.				$\delta x_{C_2H_4} = \pm 28.$		
l. Shenderei, E.R.; Zel'venskii, Ya. D.; Ivanovskii, F.P.				(estimated	d by compiler).	
Khim. Prom. <u>1960</u> , 370.				1. Shenderei, E.		
				Khim. Prom. <u>1</u>	<u>960</u> , 370.	
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COMPONENTS:

2. Solvents containing nitrogen

EVALUATOR: Peter G.T. Fogg School of Applied Chemistry University of North London

Holloway Road, London, N7 8DB, U.K.

November, 1993

CRITICAL EVALUATION:

Critical evaluation of the solubility of ethene at a partial pressure not

greater than 101.3 kPa in solvents containing nitrogen.

In general solubility in compounds containing nitrogen which have been studied is lower than solubility in halogen or oxygen compounds measured under the same conditions. It is considerably lower than solubility in hydrocarbons.

1-Methyl-2-pyrrolidinone; C,H,NO; [872-50-4]

Solubility in 1-methyl-2-pyrrolidinone at, or below 101.3 kPa was measured by Wu et al.(1), Shenderei and Ivanovskii (2) and by Lenoir et al.(3). Measurements by Shenderei from 273.15 to 288.15 K and pressures from about 13 kPa to 101.3 kPa indicate that mole fraction solubility is, within the limits of the experimental accuracy, proportional to pressure to at least 101.3 kPa. Lenoir et al. measured Henry's constant at 298.15 K and low pressure by gas chromatography. The corresponding mole fraction solubility at a partial pressure of 101.3 kPa, calculated on the basis of a linear variation with change in pressure, is within about 5% of the value corrected to 101.3 kPa from direct measurements by Wu at 100 kPa. The six data points for a partial pressure of 101.3 kPa from the three sources fit the equation

 $\ln x_1 = -503.92 + 22206/(T/K) + 74.519 \ln(T/K)$ 

standard deviation in values of  $x_1 = 1.65 \times 10^{-4}$ This can be accepted on a tentative basis for the temperature range 273-298 K.

# Nitrobenzene; C,H,NO,; [98-95-3]

The solubility in nitrobenzene was measured by Choudhari and Doraiswami (4) at a total pressure of 94.23 kPa in the temperature range 286-333 K. Lenoir et al.(3) measured Henry's constant at low pressure by gas chromatography. The corresponding mole fraction solubility at 101.3 kPa, calculated on the assumption of a linear variation of mole fraction solubility with variation of pressure, is 0.00794. The corrected and interpolated value from Choudharai's measurements is 0.00543. Measurements of gas solubility by gas chromatography are subject to some uncertainty because of effects due to surface adsorption. Some of the values of solubilities of other gases reported in Lenoir's paper are appreciably higher than values reported by other workers. The evaluator considers that Choudhari's measurements are likely to be the more reliable although further work on the system is required. The five mole fraction solubilities from Choudhari, corrected to a partial pressure of gas of 101.3 kPa, fit the equation

101.3 kPa, fit the equation  $\ln x_1 = -233.51 + 12038/(T/K) + 32.982 \ln(T/K)$ standard deviation in values of  $x_1 = 6.6 \times 10^{-5}$ Temperature range 386-333 K.

# Ammonia; NH3; [7664-41-7]

Hannaert et al.(5) reported the solubility of ethene in liquid ammonia in a paper in which the solubilities of various hydrocarbons in liquid ammonia and other solvents were reported. In each case solubilities are reported as coefficients of a two constant equation giving the variation of Henry's constant with temperature. The equation can be written in the form  $\log H = A - B/(2.3 \text{ RT})$ 

The authors identify the constant B with a heat of solution of the gas in the solvent. Mole fraction solubilities can be calculated from values of H

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COMPONENTS:		EVALUATOR:
1. 2.	Ethene; C ₂ H ₄ ; [74-85-1] Solvents containing nitrogen	Peter G.T. Fogg School of Applied Chemistry University of North London Holloway Road, London, N7 8DB, U.K.
		November, 1993

# CRITICAL EVALUATION:

if it is assumed that solubilities vary linearly with partial pressure of gas. The equation for solubility of ethene in ammonia is reported to be valid for the temperature range of 208-318 K. What is unusual about the equation for ethene in ammonia is the very low value of **B** or heat of solution compared with values for other systems which were studied by the authors. The value is  $0.23 \text{ kcal mol}^{-1}$  compared with 2.72 kcal mol-1 for ethyne in ammonia and  $1.215 \text{ kcal mol}^{-1}$  for propene in ammonia. The low value for ethene corresponds to a very small variation of solubility with change in temperature and contrasts markedly with the behaviour of ethene in nitrobenzene and in 1-methyl-2-pyrrolidinone. The evaluator is of the opinion that the solubility equation for ethene in ammonia should be treated with caution until it is confirmed by other measurements.

N,N-Dimethylacetamide;  $C_4H_9NO$ ; [127-19-5] N,N-Dimethylformamide;  $C_3H_7NO$ ; [68-12-2] N-Methylformamide;  $C_2H_5NO$ ; [123-39-7] Acetonitrile;  $C_2H_3N$ ; [75-05-8]

Brückl and Kim (6) measured the solubility in the above solvents at 298.2 K. There is no reason to doubt the reliability of the measurements but they have not been confirmed by other workers. In the case of the amides the mole fraction solubility at a partial pressure of 101.3 kPa increases with increase in the number of methyl groups present. Solubility in *N*-methylformamide is low compared with the solubility in nitrobenzene and in 1-methyl-2-pyrrolidinone and is close to the solubility in ammonia as reported by Hannaert (5).

#### Benzenamine; C_cH₇N; [62-53-3]

Lenoir et al.(3) measured Henry's constant for dissolution in benzenamine by a chromatographic method. The mole fraction solubility at a partial pressure of 101.3 kPa, calculated on the assumption of a linear variation of mole fraction solubility with change in pressure, is close to the value for dissolution in nitrobenzene. However the value needs confirmation by further measurements because of unreliability of the chromatographic method.

# Cyclohexylamine; C6H13N; [108-91-8]

Keevil et al.(7) reported a value of the solubility in cyclohexylamine at 298.1 K and 101.3 kPa. The value is higher than that in other nitrogen compounds for which data is available. This can be explained by the presence of the alicyclic ring. There is no reason to doubt the reliability of the measurement but confirmation is needed.

# N, N-Dimethylformamide; C₃H₇NO; [68-12-2] + Ethyne; C₂H₂; [74-86-2]

Shenderei (8) measured the solubility of ethene in N, N-dimethylformamide, containing various proportions of ethyne, at 218.15 K over the pressure range 13.3 - 101.3 kPa. The measurements indicate that the mole fraction solubility (moles  $C_2H_4$ /total moles of  $C_2H_4$ ,  $C_2H_2$  & DMF) does not change when the proportion of ethyne is increased from 33.8 to 249 cm³(STP)/g DMF. This is in contrast to the solubility of carbon dioxide in N, N-dimethylformamide containing various concentrations of ethyne. In this case the mole fraction solubility decreases with increase of ethyne concentration. The evaluator considers that the data for ethene needs to be confirmed before it can be accepted as reliable.

COMPONENTS:	EVALUATOR:			
<ol> <li>Ethene; C₂H₄; [74-85-1]</li> <li>Solvents containing nitrogen</li> </ol>	Peter G.T. Fogg School of Applied Chemistry University of North London Holloway Road, London, N7 8DB, U.K. November, 1993			
CRITICAL EVALUATION:	······			
References				
1. Wu, Z.; Zeck, S.; Langhorst, R.; I and Air, Beijing, China <u>1985</u> , 1, 2				
2. Shenderei, E.R.; Ivanovskii, F.P. Prom. <u>1963</u> , 10, 91-97.	Gaz Prom. <u>1962</u> , 7, 11-17; Khim.			
3. Lenoir, J-Y.; Renault, P.; Renon, 342.	Lenoir, J-Y.; Renault, P.; Renon, H. J. Chem. Eng. Data <u>1971</u> , 16, 340- 342.			
<ol> <li>Choudhari, R.V.; Doraiswami, L.K. J. Chem. Eng. Data <u>1972</u>, 17, 428- 432.</li> </ol>				
<ol> <li>Hannaert, H.; Haccuria, M.; Mathieu, M.P. Ind. Chim. Belge <u>1967</u>, 32, 156-164.</li> </ol>				
6. Brückl, N.; Kim, J.I. Z. Phys. Che	. Brückl, N.; Kim, J.I. <i>Z. Phys. Chem. (Wiesbaden) <u>1981</u>, 126,</i> 133-150.			
7. Keevil, T.A.; Taylor, D.R.; Streit 23, 237-239.	. Keevil, T.A.; Taylor, D.R.; Streitwieser, A. J. Chem. Eng. Data <u>1978</u> , 23, 237-239.			
8. Shenderei, E.R. Khim. Prom. <u>1966</u>	, 42, 514-516.			

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COMPONE		ORIGINAL MEASUREMENTS:	
1) Et [7	thene or ethylene; C ₂ H ₄ ; 74-85-1]	Hannaert, H.; Haccuria, M.; Mathieu, M. P.	
2) Am	nmonia; NH ₃ ; [7664-41-7]	Ind. Chim. Belge <u>1967</u> , 32, 156-164.	
VARIABI	IFS.	PREPARED BY:	
111121101			
	T/K = 208.15 - 318.15	H.L. Clever	、
EXPERI	MENTAL VALUES:		
_	Interval of Mol % Range	/atm ¹ Enthalpy of Constant at Dissolution .15 K ΔH/kcal mol ⁻¹ A	
	208.15-318.15 0 - 2 2	75 0.23 2.61	
1	$^{1} \log (K\pi v/atm) = A - (\Delta H/cal mol$	(2.3R(T/K))	
	uthor's definitions are:		
	$K = y_1 / x_1 = \frac{\text{mole fract}}{\text{mole fract}}$	ion gas in gas phase ion gas in liquid phase,	
	$\pi/atm = total pressure$		
	v = coefficient of fug		
		to a Henry's constant in the form e fugacity.	
	function, $K\pi\nu/atm$ , is equivalent		
	function, $K\pi\nu/atm$ , is equivalent /atm = $(f_1/atm)/x_1$ where $f_1$ is th		
H _{1,2} /	function, $K\pi\nu/atm$ , is equivalent /atm = $(f_1/atm)/x_1$ where $f_1$ is th	e fugacity.	
H _{1,2} /	function, $K\pi\nu/atm$ , is equivalent /atm = $(f_1/atm)/x_1$ where $f_1$ is th AUXILIARY	e fugacity. INFORMATION	
H _{1,2} / METHOD The a 1.A.	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of	e fugacity. INFORMATION SOURCE AND FURITY OF MATERIALS;	
H _{1,2} / METHOD The a 1.A.	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura- tion in an apparatus which gave	<pre>e fugacity. INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given. Industrial product. Contained</pre>	
H _{1,2} / METHOD The a 1.A. 1.B.	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura-	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given.</pre>	
H _{1,2} / METHOD The a 1.A. 1.B. 2.	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 10 - 15 %. [Saturat. n°2]. A measure of the static pressure of satura- tion in an apparatus which gave	<pre>e fugacity. INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given. Industrial product. Contained 0.1 per cent water. Density, p/g cm⁻³ = 0.717 at -65°C and 0.705 at -50°C.</pre>	
H _{1,2} / METHOD The a 1.A. 1.B. 2. 3.	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 10 - 15 %. [Saturat. n°2]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 2 - 5 %. [Chromato]. A Gas liquid chromatographic method estimated	<pre>e fugacity. INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given. Industrial product. Contained 0.1 per cent water. Density, p/g cm⁻³ = 0.717 at -65°C and 0.705 at -50°C.</pre>	
<pre>H_{1,2}/ METHOD The a 1.A. 1.B. 2. 3. Metho</pre>	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 10 - 15 %. [Saturat. n°2]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 2 - 5 %. [Chromato]. A Gas liquid chromatographic method estimated to have a precision of 2 - 5 %. [Anal. directe]. Direct analysis of the gaseous and	<pre>e fugacity. INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given. Industrial product. Contained 0.1 per cent water. Density, p/g cm⁻³ = 0.717 at -65°C and 0.705 at -50°C.</pre>	
<pre>H_{1,2}/ METHOD The a 1.A. 1.B. 2. 3. Metho</pre>	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 10 - 15 %. [Saturat. n°2]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 2 - 5 %. [Chromato]. A Gas liquid chromatographic method estimated to have a precision of 2 - 5 %. [Anal. directe]. Direct analysis of the gaseous and liquid phases. od 1.B. was used in this	<pre>e fugacity. INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given. Industrial product. Contained 0.1 per cent water. Density, p/g cm⁻³ = 0.717 at -65°C and 0.705 at -50°C.</pre>	
<pre>H_{1,2}/ METHOD The a 1.A. 1.B. 2. 3. Metho</pre>	function, $K\pi\nu/atm$ , is equivalent $/atm = (f_1/atm)/x_1$ where $f_1$ is th AUXILIARY D/APPARATUS/PROCEDURE: authors describe three methods: [Saturat. n°1]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 10 - 15 %. [Saturat. n°2]. A measure of the static pressure of satura- tion in an apparatus which gave a precision of 2 - 5 %. [Chromato]. A Gas liquid chromatographic method estimated to have a precision of 2 - 5 %. [Anal. directe]. Direct analysis of the gaseous and liquid phases. od 1.B. was used in this	<pre>e fugacity. INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. Air Liquide. For narcosis, 99.9 per cent. (2) Ammonia. Source not given. Industrial product. Contained 0.1 per cent water. Density, p/g cm⁻³ = 0.717 at -65°C and 0.705 at -50°C.</pre>	

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COMPONENTS:	ORIGINAL MEASUREMENTS:	
<pre>1. Ethene; C₂H₄; [74-85-1]</pre>	Brückl, N.; Kim, J. I.	
2. Miscellaneous compounds	Z. Phys. Chem. (Wiesbaden)	
	<u>1981</u> , <i>126</i> , 133-150.	
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VARIABLES: T/K = 298.2	PREPARED BY:	
<i>P/</i> kPa = 101.3	C. L. Young	
EXPERIMENTAL VALUES: T/K = 298.2	·····	
ln(H/atm) 10 ³ × Mole fraction of e	thene in liquid, $10^3 x_{C_2 H_4}$	
N,N-Dimethylacetamide; C. 4.81	H ₉ NO; [127-19-5] 8.148	
N,N-Dimethylformamide; C; 5.00	H ₇ NO; [68-12-2] 6.738	
N-Methylformamide; C ₂ H ₅ NO; [123-39-7] 5.69 3.380		
Acetonitrile; C ₂ H ₃ N; [75 5.10	6.097	
[†] at a partial pressure of 1 atmosph assuming $x_{C_2H_4} = 1/H$ .	ere, calculated by compiler,	
AUXILIARY		
	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:	
METHOD/APPARATUS/PROCEDURE:	· · · · · · · · · · · · · · · · · · ·	
METHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details given.	SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8	
Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent.	
Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Linde Co. sample, purity 99.8 volume per cent.</li> <li>2. Uvasol and analytical grade.</li> </ul>	
volumetric method described as "the Ostwald method". No other details	<pre>SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol and analytical grade. ESTIMATED ERROR:</pre>	
Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>SOURCE AND PURITY OF MATERIALS; 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol and analytical grade. ESTIMATED ERROR:</pre>	
Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol and analytical grade. ESTIMATED ERROR: δT/K = ±0.1; δH = ±1.25%</pre>	
Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol and analytical grade. ESTIMATED ERROR: δT/K = ±0.1; δH = ±1.25%</pre>	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Wu, Z.; Zeck, S.; Langhorst, R.;
2. 2-Pyrrolidinone, 1-methyl-,	Кларр, Н.
(N-methylpyrrolidinone); C ₅ H ₉ NO; [872-50-4]	Proc. Int. Conf. Coal Gas and Air,
5.5	Beijing, China , <u>1985</u> , ¹ , 209–229.
VARIABLES: $T/K = 298.15$	PREPARED BY:
	W. Hayduk
P/kPa = 100 (1 bar)	,
EXPERIMENTAL VALUES:	
Henry's Constants T/K K/Bar H/atm(mole fraction) ⁻¹	Ostwald Coefficient ² Mole Fraction $L/cm^3$ gas( $cm^3$ solvent) ⁻¹ $x_1$
298.15 135.6 132.7	1.885 0.00753
¹ Calculated by compiler.	
² Calculated by compiler for a gas par	tial pressure of 101.325 kPa.
Values personally received from the phase compositions corresponding to respectively: $y_1 = 0.999$ , and $x_1 = 0$	a pressure of 1 bar were
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Ethylene gas was stored in a glass burette equipped with an accurate	1. Ethene purity was 99.9 vol.
manometer for measuring pressure and situated in a constant temper- ature air bath. A known quantity of completely degassed solvent was charged into an equilibrium cell immersed in a liquid bath. The volume of gas absorbed was measured after the gas was admitted into the cell. The solubility was determined from	<pre>percent. 2. Solvent was provided by Merck with a minimum purity of 99.0% (GC). After treatment with molecular sieve 4X, the water content was reduced to less than 0.01%. The purity was then analyzed to be 99.9%. Measured values: d²⁵ = 1.02812 n²⁵ = 1.4686</pre>
the quantities of gas and solvent used. The apparatus and procedure are described in detail in reference 1.	ESTIMATED ERROR:
	REFERENCES: 1. Zeck, S.
	Doctoral Dissertation , Tech. Univ.
	Berlin, FRG, <u>1985</u> .

