INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

ANALYTICAL CHEMISTRY DIVISION COMMISSION ON SOLUBILITY DATA

## SOLUBILITY DATA SERIES

Volume 7

**OXYGEN AND OZONE** 

## SOLUBILITY DATA SERIES

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# SOLUBILITY DATA SERIES

Volume 7

# OXYGEN AND OZONE

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### FOREWORD

If the knowledge is undigested or simply wrong, more is not better.

How to communicate and disseminate numerical data effectively in chemical science and technology has been a problem of serious and growing concern to IUPAC, the International Union of Pure and Applied Chemistry, for the last two decades. The steadily expanding volume of numerical information, the formulation of new interdisciplinary areas in which chemistry is a partner, and the links between these and existing traditional subdisciplines in chemistry, along with an increasing number of users, have been considered as urgent aspects of the information problem in general, and of the numerical data problem in particular.

Among the several numerical data projects initiated and operated by various IUPAC commissions, the *Solubility Data Project* is probably one of the most ambitious ones. It is concerned with preparing a comprehensive critical compilation of data on solubilities in all physical systems, of gases, liquids and solids. Both the basic and applied branches of almost all scientific disciplines require a knowledge of solubilities as a function of solvent, temperature and pressure. Solubility data are basic to the fundamental understanding of processes relevant to agronomy, biology, chemistry, geology and oceanography, medicine and pharmacology, and metallurgy and materials science. Knowledge of solubility is very frequently of great importance to such diverse practical applications as drug dosage and drug solubility in biological fluids, anesthesiology, corrosion by dissolution of metals, properties of glasses, ceramics, concretes and coatings, phase relations in the formation of minerals and alloys, the deposits of minerals and radioactive fission products from ocean waters, the composition of ground waters, and the requirements of oxygen and other gases in life support systems.

The widespread relevance of solubility data to many branches and disciplines of science, medicine, technology and engineering, and the difficulty of recovering solubility data from the literature, lead to the proliferation of published data in an ever increasing number of scientific and technical primary sources. The sheer volume of data has overcome the capacity of the classical secondary and tertiary services to respond effectively.

While the proportion of secondary services of the review article type is generally increasing due to the rapid growth of all forms of primary literature, the review articles become more limited in scope, more specialized. The disturbing phenomenon is that in some disciplines, certainly in chemistry, authors are reluctant to treat even those limited-inscope reviews exhaustively. There is a trend to preselect the literature, sometimes under the pretext of reducing it to manageable size. The crucial problem with such preselection - as far as numerical data are concerned - is that there is no indication as to whether the material was excluded by design or by a less than thorough literature search. We are equally concerned that most current secondary sources, critical in character as they may be, give scant attention to numerical data.

On the other hand, tertiary sources - handbooks, reference books, and other tabulated and graphical compilations - as they exist today, are comprehensive but, as a rule, uncritical. They usually attempt to cover whole disciplines, thus obviously are superficial in treatment. Since they command a wide market, we believe that their service to advancement of science is at least questionable. Additionally, the change which is taking place in the generation of new and diversified numerical data, and the rate at which this is done, is not reflected in an increased third-level service. The emergence of new tertiary literature sources does not parallel the shift that has occurred in the primary literature.

With the status of current secondary and tertiary services being as briefly stated above, the innovative approach of the *Solubility Data Project* is that its compilation and critical evaluation work involve consolidation and reprocessing services when both activities are based on intellectual and scholarly reworking of information from primary sources. It comprises compact compilation, rationalization and simplification, and the fitting of isolated numerical data into a critically evaluated general framework. The Solubility Data Project has developed a mechanism which involves a number of innovations in exploiting the literature fully, and which contains new elements of a more imaginative approach for transfer of reliable information from primary to secondary/tertiary sources. The fundamental trend of the Solubility Data Project is toward integration of secondary and tertiary services with the objective of producing in-depth critical analysis and evaluation which are characteristic to secondary services, in a scope as broad as conventional tertiary services.

Fundamental to the philosophy of the project is the recognition that the basic element of strength is the active participation of career scientists in it. Consolidating primary data, producing a truly criticallyevaluated set of numerical data, and synthesizing data in a meaningful relationship are demands considered worthy of the efforts of top scientists. Career scientists, who themselves contribute to science by their involvement in active scientific research, are the backbone of the project. The scholarly work is commissioned to recognized authorities, involving a process of careful selection in the best tradition of IUPAC. This selection in turn is the key to the quality of the output. These top experts are expected to view their specific topics dispassionately, paying equal attention to their own contributions and to those of their peers. They digest literature data into a coherent story by weeding out what is wrong from what is believed to be right. To fulfill this task, the evaluator must cover *all* relevant open literature. No reference is excluded by design and every effort is made to detect every bit of relevant primary source. Poor quality or wrong data are mentioned and explicitly disqualified as such. In fact, it is only when the reliable data are presented alongside the unreliable data that proper justice can be done. The user is bound to have incomparably more confidence in a sufficient evaluative commentary and a comprehensive review with a complete bibliography to both good and poor data.

It is the standard practice that any given solute-solvent system consists of two essential parts: I. Critical Evaluation and Recommended Values, and II. Compiled Data Sheets.

The Critical Evaluation part gives the following information: (i) a verbal text of evaluation which discusses the numerical solubility information appearing in the primary sources located in the literature. The evaluation text concerns primarily the quality of data after consideration of the purity of the materials and their characterization, the experimental method employed and the uncertainties in control of physical parameters, the reproducibility of the data, the agreement of the worker's results on accepted test systems with standard values, and finally, the fitting of data, with suitable statistical tests, to mathematical functions; (ii) a set of recommended numerical data. Whenever possible, the set

(ii) a set of recommended numerical data. Whenever possible, the set of recommended data includes weighted average and standard deviations, and a set of smoothing equations derived from the experimental data endorsed by the evaluator;

(iii) a graphical plot of recommended data.

The compilation part consists of data sheets of the best experimental data in the primary literature. Generally speaking, such independent data sheets are given only to the best and endorsed data covering the known range of experimental parameters. Data sheets based on primary sources where the data are of a lower precision are given only when no better data are available. Experimental data with a precision poorer than considered acceptable are reproduced in the form of data sheets when they are the only known data for a particular system. Such data are considered to be still suitable for some applications, and their presence in the compilation should alert researchers to areas that need more work.

The typical data sheet carries the following information:

(1) components - definition of the system - their names, formulas and Chemical Abstracts registry numbers;

(ii) reference to the primary source where the numerical information is reported. In cases when the primary source is a less common periodical or a report document, published though of limited availability, abstract references are also given;

(iii) experimental variables;

(iv) identification of the compiler;

(v) experimental values as they appear in the primary source. Whenever available, the data may be given both in tabular and graphical form. If auxiliary information is available, the experimental data are converted also to SI units by the compiler. Under the general heading of Auxiliary Information, the essential experimental details are summarized:

(vi) experimental method used for the generation of data;

(vii) type of apparatus and procedure employed; (viii) source and purity of materials;

(ix) estimated error;

(x) references relevant to the generation of experimental data as cited in the primary source.

This new approach to numerical data presentation, developed during our four years of existence, has been strongly influenced by the diversity of background of those whom we are supposed to serve. We thus deemed it right to preface the evaluation/compilation sheets in each volume with a detailed discussion of the principles of the accurate determination of relevant solubility data and related thermodynamic information.

Finally, the role of education is more than corollary to the efforts we are seeking. The scientific standards advocated here are necessary to strengthen science and technology, and should be regarded as a major effort in the training and formation of the next generation of scientists and engineers. Specifically, we believe that there is going to be an impact of our project on scientific-communication practices. The quality of consoli-dation adopted by this program offers down-to-earth guidelines, concrete examples which are bound to make primary publication services more respon-sive than ever before to the needs of users. The self-regulatory message to scientists of 15 years ago to refrain from unnecessary publication has not achieved much. The literature is still, in 1980, cluttered with poor-quality articles. The Weinberg report (in "Reader in Science Information", Eds. J. Sherrod and A. Hodina, Microcard Editions Books, Indian Head, Inc., 1973, p.292) states that "admonition to authors to restrain themselves from premature, unnecessary publication can have little effect unless the climate of the entire technical and scholarly community encourages restraint...". We think that projects of this kind translate the climate into operational terms by exerting pressure on authors to avoid submitting low-grade material. The type of our output, we hope, will encourage attention to quality as authors will increasingly realize that their work will not be suited for permanent retrievability unless it meets the standards adopted in this project. It should help to dispel confusion in the minds of many authors of what represents a permanently useful bit of information of an archival value, and what does not.

If we succeed in that aim, even partially, we have then done our share in protecting the scientific community from unwanted and irrelevant, wrong numerical information.

A. S. Kertes

## PREFACE

Oxygen is the "acid former." Oxygen is 49.5% of the crust of the earth, 29.5% of the whole earth, and 0.96% of the universe by weight. Oxygen also forms about 20.94% of the atmosphere by mol per cent, and it is this latter abundance with which we are concerned in this volume. Oxygen from the air dissolves in the oceans, in all natural waters, in any fluids left out in the open or through which air is bubbled, and, of course, oxygen dissolves in biological fluids.

This volume is concerned with the solubility of oxygen (and ozone) in pure liquids, liquid mixtures, aqueous and organic solutions, biological fluids, and some miscellaneous solvents and mixtures. The coverage is on gas/liquid systems at high and low pressures. However, some fluids such as molten salts, alloys, glasses, and slags have been excluded, as well as polymeric materials. The scientific literature starting historically with W. Henry in 1803 has been systematically searched and the coverage should include most articles published through the end of 1980. (The editor would appreciate hearing about articles which were missed.)

This volume contains individual data sheets for each gas/liquid system in the author(s)' own reported units. In those cases where a given system was studied by several authors data sheets were <u>not</u> prepared for papers containing data of poor precision. However, reference is made to omitted papers. Again, for particular systems which have been studied by several authors, a critical evaluation is done of the data and recommended (or tentative) values are presented for that system along with a brief discussion of the contributions. These smoothed values represent our best judgement at this time. Users may use the smoothed values or the raw data in the individual data sheets.

The oxygen/water system has been widely studied by both chemical and physical means. The agreement between the two approaches is quite remarkable and I continue the recommendation made by R. Battino and H. L. Clever (Chem.  $R_{\rm V}$ , 1966, 66, 395-463) to use this system as a reference standard for work in the field. The smoothed values appearing in the critical evaluation section on oxygen/water are currently the best attainable and it is my recommendation that they be used as a reference standard.

For anyone working on data compilations (such as this one) involving solubilities, the principal bugaboo has to be solubility units. In the third edition of Hildebrand and Scott's "Solubility of Nonelectrolytes" they present a table showing the solubility of sulfur  $(S_g)$  at 25°C in benzene and toluene. In weight per cent sulfur is more soluble in benzene; however, in mol per cent or grams per liter sulfur is more soluble in toluene. There are about ten commonly used solubility units for gas solubilities, some of them historical, some in general use, and some specific to a given discipline. In the data sheets we have tabulated the solubilities in the units reported in the original paper. Where feasible the compilers have converted these solubilities to the Ostwald coefficient and/or the mole fraction solubility at 1 atm (101.325 kPa) partial pressure of gas. The conversions were carried out so that users of this volume would find most solubilities reported in a single unit, which could then be used for comparative purposes. Unless otherwise specified the units for the Bunsen coefficients reported herein are  $cm^3(STP)$  cm<sup>-3</sup> atm<sup>-1</sup>.

Although data are reported in the units presented in the original paper, they are also presented in SI in the tables (where feasible), and always in SI in the "VARIABLES" box. With respect to naming components, we have attempted to use IUPAC nomenclature throughout, the Hill system for the formulas, and the unique Chemical Abstracts Registry Numbers for the substances.

Error estimates are always difficult to do. The individual compilers have either made their own estimates or cited those of the authors. In many cases the source and purity of the materials used in the investigations were missing in the original papers. Authors should be aware that such information is useful for other workers and as a means of validating their own work. Sometimes descriptions of procedures and apparatus were sketchy. The compilers have done their best in obtaining this information from articles which were published in other languages than English.

The smoothing equations used have been of the simple two-constant form for data of average precision or of the three-constant form used by Weiss based on the Clarke and Glew approach.

$$\Delta \vec{G}_1^{\circ} / J \mod^{-1} = -RT \ln x_1 = A + BT$$
(1)

or

$$\ln x_{1} = -\Delta \overline{G}_{1}^{\circ} / RT = -(A/R) / T - (B/R)$$
(2)  
or

 $\ln x_1 = A_0 + A_1 / (T/100 \text{ K}) + A_2 \ln (T/100 \text{ K})$ (3)

Using T/100 K as a variable rather than T/K leads to coefficients of similar order of magnitude. The smoothing equations and the thermodynamic functions calculated from them are presented in the "critical evaluation" sections.

Real gas corrections are not necessary for oxygen since the molar volume at STP is 22,393  $\rm cm^3mol^{-1}$  which leads to a correction of 0.09 per cent. Only the data of B. B. Benson and his co-workers are sufficiently precise to require real gas corrections and the reported values were so corrected. The second virial coefficient for oxygen varies smoothly from -45 cm<sup>3</sup> mol<sup>-1</sup> at 200 K to -1.0 cm<sup>3</sup> mol<sup>-1</sup> at 400 K. This converts to correction factors of 0.27 per cent at 200 K to 0.063 per cent at 300 K to 0.003 per cent at 400 K. Again, these corrections are negligible considering the general precision of most of the work reported herein of 0.5 to 2.0 per cent.

In most cases the sorting of systems according to the table of contents was easy. However, for data sheets reporting on solubility in a number of solvents and for some of the "miscellaneous" systems the editor had to make some arbitrary decisions. Common names of solvents are used as well as the systematic names to aid the reader.

The literature search turned up no data for the solubility of oxygen in heavy water, D<sub>2</sub>O. This system should be measured. The reader will also note the paucity of high pressure solubility measurements for oxygen. This is no doubt due to the probability of converting the dissolution vessel into a bomb calorimeter.

The Editor appreciates the advice and suggestions made by members of the IUPAC Commission on Solubility Data, the encouragement of the Chief Editor of this series, the cooperation and hard work of the Evaluators and Compilers, and the efforts of the secretaries and assistants who worked on the project - Marty Tucker, Pauline Shively, B. Ramalingam, Tracy Park, Carolyn Dowie, and Lesley Flanagan.

Acknowledgment is made to the National Bureau of Standards for a grant which supported part of this work.

Rubin Battino

Dayton, OH

## THE SOLUBILITY OF GASES IN LIQUIDS

R. Battino, H. L. Clever and C. L. Young

### INTRODUCTION

The Solubility Data Project aims to make a comprehensive search of the literature for data on the solubility of gases, liquids and solids in liquids. Data of suitable accuracy are compiled into data sheets set out in a uniform format. The data for each system are evaluated and where data of sufficient accuracy are available values recommended and in some cases a smoothing equation suggested to represent the variation of solubility with pressure and/or temperature. A text giving an evaluation and recommended values and the compiled data sheets are published on consecutive pages.

### DEFINITION OF GAS SOLUBILITY

The distinction between vapor-liquid equilibria and the solubility of gases in liquids is arbitrary. It is generally accepted that the equilibrium set up at 300K between a typical gas such as argon and a liquid such as water is gas liquid solubility whereas the equilibrium set up between hexane and cyclohexane at 350K is an example of vapor-liquid equilibrium. However, the distinction between gas-liquid solubility and vapor-liquid equilibrium is often not so clear. The equilibria set up between methane and propane above the critical temperature of methane and below the critical temperature of propane may be classed as vapor-liquid equilibrium or as gas-liquid solubility depending on the particular range of pressure considered and the particular worker concerned.

The difficulty partly stems from our inability to rigorously distinguish between a gas, a vapor, and a liquid, which has been discussed in numerous textbooks. We have taken a fairly liberal view in these volumes and have included systems which may be regarded, by some workers, as vapor-licuid equilibria.

### UNITS AND QUANTITIES

The solubility of gases in liquids is of interest to a wide range of scientific and technological disciplines and not solely to chemistry. Therefore a variety of ways for reporting gas solubility have been used in the primary literature and inevitably sometimes, because of insufficient available information, it has been necessary to use several quantities in the compiled tables. Where possible, the gas solubility has been quoted as a mole fraction of the gaseous component in the liquid phase. The units of pressure used are bar, pascal, millimeters of mercury and atmosphere. Temperatures are reported in Kelvin.

### EVALUATION AND COMPILATION

The solubility of comparatively few systems is known with sufficient accuracy to enable a set of recommended values to be presented. This is true both of the measurement near atmospheric pressure and at high pressures. Although a considerable number of systems have been studied by at least two workers, the range of pressures and/or temperatures is often sufficiently different to make meaningful comparison impossible.

Occasionally, it is not clear why two groups of workers obtained very different sets of results at the same temperature and pressure, although both sets of results were obtained by reliable methods and are internally consistent. In such cases, sometimes an incorrect assessment has been given. There are several examples where two or more sets of data have been classified as tentative although 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 only be regarded as an "informed guess". Many of the 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). For example, it is difficult to determine coexisting liquid and vapor compositions near the critical point of a mixture using some widely used experimental techniques which yield accurate high pressure solubility data. For 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.

It is occasionally possible to evaluate data on mixtures of a given substance with a member of a homologous series by considering all the available data for the given substance with other members of the homologous series. In this study the use of such a technique has been very limited.

The estimated error is often omitted in the original article and sometimes the errors quoted do not cover all the variables. In order to increase the usefulness of the compiled tables estimated errors have been included even when absent from the original article. If the error on any variable has been inserted by the compiler this has been noted.

### PURITY OF MATERIALS

The purity of materials has been quoted in the compiled tables where given in the original publication. The solubility is usually more sensitive to impurities in the gaseous component than to liquid impurities in the liquid component. However, the most important impurities are traces of a gas dissolved in the liquid. Inadequate degassing of the absorbing liquid is probably the most often overlooked serious source of error in gas solubility measurements.

### APPARATUS AND PROCEDURES

In the compiled tables brief mention is made of the apparatus and procedure. There are several reviews on experimental methods of determining gas solubilities and these are given in References 1-7.

### METHODS OF EXPRESSING GAS SOLUBILITIES

Because gas solubilities are important for many different scientific and engineering problems, they have been expressed in a great many ways:

### The Mole Fraction, x(g)

The mole fraction solubility for a binary system is given by:

$$x(g) = \frac{n(g)}{n(g) + n(1)}$$
$$= \frac{W(g)/M(g)}{[W(g)/M(g)] + [W(1)/M(1)]}$$

here n is the number of moles of a substance (an *amount* of substance), W is the mass of a substance, and M is the molecular mass. To be unambiguous, the partial pressure of the gas (or the total pressure) and the temperature of measurement must be specified.

The Weight Per Cent Solubility, wt%

For a binary system this is given by

wt% = 100 W(g) / [W(g) + W(1)]

where W is the weight of substance. As in the case of mole fraction, the pressure (partial or total) and the temperature must be specified. The weight per cent solubility is related to the mole fraction solubility by

$$x(g) = \frac{[wt^{k}/M(g)]}{[wt^{k}/M(g)] + [(100 - wt^{k})/M(1)]}$$

The Weight Solubility, C

The weight solubility is the number of moles of dissolved gas per gram of solvent when the partial pressure of gas is 1 atmosphere. The weight solubility is related to the mole fraction solubility at one atmosphere partial pressure by

x(g) (partial pressure 1 atm) =  $\frac{C_w M(1)}{1 + C_w M(1)}$ 

where M(1) is the molecular weight of the solvent.

## The Moles Per Unit Volume Solubility, n

Often for multicomponent systems the density of the liquid mixture is not known and the solubility is quoted as moles of gas per unit volume of liquid mixture. This is related to the mole fraction solubility by

$$x = \frac{n v^{0}(1)}{1 + n v^{0}(1)}$$

where  $v^{\circ}(1)$  is the molar volume of the liquid component.

### The Bunsen Coefficient, a

The Bunsen coefficient is defined as the volume of gas reduced to 273.15K and 1 atmosphere pressure which is absorbed by unit volume of solvent (at the temperature of measurement) under a partial pressure of 1 atmosphere. If ideal gas behavior and Henry's law is assumed to be obeyed,

$$\alpha = \frac{V(g)}{V(1)} \frac{273.15}{T}$$

where V(g) is the volume of gas absorbed and V(1) is the original (starting) volume of absorbing solvent. The mole fraction solubility x is related to the Bunsen coefficient by

 $x(l atm) = \frac{\alpha}{\alpha + \frac{273.15}{T} \frac{v^{\circ}(g)}{v^{\circ}(l)}}$ 

where  $v^{\circ}(g)$  and  $v^{\circ}(1)$  are the molar volumes of gas and solvent at a pressure of one atmosphere. If the gas is ideal,

$$x = \frac{\alpha}{\alpha + \frac{273.15R}{v^{\circ}(1)}}$$

Real gases do not follow the ideal gas law and it is important to establish the real gas law used for calculating  $\alpha$  in the original publication and to make the necessary adjustments when calculating the mole fraction solubility.

## The Kuenen Coefficient, S

This is the volume of gas, reduced to 273.15K and 1 atmosphere pressure, dissolved at a partial pressure of gas of 1 atmosphere by 1 gram of solvent. The Ostwald Coefficient, L

The Ostwald coefficient, L, is defined at the ratio of the volume of gas absorbed to the volume of the absorbing liquid, all measured at the same temperature:

 $L = \frac{V(g)}{V(1)}$ 

If the gas is ideal and Henry's Law is applicable, the Ostwald coefficient is independent of the partial pressure of the gas. It is necessary, in practice, to state the temperature and total pressure for which the Ostwald coefficient is measured. The mole fraction solubility, x, is related to the Ostwald coefficient by

$$x = \left[ \frac{\mathrm{RT}}{\mathrm{P}(\mathrm{g}) \mathrm{L} \mathrm{v}^{\mathrm{O}}(1)} + 1 \right]^{-1}$$

where P is the partial pressure of gas. The mole fraction solubility will be at a partial pressure of P(g).

The Absorption Coefficient, B

There are several "absorption coefficients", the most commonly used one being defined as the volume of gas, reduced to 273.15K and 1 atmosphere, absorbed per unit volume of liquid when the total pressure is 1 atmosphere.  $\beta$  is related to the Bunsen coefficient by

 $\beta = \alpha(1-P(1))$ 

where P(1) is the partial pressure of the liquid in atmosphere.

The Henry's Law Contant

A generally used formulation of Henry's Law may be expressed as

 $P(g) = K_{u}x$ 

where  $K_{\rm H}$  is the Henry's Law constant and x the mole fraction solubility. Other formulations are

 $P(g) = K_2C(1)$ 

or

 $C(g) = K_C(1)$ 

where  $K_2$  and  $K_c$  are constants, C the concentration, and (1) and (g) refer to the liquid and gas phases. Unfortunately,  $K_H$ ,  $K_2$  and  $K_c$  are all sometimes referred to as Henry's Law constants. Henry's Law is a limiting law but can sometimes be used for converting solubility data from the experimental pressure to a partial gas pressure of 1 atmosphere, provided the mole fraction of the gas in the liquid is small, and that the difference in pressures is small. Great caution must be exercised in using Henry's Law.

The Mole Ratio, N

The mole ratio, N, is defined by

N = n(g)/n(1)

Table 1 contains a presentation of the most commonly used inter-conversions not already discussed.

For gas solubilities greater than about 0.01 mole fraction at a partial pressure of 1 atmosphere there are several additional factors which must be taken into account to unambiguously report gas solubilities. Solution densities or the partial molar volume of gases must be known. Corrections should be made for the possible non-ideality of the gas or the non-applicability of Henry's Law. TABLE 1 Interconversion of parameters used for reporting solubility

$$L = \alpha (T/273.15)$$

$$C_{w} = \alpha/v_{o}\rho$$

$$K_{H} = \frac{17.033 \times 10^{6}\rho(soln)}{\alpha M(1)} + 760$$

$$L = C_{w} v_{t,gas}\rho$$

where v is the molal volume of the gas in cm<sup>3</sup>mol<sup>-1</sup> at 0°C,  $\rho$  the density of the solvent at the temperature of the measurement, $\rho$  (soln)the density of the solution at the temperature of the measurement, and v, gas the molal volume of the gas (cm<sup>3</sup>mol<sup>-1</sup>) at the temperature of the measurement.

### SALT EFFECTS

The effect of a dissolved salt in the solvent on the solubility of a gas is often studied. The activity coefficient of a dissolved gas is a function of the concentration of all solute species (see ref. 8). At a given temperature and pressure the logarithm of the dissolved gas activity coefficient can be represented by a power series in  $C_s$ , the electrolyte concentration, and  $C_i$ , the nonelectrolyte solute gas concentration

$$\log f_{i} = \sum_{m,n} k_{mn} C_{s}^{n} C_{i}^{m}$$

It is usually assumed that only the linear terms are important for low C and C, values when there is negligible chemical interaction between solute species.

$$\log f_i = k_s C_s + k_i C_i$$

where k is the salt effect parameter and k, is the solute-solute gas interaction parameter. The dissolved gas activity is the same in the pure solvent and a salt solution in that solvent for a given partial pressure and temperature

$$a_i = f_i S_i = f_i O S_i O$$
 and  $f_i = f_i O S_i S_i$ 

where S<sub>i</sub> and S<sub>i</sub><sup>O</sup> are the gas solubility in the salt solution and in the pure solvent, respectively, and the f's are the corresponding activity coefficients. If follows that  $\log f_i/f_o = \log S_i^O/S_i = k_s C_s + k_i (S_i - S_i^O)$ . When the

quantity  $(S_i - S_i^{O})$  is small the second term is negligible even though k and k, may be of similar magnitude. This is generally the case for gas solubilities and the equation reduces to

$$\log \frac{f_i}{f_i^o} = \log \frac{s_i^o}{s_i} = k_s C_s$$

which is the form of the empirical Setschenow equation in use since the 1880's. A salt that increases the activity coefficient of the dissolved gas is said to salt-out and a salt that decreases the activity coefficient of the dissolved gas is said to salt-in.