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COMPONENTS 1. Ethe	: ne; C,H_; [74-85-1]		ORIGINAL MEASUREMENTS: Shenderei, E.R.; Ivano	ovskii, F.P.	
	rrolidinone, 1-meth	yl-,	Gaz. Prom. 1962, 7, 11-	17.	
(N−m C₅H ₉	ethylpyrrolidinone) NO; [872-50-4]	;	Same paper also in:		
			Khim. Prom. 1963,10, 91-97	•	
VARIABLES	- 		PREPARED BY:	<u>,</u>	
T/K =	273-288		W. Hayduk		
P/kPa	= 101.3 (1 atm)				
EXPERIMENT	CAL VALUES:				
		Henr	y's constant		
t /C	T ¹ /K mm Hg (	K mole fract	ion) ⁻¹ atm(mole fraction	Mole Fraction $x_1$ ) ⁻¹ Ethene, $x_1$	
0	273.15	74200	97.63	0.01024	
5	278.15	81500	107.2	0.00933	
10	283.15	88000	115.8	0.00864	
15	288:15	96250	126.6	0.00790	
		AUXILIARY	INFORMATION		
Glass with a	ARATUS/PROCEDURE: equilibrium cell magnetic stirrer.	Pressure	SOURCE AND PURITY OF MATERN Sources and purit: als not given.		
Samples strippi	d with a Bourdon ga of liquid analyzed ng out ethene. The	by solu-	<ol> <li>Properties of solvent as used by authors:</li> </ol>		
pressur	s were measured at es below atmospheric	c and	Normal boiling point = 479.15 K		
	constant was determin ref. (1).	mined.	Density at 20°C =	1.0220 g/cm ³	
			Refractive index,	$n_{\rm D}^{20} = 1.4700$	
			ESTIMATED ERROR:		
			$\delta x_1 / x_1 = \pm 2\%$		
			(Estimated by cor	npiler)	
			REFERENCES:		
	1		1. Shenderei, E.R.;	Zelvenskii,	
			Ya.D.; Ivanovskii	, F.P.	
			Gaz. Prom. 1958,	12, 36.	
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MPONENTS:		ORIGINAL MEASUR		1
	$E_2 H_4; [74-85-1]$		R.V.; Doraiswami, L.K.	
2. Nitro [98-9	benzene; C ₆ H ₅ NO ₂ ; 5-3]	J. Chem. Eng.	. Data <u>1972</u> , 17, 428-432.	ĺ
ARIABLES:		PREPARED BY:		$\left  \right\rangle$
	T/K = 286.0 - 333.0	W. Hay	<i>z</i> duk	,
· · · · ·	'kPa = 94.23		، ۱	
(PERIMENTA)	1			
Т /К	Solubility at <i>P</i> =94.23 (0.93 atm) <i>s/</i> g(1) ⁻¹	¹ Solubility at p = 101.325 kPa Mole Fraction, <i>x</i> ₁	¹ Henry's Constant H/atm(mole fraction) ⁻¹	
286	1.97	0.00763	131.1	
303	1.26	0.00496	201.6	
313	0.99	0.00394	254.1	
323	0.84	0.00337	296.7	
333	0.76	0.00308	324.5	
			pressure of 101.325 kPa.	
	ted by compiler; $x_1$ is			
¹ Calcula	ted by compiler; $x_1$ is	for a gas partial p ILLARY INFORMATION		
¹ Calcula ETHOD/APPA The glas	AUX RATUS/PROCEDURE: s absorption vessel was	for a gas partial p ILIARY INFORMATION SOURCE AND PURI 1. Ethene p	pressure of 101.325 kPa.	
¹ Calcula ETHOD/APPA The glas equipped stirrer	AUX AUX RATUS/PROCEDURE: s absorption vessel was with a stainless steel and a jacket through wh	for a gas partial p ILIARY INFORMATION SOURCE AND PURI 1. Ethene p	oressure of 101.325 kPa. TY OF MATERIALS:	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for	AUX AUX RATUS/PROCEDURE: as absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemin	for a gas partial p ILLARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal	TY OF MATERIALS: Durity 99.0%. Durity 99.0%. Durity 99.0%.	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the	AUX RATUS/PROCEDURE: a absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi. for the olefin content concentrations remained	for a gas partial p ILIARY INFORMATION ILIARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal d ESTIMATED ERROR	TY OF MATERIALS: Durity 99.0%. Durity 99.0%. Des were tested by Duphy.	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the constant ed estab	AUX RATUS/PROCEDURE: absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi- for the olefin content concentrations remainer, equilibrium was consider lished. Precautions we	for a gas partial p ILIARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal ESTIMATED ERROR der- re T/K = ±	TY OF MATERIALS: Durity 99.0%. Durity 99.0%. Deswere tested by Dephy.	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the constant ed estab taken to the air	AUX AUX RATUS/PROCEDURE: a absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi- for the olefin content concentrations remained , equilibrium was consid lished. Precautions we exclude water vapor fro from entering the vesse	for a gas partial p ILIARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal ESTIMATED ERROR T/K = ±	TY OF MATERIALS: Durity 99.0%. Durity 90.0%. Durity 90.0%.	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the constant ed estab taken to the air Experime atmosphe	AUX AUX RATUS/PROCEDURE: IS absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi- for the olefin content concentrations remainee, equilibrium was consid- lished. Precautions we exclude water vapor from from entering the vesse nts were performed at ric pressure, 0.93 atm	for a gas partial p ILLARY INFORMATION ILLARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal d der- re om 1. ESTIMATED ERROR $T/K = \pm$ $\delta s/s = \pm$ REFERENCES:	TY OF MATERIALS: Durity 99.0%. Durity 99.0%. Deswere tested by Duphy.	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the constant ed establ taken to the air Experime atmosphe (at Poon refers t	AUX AUX RATUS/PROCEDURE: IS absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi- for the olefin content concentrations remainee, , equilibrium was consider lished. Precautions we exclude water vapor from from entering the vessed nts were performed at ric pressure, 0.93 atm a, India). Reference 1 o the method of olefin	for a gas partial p ILLARY INFORMATION ILLARY INFORMATION SOURCE AND PURT 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal d der- re om 1. ESTIMATED ERROR $T/K = \pm$ $\delta s/s = \pm$ REFERENCES: 1. Thomas,	TY OF MATERIALS; Durity 99.0%. Durity 99.0%. Desene purity 99.0%. Dese vere tested by Desere tested by Desere tested by Desere tested by Desere tested by Desere tested by Deser	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the constant ed estab taken to the air Experime atmosphe (at Poon	AUX AUX RATUS/PROCEDURE: IS absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi- for the olefin content concentrations remainee, , equilibrium was consider lished. Precautions we exclude water vapor from from entering the vessed nts were performed at ric pressure, 0.93 atm a, India). Reference 1 o the method of olefin	for a gas partial p ILIARY INFORMATION ILIARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal d d der- re om 1. Ethene p 2. Nitroben The puritie chromatogra $\delta s/s = \pm$ REFERENCES: 1. Thomas, Hockstra	TY OF MATERIALS: Durity 99.0%. Durity 99.0%. Description of the state	
¹ Calcula ¹ Calcula ETHOD/APPA The glas equipped stirrer constant circulat cm ³ of s vessel, establis bled thr were wit vals for analysis When the constant ed establ taken to the air Experime atmosphe (at Poon refers t	AUX AUX RATUS/PROCEDURE: IS absorption vessel was with a stainless steel and a jacket through wh temperature water was ed. A volume of 400-50 olvent was charged into thermal equilibrium was hed and then gas was bu ough the solvent. Samp hdrawn at 10-15 min. in analysis using a chemi- for the olefin content concentrations remainee, , equilibrium was consi- lished. Precautions we exclude water vapor from from entering the vesse nts were performed at ric pressure, 0.93 atm a, India). Reference 1 o the method of olefin	for a gas partial p ILIARY INFORMATION ILIARY INFORMATION SOURCE AND PURI 1. Ethene p 2. Nitroben 0 The puritie chromatogra b- les ter- cal d d der- re om 1. Ethene p 2. Nitroben The puritie chromatogra $\delta s/s = \pm$ REFERENCES: 1. Thomas, Hockstra	TY OF MATERIALS; Durity 99.0%. Durity 99.0%. Desene purity 99.0%. Dese vere tested by Desere tested by Desere tested by Desere tested by Desere tested by Desere tested by Deser	

ORIGINAL MEASUREMENTS:
Keevil, T.A.; Taylor, D.R.
Streitwieser, A.
J. Chem. Engng. Data. <u>1978</u> , 23,
237-239.
PREPARED BY:
C.L. Young
hene = 1 atm = 101.3 kPa.
Mole fraction
of ethane.
0.0105
INFORMATION
INFORMATION SOURCE AND PURITY OF MATERIALS:
SOURCE AND PURITY OF MATERIALS:
SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed and dried
<pre>SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed and dried     over lithium cyclohexylamide ESTIMATED ERROR:</pre>
<pre>SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed and dried     over lithium cyclohexylamide ESTIMATED ERROR:</pre>
<pre>SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed and dried     over lithium cyclohexylamide ESTIMATED ERROR:</pre>
<pre>SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed and dried     over lithium cyclohexylamide ESTIMATED ERROR:</pre>
<pre>SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed and dried     over lithium cyclohexylamide ESTIMATED ERROR:</pre>

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COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Ethene; $C_{2}H_{4}$ ; [74-85-1] 2. 1-Methyl-2-pyrrolidinone,	Lenoir, J-Y.; Renault, P.; Renon, H.	
Nitrobenzene, Benzenamine (Aniline),	J. Chem. Eng. Data	
Dimethylsulfoxide, or Hexamethylphosphoric triamide	<u>1971</u> , <i>16</i> , 340-2.	
VARIABLES:	PREPARED BY:	
T/K = 298.15	C. L. Young	234
P/kPa = 101.32	, 	
EXPERIMENTAL VALUES:		
Henry's constant, <i>H</i> /atm	ⁱ Mole fraction ethene, $x_i$	
1-Methyl-2-pyrrolidinone	; C ₅ H ₉ NO; [872-50-4]	
126	0.00794	1
Nitrobenzene; C ₆ H ₅ NO ₂ ; [9	8-95-3]	
126	0.007947	
Benzenamine (Aniline); C	₆ H ₇ N; [62-53-3]	
208	0.00481	
Sulfinylbismethane (Dime	thylsulfoxide); $C_2H_6SO$ ; [67-68-5]	
312	0.00321	
Hexamethylphosphoric tri	amide; C ₆ H ₁₈ NO ₃ P; [680-31-9]	
52.9	0.0189	
¹ Calculated by compiler for a partia that the mole fraction ethene is eq	l pressure of 101.3 kPa assuming ual to 1/H.	
AUXILIARY IN	FORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
A conventional gas-liquid chromato- graphic unit fitted with a thermal	<ol> <li>L'Air Liquide sample, minimum purity 99.9 mole per cent.</li> </ol>	
conductivity detector was used. The carrier gas was helium. The value of Henry's law constant was calculated from the retention time. The value applies to very low partial pressures of gas and there may be a substantial difference from that measured at 1 atm. pressure. There is also considerable uncertainty in the value of Henry's constant since	<ol> <li>Touzart and Matignon or Serlabo sample, purity 99 mole per cent.</li> </ol>	
surface adsorption was not allowed for although its possible existence	ESTIMATED ERROR:	
was noted.	$\delta T/K = \pm 0.1;  \delta H/atm = \pm 6\%$ (estimated by compiler)	
	REFERENCES:	
	<u> </u>	ļ

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MPONENTS :	ORIGINAL MEASUREMENTS:
1. Ethene; $C_{2}H_{4}$ ; [74-85-1]	Brückl, N.; Kim. J. I.
2. Benzonitrile,	Z. Phys. Chem, (Wiesbaden)
1,4-Dioxane, Nitrobenzene,	-
Dimethylsulfoxide, or Hexamethylphosphoric triamide	<u>1981</u> , <i>126</i> , 133-150.
ARIABLES:	PREPARED BY:
T/K = 298.2	C. L. Young
P/kPa = 101.3 XPERIMENTAL VALUES:	
	¹ Mole fraction ethene, $x_1$
H is Henry's constant/atm lnH	$10^3 x_1$
Benzonitrile; C ₇ H ₅ N; [100-47-0]	
4.71	9.00
1,4-Dioxane; C ₄ H ₈ O ₂ ; [123-91-1]	2.00
$\frac{1}{4} = \frac{1}{2} \frac{1}{4} = \frac{1}{2} \frac{1}{4} = \frac{1}{4} \frac{1}{4} \frac{1}{4} = \frac{1}{4} $	9.10
4.70 Nitrobenzene; C ₆ H ₅ NO ₂ ; [98-95-3]	
4.96	7.01
Sulfinylbismethane (Dimethylsu	
5.75	3.182
Hexamethylphosphoric triamide;	
4.14	15.92
¹ Calculated by compiler for a partial that the mole fraction ethene is eq AUXILIARY IN	ual to 1/H.
that the mole fraction ethene is eq	FORMATION
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the	ual to 1/H.
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a	FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>Jual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>Jual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>pual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR:</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>FORMATION FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR:</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>pual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR:</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>pual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR:</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>pual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR:</pre>
that the mole fraction ethene is eq AUXILIARY IN ETHOD/APPARATUS/PROCEDURE: Solubilities were determined by a volumetric method described as "the Ostwald method". No other details	<pre>pual to 1/H. FORMATION SOURCE AND PURITY OF MATERIALS: 1. Linde Co. sample, purity 99.8 volume per cent. 2. Uvasol or analytical grade. Serlabo sample, purity 99 mole per cent. ESTIMATED ERROR:</pre>

IOM DOMESTIC -					319
COMPONENTS:			ORIGINAL MEA	SUREMENTS:	
1. Ethene; C ₂	H ₄ ; [74-8	5-1]	Shendere	i, E.R.	
<pre>2. Ethyne (Acetylene); C₂H₂; [74-86-2]</pre>			Khim. Pr	om. <u>1966</u> , 42	3, 514-516.
3. N, N -Dimet C H NO; [6	hylformam 8~12-2]	ide (DMF)			
VARIABLES: T/	K = 218.1	5 (-55°C)	PREPARED BY:		
	a = 13.3			W. Hayduk	
EXPERIMENTAL VALU					
Concentration Ethyne, cm ³ (STP) (g DMF) ⁻	Partial	Pressure, c	lubility,S m ³ (STP)(g DMF) ⁻¹	Solubility Coefficient $\beta = 760 \text{ s/p}_1$	Mole Fraction Ethene, $x_1$
33.8	100	13.33	1.33	10.10	0.003937
	300 500	40.00 66.66	4.02 6.76	10.18 10.27	0.01181 0.01968
	760	101.325	10.38	10.38	0.02992
101	100	13.33	1.60	12.16	0.003937
	300 500	40.00 66.66	4.85 8.15	12.29 12.39	0.01181 0.01968
	760	101.325	12.51	12.51	0.02992
164	100	13.33	1.85	14.06	0.003937
	300	40.00	5.60	14.19	0.01181
	500 760	66.66 101.325	9.40 14.45	14.29 14.45	0.01986 0.02992
249	100	13.33	2.17	16.49	0.003937
249	300	40.00	6.57	16.64	0.01181
¹ Calculated b ² Volumetric s	300 500 760 by compile solubility	40.00 66.6 101.325	6.57 11.05 16.99		0.01181 0.01968 0.02992
¹ Calculated b ² Volumetric s ethyne/g DMF. ³ Mole fractio	300 500 760 oy compile solubility on calcula	40.00 66.6 101.325 r. calculated on ted on basis of for ethene in	6.57 11.05 16.99 basis of c of three com ethyne-DMF	16.64 16.80 16.99 m ³ (STP) of eth ponents in sol	0.01181 0.01968 0.02992
¹ Calculated b ² Volumetric s ethyne/g DMF. ³ Mole fractio Henry's law i	300 500 760 oy compile solubility on calcula s obeyed	40.00 66.6 101.325 r. calculated on ted on basis of for ethene in	6.57 11.05 16.99 basis of c f three com ethyne-DMF	16.64 16.80 16.99 m ³ (STP) of eth ponents in sol solutions.	0.01181 0.01968 0.02992
¹ Calculated b ² Volumetric s ethyne/g DMF. ³ Mole fractio	300 500 760 by compile solubility on calcula s obeyed //PROCEDURE: the app thick-wall the contait bar for v essure gau for conde ad by high gas handl	40.00 66.6 101.325 r. calculated on ted on basis of for ethene in AUXILIARY ed in refer- aratus con- ed glass ning a mag- ertical ge, and nsing the pressure ing system	6.57 11.05 16.99 basis of c f three com ethyne-DMF INFORMATION SOURCE AND F SOURCE AND F	16.64 16.80 16.99 m ³ (STP) of eth ponents in sol	0.01181 0.01968 0.02992 Hene and Aution.

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COMPONENTS:	EVALUATOR:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Walter Hayduk
	Department of Chemical Engineering
2. Organic compounds containing	University of Ottawa
N, for pressures greater than	Ottawa, ON
0.2 MPa (2 atm)	Canada K1N 6N5

March, 1994

#### CRITICAL EVALUATION:

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# Critical Evaluation of Ethene Solubilities in Organic Compounds

# Containing Nitrogen for Pressures greater than 0.20 MPa

Solubilities of ethene are available for only two organic solvents containing nitrogen at pressures above 0.20 MPa. These two solvents are N,N-dimethylformamide and 1-methyl-2-pyrrolidinone.

#### N, N-Dimethylformamide; C₃H₇NO; [68-12-2]

Ethene solubilities in N,N-dimethylformamide were reported for the temperatures 298.15 K, 323.15 K and 343.15 K and for pressures in the range of 0.79 MPa to 4.22 MPa by Shakhova et al. (1). The vapor pressure for this solvent is very low so that the total pressure was considered to be the gas partial pressure. The data which were found to be essentially consistent were used to develop an equation relating the mole fraction solubility to the gas partial pressure in MPa. It is noted that the pressure in bar + 10 is equivalent to MPa.

$$\log x_{\rm p} = 457.46 (T/K)^{-1} + 0.9862 \log (p/MPa) - 2.7274$$

(1)

Only the last data point for a temperature of 343.15 K was omitted because it was obviously inconsistent. Otherwise, the data are well described by equation (1); the average, and maximum deviations from the equation are 1.4%, and 4.7%, respectively. It is further noted that extrapolation of equation (1) for a temperature of 298.15 K to a pressure of 0.1013 MPa yielded a solubility of 0.0067 mole fraction in good agreement with reliable solubilities measured at that pressure and also the value obtained using the Henry's law constant reported on the data sheet.

These data are classified as tentative.

#### 1-Methyl-2-pyrrolidinone; C5H9NO; [872-50-4]

Ethene solubilities in 1-methyl-2-pyrrolidinone were also reported by Shakhova et al. (1) for the temperatures 298.15 K, 323.15 K and 343.15 K, and for a large range of pressures, from 0.375 MPa to 9.46 MPa. These data were found to be consistent; however, a curvature of the line representing the relation between log  $(x_p/mole \ fraction)$  and  $\log(p/MPa)$  was observed. The following equation which contains a correction factor for the curvature was developed for all the data for this solvent:

 $\log (x_{\rm p}) = 486.13 (T/K)^{-1} + 0.9930 \log (p/MPa) - 0.012 p - 2.755$  (2)

The average, and maximum deviations of the values calculated using equation (2) from the data are 1.9%, and 6.5%, respectively. It is noted that equation (2) was extrapolated to a pressure of 0.1013 MPa for a temperature of 298.15 K to obtain a mole fraction solubility of 0.0077 which can be compared with the value based on the Henry's law constant recorded on the data sheet, of 0.0074 mole fraction ethene. Similarly, this extrapolated value compares very favourably with the actual experimental value as discussed in the preceding chapter of this volume. It is further noted that the vapor pressure of this solvent is also low, so that the total pressures on the data sheet were considered to be gas partial pressures in the development of equation (2).

These data are classified as tentative.

## Reference

 Shakhova, S.F.; Zubchenko, Yu, P.; Rezina, O.A. Khim. Prom. <u>1973</u>, 40, 271-2.

COMPONENT	S:	·····		ORIGINAL M	EASUREMEN	TS:	32
1. Ethe	ene; C ₂ )	H ₄ ; [74-85-1]		Shakhov	a, S. F.	.; Zubchenko	, Yu. P.:
	_	lformamide; C	3H7NO;	Rezina,		•	
[68-	-12-2]						
				Khim. P	rom. <u>19</u>	9 <u>73</u> , 49, 271-	2.
ARIABLES		200 15 242 1		PREPARED B	Y:		<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>
	•	298.15 - 343.1 0.79 - 4.21	.5		с. і	. Young	
EXPERIMEN	TAL VALUE	<u>S:</u>				•	
					_		
		Mole fraction of ethene	α†		M	ole fraction of ethene	α†
т/к	<i>P/</i> bar	in liquid,	vol/vo]	L T/K	<i>P/</i> bar	in liquid,	vol/vol
		^{<i>x</i>} C ₂ H ₄				$x_{C_2H_4}$	
298.15	7.90	0.0512	15.7	323.5	27.16	0.1309	43.8
	10.23	0.0680 0.0792	21.2	242 15	33.84	0.1608	55.7
	16.11	0.1030	25.0 33.4	343.15	12.26 17.63	0.0487 0.0706	14.9 22.1
	18.64	0.1220	40.4		22.90	0.0910	29.1
323.15	19.76 8.00	0.1275 0.0390	42.5 11.8		28.98 31.51	0.1207 0.1239	39.9 41.1
525.15	14.08	0.0674	21.0		36.17	0.1407	41.1
	15.50	0.0754 0.1030	23.7 33.4		41.85 42.15	0.1610 0.1804	55.8 64.0
and	21.28 ted in c P = 1 a perature	original paper, atmosphere adso	appears	to be vo nit volu	lume of	gas at T/K =	273.15
and	ted in c $P = 1 a$	original paper, atmosphere adso	appears	to be vo nit volur	lume of	gas at T/K =	273.15
quo and tem	ted in c P = 1 a perature	original paper, atmosphere adso	appears brbed by u	init volur INFORMATIO	lume of ne of li N	gas at T/K = quid at room	273.15
quo and tem	ted in c P = 1 a perature	original paper, atmosphere adso	appears brbed by u	init volur INFORMATIO	lume of ne of li N	gas at T/K =	273.15
quo and temj METHOD/AP Mixture	ted in c P = 1 a perature PARATUS/P stirred	original paper, atmosphere adso	AUXILIARY	INFORMATIO	lume of ne of li N PURITY O	gas at T/K = quid at room	
METHOD/AP Mixture autoclay	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa	Procedure:	AUXILIARY AUXILIARY	INFORMATIO SOURCE AND 1. Purit	lume of ne of li N D PURITY O	gas at T/K = quid at room F MATERIALS;	nt.
METHOD/AP Mixture autoclay	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa	Priginal paper, atmosphere adso a. PROCEDURE: I by ball in ro amples of liqui volumetric meth	AUXILIARY AUXILIARY	INFORMATIO SOURCE AND 1. Purit	Lume of ne of li N PURITY O Lled, n	gas at T/K = quid at room F MATERIALS: mole per cen	ıt.
METHOD/AP Mixture autoclav analysed Details Henry's	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan	Priginal paper, atmosphere adso a. PROCEDURE: I by ball in ro amples of liqui volumetric meth	AUXILIARY ocking .d	INFORMATIO SOURCE AND 1. Purit 2. Disti	Lume of ne of li N PURITY O Lled, n	gas at T/K = quid at room F MATERIALS: mole per cen	nt.
METHOD/AP Mixture autoclay analysed Details Henry's	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1).	AUXILIARY ocking d as	INFORMATIO SOURCE AND 1. Purit 2. Disti	Lume of ne of li N PURITY O Lled, n	gas at T/K = quid at room F MATERIALS: mole per cen	nt.
METHOD/AP Mixture autoclav analysed Details Henry's follows <u>t/C</u>	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1). its were listed	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given	Lume of ne of li N D PURITY O Cy 99.97 Llled, nu Lled, nu L	gas at T/K = quid at room F MATERIALS: mole per cen o other detai	nt. Lls
METHOD/AP Mixture autoclay analysed Details Henry's follows <u>t/C</u> 25	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	PROCEDURE: I by ball in ro umples of liqui rolumetric meth (1). ats were listed Yatm mole fract 150	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given ESTIMATED &T/K = ±	Lume of ne of li N D PURITY O 	gas at T/K = quid at room F MATERIALS: mole per cen	nt. Lls
METHOD/AP Mixture autoclav analysed Details Henry's follows $\frac{t/C}{25}$ 50	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	Priginal paper, atmosphere adso atmosphere adso a PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1). ats were listed <u>atm mole fract</u> 150 183	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given	Lume of ne of li N D PURITY O 	gas at T/K = quid at room F MATERIALS: mole per cen o other detai	nt. Lls
METHOD/AP Mixture autoclay analysed Details Henry's follows <u>t/C</u> 25	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	PROCEDURE: I by ball in ro umples of liqui rolumetric meth (1). ats were listed Yatm mole fract 150	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given ESTIMATED $\delta T/K = \pm$ $\delta x C_2 H_4 =$	Lume of me of li N D PURITY O Cy 99.97 Llled, no Lled, no	gas at T/K = quid at room F MATERIALS: mole per cen o other detai	nt. Lls
METHOD/AP Mixture autoclav analysed Details Henry's follows <u>t/C</u> 25 50	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	Priginal paper, atmosphere adso atmosphere adso a PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1). ats were listed <u>atm mole fract</u> 150 183	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given ESTIMATED $\delta T/K = \pm$ $\delta x_{C_2H_4} =$ REFERENCE	Lume of ne of li N D PURITY O -y 99.97 Llled, no - - - - - - - - - - - - - - - - - - -	gas at T/K = quid at room F MATERIALS: mole per cen o other detai P/bar = ±0.1;	nt. Lls
METHOD/AP Mixture autoclav analysed Details Henry's follows <u>t/C</u> 25 50	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	Priginal paper, atmosphere adso atmosphere adso a PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1). ats were listed <u>Yatm mole fract</u> 150 183	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given ESTIMATED $\delta T/K = \pm$ $\delta x_{C_2H_4} =$ REFERENCE	Lume of ne of li N D PURITY O -y 99.97 Llled, no - - - - - - - - - - - - - - - - - - -	gas at T/K = quid at room F MATERIALS: mole per cen o other detai	nt. Lls
METHOD/AP Mixture autoclav analysed Details Henry's follows <u>t/C</u> 25 50	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	Priginal paper, atmosphere adso atmosphere adso a PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1). ats were listed <u>Yatm mole fract</u> 150 183	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti given ESTIMATED $\delta T/K = \pm$ $\delta x_{C_2H_4} =$ REFERENCE 1. Shakh	Lume of ne of li N D PURITY O -y 99.97 Llled, no - - - - - - - - - - - - - - - - - - -	<pre>gas at T/K = quid at room  F MATERIALS: mole per cen o other detai  P/bar = ±0.1; F.; Zubchen</pre>	lt. Lls
METHOD/AP Mixture autoclav analysed Details Henry's follows $\frac{t/C}{25}$ 50	ted in c P = 1 a perature PPARATUS/P stirred ve. Sa d by a v in ref. constan :	Priginal paper, atmosphere adso atmosphere adso a PROCEDURE: I by ball in ro imples of liqui rolumetric meth (1). ats were listed <u>Yatm mole fract</u> 150 183	AUXILIARY ocking d as	INFORMATIO SOURCE ANI 1. Purit 2. Disti giver ESTIMATED $\delta T/K = \pm$ $\delta x_{C_2H_4} =$ REFERENCE 1. Shakh P.;	Lume of me of li N D PURITY O = y 99.97 Liled, m h ERROR: = ±5%. S: nova, S. Kaplan,	<pre>gas at T/K = quid at room  F MATERIALS: mole per cen o other detai  P/bar = ±0.1; F.; Zubchen</pre>	nt. .ls

322 COMPONENT	c.		I	OPICINAL	MEASUREMENT		••
	ene; $C_2H_4$ ;	[74-85-1]				; Zubchenko,	V11. P. •
					, O. A.	, Zubenenko,	, iu. r.,
	ethyl-2-pyrı					73, 49, 271-2	
	nethylpyrrol	lidinone);	C ₅ H ₉ NO;		<u> </u>	<u></u> ,,	•
[872	2-50-4]			1			
VARIABLES		.15 - 343.	15	PREPARED	BY:		
	P/MPa = 0.3		10		C.	L. Young	
	· · · · · · · · · · · · · · · · · · ·						
EXPERIMEN	NTAL VALUES:	e fraction	$\alpha^{\dagger}$		M	lole fraction	$\alpha^{\dagger}$
- 1	0	f ethene	α	- 4-4		of ethene	
т/к	P/bar in	n liquid,	vol/vol	т/к	P/bar	in liquid,	vol/vol
		^x C ₂ H ₄				^{<i>x</i>} C ₂ H ₄	
298.15		0.0274	6.52	323.15		0.0970	24.9
	5.78 6.38	0.0407 0.0473	9.83 11.5		24.01 25.53	0.1249 0.1331	33.1 35.6
	8.00	0.0596	14.7		27.46	0.1506	41.1
	10.54 14.89	0.0765 0.1074	19.2 27.9		38.81 50.36	0.1962 0.2427	56.6 74.3
	18.64	0.1383	37.2		51.98	0.2462	75.7
	25.53 47.32	0.1748 0.2933	49.1 96.2		73.06 83.39	0.3103 0.3649	104.3 133.2
	56.44	0.3546	127.4	343.15	5.78	0.0262	6.24
	63.94 64.75	0.3919 0.4115	149.4 162.1		8.71 13.37		9.57 14.3
323.15	3.85	0.0214	5.08		30.40	0.1302	34.7
	6.08 6.79	0.0342 0.0381	8.21 9.18		53.80 86.84	0.2067 0.3190	60.4 108.6
	10.94	0.0596	14.7		94.64		118.9
and	P = 1 atmosphere.	osphere ads	sorbed by t	unit vol	ume of li	gas at T/K = .quid at room	
I.,			AUXILIARY	INFORMATIO	ON		
METHOD/AI	PPARATUS/PROCE	DURE:		SOURCE AN	D PURITY O	F MATERIALS:	
Mixture	e stirred by	y ball in r	ocking	1. Pur:	ity 99.97	mole per cen	ıt.
autocla	ave. Sampl	les of liqu	id				
analyse	ed by a volu	umetric met	hod.			o other detai	.ls
Details	s in ref. ()	L).		giv	en.		
Henry's	constants	were liste	d as	}			
follows	:						
<u>t/c</u>	H/atm	mole fract	ion ⁻¹	VOTIMATO	FRROR.	······	
25		135		ESTIMATEI		$P/har = \pm 0$ ].	
50		174		1.		<pre>P/bar = ±0.1; estimated by</pre>	
70		208		^{δx} C ₂ H ₄	(	countraced by	COMPTTEL
				REFERENCE	ES:		
				1. Shal	chova, S.	F.; Zubchen	ko, Yu.
					Kaplan,		
				Khin	n. Prom.	<u>1973</u> , 5, 108.	

COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

 Organic solvents containing sulfur or phosphorus for pressures less than 0.2 MPa EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5

March, 1994

#### CRITICAL EVALUATION:

# Critical Evaluation of Ethene Solubilities in Organic Solvents

#### Containing Sulfur or Phosphorus for pressures less than 0.20 MPa

Seven research groups reported solubilities of ethene in organic sulfur or organic phosphorus compounds usually expressed as the Henry's constants. Particularly the data of Lenoir et al. (1) were obtained using a chromatographic method at low gas partial pressures, leading to possible errors when the results were extrapolated to 0.1013 MPa pressure. For only four of the eleven solvents were the results reported for three or more temperatures. Thus, for most of the solvents the effect of temperature on the solubility could not be determined from the results available. The sulfur and phosphorus-containing solvents were mainly the organic esters of either sulfuric or phosphoric acids. The ethene solubilities in the high boiling phosphoric acid esters were of particular interest because five of these solvents belonged to a homologous series. Thus the effect of solvent molecular weight could be qualitatively observed.

There is a data sheet describing the solubility of ethene in triphenylphosphine at pressures up to 0.595 MPa which, strictly speaking, should have appeared in a chapter all of its own.

The solubilities in individual solvents will now be considered.

#### Carbon disulfide; CS₂; [75-15-0]

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The solubility of ethene in carbon disulfide was reported by Sahgal et al. (2) for 298.15 K and a partial pressure of 0.1013 MPa. No comparable data are available in the literature.

This result is classified as tentative.

#### Sulfinylbismethane (dimethyl sulfoxide); C2H6SO; [67-68-5]

The solubility of ethene in sulfinylbismethane at 298.15 K and for a gas partial pressure of 101.3 kPa was reported by Brückl and Kim (3) and also by Lenoir et al. (1). The two solubilities differ by less than 1%.

These values are classified as tentative.

Sulfuric acid, diethyl ester (diethyl sulfate); C4H10O4S; [64-67-5]

Ethene solubilities in sulfuric acid, diethyl ester were reported for temperatures ranging from 273.15 K to 353.15 K and for a gas partial pressure of 101.3 kPa by Truchard et al. (4). These data are entirely consistent and are well represented by the following equation:

$$\log x_{1} = 479.73 \ (T/K)^{-1} - 3.5998 \tag{1}$$

Equation (1) is simpler than that of the authors, and it represents the data with an average deviation of 0.7% and a maximum deviation of 1.5% for the whole temperature range.

The results of Truchard et al. (4) are classified as tentative.

# Amidosulfurous acid, diethylmethyl ester (N,N-dimethylsulfonamide, methyl ester); C5H13NO2S; [21954-69-8]

Ethene solubilities of Makitra et al. (5) in the sulfonamide solvent for pressures below atmospheric are available for temperatures ranging from 253.15 K to 333.15 K. Unfortunately these data appear to be quite inconsistent. Henry's law is not even approximately obeyed; for each COMPONENTS:EVALUATOR:1. Ethene; C2H4; [74-85-1]Walter Hayduk<br/>Department of Chemical Engineering<br/>University of Ottawa<br/>Ottawa, ON<br/>Canada K1N 6N52. Organic solvents containing<br/>sulfur or phosphorus for<br/>pressures less than 0.2 MPaCanada K1N 6N5<br/>March, 1994

# CRITICAL EVALUATION:

temperature the solubility results cannot be extrapolated to zero solubility corresponding to a zero partial pressure of gas. At pressures below atmospheric it would be expected that Henry's law would be obeyed. Furthermore, there is a large degree of scattering of the data. Also, the solubilities at any one pressure (at 725 mm of mercury pressure for example) do not follow a regular function of temperature.

As a result, it is considered that these solubilities are of qualitative value only.

Phosphoric acid, trimethyl ester; C₃H₉O₄P; [512-56-1] Phosphoric acid, triethyl ester; C₆H₁₅O₄P; [78-40-0] Phosphoric acid, tripropyl ester; C₉H₂₁O₄P; [513-08-06] Phosphoric acid, tributyl ester; C₁₂H₂₇O₄P; [126-73-8] Phosphoric acid, tri (2-methylpropyl) ester; C₁₂H₂₇O₄P; [126-71-6]

Solubilities of ethene in five esters of phosphoric acid were reported by Lenoir et al. (1) for a temperature of 325.2 K (and for three temperatures for the tripropyl ester) as Henry's law constants. There is some doubt that these Henry's constants, by a chromatographic technique at low partial pressures of gas, are representative of the true value at 0.1013 MPa pressure. However, a check on the value obtained by Lenoir et al. for the tributyl ester is available from the results of Kosyakov et al. (6) for that solvent. The latter researchers reported results for temperatures ranging from 223.15 K to 313.15 K from which they determined Henry's constants. The results of both research groups appear consistent with one another, and were used to develop an equation for the temperature effect of solubility at a pressure of 0.1013 MPa for phosphoric acid, tributyl ester as follows:

$$\log x = 568.32 (T/K)^{-1} - 3.4716$$

١

(2)

The average, and maximum deviation of the data from equation (2) for this solvent is 0.5%, and 1.2%, respectively. Equation (2) was developed for a temperature range from 223.15 K to 325.15 K and extrapolation beyond this temperature range is not recommended.

As part of the consistency check, Figure 1 was constructed to indicate the effect on the solubilities of ethene of the solvent molecular weight for the phosphoric acid esters for the constant temperature of 325.2 K. Figure 1 indicates that there is a consistent increase in ethene solubility at a temperature of 325.2 K as the molecular weight of the phosphoric acid ester is increased. Thus, Figure 1 may have some value in extending solubility data to the many different esters of phosphoric acid.

The data of Lenoir et al. (1) and of Kosyakov et al. (6) are classified as tentative.

#### Hexamethylphosphoric triamide; C₆H₁₈N₃OP; [680-31-9]

Two sources for the ethene solubility in hexamethylphosphoric acid triamide for a temperature of 298.2 K are available: Brückl and Kim (3), and Lenoir et al. (1), with values of 0.0159 mole fraction ethene, and 0.0189 mole fraction, respectively. The difference between these two comparable results of 19% is clearly beyond any normal experimental error. Given the low pressure chromatographic method used by Lenoir et al. (1), their value is rejected, and the value of Brückl and Kim (3) is classified as tentative.

COMPONENTS:	EVALUATOR:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Walter Hayduk Department of Chemical Engineering
<ol> <li>Organic solvents containing sulfur or phosphorus for pressures less than 0.2 MPa</li> </ol>	University of Ottawa Ottawa, ON Canada K1N 6N5
	March, 1994

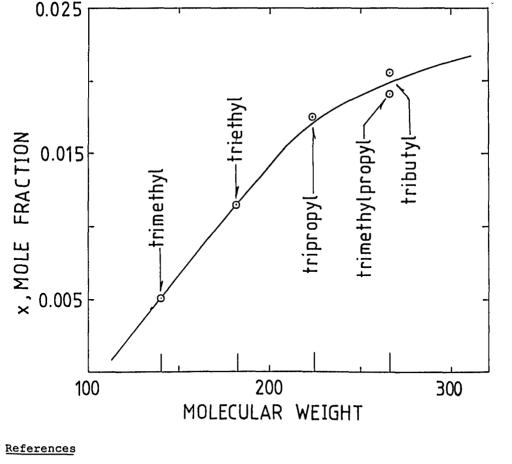
# CRITICAL EVALUATION:

Triphenylphosphine; C18H15P; [603-35-0]

Ethene solubilities at the three temperatures, 363.2 K, 378.2 K, and 393.2 K, for the three pressures, 0.491 MPa, 0.546 MPa and 0.595 MPa, respectively, were reported by Herman et al. (7). There are insufficient data to check for consistency. A linear extrapolation to a pressure of 0.1013 MPa results in mole fraction solubilities of 0.0060 at 363.2 K, 0.0054 at 378.2 K and 0.0049 at 393.2 K. The extrapolated results must be considered approximate only.

The original data are classified as tentative.

Figure 1 Solubility of ethene at 325.2 K and 0.1013 MPa in esters of phosphoric acid as a function of solvent molecular weight



# Lenoir, J.-Y.; Renault, P.; Renon, H. J. Chem. Eng. Data, <u>1971</u>, 16, 340-342.

- 2. Sahgal, A; La, H.M.; Hayduk, W. Can. J. Chem. Eng. 1978, 56, 354-357.
- Brückl, N.; and Kim, J.I. Z. Phys. Chem. (Wiesbaden), <u>1981</u>, 126, 133-150.

# COMPONENTS:EVALUATOR:1. Ethene; C2H4; [74-85-1]Walter Hayduk<br/>Department of Chemical Engineering<br/>University of Ottawa<br/>Ottawa, ON<br/>pressures less than 0.2 MPa2. Organic solvents containing<br/>sulfur or phosphorus for<br/>pressures less than 0.2 MPaCanada K1N 6N5<br/>March, 1994

CRITICAL EVALUATION:

- 4. Truchard, A.M.; Harris, H.G.; Himmelblau, D.M. J. Phys. Chem. <u>1961</u>, 65, 575-576.
- 5. Makitra, R.G.; Moin, F.B.; Politanskaya, T.I. Yas'kovyak, A. Zh. Fiz. Khim. <u>1975</u>, 49, 2723-2724; VINITI No. 1877-75.
- 6. Kosyakov, N.E.; Yushko, V.L.; Sergienko, I.D.; Khokhlov, C.F.; Taraba, P.F. Khim Prom. <u>1972</u>, 48, 432-433.
- Herman, J.M.; Gerritson, L.A.; de Loos, T.W. J. Chem. Eng. Data, <u>1981</u>, 26, 185-187.

COMPONENTS:			ORIGINAL MEASUREMENTS:
1. Ethene	; C ₂ H ₄ ; [74-85-1	]	Sahgal, A.; La, H.M.; Hayduk, W.
2. Carbon	disulfide; CS ₂ ;	i	Can. J. Chem. Eng. <u>1978</u> , 56,
[75-15	-0]		354-357.
VARIABLES:	T/K = 298.15		PREPARED BY:
	Pa = 101.325		W. Hayduk
	101.525	<u></u>	
EXPERIMENTAL	VALUES:		
	·		
		Mole Frac	tion Ostwald Coefficient
<i>t/</i> C	Т/К	Ethene	$x_1$ L/ cm ³ gas (cm ³ solvent) ⁻¹
25.2	298.15	0.0064	6 2.61
Mole fr	action ethene, a	x,, is for a	gas partial pressure of 101.325 kPa.
		-	
			{
i i			
		AUXILIARY	INFORMATION
METHOD/APPAR	ATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:
			]
	apparatus equippe prage burette, a		1. Ethene was CP grade from Matheson, 99.5 mole %
tube for	gas absorption,	a minia-	minimum purity.
solution	ernal manometer a storage burette	was used.	2. Carbon disulfide was of the
	solvent was inje nt rate into the		chromatography grade from Matheson Coleman and Bell,
spiral by	y means of a syri	nge-pump	minimum purity 99.0 mole %.
mercury u	e gas was displac Ising a mechanica	il eleva-	
	ce for a mercury required to kee		ESTIMATED ERROR:
gas press	sure constant. F	Readings	
consumed	olume of vapor-fr and volume of sc	lvent	$\delta x_1/x_1 = \pm 2\vartheta$
	to achieve satur ined from which		$\delta T/K = \pm 0.05$
solubilit	y was calculated are fluid was cir	l. Constant	REFERENCES :
through a	ı jacket enclosir	ng the	
burettes	and absorption s	spiral.	

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1 1 1 + 1		н — э	ORIGINAL MEASUREMENTS	*, t++,
1. 50	hene; $C_2 H_4$ ;	[74-85-1]	Truchard, A.M.;	Harris, H.G.;
2. Su	lfuric acid	d, diethyl ester Eate); C _L H ₁₀ O _L S;	Himmelblau, D.M	•
[6	4-67-5]	ace,, c ₄ . 1 ₀ 0 ₄ .	J. Phys. Chem. <u>196</u>	<u>1</u> ,6 ⁵ , 575-576.
RIABLE	S: T/K = 2	73-353	PREPARED BY:	
	P/kPa = 10	01.325	W. Hayduk	,
PERIME	NTAL VALUES:	Henry's Constant	¹ Mole Fraction	² Partial Molal
t/C	T/K	H/atm (mole fraction)	Ethene, x ₁	Heat of Solution -ΔH/cal (mole)
0	273.15	68.71	0.01455	2430
20	293.15	92.24	0.01084	2300
25	298.15	98.73	0.01013	2270
30	303.15	105.1	0.00951	2240
40	313.15	117.3	0.00853	2180
60	333.15	144.2	0.00693	2080
80	353.15	172.8	0.00579	1995
Par	tial molal ation:	Dl.325 kPa. heat of solution tab = 2.303 [ dlog ^H /d (1	ulated by authors	for a partial and based on
Par equ Tem	tial molal ation: ΔH perature c	heat of solution tab = 2.303 [ 3 log #/3 (1 pefficient of # expre	ulated by authors /T)] ssed by:	and based on
Par equ Tem	tial molal ation: ΔH perature c	heat of solution tab = 2.303 [ 3 log #/3 (1 pefficient of # expre 666 - 0.132845 (10 ³ )(	ulated by authors /T)] ssed by:	and based on
Par equ Tem lo	tial molal ation: ΔH perature c	heat of solution tab = 2.303 [ 0 log H/0 (1 pefficient of H expre 666 - 0.132845 (10 ³ )( AUXILIARY	ulated by authors /T)] ssed by: 1/T) - 5.39706(10 ⁴	and based on ) $(1/T)^2$ ; $T/K$
Par equ Tem lo ETHOD// Two Cc large in a manom 200 cc the l thoro ethen flask was a ing t reach The p mater mine were	tial molal ation: $\Delta H$ perature C og $H = 3.04$ APPARATUS/PRO alibrated or than the bath conne leter were m ³ of solv arger sphe ughly evac to 2 atm dmitted to he solvent equilibri oressures w ial balanc the solubi measured f	heat of solution tab = 2.303 [ 0 log H/0 (1 pefficient of H expre 666 - 0.132845 (10 ³ )( AUXILIARY	ulated by authors /T)] ssed by: 1/T) - 5.39706(10 ⁴ ) INFORMATION SOURCE AND PURITY OF 1. Ethene source given. 2. Diethyl sulf practical gr	and based on ) $(1/T)^2$ ; $T/K$ MATERIALS: we and purity not tate was Eastman tade purified by a Na CO, solution