Although salt effect studies have been carried out for many years, there appears to be no common agreement of the units for either the gas solubility or the salt concentration. Both molar (mol dm<sup>-1</sup>) and molal (mol kg<sup>-1</sup>) are used for the salt concentration. The gas solubility ratio  $S_i / S_i$  is given as Bunsen coefficient ratio and Ostwald coefficient ratio,

which would be the same as a molar ratio; Kueunen coefficient ratio, volume dissolved in 1 g or 1 kg of solvent which would be a molal ratio; and mole fraction ratio. Recent theoretical treatments use salt concentration in mol dm<sup>-3</sup> and S<sub>i</sub>  $^{\circ}/S_{i}$  ratio as mole fraction ratio with each salt ion acting as a mole. Evaluations which compare the results of several workers are made in the units most compatible with present theory. TEMPERATURE DEPENDENCE OF GAS SOLUBILITY In a few cases it has been found possible to fit the mole fraction solubility at various temperatures using an equation of the form.  $\ln x = A + B / (T/100K) + C \ln (T/100K) + DT/100K$ It is then possible to write the thermodynamic functions  $\Delta \overline{G}_1^0, \Delta \overline{H}_1^0, \Delta \overline{S}_1^0$  and  $\Delta \overline{C}_{p_1}^0$  for the transfer of the gas from the vapor phase at 101.325 Pa partial pressure to the (hypothetical) solution phase of unit mole fraction as:  $\Delta \overline{G}_1^0 = -RAT - 100 RB - RCT ln (T/100)$  $\Delta \overline{S}_{1}^{0} = RA + RC \ln (T/100) + RC$  $\Delta \overline{H}_{1}^{0} = -100 \text{ RB} + \text{RCT}$ p1<sup>=</sup> ۵ǰ RC In cases where there are solubilities at only a few temperatures it is convenient to use the simpler equations.  $\Delta \overline{G}_{1}^{0} = - RT \ln x = A + BT$ in which case  $A = \Delta \overline{H}^{\circ}_{1}$  and  $-B = \Delta \overline{S}^{\circ}_{1}$ . REFERENCES Battino, R.; Clever, H.L. Chem. Rev. 1966, 66, 395. Clever, H.L.; Battino, R. in Solutions and Solubilities, Ed. M.R.J. 2. Dack, J. Wiley & Sons, New York, 1975, Chapter 7. Hildebrand, J.H.; Prausnitz, J.M.; Scott, R.L. Regular and Related 3. Solutions, Van Nostrand Reinhold, New York, 1970, Chapter 8. Markham, A.E.; Kobe, K.A. Chem. Rev. 1941, 63, 449. Wilhelm, E.; Battino, R. Chem. Rev. 1973, 73, 1. Wilhelm, E.; Battino, R.; Wilcock, R.J. Chem. Rev. 1977, 77, 219. Kertes, A.S.; Levy, O.; Markovits, G.Y. in Experimental Thermochemistry Vol. II, Ed. B. Vodar and B. LeNaindre, Butterworth, London, 1974, Chapter 15. 4. 5. 6. 7. 8. Long, F.A.: McDevit, W.F. Chem. Rev. 1952, 51, 119.

Water
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COMPONENTS:	EVALUATOR:
<pre>(1) Oxygen; 0<sub>2</sub>; [7782-44-7] (2) Water; H<sub>2</sub>O; [7732-18-5]</pre>	Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 U.S.A.

CRITICAL EVALUATION:

The solubility of oxygen in water at atmospheric pressure has probably been the most intensively studied gas solubility system. The work started with the early and crude measurements of Bunsen in 1855 and extends to the high precision measurements of Benson, Krause, and Peterson in 1979. The solubility may be determined by strictly physical means such as measuring P, V, and T, by chemical means via some version of the Winkler method, by gas chromatography, and via electrochemical methods using some version of the Clark electrode and polarography. The correspondence between the several approaches is surprisingly good.

Since this system is of such interest to oceanographers and biologists and biochemists and limnologists and sanitary engineers and physical chemists (to name a few!), I will be presenting two sets of recommended values. The first set covers the temperature range 273 to 348K and is a smoothed composite of the work in some fifteen papers. The second set covers the range 273 to 333K and is the smoothed values of Benson, Krause, and Peterson. (Details follow.) The agreement on these solubility values to a precision of about  $\pm 0.2$  per cent leads me to recommend that the Benson, Krause, and Peterson smoothed values be taken as standard for comparison and that all workers in the field test their apparatus and methods against them, particularly the 298.15K mole fraction solubility at 101.325kPa partial pressure of gas of  $2.301 \times 10^{-5}$ . This value is 0.17 per cent higher than the smoothed value recommended in the review by Wilhelm, Wilcock, and Battino (1) and 0.30 per cent higher than the value recommended in the earlier review by Battino and Clever (2). Thus, it would be safe to state that the recommended values are reliable to at least  $\pm 0.30$  per cent.

Over forty papers with data on the O<sub>2</sub>/H<sub>2</sub>O system were screened - of these some twenty-five were considered to contain data of sufficient accuracy (comparing them against the smoothed valued in reference 1) to attempt smoothing as a group. After many trials and rejecting the papers containing points about two standard deviations beyond the smoothed line, a group of fifteen papers remained which used a variety of approaches to the measurements. The 149 points used in the smoothing were obtained as follows (reference - number of data points used from that reference): 3-21, 4-37, 5-26, 6-14, 7-2, 8-15, 9-1, 10-3, 11-14, 12-1, 13-1, 14-1, 15-8, 16-3, 17-2. The fitting equation used was

$$\ln x_1 = A + B/(T/100K) + C \ln (T/100K)$$
(1)

By using T/100K as the variable the coefficients were all of the same order of magnitude. Increasing the order of fit to four and five constants did not improve the fit at all. The best fit for the 149 points gave

 $\ln x_1 = -66.73538 + 87.47547/(T/100K) + 24.45264 \ln (T/100K)$ (2)

where  $x_1$  is the mole fraction solubility at 101.325 kPa partial pressure of gas. The standard deviation of the fit in  $x_1$  was  $\pm 0.72 \times 10^{-7}$  for a per cent deviation of  $\pm 0.36$  per cent at the middle of the temperature range of 273 to 348K. Table 1 gives smoothed values of the mole fraction at 101.325 kPa partial pressure of gas and the Ostwald coefficient at 5K intervals.

Table 1 also gives the thermodynamic functions  $\Delta \overline{G_1^\circ}$ ,  $\Delta \overline{H_1^\circ}$ , and  $\Delta \overline{S_1^\circ}$ , for the transfer of gas from the vapor phase at 101.325 kPa partial pressure to the (hypothetical) solution phase of unit mole fraction. These thermodynamic properties were calculated from the smoothing equation according to the following equations:

 $\Delta \overline{G}_{1}^{\circ} = -RAT - 100RB - RCT \ln(T/100)$ (3)  $\Delta \overline{S}_{1}^{\circ} = RA + RC \ln(T/100) + RC$ (4) continued on following page

COMPONENTS: EVALUATOR: (1)Oxygen; 02; [7782-44-7] Rubin Battino Department of Chemistry (2) Water; H<sub>2</sub>O; [7732-18-5] Wright State University Dayton, OH 45435 U.S.A. CRITICAL EVALUATION: continued  $\Delta \overline{H}_1^\circ = -100 \text{RB} + \text{RCT}$ (5)  $\Delta C_{p_1}^{\circ} = RC$ (6) The  $\Delta \overline{C}_{p_1}^{\circ}$  value was constant at 203 J mol<sup>-1</sup>K<sup>-1</sup>. TABLE 1. Smoothed values of the solubility of oxygen in water, and thermodynamic functions at 5K intervals using equation 2 at 101.325 kPa partial pressure of gas  $\Delta \overline{S}_{1}^{\prime} / J_{MO1}^{-1} K^{-1}$ т/к 273.15 23.02 3.949 4.913 -17.20 -147.3 278.15 3.460 4.384 23.75 -16.18 -143.6 24.46 283.15 -15.16 3.070 3.958 -139.9 288.15 2.756 3.614 25.15 -14.15 -136.4 25.93 -13.13 293.15 2.501 3.333 -132.9 -12.11 298.15 2.293 3.104 26.48 -129.5 303.15 2.918 27.12 -11.10 2.122 -126.1 -10.08 308.15 1.982 2,766 27.74 -122.7 - 9.06 313.15 1.867 2.643 28.35 -119.5 - 8.05 - 7:03 2.545 28.94 -116.3 318.15 1.773 333.15 1.697 2.468 29.51 -113.1 - 6.01 30.07 -110.0 328.15 1.635 2.409 333.15 1.586 2.367 30.61 - 5.00 -106.9 - 3.98 -103.9 1.549 2.339 31.14 338.15 - 2.97 - 1.95 343.15 1.521 2.325 31.65 -100.9 348.15 1.502 2.323 32.15 - 97.9 а Mole fraction solubility at 101.325 kPa partial pressure of gas. b Ostwald coefficient. Benson, Krause, and Peterson (4) studied the solubility of oxygen in water and attained an unprecedented precision in their work. If we fit their 37 data points using equation (1) we get  $\ln x_1 = -64.21517 + 83.91236/(T/100K) + 23.24323 \ln(T/100K)$ (7) This is for the temperature range 273 to 333 K and it fits the data with a standard deviation in  $x_1$  of ±0.36 x  $10^{-7}$  or ±0.17 per cent at the midpoint. However, the authors chose to fit their data to the following equation  $\ln k = 3.71814 + 5.59617 \times 10^3 / (T/K) - 1.049668 \times 10^6 / (T/K)^2$ (8) where the fugacity  $f = k x_1$  and k is the Henry coefficient. They recommend this equation over the 273 to 373 K range. For unit fugacity the mole fraction solubilities calculated from this equation are given in Table 2 at 5 K intervals. The standard deviation of the fit to this equation is  $\pm 0.017$  per cent. If equation 8 is written in the general form of  $\ln k = a_0 + a_1/(T/K) + a_2/(T/K)^2$ (9) then the thermodynamic functions are given by:  $\Delta \overline{G}_{1}^{\circ} = R [a_{0}(T/K) + a_{1} + a_{2}/(T/K)]$ (10)

continued on following page

COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> [7782-44-7] (2) Water; H <sub>2</sub> O; [7732-18-5]	Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 U.S.A.

CRITICAL EVALUATION:

continued

 $\Delta \overline{H}_{1}^{\circ} = R \quad a_{1} + 2a_{2}/(T/K)$  $\Delta \overline{S}_{1}^{\circ} = R \quad -a_{0} + a_{2}/(T/K)^{2}$  $\Delta \overline{C} p_{1}^{\circ} = -2 R a_{2}/(T/K)^{2}$ 

The values calculated from these equations differ little from those presented in Table 1 except, of course, for the heat capacity. Equation 13 predicts a temperature dependence which equation 6 does not.

TABLE 2. Smoothed values of the solubility of oxygen in water using equation 8 at 5K intervals and at unit fugacity

т/к	10 <sup>5</sup> x1 <sup>a</sup>	т/к	10 <sup>5</sup> x1 <sup>a</sup>	т/к	10 <sup>5</sup> ×1	
273.15	3.9583	308.15	1.9906	343.15	1.4930	<u></u>
278.15	3.4655	313.15	1.8743	348.15	1.4634	
283.15	3.0747	318.15	1.7776	353.15	1.4403	
288.15	2.7614	323.15	1.6973	358.15	1.4230	
293.15	2.5078	328.15	1.6305	363.15	1.4107	
298.15	2.3009	333.15	1.5753	368.15	1.4031	
303.15	2.1310	338.15	1.5299	373.15	1.3996	

<sup>a</sup> Mole fraction solubility at unit fugacity.

Benson, et al. (4) also analyzed the high-pressure data of Stephan, et al. (18) and calculated Henry coefficients from this data. Benson, et al., fit the Stephan, et al., data with their own and obtained equation 14 which they recommend for values above 373K. The Stephan, et al., data was

$$\ln k = -4.1741 + 1.3104 \times 10^{4} / (T/K) - 3.4170 \times 10^{6} / (T/K)^{2} + 2.4749 \times 10^{8} / (T/K)^{3}$$

fit to  $\pm 2.0$  per cent which was within their experimental error. Table 3 contains the mole fraction solubilities calculated using equation 14 in the temperature range 373 to 563K.

TABLE 3. Smoothed values of the mole fraction solubility of oxygen in water úsing equation 14 at 5K intervals and 101.325 kPa partial pressure of gas.

Т/К	10 <sup>5</sup> ×1	т/К	10 <sup>5</sup> ×1	T/K	10 <sup>5</sup> ×1	
373.15 378.15 383.15 388.15 393.15 398.15 403.15 408.15 413.15 418.15 423.15 428.15 433.15	1.414 1.423 1.437 1.455 1.478 1.505 1.537 1.573 1.614 1.659 1.710 1.765 1.824	438.15 443.15 448.15 453.15 458.15 463.15 463.15 468.15 473.15 478.15 483.15 488.15 493.15	1.889 1.960 2.036 2.117 2.205 2.298 2.399 2.506 2.620 2.742 2.871 3.009 3.156	503.15 508.15 513.15 518.15 523.15 528.15 533.15 538.15 543.15 543.15 553.15 558.15 563.15	3.312 3.477 3.653 3.839 4.036 4.245 4.467 4.701 4.949 4.701 5.488 5.781 6.090	

3

(14)

Uxygen Solubilit	ies up to 200 kPa
COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Rubin Battino
(2) Water; H <sub>2</sub> O; [7732-18-5]	Department of Chemistry Wright State University
	Dayton, OH 45435 U.S.A.
CRITICAL EVALUATION:	
continu	ed
Ten references (19-28) contained historical interest to have had data did not meet the overall requirements fifteen used for the initial smoothin	of being included in the group of
For completeness of coverage I a other work (29-50), most of which was papers, for example, are of historic erratically 10-20 per cent off from m Klots and Benson paper (51) contains solubilities in water. The heavier i about 0.08 per cent.	of much poorer precision. Bunsen's interest, but his values are odern measurements. Finally, the data for the ratio of <sup>32</sup> 0, to <sup>34</sup> 0,
References	
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<u>1961, 85. 81-6.</u> 24. Müller, C. Z. Physik. Chem. <u>1912</u>	,81 , 483-503.
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l neld at Udense Iniversity. Venman	s of a <del>n In</del> terdisciplinary Symposium ck, 26-27 Sept. 1974, Ed. H. Degn., cientific Publishing Co. Amsterdam
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continued on following page

Water

COMPONENTS :	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Water; H <sub>2</sub> O; [7732-18-5]	Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 U.S.A.
CRITICAL EVALUATION:	
con	tinued
<ul> <li>1957, 61, 1078-82.</li> <li>37. Liss, P.S.; Slater, P.G. Nature</li> <li>38. Maharajh, D.M.; Walkley, J. Natu</li> <li>39. Morrison, T.J.; Billett, F. J. (40. Orcutt, F.S.; Seevers, M.H. J.</li> <li>41. Pogrebnaya, V.L.; Usov, A.P.; Ba</li> <li>1972, 17, 344-5.</li> <li>42. Pospisil, J.; Luzny, Z. Coll. C:</li> <li>43. Schwab, G.M.; Berninger, E. Z.</li> <li>44. Shoor, S.K. Ph.D. thesis, Unive</li> </ul>	233-6. <u>1906</u> , 55, 622-34. pr, J.H.; Gross, P.M. J. Phys. Chem. Phys. <u>1972</u> , 238, 64. tre (London) <u>1972</u> , 236, 165. Chem. Soc. <u>1948</u> , 2033-5. Biol. Chem. <u>1937</u> , 117, 501-7. Hranov, A.V. Zh. Vses. Khim. Obshchest. Pech. Chem. Commun. <u>1960</u> , 25, 589-92. Physik. Chem. <u>1928</u> , A138, 55-74. rs ity of Florida, <u>1968</u> . ns, K.E. J. Phys. Chem. <u>1969</u> , 78 3-54. 4-74. 22-10. 892, 9, 171-5.