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OMPONENTS	· · · · · · · · · · · · · · · · · · ·			OPTOTNAL	MEACUDENCEN		329
		_	_		MEASUREMENT		
1. Eth	ene; $C_2 H_4$	; [74-85	-1]	Makit	tra, R.G.;	Moin, F.B.	;
	dosulfuro hyl ester		diethyl-, iethvl			.I.; Yas'k 1975,49	
sul	fonamide, 1 ₁₃ NO ₂ S; [	methyle	ster);		FI No. 1877		· · · · · · · · · · · · · · · ·
ARIABLES		- 262 46	- 338.15	PREPARED	BY:		
	•	= 253.15 = 13.3 -			W. Ha	ayduk	
EXPERIMEN	TAL VALUES:					•	
		<del><u>-</u></del>					
Temper t/° T/K	С	-20 53.15	0 273.15	20 293.15	35 308.15	50 323.15	65 338.15
Partia Pressu mm Hg,	re,p						
100	13.3	5	4	2	2	1	· _
200 300	26.7 40.4	7 10	6 8	5 6	4 6	3 5	1 2
400	53.3	12	11	7	7	6	3
	66.7 80.0	15 20	13 17	8 10	8 8	7 8	4 6
,725	96.7	25	19	12	11	10	7
	4 4						
² 760	101.3 101.3 Dubility	19.4 25.97 is expre	18.9 20.5 ssed as 10 ⁴	13.0 12.7 x, where	11.9 12.2 x, is the	10.7 10.3 mole fract	8.1 5.7 ion.
² 760 The so ¹ The s consta ² Solub listed	101.3 lubility olubility nts given dility at below.	25.97 is expre at 101. in the 101.3 kP	20.5 ssed as 10 ⁴ 3 kPa was ca	$\frac{12.7}{x_1 \text{ where}}$ <pre>lculated</pre> .ted by the second	$\frac{12.2}{x_1 \text{ is the}}$ by the complexities	10.3 mole fract mpiler from r from H va	5.7 ion. Henry's lues
² 760 The so ¹ The s consta ² Solub listed	101.3 lubility olubility nts given dility at below.	25.97 is expre at 101. in the 101.3 kP	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap	$\frac{12.7}{x_1 \text{ where}}$ <pre>lculated</pre> .ted by the second	$\frac{12.2}{x_1}$ is the by the com- he compiler ited in VIN	10.3 mole fract mpiler from r from H va	5.7 ion. Henry's lues
² 760 The so ¹ The s consta ² Solub listed The da	101.3 lubility olubility nts given dility at below.	25.97 is expre at 101. in the 101.3 kP btained	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap	12.7 x ₁ where lculated ited by the per depose Y INFORMAT	$\frac{12.2}{x_1}$ is the by the com- he compiler ited in VIN	10.3 mole fract npiler from r from H va NITI, Mosco	5.7 ion. Henry's lues
2760 The so ¹ The so ² Solub listed The da METHOD/AP The me not sp It is Henry' of the law is	101.3 lubility olubility nts given bility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver	25.97 is expre at 101. in the 101.3 kP btained CEDURE: easureme the pap obeyed. ws that	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR AUXILIAR nt was er that A check Henry's	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed	12.2 x ₁ is the by the com- he compiler ited in VIN ION AND PURITY OF hene purity romatograph e solvent w iling tempo asured at 4	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS: Y by gas by was 99.5 was washed erature was 4 mm mercur	5.7 ion. Henry's lues w. %. and
2760 The so ¹ The s consta ² Solub listed The da METHOD/AP The me not sp It is Henry' of the law is obeyedd Henry' mole f. author	101.3 lubility olubility nts given ility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as	25.97 is expre at 101. in the 101.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe child boomed pro- put	12.2 $x_1$ is the by the com- he compiler ited in VIN ION AND PURITY OF hene purity romatograph a solvent willing tempor asured at 4 asure as 7 rity not de	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS: y by gas by was 99.5 was washed erature was f mm mercur 115°C. Act	5.7 ion. Henry's lues w. %. and
2760 The so ¹ The s consta ² Solub listed The da METHOD/AP The me not sp It is Henry' of the law is obeyedd Henry' mole f. author	101.3 Pubility olubility nts given ility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth	25.97 is expre at 101. in the l01.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe child boomed pro- put	12.2 x ₁ is the by the com- he compiler ited in VIN ION AND PURITY OF hene purity romatograph e solvent w iling temper asured at 4 essure as 1	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS: y by gas by was 99.5 was washed erature was f mm mercur 115°C. Act	5.7 ion. Henry's lues w. %. and
2760 The so The so Consta 2Solub listed The da METHOD/AP The me not sp It is Henry' of the law is obeyedd Henry' mole f. author compil.	101.3 lubility olubility ility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth	25.97 is expre at 101. in the 101.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c H 1	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the ed by the : ompiler)	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed pro- put ESTIMATE	12.2 x ₁ is the by the com- he compiler ited in VIN ION AND PURITY OF hene purity romatograph e solvent willing temper asured at 4 essure as 1 rity not de ED ERROR:	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS: y by gas by was 99.5 was washed erature was f mm mercur 115°C. Act	5.7 ion. Henry's lues w. %. and Yual
2760 The so ¹ The s consta ² Solub listed The da The da WETHOD/AP The me not sp It is Henry' of the law is obeyed Henry' mole f: author compil <u>t/°C</u>	101.3 lubility olubility nts given bility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth 10 ⁻²	25.97 is expre at 101. in the lol.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c H 1 0	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the ed by the : ompiler) 0 ⁻² H	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed pro- put ESTIMATE	12.2 $x_1$ is the by the com- he compiler ited in VIN ION AND PURITY OF thene purity romatograph e solvent willing temper asured at 4 essure as 1 rity not de ED ERROR: $x_1 / x_1 = 0.1$	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS; y by gas hy was 99.5 was washed erature was a mm mercur 115°C. Act etermined.	5.7 ion. Henry's lues w. %. and Yual
$\frac{2760}{\text{The so}}$ The so $\frac{1}{\text{The sc}}$ $\frac{2}{\text{Solub}}$ listed The da $\frac{1}{\text{The da}}$ The me not sp It is Henry' of the law is obeyedd Henry' mole f. author compil. $\frac{t/°C}{-20}$	101.3 lubility olubility nts given ility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth 10 ⁻² 392	25.97 is expre at 101. in the l01.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c H 1 0 5	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the ed by the : ompiler) 0 ⁻² H 2927	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed pro- put ESTIMATE	12.2 $x_1$ is the by the com- he compiler ited in VIN ION AND PURITY OF thene purity romatograph e solvent willing temper asured at 4 essure as 1 rity not de ED ERROR: $x_1 / x_1 = 0.1$	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS; y by gas hy was 99.5 was washed erature was a mm mercur 115°C. Act etermined.	5.7 ion. Henry's lues w. %. and Yual
$\frac{2760}{\text{The so}}$ The so consta 2Solub listed The da METHOD/AP The me not sp It is Henry' of the law is obeyed Henry' mole f. author compil $\frac{t/°C}{-20}$	101.3 lubility olubility ity at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth 10 ⁻² 392 402	25.97 is expre at 101. in the 101.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c H 1 0 5 0	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the ed by the : ompiler) 0 ⁻² H 2927 3714	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed pro- put ESTIMATE	12.2 $x_1$ is the by the com- he compiler ited in VIN ION AND PURITY OF thene purity romatograph e solvent willing temper asured at 4 essure as 1 rity not de ED ERROR: $x_1 / x_1 = 0.1$	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS; y by gas hy was 99.5 was washed erature was a mm mercur 115°C. Act etermined.	5.7 ion. Henry's lues w. %. and Yual
$\frac{2760}{\text{The so}}$ The so $\frac{1}{\text{The so}}$ $\frac{2}{\text{Solub}}$ listed The da $\frac{1}{\text{The solution}}$ $\frac{1}{\text{Solution}}$ The me not sp It is Henry' of the law is obeyed Henry' mole f. author compil $\frac{t/°C}{-20}$ 0 20	101.3 lubility olubility nts given below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth 10 ⁻² 392 402 583	25.97 is expre at 101. in the 101.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c H 0 5 0 0 0	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the ed by the : ompiler) 0 ⁻² H 2927 3714 6000	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed pro- put ESTIMATE	12.2 $x_1$ is the by the com- he compiler ited in VIN ION AND PURITY OF thene purity romatograph e solvent willing temper asured at 4 essure as 1 rity not de ED ERROR: $x_1 / x_1 = 0.1$	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS; y by gas hy was 99.5 was washed erature was a mm mercur 115°C. Act etermined.	5.7 ion. Henry's lues w. %. and Yual
$\frac{2760}{\text{The so}}$ The so $\frac{1}{\text{The sc}}$ $\frac{2}{\text{Solub}}$ listed The da $\frac{1}{\text{The sc}}$ The me not sp It is Henry' of the law is obeyed Henry' mole f. author compil. $\frac{t/°C}{-20}$ 0 20 35	101.3 lubility olubility nts given ility at below. ta were o PARATUS/PRO thod of m ecified. stated in s law is data sho only ver s constan raction, s and as er are as (auth 10 ⁻² 583 638	25.97 is expre at 101. in the l01.3 kP btained CEDURE: easureme the pap obeyed. ws that y approx ts, H in as deter calculat follows ors) (c H 1 0 5 0 0 0	20.5 ssed as 10 ⁴ 3 kPa was ca paper. a as calcula from the pap AUXILIAR nt was er that A check Henry's imately mm Hg/ mined by the ed by the i ompiler) 0 ⁻² H 2927 3714 6000 6222	12.7 x ₁ where lculated ted by the per depose Y INFORMAT SOURCE A 1. Ethe che 2. The boomed pro- put ESTIMATE	12.2 $x_1$ is the by the com- he compiler ited in VIN ION AND PURITY OF thene purity romatograph e solvent willing temper asured at 4 essure as 1 rity not de ED ERROR: $x_1 / x_1 = 0.1$	10.3 mole fract mpiler from r from H va NITI, Mosco MATERIALS; y by gas hy was 99.5 was washed erature was a mm mercur 115°C. Act etermined.	5.7 ion. Henry's lues w. %. and Yual

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COMPONENTS:			ORIGINAL MEASUREMENTS:	Mai 2 1 1
1 1144	о и . [74 ог-1]		Lenoir, J-Y.; Renault, P.; Re	
	C ₂ H ₄ ; [74-85-1]			
2 Esters	of phosphoric acid		J. Chem. Eng. Data <u>1971</u> , 16	, 340-
VARIABLES:				<u> </u>
	/K = 298.2 - 343.2		PREPARED BY:	
P/k	Pa = 101.3		C. L. Young	
EXPERIMENTAL	VALUES:			
	T/K Henry	's constan	t Mole fraction at 1 at	n*
	H H	$C_2H_4$ /atm	^{<i>x</i>} C ₂ H ₄	
	Phosphoric acid,	trimethyl	ester; C ₃ H ₉ O ₄ P; [512-56-1]	
	325.2	199	0.00503	
	Phosphoric acid,	triethyl	ester; C ₆ H ₁₅ O ₄ P; [78-40-0]	
	325.2	- 87.0	0.0115	
			ester; C ₉ H ₂₁ O ₄ P; [513-08-6]	]
	298.2	41.1	0.0243	-
	323.2	57.3	0.0175	
	343.2	71.1	0.0141	
			ester; C ₁₂ H ₂₇ O ₄ P; [126-73-1	8]
	325.2	52.5	0.0190	
Phosp	horic acid, tri(2-	methylprop	yl) ester; C ₁₂ H ₂₇ O ₄ P; [126-	71-6]
	325.2	48.7	0.0205	
* Calcula i.e., x	ted by compiler as $C_{2H_4}$ (1 atm) = $1/H_C$	suming a l	inear function of $H_{C_2H_4}$ vs $x_C$	 2 H ₄ ′
	<del></del>	AUVT7 TADV		
		AUXILIARI	INFORMATION	
	ATUS/PROCEDURE: .onal gas-liquid ch	iromato-	SOURCE AND PURITY OF MATERIALS: (1) L'Air Liquide sample, m	inimu
graphic un	it fitted with a t	hermal	purity 99.9 mole per cent.	
carrier ga		e value of	(2) Touzart and Matignon or Serlabo sample, purity 99 mo	
	w constant was cal etention time. Th	lculated ne value	cent.	ro he
applies to	very low partial	pressures	1	
difference	there may be a su from that measure	ed at	1	
	ssure. There is a le uncertainty in			
of Henry's	constant since su was not allowed f	irface		
although i	ts possible existe		ESTIMATED ERROR:	
noted.			$\delta T/K = \pm 0.1;  \delta H/\text{atm} = \pm 6\%$ (estimated by compiler).	
			REFERENCES:	
			1	

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OMPONENTS:	. [74-85-1]	,	ORIGINAL MEASUREMENT: Kosyakov, N.E.;	
1. Ethene; C ₂ H	4		_	
2. Phosphoric (tributyl p	hosphate); C	y1 ester 12 ^H 27 ^O 4 ^P ;		; Khokhlov, C.F.;
[126-73-8]			Taraba, P.F.	
			Khim. Prom. <u>1972</u> , 4	8,432-433.
ARIABLES: T/K = 223	-313		PREPARED BY:	
<i>P</i> /kPa = 101			W. Hayduk	,
EXPERIMENTAL VALUE			<u> </u>	· · · · · · · · · · · · · · · · · · ·
		² Henry' s	Constant	² Mole Fraction
t/C	¹ <i>T</i> /K	H/atm (mo]	e fraction) ⁻¹	Ethene, $x_1$
40	313.15	45	5.2	0.0221
20	293.15	34	1.1	0.0293
0	273.15	24	1.9	0.0401
-20	253.15	16	5.9	0.0593
-40	233.15	10	).9	0.0921
-50	223.15	8	3.33	0.120
Data measure pressure sho	ed at several ows that Henr	pressures y's law is	between 100 and 7 obeyed.	60 mm mercury
		AUXILIARY	INFORMATION	
ETHOD /APPARATUS / H	PROCEDURE:		SOURCE AND PURITY OF	MATERIALS:
A static methc are given in r		Details	<ol> <li>Ethene minimu 99.0 mole %.</li> </ol>	m purity
			2. Purity and so	urce unspecified.
			ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 2\%$ (O $\delta x_1 / x_1 = \pm 4\%$ (A	s read from graph
			REFERENCES:	y compiler) ; Shakhova, C.F. 1961. 3. 177.

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Ethene; C₂H₄; [74-85-1]</pre>	Herman, J.M.; Gerritson, L.A. de Loos, T.W.
<pre>2. Triphenylphosphine; C₁₈H₁₅P; [603-35-0]</pre>	J. Chem. Eng. Data, <u>1981</u> ,26, 185- 187.
VARIABLES: T/K = 363.2 - 393.2	PREPARED BY:
P/MPa = 0.491 - 0.595	C.L. Young
EXPERIMENTAL VALUES:	
T/K P/MPa	Mole fraction of ethene in liquid, ^x C ₂ H,
363.2 0.491 378.2 0.546 393.2 0.595	0.029 0.029 0.029
AUXILIARY	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS;
	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>Phillips sample, purity 99.98 mole per cent.</li> <li>Fluka sample, purity 99.5 wt</li> </ul>
METHOD/APPARATUS/PROCEDURE: Cailletet tube with sample of known composition confined over mercury. Pressure on the sample was increased by small increments until bubble point reached. Equilibrium establis- hed at each step. Sample stirred with magnetically operated device. Pressure measured using Bourdon	<pre>SOURCE AND PURITY OF MATERIALS: 1. Phillips sample, purity 99.98 mole per cent. 2. Fluka sample, purity 99.5 wt per cent. ESTIMATED ERROR:</pre>
METHOD/APPARATUS/PROCEDURE: Cailletet tube with sample of known composition confined over mercury. Pressure on the sample was increased by small increments until bubble point reached. Equilibrium establis- hed at each step. Sample stirred with magnetically operated device. Pressure measured using Bourdon	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>1. Phillips sample, purity 99.98 mole per cent.</li> <li>2. Fluka sample, purity 99.5 wt per cent.</li> <li>ESTIMATED ERROR:</li> </ul>

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, L COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

 Biological fluids, a natural oil and a petroleum fraction for pressures less than 0.1013 MPa EVALUATOR: Walter Hayduk Department of Chemical Engineering University of Ottawa Ottawa, ON Canada K1N 6N5

March, 1994

#### CRITICAL EVALUATION:

Critical Evaluation of Ethene Solubilities in Biological Fluids, Olive

## Oil and Petroleum for Pressures less than 0.1013 MPa

The solubility for a temperature of 298.15 K of ethene for a range of pressures below atmospheric was reported for components of dog blood including water, hemoglobin solution, blood plasma as well as in whole blood by Grollman (1). The solubilities were reported as the Bunsen and Ostwald coefficients. It can be concluded that Henry's law is obeyed for water and approximately obeyed for the other three solvents. It is also apparent that the ethene solubility is lowest in the hemoglobin solution and increases in water, in blood plasma and finally reaches the highest value in whole blood for constant gas pressures. Further, the solubilities in whole blood of three different species were compared at 310.65 K; lowest values were obtained for human blood, higher values in rabbit blood and highest values in dog blood. These results may be of qualitative value only because the results for water are too low when compared with modern values. Please see the chapter for solubilities in water in this volume.

Orcutt and Waters (2) reported ethene solubilities at 298.15 K in human blood and in aqueous solutions containing increasing quantities of chemical reagents. These reagents were acid ferricyanide, caustic and alkaline hydrosulfite reagent added sequentially, with the ethene solubility determined after each addition. The solubility decreased with each addition of the chemical solutions. It is of interest that the extrapolated value for the ethene solubility in human blood at 298.15 K expressed as the Ostwald coefficient is 0.143 cm³ ethene/cm³ of blood and is nearly identical to the value obtained by the previous researcher of 0.142 cm³ ethene/cm³ blood except in the latter case it is for dog blood. This contradicts the findings of Grollman at 310.65 K.

The solubilities of Orcutt and Waters are classified as tentative.

The single value for the solubility of ethene in olive oil at 310.2 K of Saidman et al. (3) is classified as tentative.

The solubilities of ethene in a petroleum fraction at two temperatures were reported both as the Bunsen and Ostwald coefficients by Gniewosz and Walfisz (4). Without further specifications as to properties and analysis of the petroleum fraction, this data is of little use.

#### References

- 1. Grollman, A. J. Biol. Chem. 1929, 82, 317-325.
- 2. Orcutt, F.S.; Waters, R.M. J. Biol. Chem. 1937, 117, 509-515.
- Saidman, L.J.; Eger, E.I.; Munson, E.S.; Severinghaus, J.W. Anesth. <u>1966</u>, 27, 180-184.
- 4. Gniewosz, S.; Walfisz, A. Z. Phys. Chem. <u>1887</u>, 1, 70-72.

OMPONENTS :			ORIGINAL MEA	SUREMENTS :	
1. Ethene; C	H ₄ ; [74-85-1	]	Grollman	, A.	
2. Water; H ₂ C Dog blood, dog hemog]	); [7732-18-5 , dog plasma, lobin.	] and	J. Biol. C 317-325.	Them. <u>1929</u> ,	82 ,
	≈ 298.15 (25 ≈ 73.3-133.3	.0°C)	PREPARED BY: W.	Hayduk	
XPERIMENTAL VALU				+ <u>u</u>	
			بىتونىي يىتورى يودىتى يورى	, 	
Ethene Partis p ₁ /mm mercury		Ostwald ( Water		, L/cm³(gas) Hemoglobin	
550 600 650 700 750 800 850 900 950 1000	73.33 79.99 86.66 93.33 99.99 106.7 113.3 112.0 126.7 133.3	0.112 0.113 0.113 0.112 0.113 0.113 0.113 0.114 0.113 0.113	0.114 0.114 0.115 0.115 0.115 0.115 0.116 0.115 0.116 0.117	0.104 0.105 0.106 0.105 0.106 0.106 0.106 0.106 0.107 0.107	$\begin{array}{c} 0.141 \\ 0.141 \\ 0.142 \\ 0.142 \\ 0.142 \\ 0.142 \\ 0.143 \\ 0.143 \\ 0.143 \\ 0.143 \\ 0.144 \end{array}$
Average L		0.1129	0.1151	0.1056	0.1420
The hemoglob: of solution.	in solution c	ontained 8.	5 g purifie	d hemoglobin	in 100 cm³
		AUXILIARY	INFORMATION		
immersed in bath was use saturated so over mercury desorption a in three eva transferred the volume w sample of th Solubilities	ling-type of a constant te d. A known v lution was tr into a Van S pparatus. Ga cuations was to a sample t as determined e gas was ana were determi	mperature olume of ansferred lyke s removed ube where and a lyzed. ned at	<ol> <li>Ethen not g</li> <li>Hepar</li> </ol>	PURITY OF MATERIA te source and tiven. in was used a coagulant.	purity was
	sures below a mospheric and oefficients.		ESTIMATED E	$\frac{\delta T}{K} = \frac{1}{2}$	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Grollman, A.
<ol> <li>Water; H₂O; [7732-18-5] Human blood, dog blood, rabbit blood, and aqueous lipoidal suspensions of dog blood.</li> </ol>	J. Biol. Chem. <u>1929</u> , 82, 317–325.
VARIABLES: $T/K = 310.65$ (37.5°C)	PREPARED BY:
P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	I
Bunsen Coefficient	
$\begin{array}{c} \beta / \text{cm}^3 (\text{gas}) & {}^{10} \\ \text{Solvent} & \text{NTP cm}^{-3} (\text{solvent}) & L / \\ \end{array}$	stwald coefficient ² Solubility, s / cm ³ cm ³ (gas) cm ⁻³ (solvent) gas (g water) - 1
Water, distilled 0.078	0.089 0.0785
Lipoidal suspension of dog blood 0.120	0.136
Human blood 0,123	0.140 0.156
Dog blood 0.141	0.160 0.167
Rabbit blood 0.128	0.146 0.148
110°C and determining loss in weigh ³ Blood lipoids were extracted from b and petroleum ether.	
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A glass bubbling-type of saturator immersed in a constant temperature bath was used. The gas was	<ol> <li>Ethene source and purity not given.</li> </ol>
presaturated with water vapor. A known volume of saturated solution was transferred over mercury into a Van Slyke desorption apparatus. Gas removed in three evacuations was transferred to a sample tube where the volume was determined and a sample of the gas was analyzed. The solubilities were	2. Heparin was used as a blood anticoagulant in all cases.
expressed as the Bunsen coefficients.	ESTIMATED ERROR: $\delta\beta/\beta = \pm 0.04$ (compiler) $\delta T/K = \pm 0.05$
	REFERENCES:

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COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Ethene; C ₂ H ₄ ; [74-85-1]	Orcutt, F.S.; Waters, R.M.
2. Human blood	J. Biol. Chem. <u>1937</u> , 117,
3. Various aqueous solutions.	509-515.
VARIABLES: $T/K = 298.15$	PREPARED BY:
P/kPa = 101.325	W. Hayduk
EXPERIMENTAL VALUES:	<b>.</b>
Solution, defined below L	Ostwald coefficient / cm³(gas) cm ⁻³ (solvent solution)
	0.118 0.110 0.093
I: Solution I contains 1 cm ³ bloo ferricyanide reagent, total 3. II: Solution II contains Solution	
hydrosulfite reagent, total 5. The value of the Ostwald coefficient	5 cm ³ . in dilute aqueous salt solutions
hydrosulfite reagent, total 5.	5 cm ³ . in dilute aqueous salt solutions er suggesting that the Ostwald that in water, $L = 0.108$ cm ³ gas/c estimated by the compiler for "pu
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood.	in dilute aqueous salt solutions er suggesting that the Ostwald that in water, $L = 0.108 \text{ cm}^3 \text{ gas/c}$ estimated by the compiler for "pur
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE:	5 cm ³ . in dilute aqueous salt solutions er suggesting that the Ostwald that in water, $L = 0.108$ cm ³ gas/c estimated by the compiler for "pur nd to be $L = 0.143$ cm ³ ethene/cm ³ INFORMATION SOURCE AND PURITY OF MATERIALS;
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE: The Van Slyke-Neill manometric method which is based on the	5 cm ³ . in dilute aqueous salt solutions er suggesting that the Ostwald that in water, $L = 0.108$ cm ³ gas/c estimated by the compiler for "pur nd to be $L = 0.143$ cm ³ ethene/cm ³ INFORMATION
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE: The Van Slyke-Neill manometric method which is based on the desorption of gases from blood in a partial vacuum was used. A small volume of solvent is saturated with	5 cm ³ . in dilute aqueous salt solutions er suggesting that the Ostwald that in water, L = 0.108 cm ³ gas/c estimated by the compiler for "pur nd to be L = 0.143 cm ³ ethene/cm ³ INFORMATION SOURCE AND PURITY OF MATERIALS; 1. Ethene source and purity not
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE: The Van Slyke-Neill manometric method which is based on the desorption of gases from blood in a partial vacuum was used. A small volume of solvent is saturated with gas through the solvent and shaking the saturator at constant temperature and atmospheric pressure. A small, carefully measured volume of saturated	<pre>5 cm ³. in dilute aqueous salt solutions er suggesting that the Ostwald that in water, L = 0.108 cm³ gas/c estimated by the compiler for "pur nd to be L = 0.143 cm³ ethene/cm³ INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not specified. 2. Human, blood, not otherwise</pre>
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE: The Van Slyke-Neill manometric method which is based on the desorption of gases from blood in a partial vacuum was used. A small volume of solvent is saturated with gas by alternately bubbling the gas through the solvent and shaking the saturator at constant temperature and atmospheric pressure. A small, carefully measured volume of saturated solution is drawn into a 50 cm ³ burette by lowering the mercury	<pre>5 cm³. in dilute aqueous salt solutions er suggesting that the Ostwald that in water, L = 0.108 cm³ gas/c estimated by the compiler for "pur nd to be L = 0.143 cm³ ethene/cm³  INFORMATION SOURCE AND PURITY OF MATERIALS; 1. Ethene source and purity not specified. 2. Human, blood, not otherwise specified. 3. Aqueous solutions as given above, not otherwise</pre>
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE: The Van Slyke-Neill manometric method which is based on the desorption of gases from blood in a partial vacuum was used. A small volume of solvent is saturated with gas by alternately bubbling the gas through the solvent and shaking the saturator at constant temperature and atmospheric pressure. A small, carefully measured volume of saturated solution is drawn into a 50 cm ³ burette by lowering the mercury level in it. A partial vacuum is produced releasing most of the gas. The pressure, volume and	<pre>5 cm³. in dilute aqueous salt solutions er suggesting that the Ostwald that in water, L = 0.108 cm³ gas/c estimated by the compiler for "pur nd to be L = 0.143 cm³ ethene/cm³ INFORMATION SOURCE AND PURITY OF MATERIALS; 1. Ethene source and purity not specified. 2. Human, blood, not otherwise specified. 3. Aqueous solutions as given above, not otherwise specified.</pre>
hydrosulfite reagent, total 5. The value of the Ostwald coefficient containing blood exceeds that in wat coefficient in blood is greater than water. The Ostwald coefficient was blood using reference 1 and was fou blood. AUXILIARY METHOD/APPARATUS/PROCEDURE: The Van Slyke-Neill manometric method which is based on the desorption of gases from blood in a partial vacuum was used. A small volume of solvent is saturated with gas by alternately bubbling the gas through the solvent and shaking the saturator at constant temperature and atmospheric pressure. A small, carefully measured volume of saturated solution is drawn into a 50 cm ³ burette by lowering the mercury level in it. A partial vacuum is produced releasing most of the gas.	<pre>5 cm³. in dilute aqueous salt solutions er suggesting that the Ostwald that in water, L = 0.108 cm³ gas/c estimated by the compiler for "pur nd to be L = 0.143 cm³ ethene/cm³  INFORMATION SOURCE AND PURITY OF MATERIALS: 1. Ethene source and purity not specified. 2. Human, blood, not otherwise specified. 3. Aqueous solutions as given above, not otherwise specified. ESTIMATED ERROR:</pre>