COMPONENTS :	ODT OTVILL 100 LOUDELEDUTE
COMPONENTS:	ORIGINAL MEASUREMENTS:
	Timofeev, W.
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Z. Physik. Chem. <u>1890</u> , 6, 141-52.
(2) Water; H <sub>2</sub> 0; [7732-18-5]	2. Thysee. chem. <u>1050</u> , 0, 141 52.
2	
VARIABLES:	PREPARED BY:
T/K = 279-286	
P/kPa = 101.325	R. Battino
EXPERIMENTAL VALUES:	_
$T/K^{a}$ 10 <sup>5</sup> x <sub>1</sub> <sup>b</sup> 10	$10^2 L^{c}$ $10^2 \alpha^{d}$
279.55 3.328 4	4.1408
285.72 2.896 3	3.767 3.6011
	J. 0011
2	
<sup>a</sup> Temperature reported to 0.1°C.	
b	
<sup>b</sup> Mole fraction solubility at 101.32 gas. Calculated by compiler.	25 kPa (latm) partial pressure of
gas. Calculated by compiler.	
<sup>C</sup> Ostwald coefficient calculated by	compiler.
<sup>d</sup> Bunsen coefficient.	
- Bunsen coefficient.	
	,
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
Used a Bunsen absorption apparatus	
as modified by Ostwald. Basically,	No details given.
a manometric/volumetric apparatus.	
Details and a drawing are given in	
the paper.	
	ESTIMATED ERROR:
	$\delta \alpha / \alpha = \pm 0.01$ , estimate by compiler.
	REFERENCES:
8	

Water				
COMPONENTS :	ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Geffcken, G.			
(2) Water; H <sub>2</sub> O; [7732-18-5]	Z. Physik. Chem. <u>1904</u> , 49, 257-302.			
VARIABLES: T/K = 298 - 298	PREPARED BY:			
P/kPa = 101.325 (1 atm)	R. Battino			
EXPERIMENTAL VALUES:				
T/K <sup>a</sup> 10 <sup>5</sup>	x <sub>1</sub> b 10 <sup>2</sup> L <sup>C</sup>			
288.15 2.	768 3.630 <sup>d</sup>			
298.15 2.	275 3.080 <sup>e</sup>			
a Temperature reported as 15 and 25	°C.			
<sup>b</sup> Mole fraction solubility at 101.3 gas. Calculated by compiler.	25 kPa (l atm) partial pressure of			
<sup>C</sup> Ostwald coefficient.				
d Average of the following values ( 3.618, 3.643, 3.618.	10 <sup>2</sup> L): 3.639, 3.640, 3.619, 3.635,			
<sup>e</sup> Average of the following values ( 3.081, 3.081, 3.091. (Average is reported 3.080.)	19 <sup>2</sup> L): 3.096, 3.074, 3.096, 3.087, 3.088, although the author			
AIIXTLIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The design of Ostwald was used. The critical gas burets and a absorption vessel were thermo- statted. A manometric/volumetric procedure. Details and a drawing given in the original paper.	<ul> <li>(1) Prepared from heating pure KC103 and MnO2. Washed in dilute KOH and dried over concentrated H2S04.</li> <li>(2) No comment by author.</li> </ul>			
	ESTIMATED ERROR: $\delta L/L = \pm 0.01$ , estimate by compiler.			
	REFERENCES :			

	ORIGINAL MEASUREMENTS:	
; [7782-44-77]	Fox, C.J.J.	
; [7732-18-5]	Trans. Faraday So	c. <u>1909</u> , 5, 68 <b>-8</b> 7.
	PREPARED BY:	
16	R. Battino	
:		<u></u>
Mole Fraction <sup>b</sup> Ostw 10 <sup>5</sup> x1	ald Coefficient <sup>C</sup> B 10 <sup>2</sup> L	unsen Coefficient <sup>d</sup> $10^{2}\alpha$
3.907 3.873 3.422 3.422 3.035 3.036 2.733 2.752 2.500 2.489 2.296 2.300 2.034 2.032 1.993 1.993 1.889 1.889 1.887 1.782 1.778 1.699 1.699	4.872 4.832 4.344 4.345 3.925 3.927 3.591 3.616 3.341 3.326 3.118 3.123 2.805 2.803 2.785 2.786 2.674 2.672 2.559 2.553 2.472 2.472 continued on	4.861 4.818 4.258 3.775 3.776 3.397 3.421 3.105 3.091 2.847 2.852 2.519 2.517 2.465 2.465 2.332 2.330 2.195 2.190 2.088 2.088 following page
AUXILIARY	INFORMATION	<u> </u>
······		ATERIALS
termined by weighing. introduced from a flask shaken and a of the volume of	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.004$ est REFERENCES:	eating KMnO <sub>4</sub> in then passing ime and P <sub>2</sub> O <sub>5</sub> . imated by compiler. <i>Z. Physik. Chem.</i>
	<pre>i; [7732-18-5]  l6  i Mole Fraction<sup>b</sup> Ostw l0<sup>5</sup>x1</pre>	; $[7782-44-77]$ ; $[7732-18-5]$ PREPARED BY: 16 PREPARED BY: 16 PREPARED BY: 16 PREPARED BY: 16 PREPARED BY: 16 R. Battino PREPARED BY: 10 <sup>2</sup> L 3.907 4.872 3.073 4.832 3.422 4.344 3.422 4.345 3.035 3.925 3.036 2.752 3.036 2.752 3.036 2.752 3.616 2.500 3.341 2.489 3.326 2.296 3.118 2.300 1.23 2.034 2.805 2.032 1.993 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.993 2.785 1.699 2.472 1.699 2.472 Continued on AUXILIARY INFORMATION OCEDURE: m of the Estreicher was used. Diagram given in paper. The sed by boiling using system. The quantity termined by weighing. introduced from a flask shaken and a of the volume of s made after there are manometer is used to at different veral readings at eratures are taken on the absorption $\delta a/a = \pm 0.004$ est REFERENCES: 1. Estreicher, T.

## Water

		VVGLGI	
COMPONENTS:		ORIGINAL MEASU	REMENTS:
(1) Oxygen;	0 <sub>2</sub> ; [7782-44-77]	Fox, C.J.J.	
<pre>(2) Water;</pre>	н <sub>2</sub> 0; [7732-18-5]	Trans. Faraday	Soc. 1909, 5, 68-87.
		continued	
	h		
т/к <sup>а</sup>	Mole Fraction <sup>b</sup> 10 <sup>5</sup> x <sub>1</sub>	Ostwald Coefficient <sup>C</sup> 10 <sup>2</sup> L	Bunsen Coefficient <sup>d</sup> 10 <sup>2</sup> α
274.78 <sup>e</sup>	3.799	4.755	4.727
275.33 279.35	3.726 3.367	4.673 4.284	4.636 4.189
279.75 282.68	3.342	4.258 4.011	4.158
282.76	3.116 3.116	4.012	3.876 3.876
286.80	2.855	3.727	3.550
286.90 289.87	2.844 2.691	3.714 3.549	3.536 3.344
289.90	2.680	3.534	3.330
296.95	2.391	3.226	2.967
297.05 303.01	2.383 2.140	3.216 2.941	2.957 2.651
303.03	2.147	2.951	2.660
310.66	1.950	2.740	2.409
310.69 316.40	1.947 1.818	2.737 2.596	2.406 2.241
316.44	1.817	2.595	2.240
<ul> <li>b Mole fract calculated</li> <li>C Ostwald cond Bunsen coe</li> <li>e Second ser</li> <li>f Smoothing 1000 α with t</li> </ul>	by compiler. efficients calculate fficients reported i ies of measurements equation of author o = 49.239 - 1.3440t + in °C. o determined the sol	Dl.325 kPa (l atm) par ed by compiler. in original paper.	024 t <sup>3</sup>

COMPONENTS :			ORIGINAL MEASUR	EMENTS:	
(1) Oxyge	n; 0 <sub>2</sub> ; [7782	-44-7]	Bohr, C.		
(2) Water	; H <sub>2</sub> O; [7732	-18-5]	Z. Physik.	Chem. <u>1910</u> , 71	, 47-50.
VARIABLES: T/K =	204		PREPARED BY:		
P/kPa =			R. Battino		
EXPERIMENTAL	VALUES:		L		
	т/к <sup>а</sup>	10 <sup>5</sup> x <sub>1</sub> <sup>b</sup>	10 <sup>2</sup> L <sup>C</sup>	10 <sup>2</sup> a <sup>d</sup>	
	294.15	2.480	3.316	3.079	
<sup>b</sup> Mole fr gas cal <sup>c</sup> Ostwald	culated by c	ility at 101.32 ompiler. calculated by		partial pressu	re of
		AUXILIARY	INFORMATION		
METHOD/APPARA	TUS/PROCEDURE:	······································	SOURCE AND PURI	TY OF MATERIALS:	
is descri Paper als	bed in refer	lubilities in	No details	given.	
			ESTIMATED ERROR	{:	
			$\delta \alpha / \alpha = \pm 0.0$	1, estimate by a	author.
			REFERENCES:		
			Blutfarb Jolin, A	Sauerstoffaufn stoffes. Kopen rchiv f. (Anat. gie <u>1889</u> , 265.	ahme des hagen <u>1895</u> . u.)

Wa	ter
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Wa	iter	11
COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Müller, C.	
(2) Water; H <sub>2</sub> O; [7732-18-5]	Z. Physik. Chem. <u>1912</u> , 81, 483-503.	
VARIABLES:	PREPARED BY:	
T/K = 288-289	R. Battino	
P/kPa = 101.325		
EXPERIMENTAL VALUES:		
Mole Fraction <sup>b</sup> T/K <sup>a</sup> 10 <sup>5</sup> x <sub>1</sub>	Ostwald Coeff. <sup>C</sup> Bunsen Coeff. <sup>d</sup> $10^{2}L$ $10^{2}\alpha$	
288.45 2.715	3.564 3.375	
289.35 3.528	3.528 3.330	
<sup>C</sup> Ostwald coefficient calculated by <sup>d</sup> Bunsen coefficient.	Compilei.	
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is real on the volume and all liquid volumes were calibrated with mercury. Original paper contains details and a drawing. Solubilities also reported in sucrose, d-glucose,	<ul> <li>(1) From the heating of KMnO<sub>4</sub> and washed in concentrated KOH solution.</li> <li>(2) No comment by author.</li> </ul>	
chloral hydrate, and glycerol aqueous solutions.	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.01$ , estimate by compiler	•
	REFERENCES :	

COMPONENTS :			ORIGINAL MEASU	UREMENTS :		
(1) Oxygen	; 0 <sub>2</sub> ; [7782-4	44-7]	Adeney, W. E.; Becker, H. G.			
(2) Water; H <sub>2</sub> O; [7732-18-5]			Royal Dublin Soc. Scientific Pro. <u>1919</u> , 15, 609-28.			
VARIABLES:			PREPARED BY:			
T/K = 276-3	08		R. Batti	ino		
EXPERIMENTAL VA	LURC.					
EXPERIMENTAL VA	TOF2:					
t/°C	т <sup>а</sup> /к	10 <sup>5</sup> ×1 <sup>a,b</sup>	10 <sup>2</sup> L <sup>a,c</sup>	$10^2 \alpha^d / \text{cm}^3 (\text{STP}) \text{cm}^{-3} \text{atm}^{-1}$		
2.5	275.7	3.529	4.431	4.390		
8.8	282.0	2.982	3.830	3.710		
15.5	288.7	2.580	3.389	3.206		
20.2	293.4	2.379	3.174	2.955		
25.2	298.4	2.203	2.985	2.732		
30.3	303.5	1.990	2.739	2.465		
35.1	308.3	1.835	2.562	2.270		
	<u> </u>	AUXILIARY	INFORMATION			
METHOD/APPARATU	IS / PROCEDURE :		SOURCE AND PUL	RITY OF MATERIALS:		
	c system usin rets was used		perman	ed from heating potassium aganate and washing the th caustic potash.		
			(2) Distil	led.		
			ESTIMATED ERR	OR:		
			$\begin{array}{rcl} \delta \alpha / \alpha &=& \pm 0  . \\ \delta T / K &=& \pm 0  . \end{array}$	02, compiler's estimate. 1		
			REFERENCES :	······································		
			L			

COMPONENTS :		ORIGINAL MEASUREMENTS:
	[7782-44-7]	Livingston, J.; Morgan, R.; Richardson, A.H.
(2) Water; H <sub>2</sub> O;	[7732-13-5]	J. Phys. Chem. <u>1930</u> , 34, 2356-66.
VARIABLES:		PREPARED BY:
T/K = 298		R. Battino
P/kPa = 23 - 101	-	
EXPERIMENTAL VALUES:		
t/°	°С т <sup>а</sup> /к 10 <sup>5</sup>	$x_1^{a,b}$ $10^2 L^{a,c}$ q'd
25	5 298 2	.304 3.120 0.04080
l l	Calculated by compil	er.
b	Mole fraction solubi pressure of gas.	lity at 101.325 kPa partial
с	Ostwald coefficient.	
	at 25°C and a partia	orbed by 1000 cm <sup>3</sup> of solvent 1 pressure of 760 mm Hg. asurements at slightly vary- near 760 mm Hg.
	P <sub>O2</sub> /mmHq 10	$2_{q}^{a}$ $10^{2}L^{b}$
	202.2       1         240.7       1         242.5       1	.95 3.158 .07 3.073 .28 3.088 .28 3.065 .50 3.103 continued on following page
	······································	
		INFORMATION
METHOD /APPARATUS / PROC	EDURE :	SOURCE AND PURITY OF MATERIALS:
oxygen. Details paper. For the measurements the	mount of dissolved are given in the hydrostatic pressure e equilibration a pressure due to	No details given.
		ESTIMATED ERROR: δq'/q' = ±0.003, authors' estimate. REFERENCES:

PONENTS	5:				ORIGINA	AL MEASUR	EMENTS	5:	
(1) 02	xygen; O	2; [7	782-44-7]			ston, J.;		an, R.;	
(2) Wa	ater; H <sub>2</sub>	0; [7	732-18-5]			hardson,			
	2				J. Phy	s. Chem.	<u>1930</u> ,	34, 2356	-66.
	•• • • • •							<u></u>	
				conti					
			P <sub>O2</sub> /mm Hq	10 <sup>2</sup> q	a	10 <sup>2</sup> L <sup>b</sup>			
			- 2						
			300.3 349.0	1.6		3.094 3.062			
			364.1	1.9	6 :	3.126		-	
			396.1 413.7	2.1		3.079 3.088			
			433.3	2.2	7 :	3.042			
			440.5 446.7	2.3		3.072			
			458.3	2.4	-	3.055 3.079			
			478.1	2.5	4 :	3.085			
			504.8 511.4	2.6		3.049 3.107			
			539.7	2.8		3.045			
			559.3 577.7	2.9		3.063			
			610.2	3.2		3.046 3.093			
			614.6	3.2	7 3	3.090			
			639.7 649.2	3.3		3.059 3.059			
			738.7	3.8	7 3	3.042			
a	Grams of		738.7 741.1 741.1 gen/1000 cm <sup>3</sup>	3.94 3.93 solver	a sint at the	3.087 3.080 	press	sure of g	as
h	indicate	eđ.	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca	3.94 3.93 solver ments at	at at the 25°C (2 ed from	3.087 3.080 e partial 298 K).	press	sure of g	as
h	indicate	eđ.	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca	3.94 3.93 solver ments at	4 3 nt at the 25°C (2	3.087 3.080 e partial 298 K).	press	sure of g	as
h	indicate Ostwald	eđ.	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca	3.94 $3.92$ solver ents at $1culate$ $x 298$ $20 x 27$	$\begin{array}{c} \text{at at the 25°C (2)}\\ \text{at at the 25°C (2)}\\ \text{at from }\\ \frac{x 760 x}{73 x P_{O_2}} \end{array}$	3.087 3.080 e partial 298 K).			as
b t/° 15.	indicate Ostwald <sup>9</sup> C T <sup>6</sup> 2 288	ed. coef <sup>1</sup> /K	$738.7$ $741.1$ $741.1$ $gen/1000 cm3$ All measurem ficient. Ca $L = \frac{224}{3}$ $P_{T}^{b}/mm Hq$ $815.4$	3.94 $3.93$ $3.93$ $3.93$ $3.93$ $3.93$ $3.93$ $3.94$	at at the 25°C (2) at the $\frac{x}{73} \times \frac{760}{2}$ at $\frac{x}{73} \times \frac{760}{2}$ at $\frac{x}{73} \times \frac{760}{2}$ at $\frac{x}{73} \times \frac{760}{2}$ at $\frac{x}{73}$ at $\frac{760}{2}$ at $\frac{1}{2}$ a	3.087 3.080 e partial 298 K). q 10 <sup>2</sup> q' <sup>2</sup> 5.016	3	10 <sup>2</sup> L <sup>e</sup>	as
b t/°	indicate Ostwald <sup>o</sup> C T <sup>2</sup> 2 288 2 288	ed. coef <sup>1</sup> /K 	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ $P_{T}^{b}$ /mm Hq 815.4 850.9	3.94 $3.93$ $3.93$ $3.93$ $3.93$ $3.93$ $3.93$ $3.94$	ant at the 25°C (2) and from $\frac{x 760 \times 73 \times P_{02}}{73 \times P_{02}}$ $go_2^{c}/dm^3$	3.087 3.080 e partial 298 K). q 10 <sup>2</sup> q' <sup>c</sup> 5.016 4.865	3	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717	as
b t/° 15. 15. 15. 15.	indicate Ostwald 2 288 2 288 2 288 2 288	ed. coef /K	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ $P_{T}^{b}$ /mm Hq 815.4 850.9 861.3 921.2	3.94 3.92 solver ents at 1culate $x 29820 \times 2710^{2}5.5.5.5.5.$	$\frac{4}{3}$ $\frac{4}{25 \circ C} (2)$ $\frac{2}{2} = \frac{2}{25 \circ C} (2)$ $\frac{2}{2} = \frac{2}{25 \circ C} (2)$ $\frac{2}{2} = \frac{2}{25 \circ C} (2)$ $\frac{2}{25 \circ$	3.087 3.080 298 K). 998 K). 99	3	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737	as
b t/° 15. 15. 15. 15. 15.	indicate Ostwald 2 288 2 288 2 288 2 288 6 289	ed. coef /K .4 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ $P_{T}^{b}$ /mm Hq 815.4 850.9 861.3 921.2 801.8	3.94 3.93 solver ents at lculate x 298 $20 \times 27$ $10^{2}$ 5. 5. 5. 5. 5.	$\frac{4}{3}$ $\frac{4}{3}$ $\frac{4}{3}$ $\frac{1}{3}$ $\frac{1}$	3.087 3.080 298 K). 298 K). 20	3	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704	as
b t/° 15. 15. 15. 15.	indicate Ostwald 2 288 2 288 2 288 2 288 6 289 6 289	ed. coef /K	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ $P_{T}^{b}$ /mm Hq 815.4 850.9 861.3 921.2	3.94 3.93 solver ents at lculate $x 298 20 x 27 102c 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.$	$\frac{4}{3}$ $\frac{4}{25 \circ C} (2)$ $\frac{2}{2} = \frac{2}{25 \circ C} (2)$ $\frac{2}{2} = \frac{2}{25 \circ C} (2)$ $\frac{2}{2} = \frac{2}{25 \circ C} (2)$ $\frac{2}{25 \circ$	3.087 3.080 298 K). 998 K). 99	1	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737	as
b t/° 15. 15. 15. 16. 16. 16. 16.	indicate Ostwald C T <sup>6</sup> 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289	d. coef /K .4 .4 .4 .4 .8 .8 .8 .8 .8	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca L = $\frac{224}{3}$ P <sup>b</sup> _T/mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0	3.94 3.93 solver ents at lculate $x 29820 \times 2710^{2}c5.5.5.5.5.5.5.5.5.5.$	$\begin{array}{c}                                     $	3.087 3.080 2 partial 298 K).	1	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698	as
b t/° 15. 15. 15. 16. 16. 16. 16. 16. 17.	indicate Ostwald C T <sup>6</sup> 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 2 290	d. coef /K .4 .4 .4 .8 .8 .8 .8 .8 .8	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca L = $\frac{224}{3}$ P <sub>T</sub> <sup>b</sup> /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0	3.94 3.93 3.93 solver lents at lculate $x 298 20 x 27 102 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.$	$\begin{array}{c}     4 \\     3 \\     at at the constraints of the second se$	3.087 3.080 e partial 298 K). q 10 <sup>2</sup> q' <sup>2</sup> 5.016 4.865 4.898 4.891 4.847 4.520 4.601 4.840 4.765	1 	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641	as
b t/° 15. 15. 15. 16. 16. 16. 16. 17. 17. 17.	indicate Ostwald 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 2 290 2 290	ed. coef /K .4 .4 .4 .4 .4 .8 .8 .8 .8 .8 .8 .8 .8 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> <sub>T</sub> /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9	3.94 3.92 solver ents at 1culate $x 29820 \times 2710^2 c5.55$	4 3 t at the 25°C (2) ed from $x 760 x73 x P_{O_2}gO_2^C/dm^3438478582889346306441881198193553$	3.087 3.080 e partial 298 K). q 10 <sup>2</sup> q' <sup>c</sup> 5.016 4.865 4.898 4.891 4.847 4.520 4.601 4.840 4.601 4.840 4.765 4.549 4.715	1	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603	as
b t/° 15. 15. 15. 16. 16. 16. 17. 17. 17.	indicate Ostwald C T <sup>2</sup> 2 288 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 2 290 2 290 2 290 2 290	ed. coef //K .4 .4 .4 .4 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> <sub>T</sub> /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6	3.94 3.92 solver ents at lculate $x 29820 \times 2710^2 c5.55$	4 3 $x^{1} = 25 \circ C (2)$ $x^{2} = 25 \circ C (2)$ $x^{2} = 760 \times 73 \times P_{O_{2}}$ $y^{O_{2}}/dm^{3}/dm^{3}$ $y^{O_{2}}/dm^{3}/dm^{3}$ $y^{O_{2}}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/dm^{3}/$	3.087 3.080 298 K). 298 K).	3	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603 3.670	as
b t/° 15. 15. 15. 16. 16. 16. 17. 17. 17. 17. 19.	indicate Ostwald C T <sup>2</sup> 2 288 2 288 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 2 290 2 290 2 290 2 290	ed. coef /K .4 .4 .4 .4 .8 .8 .8 .8 .8 .8 .8 .8 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> <sub>T</sub> /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9	3.94 3.93 solver lents at lculate x 298 $20 \times 27$ $10^{2}c$ 5.5	4 3 $x^{1} = 25 \circ C$ (2 $x^{2} = 25 \circ C$ (2 $x^{2} = 760 \times 73^{2} = 70^{2}$ $y^{2} = 760 \times 70^{2$	3.087 3.080 e partial 298 K). q 10 <sup>2</sup> q' <sup>c</sup> 5.016 4.865 4.898 4.891 4.847 4.520 4.601 4.840 4.601 4.840 4.765 4.549 4.715	3	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603	as
b t/° 15. 15. 15. 16. 16. 16. 17. 17. 17. 17. 19. 19.	indicate Ostwald C T <sup>6</sup> 2 288 2 288 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 6 289 6 289 2 290 2 290 2 290 2 290 2 292 2 292	d. coef /K .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> _T/mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6 794.1 839.7 867.5	3.94 3.93 3.93 solver lents at lculate $x 298 20 x 27 102c 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.$	4 3 at at the 25°C (2 ad from x 760 x 73 x P <sub>O2</sub> 30 <sup>C</sup> /dm <sup>3</sup> 438 478 582 889 346 306 441 881 198 193 553 806 890 046 305	3.087 3.080 2 partial 298 K). 9 10 <sup>2</sup> q' <sup>2</sup> 5.016 4.865 4.898 4.891 4.847 4.520 4.601 4.840 4.765 4.529 4.715 4.803 4.524 4.423 4.506	I	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603 3.603 3.670 3.457 3.380 3.365	as
b t/° 15. 15. 15. 16. 16. 16. 17. 17. 17. 19. 19. 19.	indicate Ostwald C T <sup>6</sup> 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 2 290 2 290 2 290 2 290 2 290 2 290 2 290 2 292 2 292 2 292	d. coef /K .4 .4 .4 .4 .8 .8 .8 .8 .8 .8 .8 .8 .8 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> <sub>T</sub> /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6 794.1 839.7 867.5 897.7	3.94 3.92 solver ents at lculate x 298 20 x 27 $10^2$ 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	4 3 1 1 2 2 3 2 4 4 2 5 2 3 4 4 4 5 8 2 5 2 3 4 3 4 4 3 5 8 9 3 4 4 1 9 1 9 3 4 4 1 8 1 9 3 4 4 1 9 3 5 5 3 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 4 6 8 9 3 5 5 3 8 9 3 4 6 8 9 3 5 5 3 8 9 3 4 6 8 9 3 5 5 3 8 9 3 5 5 3 8 9 3 5 5 3 8 8 9 3 5 5 3 8 9 3 5 5 3 8 9 3 5 5 3 8 6 8 9 3 5 5 3 8 9 5 5 5 8 8 9 5 5 5 8 8 9 5 5 5 8 8 9 5 5 5 8 8 9 5 5 5 8 8 9 0 6 5 5 5 8 8 9 0 5 5 5 5 8 8 9 0 5 5 5 8 8 9 0 5 5 5 5 8 8 9 0 5 5 5 5 5 5 8 9 0 5 5 5 5 5 5 5 5 5 5 5 5 5	3.087 3.080 2.98 K). 2.98 K). 2.	1	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.698 3.641 3.476 3.603 3.670 3.457 3.380 3.365 3.447	as
b t/° 15. 15. 15. 16. 16. 16. 16. 17. 17. 17. 19. 19. 19. 19. 20. 20.	indicate Ostwald C T <sup>2</sup> 2 288 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 2 290 2 290 2 290 2 290 2 290 2 292 2 292 2 293 2 293 2 293	ed. coef /K .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> _T/mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6 794.1 839.7 867.5	3.94 3.92 3.92 solver ents at 1culate $x 29820 \times 2710^2 c5.55.$	4 3 1 1 2 2 2 3 2 2 3 2 3 3 4 4 3 2 2 3 2 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 5 5 3 4 5 5 3 4 5 5 5 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5	3.087 3.080 2.98 K). 2.98 K). 2.	1	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603 3.670 3.457 3.380 3.365 3.447 3.339 3.326	as
b t/° 15. 15. 15. 16. 16. 16. 16. 17. 17. 17. 19. 19. 19. 19. 20. 20. 20.	indicate Ostwald C T <sup>2</sup> 2 288 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 2 290 2 290	d. coef /K .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 741.1 ficient. Ca $L = \frac{224}{3}$ $P_T^{b}$ /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6 794.1 839.7 867.5 897.7 796.8 853.8 869.4	3.94 3.92 solver ents at lculate $20 \times 27$ $10^2 c$ 5.5	A at the	3.087 3.080 2.98 K). 2.98 K). 2.	1	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603 3.670 3.457 3.380 3.365 3.447 3.339 3.326 3.276	as
b t/° 15. 15. 15. 16. 16. 16. 16. 17. 17. 17. 19. 19. 19. 19. 20. 20.	indicate Ostwald C T <sup>2</sup> 2 288 2 290 2 290 2 290 2 290 2 292 2 292 2 292 2 293 2 293	d. coef /K .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 741.1 ficient. Ca $L = \frac{224}{3}$ $P_T^{b}$ /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6 794.1 839.7 867.5 897.7 796.8 853.6	3.94 3.92 solver ents at lculate x 298 $20 \times 27$ $10^2 c$ 5.5	4 3 1 1 2 2 2 3 2 2 3 2 3 3 4 4 3 2 2 3 2 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 5 5 3 4 5 5 3 4 5 5 5 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5	3.087 3.080 2.98 K). 2.98 K). 2.	3	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.737 3.704 3.454 3.516 3.698 3.641 3.476 3.603 3.670 3.457 3.380 3.365 3.447 3.339 3.326	as
b t/° 15. 15. 15. 16. 16. 17. 17. 17. 17. 19. 19. 19. 20. 20. 20.	indicate Ostwald C T <sup>6</sup> 2 288 2 288 2 288 2 288 2 288 2 288 2 288 2 288 6 289 6 289 6 289 6 289 6 289 6 289 6 289 2 290 2 290 2 290 2 290 2 292 2 293 2 293 2 293 2 293 4 293	d. coef /K .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	738.7 741.1 741.1 gen/1000 cm <sup>3</sup> All measurem ficient. Ca $L = \frac{224}{3}$ P <sup>b</sup> <sub>T</sub> /mm Hq 815.4 850.9 861.3 921.2 801.8 855.6 862.2 887.0 819.0 857.5 884.9 908.6 794.1 839.7 867.5 897.7 796.8 853.6 869.4 884.9	3.94 3.92 solver lents at lculate x 298 $20 \times 27$ $10^{2}c$ 5.5	A at the	3.087 3.080 2 partial 298 K).	E	10 <sup>2</sup> L <sup>e</sup> 3.833 3.717 3.743 3.704 3.454 3.516 3.698 3.641 3.476 3.603 3.670 3.457 3.380 3.365 3.447 3.339 3.326 3.276 3.264	as