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1. Ethene, (Ethylene); C2H4; [74-85-1]       Saidman, J.J.; Eger, E.I.; Munson, E.S.; Severinghaus, J.W.         2. Olive oil.       Anesthesiology, 1966, 27,180-184.         VARIABLES: T/K = 310.2       PREPARED BY: C.L. Young.         t/°C       7/K         37       310.2         37       310.2         4UXILIARY INFORMATION         METHOD/APPARATUS/PROCEDURE: Noom amount of watch or eguilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1).         ESTIMATED ERROR: S 7/K = 10.1. (estimated by compiler)         ESTIMATED ERROR: S 7/K = 10.1. (estimated by compiler)         REFRENCES: L. Douglas, E. J. Phys. Chem. 1964	DMPONENTS :	IOPTOTAL	MEASUDENENTS -	<u>.</u>	337
[74-85-1]       E.S.; Severinghaus, J.W.         2. Olive oil.       Anesthesiology, <u>1956</u> , \$7,180-184.         ARMABLES:       T/K = 310.2         TYRERIMENTAL VALUES:       C.L. Young.         t/°C       T/K         37       310.2         37       310.2         37       310.2         40XILLARY INFORMATION         MAXIMUM PROCEDURE:         Mode to estimated vich a known volume of gas and change in volume used to estimated vich a known volume of gas and change in volume used to estimated otawald coefficient. Details of apparatus in source and ref. (1).         ESTIMATED ERROR:         6 T/K = 10.1. (estimated by compiler)         REFERENCES:         1. Douglas, E. J. Phys. Chem. 1964				E T + Munson	
ARLABLES: T/K = 310.2 T/K = 10.1 T/K = 10.1					
C.L. Young.         XPERIMENTAL VALUES: $t/^{\circ}C$ $T/K$ No of Samples       Ostwald coefficient Mean       Standard deviation         37       310.2       6       1.260       0.028         AUXILIARY INFORMATION         Source AND FURITY OF MATERIALS:         Modified Scholander apparatus used. Known amount of water equilibrated with a known volume used to estimated Ostwald coefficient Modified Scholander apparatus used. Known amount of water equilibrated change in volume used to estimated obswal coefficient AUXILIARY INFORMATION       Source AND FURITY OF MATERIALS:         1. No details given.       2. Degassed.         ESTIMATED ERROR: $\delta T/K = \pm 0.1. (estimated bycompiler)         REFERENCES:1. Douglas, E. J. Phys. Chem. 1964   $	2. Olive oil.	Anest	hesiology, <u>1966</u> ,	27,180-184.	
T/K = 310.2       C.L. Young.         t/*C       T/K       No of Samples       Ostwald coefficient Mean Standard deviation         37       310.2       6       1.260       0.028         AUXILIARY INFORMATION         MODIFIES INFORMATION         MODIFIES INFORMATION         MODIFIES INFORMATION         MODIFIES INFORMATION         METHOD/APPARATUS/PROCEDURE:       SOURCE AND PURITY OF MATERIALS:         Modified Scholander apparatus used. Known amount of water equilibrated ohange in volume used to estimated obswald coefficient apparatus in source and ref. (1).       SOURCE AND PURITY OF MATERIALS:         ESTIMATED ERROR: 6 %7/K = ±0.1. (estimated by compiler)       Compiler)         REFERENCES: 1. Douglas, E. J. Phys. Chem. 1960	ARTABLES .	DEDADI			
AUXILIANY INFORMATION         AUXILIANY INFORMATION         37 310.2 6 1.260 0.028         AUXILIANY INFORMATION         AUXILIANY INFORMATION         MODIFIES         MODIFIES <td></td> <td>I KLIAKI</td> <td></td> <td>oung.</td> <td></td>		I KLIAKI		oung.	
t/°C     7/K     No of Samples     Ostwald coefficient Mean     Standard deviation       37     310.2     6     1.260     0.028         AUXILIARY INFORMATION         Methol/APPARATUS/PROCEDURE:     Source AND PURITY OF MATERIALS:       Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimated obtwald coefficient. Details of apparatus in source and ref. (1).     Source AND PURITY OF MATERIALS:       I. No details given.     2. Degassed.       ESTIMATED ERROR: 6 T/K = 10.1. (estimated by compiler)       REFERENCES: 1. Douglas, E. J. Phys. Chem. 1964	1/K - 510.2				)
t/*C     T/K     No of Samples     Mean     Standard deviation       37     310.2     6     1.260     0.028 AUXILIARY INFORMATION AUXILIARY INFORMATION EETHOD/APPARATUS/PROCEDURE: Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1). ESTIMATED ERROR: 6 1/K = 10.1. (estimated by compiler) REFERENCES: 1. Douglas, E. J. Phys. Chem. 1964	XPERIMENTAL VALUES:				
AUXILIARY INFORMATION METHOD/APPARATUS/FROCEDURE: Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1). ESTIMATED ERROR: $\delta$ 7/K = ±0.1. (estimated by compiler) REFERENCES: 1. Douglas, E. J. Phys. Chem. <u>1964</u>	t/°C T/K	No of Samples		Standard	
<pre>METHOD/APPARATUS/PROCEDURE: Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1).</pre> SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed. 2. Degassed. ESTIMATED ERROR: δ 1/K = ±0.1. (estimated by compiler) REFERENCES: 1. Douglas, E. J. Phys. Chem. 1964	37 310.2	6	1.260	0.028	
Termod/APPARATUS/PROCEDURE:SOURCE AND PURITY OF MATERIALS:Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1).SOURCE AND PURITY OF MATERIALS: 1. No details given. 2. Degassed.Substrained Strained Coefficient.Source and ref. (1).Source and ref. (1).ESTIMATED ERROR: $\delta T/K = \pm 0.1.$ (estimated by compiler)REFERENCES: 1. Douglas, E. J. Phys. Chem. 1964					
<ul> <li>Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1).</li> <li>ESTIMATED ERROR: δ T/K = ±0.1. (estimated by compiler)</li> <li>REFERENCES:</li> <li>Douglas, E. J. Phys. Chem. <u>1964</u></li> </ul>		AUXILIARY INFORM/	ATION		
<pre>Known amount of water equilibrated with a known volume of gas and change in volume used to estimated Ostwald coefficient. Details of apparatus in source and ref. (1).</pre> 2. Degassed. 2. Degassed. ESTIMATED ERROR: δ 1/K = ±0.1. (estimated by compiler) REFERENCES: 1. Douglas, E. J. Phys. Chem. 1964				-	
δ T/K = ±0.1. (estimated by compiler) REFERENCES: 1. Douglas, E. J. Phys. Chem. <u>1964</u>	Known amount of water eq with a known volume of g change in volume used to Ostwald coefficient. De	uilibrated as and 2. estimated tails of		1.	
compiler) REFERENCES: 1. Douglas, E. J. Phys. Chem. <u>1964</u>		ESTIMA	TED ERROR:		
REFERENCES: 1. Douglas, E. J. Phys. Chem. <u>1964</u>	1		$\delta T/K = \pm 0.1.$ (e:	stimated by ompiler)	
l. Douglas, E. J. Phys. Chem. <u>1964</u>	<i>л</i>	REFERI	INCES:		
				Phys. Chem. 196	54,
			58, 169.	-	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Ethene or ethylene; C ₂ H ₄ ; [74-85-1]	Gniewosz, S.; Walfisz, A.
(2) Petroleum.	Z. Phys. Chem. <u>1887</u> , 1, 70 - 72.
(-,	
VARIABLES: T/K = 283.15, 293.15	PREPARED BY: M. E. Derrick
p/kPa = 101 ("atmospheric")	H. L. Clever
EXPERIMENTAL VALUES:	
Temperature	
Bunsen Coeffic: $t/^{\circ}C$ $T/K$ $\alpha/cm^{3}$ (STP) $\alpha$	ient Coefficient
10 283.15 0.165 0.162	
0.166 0.164	
20 293.15 0.144 0.141 0.142	
0.142	Av. 0.152
The Ostwald coefficients we compiler.	ere calculated by the
	ere calculated by the
compiler. AUXILIARY	INFORMATION
compiler. AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND FURITY OF MATERIALS:
Compiler. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information.
COMPILER. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large	INFORMATION SOURCE AND FURITY OF MATERIALS:
Compiler. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask.
AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large water bath. The volume of gas absorbed in a known volume of degassed petroleum was measured direcly using the gas	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask.
AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large water bath. The volume of gas absorbed in a known volume of degassed petroleum was measured direcly using the gas	INFORMATION SOURCE AND FURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask.
AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large water bath. The volume of gas absorbed in a known volume of degassed petroleum was measured direcly using the gas	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask. ESTIMATED ERROR:
AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large water bath. The volume of gas absorbed in a known volume of degassed petroleum was measured direcly using the gas	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask. ESTIMATED ERROR:</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large water bath. The volume of gas absorbed in a known volume of degassed petroleum was measured direcly using the gas	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask. ESTIMATED ERROR:</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The system was thermostated in a large water bath. The volume of gas absorbed in a known volume of degassed petroleum was measured direcly using the gas	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Ethene. No information. (2) Petroleum. Russian petroleum. Cleaned by boiling in a large copper flask. ESTIMATED ERROR:</pre>

COMPONENTS: 1. Ethene; C₂H₄; [74-85-1]

2. Hydrocarbon fuels, crude oils and waxes for pressures greater than 0.20 MPa

March, 1994

#### CRITICAL EVALUATION:

Critical Evaluation for Ethene Solubilities in Hydrocarbon Fuels, Russian

Crude Oils and Waxes for pressures greater than 0.20 MPa

Solubilities of ethene in gasoline and kerosenes were reported by Hannaert et al. (1) for temperatures ranging from 233.15 K to 293.15 K expressed as an exponential function of the equilibrium ratio  $K = y_1/x_1$  in which  $y_1$ , and  $x_1$  are mole fractions in the gas, and liquid phase, respectively. It was possible to calculate mole fractions because the boiling fractions and densities of these hydrocarbons were measured and were associated with certain average molecular weights. In consequence, the results must be of lower accuracy because the true composition was actually unknown. The authors claimed accuracies ranging from 2% to 15%.

Hannaert et al. (1) also reported solubilities of ethene in two types of Carbowax for a range of temperatures from 273.15 K to 353.15 K. As for gasoline and kerosenes, a similar exponential function was used to express the solubility results. Here also, the molecular weights of the Carbowax had been previously determined so that mole fraction solubilities could be determined.

Both results of Hannaert et al. (1) are classified as tentative.

Chou and Chao (2) reported solubilities of ethene in Fischer-Tropsch SASOL wax for pressures ranging from 1.016 MPa to 5.163 MPa and for temperatures 473.2 K and 533.1 K. The results are consistent and obey Henry's law.

These data are classified as tentative.

Safronova and Zhuze (3,4) reported ethene solubilities in three Russian crude oils for three temperatures, 293 K, 323 K and 373 K for pressures to 20 MPa, in the form of modified Bunsen coefficients. In the first paper, published in 1958, some numerical results were reported and in the second paper, published in 1962, only graphical results were reported, for the same crude oils. Densities, viscosities and some analyses of the oils were also given. Even for identical conditions deviations between results were up to 9% from the two sources. Thus, the accuracy is probably of this order.

These data are classified as tentative.

References

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- 1. Hannaert, H.; Haccuria, M.; Mathieu, M.P. Ind. Chim. Belge <u>1967</u>, 32, 156-164.
- 2. Chou, J.S.; Chao, K-C. Ind. Eng. Chem. Res. 1992, 31, 621-623.
- Safronova, T.P.; Zhuze, T.P. Khim. Tekn. Topl. Mas. <u>1958</u>, 3(2), 41-46., or Chem. Abstr. 1958, 52, 8518d.
- 4. Safronova, T.P.; Zhuze, T.P. Neft. Khoz. 1962, 40, 34-47.

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OMPONE			OKIGIA	AL MEASUREMENTS:		
(1) 1	Ethene or ethyle [74-85-1]	ne; C ₂ H ₄ ;		aert, H.; Hacc Mathieu, M. P.		
	Kerosenes; Gasoline.		Ind. 156-1	Chim. Belge <u>1</u> 164.	<u>.967</u> , 32,	
ARIABI	LES:	<u></u>	PREPARI	ED BY:		
	T/K = 233.15 -	293.15		E. L. Booz H. L. Clev		
XPERI	MENTAL VALUES:					
	Temperature Interval of Measurements T/K	Ethene Mol & Range $10^2 x_1/mol$ %	Kπv/atm ¹ at 293.15 K	Enthalpy of Dissolution $\Delta H/kcal mol^{-1}$	Constant	_
	Kerosene A-1					
	233.15-293.15	1 - 2	44	2.65	3.62	
	Kerosene A-2					
	233.15-293.15	1 - 2	44	2.41	4.42	
	Kerosene A-3					
	243.15-293.15	2 - 5	48	2.74	3.73	
	Gasoline					
	243.15-293.15	1 - 3	43	2.42	3.435	
		ions are: $y_1/x_1 = \frac{\text{mole}}{\text{mole}}$	fraction c fraction c	.3R(T/K)) g <u>as in gas pha</u> gas in liquid	se phase,	
	author's definit K = π/at	ions are:	fraction c fraction c ssure,	gas in gas pha gas in liquid	se phase,	
	author's definit K = π/at	ions are: $y_1/x_1 \approx \frac{\text{mole}}{\text{mole}}$ m = total pre coefficient o	fraction c fraction c ssure,	yas in gas pha yas in liquid 7.	se phase,	
The a	author's definit K = π/at	ions are: $y_1/x_1 \approx \frac{\text{mole}}{\text{mole}}$ m = total pre coefficient o AUXIL E:	fraction c fraction c ssure, f fugacity lARY INFORM SOURCE s: (1) F	yas in gas pha yas in liquid 7. ATION AND PURITY OF M Ethene. Air L	ATERIALS:	
The a	author's definit	ions are: $y_1/x_1 = \frac{mole}{mole}$ m = total pre coefficient o AUXIL E: three method A measure o sure of satur ratus which g	fraction c fraction c ssure, f fugacity lARY INFORM SOURCE s: (1) F r f a- ave L f	yas in gas pha yas in liquid 7. ATION AND PURITY OF M Sthene. Air L harcosis, 99.9 Kerosenes and Distillation Range, t/°C	ATERIALS: iquide. For per cent. gasoline. Density ρ ^{2 0} /g cm ⁻³	
The a METHOD The a l.A.	author's definit K = π/at ν = D/APPARATUS/PROCEDUR authors describe [Saturat. n°1]. the static pres tion in an appa	ions are: $y_1/x_1 = \frac{mole}{mole}$ m = total pre coefficient o AUXIL E: three method A measure o sure of satur ratus which g 10 - 15 %. A measure o sure of satur ratus which g	fraction c fraction c ssure, f fugacity IARY INFORM S: (1) F a- ave [ f a- f a- f f a- f f a- f f f f f f f f	yas in gas pha yas in liquid y. ATION AND PURITY OF M Sthene. Air L Narcosis, 99.9 Gerosenes and Distillation	ATERIALS: iquide. For per cent. gasoline. Density	mol v 170 145 192 122
The a METHOD The a l.A.	author's definit K = π/at ν =	ions are: $y_1/x_1 = \frac{mole}{mole}$ m = total pre coefficient o AUXIL E: three method A measure o sure of satur ratus which g 10 - 15 %. A measure o sure of satur ratus which g 2 - 5 %. Gas liquid method	fraction c fraction c ssure, f fugacity IARY INFORM S: (1) F (2) F a- ave f f a- ave Gasol	ATION AND PURITY OF M Chene. Air L harcosis, 99.9 (crosenes and Distillation Range, t/°C A-1 150-280 A-2 150-185 A-3 207-255	ATERIALS: iquide. For per cent. gasoline. Density $\rho^{2^{0}/g}$ cm ⁻³ 0.7805 0.7700 0.784	mol v 170 145 192
The a METHOD The a 1.A. 1.B. 2.	author's definit K = $\pi/at$ v = D/APPARATUS/PROCEDUR authors describe [Saturat. n°1]. the static pres tion in an appa a precision of [Saturat. n°2]. the static pres tion in an appa a precision of [Chromato]. A chromatographic estimated to ha	ions are: $y_1/x_1 = \frac{mole}{mole}$ m = total pre coefficient o AUXIL E: three method A measure o sure of satur ratus which g 10 - 15 %. A measure o sure of satur ratus which g 2 - 5 %. Gas liquid method ve a precisio . Direct gaseous and	fraction c fraction c ssure, f fugacity lARY INFORM s: (1) F f (2) F a- ave Gasol f f a- ave Gasol n The f to a H 2 %	ATION AND PURITY OF M Chene. Air L harcosis, 99.9 (cerosenes and Distillation (ange, t/°C) (-1 150-280 (-2 150-185) (-3 207-255) ine 94-168	ATERIALS: iquide. For per cent. gasoline. Density ρ ²⁰ /g cm ⁻³ 0.7805 0.7700 0.784 0.7521 atm, is equi ant in the f	mol v 170 145 192 122 