Water
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(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Water; H <sub>2</sub> O; [7732-18-5] Livingston, J.; Morgan, R.; Richardson, A.H. J. Phys. Chem. <u>1930</u> , 34, 2356-6 continued $t/^{\circ}C$ T <sup>A</sup> /K P <sup>D</sup> <sub>T</sub> /mm Hq 10 <sup>2</sup> go <sup>2</sup> <sub>2</sub> /dm <sup>3</sup> 10 <sup>2</sup> q <sup>+</sup> C 10 <sup>2</sup> L <sup>e</sup> 20.4 293.6 875.8 5.193 4.457 3.406 20.4 293.6 904.3 5.454 4.451 3.401 20.6 293.8 802.6 4.796 4.377 3.345 20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 839.0 4.966 4.392 3.357 21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 839.0 4.966 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 894.1 5.123 4.355 3.328 21.0 294.2 878.1 5.123 4.356 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 883.3 5.186 4.332 3.310 a Calculated by compiler. <sup>b</sup> Total pressure. Height of a column of water plus atmospheric pressure. <sup>c</sup> Grams of oxygen/dm <sup>3</sup> solvent at the pressure of the measurement <sup>d</sup> Grams of oxygen/dm <sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen. <sup>e</sup> Ostwald coefficient. <sup>f</sup> All measurements at 25°C (298 K).	NENTS:			ORIGINAL	MEASUREMEN	TS:
$\begin{array}{c} \text{continued} \\ \hline \\ \text{continued} \\ \hline \\ \hline \\ \hline \\ \frac{1}{20.4} \begin{array}{c} 293.6 \\ 293.6 \\ 20.4 \\ 293.6 \\ 20.4 \\ 293.6 \\ 293.8 \\ 802.6 \\ 4.796 \\ 4.972 \\ 4.451 \\ 3.401 \\ 20.6 \\ 293.8 \\ 857.0 \\ 5.454 \\ 4.451 \\ 3.401 \\ 20.6 \\ 293.8 \\ 857.0 \\ 5.454 \\ 4.451 \\ 3.401 \\ 20.6 \\ 293.8 \\ 857.0 \\ 5.043 \\ 4.320 \\ 3.301 \\ 20.6 \\ 293.8 \\ 891.5 \\ 5.271 \\ 4.346 \\ 3.321 \\ 21.0 \\ 294.2 \\ 839.0 \\ 4.966 \\ 4.392 \\ 3.357 \\ 21.0 \\ 294.2 \\ 894.1 \\ 5.111 \\ 4.251 \\ 3.248 \\ 21.0 \\ 294.2 \\ 894.1 \\ 5.111 \\ 4.251 \\ 3.248 \\ 21.0 \\ 294.2 \\ 894.1 \\ 5.111 \\ 4.251 \\ 3.248 \\ 21.0 \\ 294.2 \\ 895.1 \\ 5.209 \\ 4.346 \\ 3.321 \\ 21.5 \\ 294.7 \\ 781.5 \\ 4.580 \\ 4.346 \\ 3.321 \\ 21.5 \\ 294.7 \\ 864.8 \\ 5.078 \\ 4.330 \\ 3.301 \\ 21.5 \\ 294.7 \\ 883.3 \\ 5.186 \\ 4.332 \\ 3.310 \\ 21.5 \\ 294.7 \\ 884.8 \\ 5.078 \\ 4.380 \\ 3.321 \\ 21.5 \\ 294.7 \\ 884.8 \\ 5.078 \\ 4.380 \\ 3.321 \\ 21.5 \\ 294.7 \\ 884.8 \\ 5.078 \\ 4.380 \\ 3.321 \\ 21.$		-				gan, R.;
$\frac{t/^{\circ}C}{c} \frac{T^{a}/K}{r^{b}/r^{mm Hq}} \frac{10^{2}go_{2}^{c}/dm^{3}}{10^{2}q^{1}c} \frac{10^{2}L^{e}}{10^{2}L^{e}}$ $\frac{20.4}{293.6} \frac{293.6}{904.3} \frac{875.8}{5.454} \frac{4.457}{4.451} \frac{3.406}{3.405}$ $\frac{20.4}{293.8} \frac{293.6}{802.6} \frac{4.796}{4.796} \frac{4.377}{4.377} \frac{3.445}{3.405}$ $\frac{20.6}{293.8} \frac{293.8}{857.0} \frac{5.043}{4.320} \frac{3.301}{3.201}$ $\frac{20.6}{206} \frac{293.8}{293.8} \frac{857.6}{891.5} \frac{4.972}{5.271} \frac{4.247}{4.346} \frac{3.321}{3.211}$ $\frac{21.0}{294.2} \frac{294.2}{832.7} \frac{4.926}{4.926} \frac{4.392}{4.328} \frac{3.357}{3.356}$ $\frac{21.0}{294.2} \frac{294.2}{894.1} \frac{5.111}{5.056} \frac{4.328}{4.329} \frac{3.367}{3.328}$ $\frac{21.0}{294.2} \frac{294.2}{878.1} \frac{5.123}{5.123} \frac{4.355}{4.355} \frac{3.328}{3.321}$ $\frac{21.0}{294.2} \frac{297.0}{87.1} \frac{4.684}{4.380} \frac{4.339}{3.316}$ $\frac{21.0}{294.2} \frac{297.1}{87.1} \frac{4.520}{5.209} \frac{4.346}{3.321}$ $\frac{21.5}{294.7} \frac{294.7}{807.7} \frac{4.741}{4.320} \frac{4.330}{3.301}$ $\frac{21.5}{294.7} \frac{294.7}{803.3} \frac{5.186}{4.332} \frac{4.330}{3.309}$ $\frac{3.309}{21.5} \frac{294.7}{883.3} \frac{801}{5.186} \frac{4.332}{4.332} \frac{3.310}{3.309}$ $\frac{1}{21.5} \frac{294.7}{883.3} \frac{801}{5.186} \frac{4.328}{4.332} \frac{3.310}{3.309}$ $\frac{1}{21.5} \frac{294.7}{883.3} \frac{801}{5.286} \frac{4.826}{4.332} \frac{4.326}{3.321} \frac{3.310}{5} \frac{1}{5} \frac{5.29}{5} \frac{5.29}{5} \frac{5.29}{5} 5$	) wate	er; H <sub>2</sub> 0;	[7732-18-5]	J. Phys.	Chem. <u>1930</u>	, 34, 2356-66.
$\frac{t/^{\circ}C}{1} \frac{T^{a}/K}{r^{b}/r^{mm Hq}} \frac{10^{2}go_{2}^{c}/dm^{3}}{10^{2}q^{1}c^{c}} \frac{10^{2}L^{e}}{10^{2}L^{e}}$ $\frac{20.4}{293.6} \frac{293.6}{904.3} \frac{875.8}{5.454} \frac{5.193}{4.457} \frac{4.457}{3.406}$ $\frac{20.4}{293.8} \frac{293.6}{802.6} \frac{875.8}{4.796} \frac{4.377}{4.377} \frac{3.445}{3.401}$ $\frac{20.6}{293.8} \frac{293.8}{857.0} \frac{5.043}{4.320} \frac{4.320}{3.301}$ $\frac{20.6}{20.6} \frac{293.8}{293.8} \frac{859.6}{891.5} \frac{4.972}{5.271} \frac{4.247}{4.346} \frac{3.321}{3.211}$ $\frac{21.0}{294.2} \frac{294.2}{832.7} \frac{4.926}{4.926} \frac{4.392}{4.328} \frac{3.357}{3.356}$ $\frac{21.0}{294.2} \frac{294.2}{894.1} \frac{5.151}{5.121} \frac{4.251}{4.328} \frac{3.367}{3.328}$ $\frac{21.0}{294.2} \frac{294.2}{892.6} \frac{4.826}{4.826} \frac{4.339}{4.339} \frac{3.316}{3.321}$ $\frac{21.0}{294.2} \frac{297.0}{87.1} \frac{4.684}{4.555} \frac{4.328}{3.321}$ $\frac{21.0}{294.2} \frac{297.0}{87.1} \frac{4.520}{5.123} \frac{4.355}{4.328} \frac{3.328}{3.211}$ $\frac{21.5}{294.7} \frac{294.7}{807.7} \frac{87.7}{4.741} \frac{4.320}{4.320} \frac{3.301}{3.301}$ $\frac{21.5}{294.7} \frac{294.7}{807.7} \frac{864.8}{4.741} \frac{5.078}{4.330} \frac{3.309}{3.310}$ $\frac{21.5}{294.7} \frac{294.7}{883.3} \frac{80.2}{5.186} \frac{4.332}{4.332} \frac{3.310}{3.309}$ $\frac{21.5}{294.7} \frac{294.7}{883.3} \frac{80.2}{5.186} \frac{4.332}{4.332} \frac{3.310}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{85.078} \frac{5.078}{4.330} \frac{3.309}{3.309}$ $\frac{21.5}{294.7} \frac{864.8}{85.078} \frac{5.078}{4.332} \frac{3.310}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{85.078} \frac{5.186}{4.332} \frac{3.310}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{85.078} \frac{5.186}{4.332} \frac{3.310}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{5.078} \frac{5.078}{4.330} \frac{3.309}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{3.501} \frac{5.186}{4.332} \frac{4.326}{3.310}$ $\frac{1}{3.300} \frac{3.309}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{3.501} \frac{5.078}{4.330} \frac{4.326}{3.301}$ $\frac{1}{3.300} \frac{3.309}{3.309}$ $\frac{1}{21.5} \frac{294.7}{294.7} \frac{864.8}{3.501} \frac{5.186}{4.332} \frac{4.329}{3.310}$ $\frac{1}{3.500} \frac{3.500}{4.300} \frac{4.326}{3.300} \frac{3.309}{3.309}$ $\frac{1}{2.5} \frac{294.7}{294.7} \frac{864.8}{3.501} \frac{5.278}{4.320} \frac{3.310}{3.300}$ $\frac{1}{3.50} \frac{1}{3.50} \frac{1}{3.50} \frac{1}{3.50} \frac{1}{3.50} \frac{1}{3.50} \frac{1}{3.50} \frac{1}{3.50} $						
<pre>20.4 293.6 875.8 5.193 4.457 3.406 20.4 293.6 904.3 5.454 4.451 3.401 20.6 293.8 802.6 4.796 4.377 3.345 20.6 293.8 857.0 5.043 4.320 3.301 20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 894.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 878.1 5.056 4.328 3.307 21.0 294.2 895.1 5.209 4.346 3.321 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.6 4.826 4.339 3.316 21.0 294.2 877.7 4.741 4.320 3.301 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 867.7 4.741 4.320 3.301 21.5 294.7 883.3 5.186 4.332 3.310</pre>	· <u> </u>	<u> </u>	<u></u>	continued		
<pre>20.4 293.6 904.3 5.454 4.451 3.401 20.6 293.8 802.6 4.796 4.377 3.345 20.6 293.8 857.0 5.043 4.320 3.301 20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 868.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>	t/°C	т <sup>а</sup> /К	P <sup>b</sup> ∕mm Hq	$10^2 go_2^c/dm^3$	10 <sup>2</sup> q' <sup>c</sup>	10 <sup>2</sup> L <sup>e</sup>
<pre>20.6 293.8 802.6 4.796 4.377 3.345 20.6 293.8 857.0 5.043 4.320 3.301 20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 895.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>						
<pre>20.6 293.8 857.0 5.043 4.320 3.301 20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 868.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 797.0 4.684 4.380 3.347 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>						
<pre>20.6 293.8 859.6 4.972 4.247 3.245 20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 868.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>						
<pre>20.6 293.8 891.5 5.271 4.346 3.321 21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 868.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 797.0 4.684 4.380 3.347 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>						
<pre>21.0 294.2 832.7 4.926 4.392 3.357 21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 868.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 797.0 4.684 4.380 3.347 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>			-			
<pre>21.0 294.2 839.0 4.966 4.395 3.358 21.0 294.2 868.1 5.056 4.328 3.307 21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 797.0 4.684 4.380 3.347 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>						
<pre>21.0 294.2 894.1 5.111 4.251 3.248 21.0 294.2 797.0 4.684 4.380 3.347 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>	21.0	294.2				3.358
<pre>21.0 294.2 797.0 4.684 4.380 3.347 21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>				5.056		
21.0 294.2 829.6 4.826 4.339 3.316 21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310						
21.0 294.2 878.1 5.123 4.355 3.328 21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310						
21.0 294.2 895.1 5.209 4.346 3.321 21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310 a Calculated by compiler. b Total pressure. Height of a column of water plus atmospheric pressure. c Grams of oxygen/dm <sup>3</sup> solvent at the pressure of the measurement d Grams of oxygen/dm <sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen. e Ostwald coefficient.						
<pre>21.5 294.7 781.5 4.580 4.346 3.321 21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310</pre>						
<pre>21.5 294.7 807.7 4.741 4.320 3.301 21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310 a Calculated by compiler. b Total pressure. Height of a column of water plus atmospheric pressure. c Grams of oxygen/dm<sup>3</sup> solvent at the pressure of the measurement d Grams of oxygen/dm<sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen. e Ostwald coefficient. f</pre>						
<pre>21.5 294.7 864.8 5.078 4.330 3.309 21.5 294.7 883.3 5.186 4.332 3.310 a Calculated by compiler. b Total pressure. Height of a column of water plus atmospheric pressure. c Grams of oxygen/dm<sup>3</sup> solvent at the pressure of the measurement d Grams of oxygen/dm<sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen. e Ostwald coefficient. f</pre>						
<pre>21.5 294.7 883.3 5.186 4.332 3.310 a Calculated by compiler. b Total pressure. Height of a column of water plus atmospheric pressure. c Grams of oxygen/dm<sup>3</sup> solvent at the pressure of the measurement d Grams of oxygen/dm<sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen. e Ostwald coefficient. f</pre>						
<ul> <li>Calculated by compiler.</li> <li>b Total pressure. Height of a column of water plus atmospheric pressure.</li> <li>c Grams of oxygen/dm<sup>3</sup> solvent at the pressure of the measurement</li> <li>d Grams of oxygen/dm<sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen.</li> <li>e Ostwald coefficient.</li> </ul>	21.5	294.7	883.3	5.186	4.332	3.310
<ul> <li>b Total pressure. Height of a column of water plus atmospheric pressure.</li> <li>c Grams of oxygen/dm<sup>3</sup> solvent at the pressure of the measurement</li> <li>d Grams of oxygen/dm<sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen.</li> <li>e Ostwald coefficient.</li> </ul>	a Ca	lculated	by compiler.			
<ul> <li>Grams of oxygen/dm<sup>3</sup> solvent at the pressure of the measurement</li> <li>Grams of oxygen/dm<sup>3</sup> solvent at 1 atm (101.325 kPa) partial pressure of oxygen.</li> <li>Ostwald coefficient.</li> </ul>	TO		sure. Height	of a column of	water plus	atmospheric
e Ostwald coefficient.	-		xygen/dm <sup>3</sup> solv	ent at the pres	sure of the	measurement.
f	Gr			ent at 1 atm (]	.01.325 kPa)	partial
f All measurements at 25°C (298 K).	e Os	twald co	efficient.			
	f Al	1 measur	ements at 25°C	с (298 к).		
	f Al	l measur	ements at 25°C	с (298 к).		

		ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub>	; [7782-44-7]	Morrison, T.J.; Bille	ett, F.
(2) Water; H <sub>2</sub> C	); [7732-18-5]	J. Chem. Soc. <u>1952</u> ,	3919-22.
ARIABLES:		PREPARED BY:	
т/к - 286 - 348	3	R. Battino	
XPERIMENTAL VALUES:	1.		
T/K <sup>a</sup>	Mole Fraction <sup>b</sup> 10 <sup>5</sup> x <sub>1</sub>	Ostwald Coeff. <sup>C</sup> 10 <sup>2</sup> L	sod
235.85	2.926	3.808	36.39
286.65	2.860	3.732	35.56
290.45	2.622	3.464	32.58
294.65	2.427	3.250	30.13
303.15	2.138	2.940	26.49
312.55	1.889	2.670	23.33
322.45	1.715	2.490	21.09
331.65	1.615	2.400	19.77
338.45	1.562	2.360	19.05
345.65	1.508	2.318	18.32
348.05	1.500	2.319	18.20
C Ostwald cooff	icient calculated by	compiler.	
d S is the sol		andard temperature and	pressure per
d S is the sol	ubility in cm <sup>3</sup> at sta er at a total gas pres	andard temperature and	pressure per
d s is the sol 1000g of wate	ubility in cm <sup>3</sup> at sta er at a total gas pres AUXILIARY	andard temperature and ssure of 1 atm.	
d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th	AUXILIARY AUXILIARY CEDURE: ssed by thorough en flows in a thin	andard temperature and ssure of 1 atm. INFORMATION	RIALS: and from KMnO,
d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla	AUXILIARY CEDURE:	andard temperature and soure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a	RIALS: and from KMnO <sub>4</sub> sults.
d S is the sol 1000g of wate THOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved	AUXILIARY AUXILIARY CEDURE: ssed by thorough en flows in a thin ss spiral and into containing the gas . Equilibrium is	andard temperature and soure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res	RIALS: and from KMnO <sub>4</sub> sults.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without	andard temperature and soure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res	RIALS: and from KMnO <sub>4</sub> sults.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROC Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The	andard temperature and soure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res	RIALS: and from KMnO <sub>4</sub> sults.
d S is the sol 1000g of wate THOD/APPARATUS/PROC Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The as its own gas buret d on the burets are	andard temperature and soure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res	RIALS: and from KMnO <sub>4</sub> sults.
d s is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas containing the gas for a spiral and into containing the g	andard temperature and soure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res	RIALS: and from KMnO <sub>4</sub> sults.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula The method is d reference (1).</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough een flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The as its own gas buret d on the burets are te the solubility. escribed in The present paper	Andard temperature and asure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res (2) No comment by aut ESTIMATED ERROR:	RIALS: and from KMnO <sub>4</sub> sults. thors.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula The method is d reference (1). describes an im</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas containing the gas for a spiral and into containing the g	<pre>andard temperature and ssure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res (2) No comment by aut ESTIMATED ERROR:</pre>	RIALS: and from KMnO <sub>4</sub> sults. thors.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula The method is d reference (1). describes an im section based o</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The as its own gas buret d on the burets are te the solubility. escribed in The present paper proved degassing	<pre>andard temperature and ssure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res (2) No comment by aut ESTIMATED ERROR:</pre>	RIALS: and from KMnO <sub>4</sub> sults. thors.
d S is the sol 1000g of wate ETHOD/APPARATUS/PROC Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula The method is d reference (1). describes an im section based o	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The as its own gas buret d on the burets are te the solubility. escribed in The present paper proved degassing	<pre>andard temperature and ssure of 1 atm. INFORMATION SOURCE AND PURITY OF MATER (1) From a cylinder a gave the same res (2) No comment by aut (2) No comment by aut (2) No comment by aut (2) So comment by aut (3) So comment by aut (4) So comment by aut (5) So c</pre>	RIALS: and from KMnO <sub>4</sub> sults. thors. imate of Lity by authors.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula The method is d reference (1). describes an im section based o</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The as its own gas buret d on the burets are te the solubility. escribed in The present paper proved degassing	<pre>andard temperature and ssure of 1 atm. INFORMATION SOURCE AND PURITY OF MATEL (1) From a cylinder a gave the same res (2) No comment by aut (2) No comment by aut (3) No comment by aut (3) No comment by aut (4) No comment by aut (4) No comment by aut (4) No comment by aut (5) No c</pre>	RIALS: and from KMnO <sub>4</sub> sults. thors. imate of Lity by authors.
<pre>d S is the sol 1000g of wate ETHOD/APPARATUS/PROO Solvent is dega boiling. It th film down a gla a buret system to be dissolved rapidly attaine be varied over affecting the s solvent serves and volumes rea used to calcula The method is d reference (1). describes an im section based o</pre>	AUXILIARY AUXILIARY CEDURE: ssed by thorough ten flows in a thin ss spiral and into containing the gas . Equilibrium is d. Flow rates may a wide range without olubility. The as its own gas buret d on the burets are te the solubility. escribed in The present paper proved degassing	<pre>andard temperature and ssure of 1 atm. INFORMATION SOURCE AND PURITY OF MATEL (1) From a cylinder a gave the same res (2) No comment by aut (2) No comment by aut (3) No comment by aut (3) No comment by aut (4) No comment by aut (5) No c</pre>	RIALS: and from KMnO <sub>4</sub> sults. thors. imate of Lity by authors.

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		Wa	ter
COMPONENTS:			ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ;	[7782-44-7]		Steen, H.
-			Limnol. Oceanog. <u>1958</u> , 3, 423-6.
(2) Water; H <sub>2</sub> O;	[//32-18-5]	1	Limnol. Oceanog. <u>1998</u> , 9, 429 0.
VARIABLES:	<u></u>		
T/K = 279 - 297			PREPARED BY:
P/kPa = 101.325			R. Battino
EXPERIMENTAL VALUES:			
т/к <sup>а</sup>	10 <sup>5</sup> x1 <sup>b</sup>	10 <sup>2</sup> 1	$L^{c}$ $10^{2}\alpha^{d}$
279.15	3.367	4.28	
	2.952		32 3.671
291.15	2.599	3.44	
297.15		3.10	
<sup>a</sup> Temperature re	ported to 0.1°	°c.	
b Molefraction s	olubility at ]	101.32	5 kPa (l atm) partial pressure of gas
Calculated by	compiler.		
<sup>c</sup> Ostwald coeffi		ted by	compiler.
<sup>d</sup> Bunsen coeffic	ient.		
<sup>e</sup> Average values	at each tempe	eratur	e. Raw values are (all $\alpha \propto 10^2$ ):
279 <b>.</b> 15K	285 <b>.</b> 15K	291.1	5K 297.15K
4.188	3.673	3.2	29 2.901
4.186 4.196	3.664 3.674	3.2	31         2.908           22         2.898
4.186	3.673	3.2	
	AU	XILIARY	/ INFORMATION
METHOD/APPARATUS/PROCE			SOURCE AND PURITY OF MATERIALS:
The procedure fo	llowed was the	at	
used by Scholand 0.5cm <sup>3</sup> analyzer.	er (1) in his Gas-free wa	ter	No details given.
was prepared by	boiling.		
Temperature was ±0.01°C and know	controlled to m to +0.05°C.		
			ESTIMATED ERROR:
			$\delta \alpha / \alpha = \pm 0.3$ %, estimate by author $\delta T/T = \pm 0.05$ K, estimate by author
			DEPEDENCYC .
			REFERENCES: 1. Scholander, P.F. J. Biol. Che <u>1947</u> , 167, 235-50.
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COMPONENTS		lont	CINAL MELOUPPLETIEL			
COMPONENTS:			ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ;			Elmore, H.L.; Hayes, T.W.			
(2) Water; H <sub>2</sub> O;	[7732-18-5]	J.	J. Sanít. Eng. Dív. Am. Soc. Cívíl Engrs. <u>1960</u> , 86(SA4), 41-53.			
VARIABLES:	· · · · · · · · · · · · · · · · · · ·	PRE	PREPARED BY:			
T/K = 275-30	02		R. Battino			
EXPERIMENTAL VALUES:						
t/°C T <sup>a</sup> /K	10 <sup>5</sup> x a,b	10 <sup>2</sup> L <sup>a</sup> ,	$10^2 \alpha^a, d/$ cm <sup>3</sup> (STP) cm <sup>-3</sup> atm	cs <sup>e</sup>		
1.81 274.96 1.82 274.97 1.83 274.98 1.85 275.00	3.750 3.756 3.765 3.761	4.697 4.704 4.716 4.711	4.666 4.673 4.685 4.680	13.874 13.894 13.930 13.914		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		4.409 4.388 4.407 4.375 4.379 4.381 4.398 4.394 4.391 4.386	4.330 4.310 4.328 4.297 4.301 4.300 4.318 4.313	12.851 12.791 12.845 12.753 12.764 12.762 12.813 12.800 12.792 12.771		
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	3.107 3.104 3.104 3.103 3.100 3.099 3.104 3.114	3.995 3.993 3.993 3.993 3.989 3.989 3.987 3.997 4.009	3.862 3.862	11.439 11.428 11.430 11.423 11.410 11.405 11.421 11.457 wing page		
	AU	XILIARY INF		<u>2</u>		
METHOD/APPARATUS/PROCE	DURE :	so	URCE AND PURITY OF MATE	RIALS:		
The determination of the amount of dissolved oxygen was via the Winkler method. The procedure and the reagents used are described in detail. The endpoint in the final titration was detected ampero- metrically. Equilibrium saturation was attained via two methods: (a) after the water was deoxygenated by bubbling nitrogen through it, the water was allowed to absorb			(1) From air or from (2) Distilled.	n a tank.		
oxygen from the o atmosphere with o (b) the water was saturated with g then allowed to a saturation level of constant gent	gentle stirrin s first super- aseous oxygen approach the under the in	and $E$ fluence $\delta$	TIMATED ERROR: $C_{s} = \pm 0.020$ , standar stimate by authors. 0.032 at 2°C to $\pm 0.02$ $F/K = \pm 0.05$ FERENCES:	Ranges from		