					3 <b>4</b> 1
OMPONENTS :			AL MEASUREMENTS:		
(1) Ethene or ethyle [74-85-1]	ene; C ₂ H ₄ ;		aert, H.; Haccun Mathieu, M. P.	ria, M.;	
(2) Carbowaxes; Carbowax 400, Carbowax 350.		Ind. 156-1	Chim. Belge <u>190</u> 164.	<u>57</u> , 32,	
ARIABLES:		PREPAR			
		I KEFAK			257
T/K = 273.15 -	353.15		H.L. Cle	ver	
XPERIMENTAL VALUES:					
Temperature Interval of Measurements T/K	Mol % Range	at	Enthalpy of Dissolution ∆H/kcal mol ⁻¹	Constant A	
Carbowax 400					
273.15-353.15		83	1.69	3.185	
Carbowax 350					
293.15-313.15		81.5	2.66	3.90	
¹ log (Κπν/atm) =	= A - $(\Delta H/cal model)$	$(2.3)^{-1})/2.3$	R(T/K)	······································	
The author's definit					
		mation a	and in one phose		
х —	$y_1/x_1 = \frac{\text{more in}}{\text{mole fr}}$	raction g	as in gas phase as in liquid ph	nase,	
π/at	m = total pres	sure,			
ν =	coefficient of	fugacity			
The function, $K\pi\nu/at$				t in the form	
$H_{1,2}/\text{atm} = (f_1/\text{atm}),$	$a_1$ where $j_1$ is	che ruga	icity.		
	AUXILI	ARY INFORM	ATION		
ÆTHOD/APPARATUS/PROCEDU The authors describe		: (1) E	AND PURITY OF MAD thene. Air Lic arcosis, 99.9 p	uide. For	
	ssure of satura. Tratus which gav	(2) C 7e C	Carbowax. Unior Carbowax. Unior Carbowax 400 mol 00 ± 20.	n Carbide. vcols. Lecular weight	
	sure of satura- ratus which gav	- 3	arbowax 350 mol 50 ± 15.	lecular weight	
2. [Chromato]. A chromatographic estimated to ha of 2 - 5 %.	method	ESTIM	ATED ERROR:		
<ol> <li>[Anal. directe] analysis of the liquid phases.</li> </ol>		REFER	ENCES :		
Method 2 was used fo	or these systems	s <b>.</b>			
		l			

l

COMPONENTS:		ORIG	INAL MEASUREMENTS:
1. Ethene; C ₂ H	H.; [74-85-1]	Chou.	J.S.; Chao, K-C.
-		Ind.	Eng. Chem. Res., <u>1992</u> ,
2. Fischer-Tr	opsch SASOL w	ax 31,	621-623.
VARIABLES:		PREP	ARED BY:
T/K = 473-533	; p/MPa = 1-5	;	C.L. Young
8 9 W IN			. <u> </u>
EXPERIMENTAL VALUE	ç.		
	p/atm	p/MPa	Solubility/mol kg ⁻¹
473.2 (200.0)	10.06	1.016	0.234
••••••	20.12	2.039	0.491
	29.99	3.039	0.746
	39.97	4.050	1.01
<b>FOR 2</b> 4855	49.90	5.056	1.26
533.1 (259.9)		1.017	0.200
	20.12 30.90	2.039	0.416 0.633
	30.90	3.131 4.057	0.833
	50.95	5.163	1.07
			<u>.</u>
	AUX	ILIARY INFOR	MATION
METHOD/APPARATUS/P			MATION CE AND PURITY OF MATERIALS:
METHOD/APPARATUS/P Single pass f passed throug equilibrium c liquid sample pressure relea hydrocarbon c trap and weig volumerically measured with thermocouple a Bourdon gauge	ROCEDURE: low method. G h presaturato ell. At equil s withdrawn, ased, solidif ollected in g hed. Gas esti . Temperature chromel-alum and pressure	as 1. r then ibrium 2. ied lass mated el	······································
Single pass f passed through equilibrium c liquid sample pressure relea hydrocarbon c trap and weigh volumerically measured with	ROCEDURE: low method. G h presaturato ell. At equil s withdrawn, ased, solidif ollected in g hed. Gas esti . Temperature chromel-alum and pressure	as 1. r then ibrium 2. ied lass mated el with	CE AND PURITY OF MATERIALS: Matheson sample, purity at least 99.5 mole %. SASOL wax, av carbon no. 43, av. mol wt 605, 74% paraffins, 14% mono- olefins, 12% oxygenates, % branching 0.05, carbon
Single pass f passed through equilibrium c liquid sample pressure relea hydrocarbon c trap and weigh volumerically measured with thermocouple	ROCEDURE: low method. G h presaturato ell. At equil s withdrawn, ased, solidif ollected in g hed. Gas esti . Temperature chromel-alum and pressure	as 1. r then ibrium 2. ied lass mated el with ESTI REFE	CE AND PURITY OF MATERIALS: Matheson sample, purity at least 99.5 mole %. SASOL wax, av carbon no. 43, av. mol wt 605, 74% paraffins, 14% mono- olefins, 12% oxygenates, % branching 0.05, carbon no range 20-250. MATED ERROR: $\delta T/K = \pm 0.1; \delta p/MPa = \pm 0.05$

									0-	3
COMPONENTS	:			ORIGINAL	MEASUREMEN	rs:				٦
1. Ethe	ne; $C_2 H_4$ ;	[74-85-1]		Safron	ova, T.P.	.; Zhu	ze, T.	Ρ.		
2. Thre	e crude oi	l solvents;		Neft. K	choz. <u>196</u>	2, 40	, 43-4	7.		
some	propertie	s given below	7:							
										1
VARIABLES:	т/к =	293.15 - 373.	15	PREPARED						ر ل ^ـ
	P/MPa =	to 5.07 (50 a	.tm)		W. Ha	ayduk				1 - 1
		· · · · · · · · · · · · · · · · · · ·					•			_
EXPERIMENT	TAL VALUES:	¹ Solubility	Coeffi	-lont. K	/cm ³ et	ana	¹ Ma	vim	100	{
		at S	TP (cm ³	solvent	$(atm)^{-1}$		App	lica	ıble	
t/C	T/K	Solvent I	Solv	ent II	Solver	nt III		essu m (1		
<u></u>								<u> </u>	<del></del>	
20 50	293.15 323.15	3.22 1.15	2. ⁻ 1		1.0				2.53)	
100	373.15	1.00	0.		0.				5.07)	
							e. •	,		
pressur	e. Values	ubilities wer for the lowe	r press	ire regi	on for wh	nich t	he rel	atic	n	
		read from enl o at least 10		caphs by	the comp	piler.	Addi	tior	al	
		of the solvent		nown bel	ow:					1
Solvent	Density,		ion Sol		A		Compo		on	
	g cm °		orized,	*		<u> </u>	Vapor,	<b>9</b>		
		TO 473K F	rom 473	to 573K	То 473		From 4		:0 573	1
<u></u>		TO 473K F	'rom 473		TO 473 A B	sk 📃			:0 573 <u>C</u>	
	0.8530	25	19	to 573K	A B	зк С 11	From 4 	73 t B 21	<u> </u>	
II (	0.8530 0.8494 0.8713			to 573K	A B	3K C 11 1 8.6	From 4 A 52 42	73 t B	C	
II III Solvent	0.8494 0.8713 s: I = Ro	25 18 20 mashkinskaya;	19 23 20 II = S	to 573K	A B 65 24 27 64.4 47 41 kaya; III	3K C 11 4 8.6 12 C = Ne	From 4 A 52 42 43	73 t B 21 41 35	27 17 22	
II III Solvent Fraction	0.8494 0.8713 s: I = Ro ns: A = P	25 18 20 mashkinskaya; araffin; B =	19 $23$ $20$ II = St Naphther	to 573K	A B 65 24 27 64.4 47 41 kaya; II: Aromatic	$ \begin{array}{c} 3K \\ C \\ 11 \\ 4 \\ 8.6 \\ 12 \\ C = Ne \\ C \\ 5 \\ \end{array} $	From 4 A 52 42 43 bitdag	73 t B 21 41 35 skay	27 17 22 7a	
II III Solvent Fraction	0.8494 0.8713 s: I = Ro ns: A = P	25 18 20 mashkinskaya;	19 $23$ $20$ II = St Naphther	to 573K	A B 65 24 27 64.4 47 41 kaya; II: Aromatic	$ \begin{array}{c} 3K \\ C \\ 11 \\ 4 \\ 8.6 \\ 12 \\ C = Ne \\ C \\ 5 \\ \end{array} $	From 4 A 52 42 43 bitdag	73 t B 21 41 35 skay	27 17 22 7a	
II III Solvent Fraction Please	0.8494 0.8713 s: I = Ro ns: A = P	25 18 20 mashkinskaya; araffin; B = bage for (appa	19 23 20 II = S Naphther irently)	to 573K .5 .5 nic; C = same da	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis	3K C 11 4 8.6 12 5 Nec 5 Shed i	From 4 A 52 42 43 bitdag n a di	73 t B 21 41 35 skay	27 17 22 7a	
II Solvent Fraction Please form.	0.8494 0.8713 s: I = Ro ns: A = P see next p	25 18 20 mashkinskaya; paraffin; B = page for (appa A EDURE:	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; II: Aromatic ta publis	3K C 11 4 8.6 12 C = Ne Shed i F MATER	From 4 A 52 42 43 bitdag n a di	73 t B 21 41 35 skay ffen	<u>C</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit	3K C 11 4 8.6 12 C = Ne Shed i F MATER	From 4 A 52 42 43 bitdag n a di	73 t B 21 41 35 skay ffen	<u>C</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified.	3K         C           11         8.6           12         12           C = Ne         2           Shed i         1           F MATER         2           Cy and         2	From 4 A 52 42 43 bitdag n a di HALS: sourc	73 t B 21 41 35 skay ffer e nc	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents. T s must de	3K         C           11         8.6           12         12           1 = Ne         3           Shed i         3           F MATER         3           Cy and         3           Che na         3	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of	73 t B 21 41 35 skay ffen e nc the	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents.	3K         C           11         8.6           12         12           1 = Ne         3           Shed i         3           F MATER         3           Cy and         3           Che na         3	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of	73 t B 21 41 35 skay ffen e nc the	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents. T s must de	3K         C           11         8.6           12         12           1 = Ne         3           Shed i         3           F MATER         3           Cy and         3           Che na         3	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of	73 t B 21 41 35 skay ffen e nc the	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents. T s must de	3K         C           11         8.6           12         12           1 = Ne         3           Shed i         3           F MATER         3           Cy and         3           Che na         3	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of	73 t B 21 41 35 skay ffen e nc the	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents. T s must de rce.	3K         C           11         8.6           12         12           1 = Ne         3           Shed i         3           F MATER         3           Cy and         3           Che na         3	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of	73 t B 21 41 35 skay ffen e nc the	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents. To s must de rce.	The nates igna	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of te the	73 t B 21 41 35 skay ffer the ir	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III Aromatic ta publis DN D PURITY O ene purit cified. vents. T s must de rce.	The nates igna	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of te the	73 t B 21 41 35 skay ffer the ir	<u>c</u> 27 17 22 7a cent	
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II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III: Aromatic ta publis DN D PURITY O ene purit cified. vents. To s must de rce. D ERROR: $K_B = \pm 64$ ES:	3K C 11 4 8.6 12 C = Ne Shed i F MATER Cy and Che national She national Che national Che national She national Che national She	From 4 A 52 42 43 bitdag n a di IALS: sourc mes of te the piler)	73 t B 21 21 41 35 skay ffer e nc the ir	 27 17 22 7a cent ot	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III: Aromatic ta publis DN D PURITY O ene purit cified. vents. To s must der rce. D ERROR: $K_B = \pm 65$ ES: ronova, To	T.P.;	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of te the piler) Zhuze,	73 t B 21 21 41 35 skay ffen the ir T.1	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III: Aromatic ta publis DN D PURITY O ene purit cified. vents. To s must de rce. D ERROR: $K_B = \pm 64$ ES:	T.P.;	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of te the piler) Zhuze,	73 t B 21 21 41 35 skay ffen the ir T.1	<u>c</u> 27 17 22 7a cent	
II Solvent Fraction Please form. METHOD/APP The app	0.8494 0.8713 s: I = Ro ns: A = P see next p PARATUS/PROCT aratus and	25 18 20 mashkinskaya; araffin; B = bage for (appa A EDURE: procedure ar	19 23 20 II = Si Naphthei irently) UXILIARY	to 573K .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	A B 65 24 27 64.4 47 41 kaya; III: Aromatic ta publis DN D PURITY O ene purit cified. vents. To s must der rce. D ERROR: $K_B = \pm 65$ ES: ronova, To	T.P.;	From 4 A 52 42 43 bitdag n a di HALS: sourc mes of te the piler) Zhuze,	73 t B 21 21 41 35 skay ffen the ir T.1	<u>c</u> 27 17 22 7a cent	

COMPONENT		1		ORIGINAL MEASUREMENTS:
(1) Ethene; C ₂ H ₄ ; [74-85-1]			Safronova, T. P.; Zhuze, T. P.	
(2) Petroleum, crude oils.				Khim. i Tekhnol. Topliva i Masel 1958, 3 (2), 41-46.
				Chem. Abstr. <u>1958</u> , 52, 8518d.
VARIABLES	-			PREPARED BY:
T/K = 293 - 373 p/MPa = up to 20.3				H. L. Clever
EXPERIMEN	TAL VALUES:			· · · · · · · · · · · · · · · · · · ·
	Tempe	rature 1	Pressure	Solubility Coefficient
	t/°C	<i>T/</i> K	p/atm	$/cm^3 cm^{-3} atm^{-1}$
	l. Neb gravid centis	y, d <u></u> ²° = (	kchagyli 0.8713,	an layer) crude oil, Specific kinematic viscosity = 8.70
	100	373	25 50 , 100	0.616 0.681 0.792
	2. Rom d ₄ ² =	ashkino o: 0.8530, k:	ilfield inematic	crude oil, Specific gravity, viscosity = 6.54 centistokes.
	100	373	25 50 100	0.760 0.919 1.049
	3. Sur d ₄ ° =	akhany oi 0.8494, k	l field inematic	crude oil, Specific gravity viscosity = 5.19 centistokes.
	100	373	25 50 100 200	0.724 0.709 0.791 0.911
			UXILIARY	INFORMATION
	PARATUS/PROCEDUR		igh	SOURCE AND FURITY OF MATERIALS; (1) Ethene.
pressur paper. Many	e apparatus wa of the data a of Solubility A summary of	s given in re present /cm ³ cm ⁻³	the ed in vs.	<ul> <li>(2) Petroleum crude oils. Three crude oils. Descriptions given above. Additional information on composition in the paper.</li> </ul>
System	Temperatures t/°C	Maximum Pressure p./atm		
1	20, 50, 100	200		ESTIMATED ERROR:
2 3	20, 50, 100 20, 50, 100	160 180		The compiler estimates the data have an uncertainty of 3 to 5 percent.
				REFERENCES :

## SYSTEM INDEX Page numbers preceded by E refer to evaluation texts whereas page numbers not preceded by E refer to compiled tables. Compounds are named as in Chemical Abstracts indexes (toluene appears under Benzene, methyl-). The word "aqueous" or "ternary" in brackets after the solvent name designates that the solvent is in solution with water, or is one component of a multicomponent non-aqueous solvent solution, repectively. E309, 312 Acetamide, N, N-dimethyl-E290, 302-303 E270, 278 Acetic acid, ethenyl ester Acetic acid, methyl ester Acetic acid, trichloro-ethyl ester E253, 269 Acetone see 2-Propanone Acetonitrile E309. 312 Acetylene see Ethyne Amidosulfurous acid, diethylmethyl ester E323, 329 Ammonia E308, 311 Ammonium nitrate see Nitric acid, ammonium salt Aniline see Benzenamine E38, E41, 60, 62 Barium chloride (aqueous) Benzenamine E309, 317 E125, 129-133, E148, 154-158 Benzene E225, 250 Benzene (ternary) Benzene, bromo-E223, 244 E223, 240-243 E150, 165 E126, E149, 163, 166-167 Benzene, chloro Benzene, diethyl Benzene, 1,2-dimethyl-Benzene, 1,2-dimethyl-(ternary) E151, 171 Benzene, 1,3-dimethyl-E126, 138-139, E149, 165, 168 Benzene, 1,3-dimethyl-(ternary) E151, 172 E126, E149, 163, 169 Benzene, 1,4-dimethyl-Benzene, 1,4,-dimethyl-(ternary) E151, 173 E150, 164 Benzene, ethyl Benzene, ethyl-(ternary) E151, 170-173 E126-E127,134-137, E148, 159-162 Benzene, methyl-E150, 145-146, E224, 248 E308, 315, 317-318 E180, 209 Benzene, methyl-(ternary) Benzene, nitro-Benzenemethanol E309, 318 Benzonitrile Benzyl alcohol see Benzenemethanol Blood, dog Blood, human Blood, rabbit E333, 334-335 E333, 335-336 E333, 335 Bromobenzene see Benzene, bromo-Bromochloromethane see Methane, bromochloro-Bromocyclohexane see Cyclohexane, bromo-Butane, 2,2'-dimethyl-E78, 87 E177, E181, 194-196 1-Butanol E181, 210 E290, 307 1-Butanol (ternary) 2-Butanone E63, 68-69 2-Butanone (aqueous) Carbon disulfide E323, 327 Carbon tetrachloride see Methane, tetrachloro-Carbonic acid, dipotassium salt (aqueous) E43, 61 Carbonic acid, disodium salt (aqueous) E42, 58

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