Water	
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			Water		
COMPONENT	rs:		0	RIGINAL MEASUREMEN	VTS:
(1) Oxy	/gen; 0 <sub>2</sub> ; [	7782-44-7]	E	lmore, H.L.; Hayes	5, T.W.
	- ter; H <sub>2</sub> 0; [		Ţ	. Sanit. Eng. Div. Engrs. <u>1960</u> , 86(S	. Am. Soc. Civil SA4), 41-53.
		<u> </u>	continued		
t∕°C	т <sup>а</sup> /к	10 <sup>5</sup> ×1,b	10 <sup>2</sup> L <sup>a,c</sup>	$cm^3$ (STP) $cm^{-3}atr$	n <sup>-1</sup> Cs <sup>e</sup>
15.56	288.71	2.705	3.544	3.353	9.862
15.56	288.71	2.708	3.558	3.366	9.901
15.56 15.56	288.71 288.71	2.707 2.704	3.557 3.552	3.366 3.360	9.899 9.883
15.56	288.71	2.707	3.566	3.373	9.922
15.57	288.72	2.708	3.558	3.366	9.900
20.45	293.60	2.456	3.279	3.051	8.917
20.65	293.80	2.456 2.457 2.457	3.282	3.052	8.919
20.65	293.80	2.457	3.292	3.052	8.882
20.65	293.80	2.457 2.453	3.276	3.046	8.903
20.75	293.90 293.90	2.454 2.443 2.460	3.279	3.047 3.034	9.900
20.75	293.90	2.443	3.264 3.288	3.034	8.862 8.937
20.80	293.95	2.460 2.450	3.274	3.043	8.888
20.80	293.95	2.451	3.275	3.044	8.891
20.90	294.05	2.451 2.448	3.272	3.039	8.876
20.90	294.05	2.434	3.254	3.023	8.831
20.95	294.10	2.444	3.268	3.035	8.867
22.97		2.353	3.166	2.920	8.499
22.98	296.13	2.356	3.170	2.924	8.511
22.98 23.12	296.13	2.354	3.167	2.921	8.502
23.12	296.27 296.32	2.344 2.359	3.156 3.176	2.909 2.924	8.468 8.510
23.18	296.32	2.340	3.151	2.905	8.455
29.11	302.26	2.098	2.877	2.600	7.568
29.12	302.27	2.100	2.879	2.602	7.572
29.13	302.28	2.089	2.865	2.589	7.534
29.13	302.28	2.094	2.871	2.594	7.550
29.16	302.31	2.093	2.870	2.593	7.548
29.30	302.45	2.091	2.869	2.591	7.542
<sup>a</sup> Cale	culated by	compiler.			
b Mole	e fraction	solubility af	t 101.325 k	Pa partial pressu	re of gas.
~	wald coeffi	-			<b>J</b>
a					
	sen coeffic	lent.			
five	e replicate othing curv	e detérminatione:	ons. The a	alues reported are uthors give the fe	ollowing
	$C_{s} = 14.6$	52 - 0.41022	(t/°C) + 0.	0079910(t/°C) <sup>2</sup> -	0.000077774(t/°C)
val	id in the r	ange 0 to 30°	°C.		

		ORIGINAL MEASUREMENTS:					
D <sub>3</sub> ; [7782-4	4-7]	Morris, C. J.; Stumm, W.; Galal, H.A.					
(2) Water; H <sub>2</sub> O; [7732-18-5]			Proc. Am. Soc. Civil Engrs. <u>1961</u> , 85 81-6.				
		PREPARED BY					
т/к = 278-303							
		R. B	attino				
UES:							
т <sup>а</sup> /к	10 <sup>5</sup> ×1 <sup>a,b</sup>	10 <sup>2</sup> L <sup>a,c</sup>	l0 <sup>2</sup> α <sup>d,e</sup> / cm <sup>3</sup> (STP)cm <sup>-3</sup> atm <sup>-</sup>	c <sup>d,f</sup>			
280.39 282.68 282.73 283.08 287.91 291.65 292.56	2.766 2.606 2.588 2.588	3.624 3.453 3.433	4.333 4.074 3.908 3.851 3.834 3.438 3.215 3.215 2.952 2.817 2.7239	12.833 12.050 11.542 11.371 11.319 10.104 9.475 9.404 9.265 8.567 8.567 8.141 7.8139			
tion solubi oefficient. I by the ch officient. 7 in mg O <sub>2</sub>	lity at 101.32 memical method. per liter.						
	AUXILIARY	INFORMATION					
al method curated wit or three da gen determ od. In the gaseous oxy ce was brou	h CO <sub>2</sub> free ys and the hined by the manometric gen at a hight into	(1) Norm chem comm	al air freed fro ical method. No ent for physical	m CO <sub>2</sub> for			
	20; [7732-1 20; [7732-1 78-303 UES: T <sup>a</sup> /K 278.29 280.39 282.69 282.73 283.08 287.91 291.31 291.65 292.56 296.62 298.95 302.25 A by compil cion solubi befficient. A by the child by the child cont-author /PROCEDURE: cal method curated without and three day of three day ye was brou	$T^{8}-303$ UES: $T^{a}/K   10^{5}x_{1}^{a,b}$ $278.29   3.483 280.39   3.275 282.69   3.142 282.73   3.096 283.08   3.082 287.91   2.766 291.31   2.606 291.65   2.588 292.56   2.588 292.56   2.588 292.56   2.588 292.56   2.588 293.95   2.271 302.25   2.1989 A by compiler. tion solubility at 101.32 pefficient. A by the chemical method. efficient. y in mg O2 per liter. point-author's comment. AUXILIARY$	$2^{\circ}$ ; $[7732-18-5]$ Proc. Am. 81-6. $2^{\circ}$ ; $[7732-18-5]$ Prepared by: 81-6. $78-303$ R. B $78-303$ $816^{2}$ $78-303$ $10^{2}L^{a,C}$ $278.29$ $3.483$ $4.415$ $280.39$ $3.275$ $4.182$ $282.69$ $3.142$ $4.044$ $282.73$ $3.096$ $3.986$ $287.91$ $2.766$ $3.624$ $291.31$ $2.606$ $3.433$ $292.56$ $2.588$ $3.433$ $296.62$ $2.379$ $3.0083$ $302.25$ $2.1989$ $3.0139$ A by compiler. $206$ $2.98.95$ cion solubility at 101.325 kPa part $206$ $298.95$ $2.271$ $3.083$	2Proc. Am. Soc. Civil Engr Bl-6. $20; [7732-18-5]$ Proc. Am. Soc. Civil Engr Bl-6. $78-303$ R. BattinoUES: $T^{a}/K$ $10^{5}x_{1}^{a,b}$ $10^{2}L^{a,C}$ $10^{2}\sigma^{d,e}/cm^{3}(STP) cm^{-3}atm^{-1}$ 278.293.4834.415278.293.4834.415282.693.1424.044290.393.2754.182291.312.6663.624291.312.6663.453292.562.5883.433291.652.5883.433292.562.5883.433292.562.5883.433292.562.5883.433292.552.1989302.252.1989302.252.1989301392.7239A by compiler.cion solubility at 101.325 kPa partial pressure of pefficient.A by the chemical method.Source AND PURITY OF MATERIALS(1) Normal air freed fro chemical method. No comment for physical(2) Distilled.(2) Distilled.			

Wa	ater
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		v	Vater		
COMPONENTS :			EVALUATOR:		
(1) Oxygen; (	D <sub>2</sub> ; [7782-44	-7]	Morris, C	.J.; Stumm, W.; Gal	al, H.A
(2) Water; H	-			Soc. Civil Engrs., 6.	<u>1961</u> ,
		con	tinued		
t/°C	т <sup>а</sup> /қ	10 <sup>5</sup> x a,b	10 <sup>2</sup> L <sup>a,c</sup>	$10^{2} \alpha^{d} \cdot e/$ cm <sup>3</sup> (STP) cm <sup>-3</sup> atm <sup>-1</sup>	c <sub>s</sub> d,f
11.47	284.62	2.965	3.843	3.688	10.89
14.54	287.69	2.767	3.623	3.440	10.13
15.00	288.15	2.766	3.627 3.579	3.438 3.398	10.12
15.00 17.03	288.15 290.18	2.729 2.660	3.511	3.305	9.99 9.70
22.79	290.15	2.376	3.195	2.949	8.59
22.79	295.94	2.364	3.179	2.934	8.54
22.79	295.94	2.382	3.203	2.956	8.61
22.79	295.94	2.359	3.172	2.928	8.53
22.79	295.94	2.364	3.179	2.934	8.54
26.97	300.12	2.216	3.018	2.747	7.93

<sup>a</sup> Calculated by compiler.

 $^{\rm b}$  Mole fraction solubility at 101.325 kPa partial pressure of gas.

2.223

2.163

3.028

2.974

2.756

2.680

<sup>c</sup> Ostwald coefficient.

26.98

29.96

d Determined manometrically.

e Bunsen coefficient.

<sup>f</sup> Solubility in mg  $O_2$  per liter.

300.13

303.11

7.95

7.69

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Klots, C. E.; Benson, B. B.
(2) Water; H <sub>2</sub> O; [7732-18-5]	J. Maríne Res. (Sears Found. Marine Res.) <u>1963</u> , 21, 48-57.
VARIABLES:	PREPARED BY:
т/к = 275-299	R. Battino
EXPERIMENTAL VALUES:	
$\begin{array}{c} \text{Mole Fraction}^{\text{b}} & \text{Ostwald Coe}\\ T/K^{\text{a}} & 10^{5} \text{x}_{1} & 10^{2} \text{L} \\ \hline \end{array}$	eff. <sup>C</sup> Bunsen Coeff. <sup>d</sup> $10^{2}\alpha$ $\alpha (O_{2})/\alpha (N_{2})^{e}$
275.44 3.736 4.687	4.648 2.047
276.10         3.651         4.591           278.93         3.389         4.305	4.542 2.037 4.216 2.027
279.69 3.336 4.249	4.150 2.029
280.19 3.292 4.202	4.096 2.026
284.872.9573.835284.952.9453.820	3.677 2.004 3.662 1.999
287.52 2.801 3.665	3.482 1.997
295.13         2.417         3.241           295.20         2.255         3.241	3.000 1.955
296.29         2.365         3.184           296.35         2.366         3.186	2.935 1.947 2.937 1.950
296.83 2.344 3.161	2.909 1.947
296.86         2.348         3.167           297.20         2.333         3.150	2.914 1.950 2.895 1.949
297.51         2.333         3.141	2.884 1.949
299.42 2.247 3.055	2.737 1.936
	continued on following page
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
	(1) "Tank" grade with less than 0.2%
connected by two stopcocks. Degassed	
water is introduced into one bulb. Dry gas is introduced into the other	(2) "Sterile" distilled.
bulb. The volumes of both are known	
to better than 0.05%. The stopcocks between the bulbs are opened, about	
one-half the water is moved into	
the gas bulb and the apparatus	
agitated in a thermostat for up to 48 hrs. Then the bulbs are placed	
upright and the saturated water and	
the gas phase isolated. The undissolved gas is removed and its	ESTIMATED ERROR:
pressure, volume and temperature	Precision $\delta \alpha / \alpha = \pm 0.002$ , author's
measured in the dry state to determine the number of moles. The	estimate.
moles of dissolved gas are similarly	REFERENCES :
determined. Constancy of gas mass in an experiment is about 0.05%.	INTERNICED,
Solubility is calculated from the	
known volumes and quantities.	

COMPONENTS :		
		ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7	782-44-7]	Klots, C. E.; Benson, B. B.
(2) Water; H <sub>2</sub> O; [7	732-18-5]	J. Marine Res. (Sears Found. Marine Res.) <u>1963</u> , 21, 48-57.
		continued
	т/к	$\alpha (O_2) / \alpha (N_2)^{f}$
	278.90 284.10 285.05 285.05 295.55 296.85	2.024 2.002 1.999 2.002 1.947 1.944
Mole fraction sol gas calculated by	ubility at 101. compiler.	atures reported to 0.01°C. 325 Pa (1 atm) partial pressure of
Ostwald coefficie		
Bunsen coefficien Ratio of solubili		as Bunsen coefficients from a 50:50
mixture. Determi	ned manõmetriča	lly.
Same as (e) but d	etermined mass	<pre>spectrometrically. ratios (authors) is about 0.2%.</pre>

	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Douglas P	
	Douglas, E.	
(2) Water; H <sub>2</sub> O; [7732-18-5]	J. Phys. Chem. <u>1964</u> , 6	8, 169-74.
VARIABLES:	PREPARED BY:	
T/K = 291 - 302		
P/kPa = 101.325	R. Battino	
EXPERIMENTAL VALUES:	L	5
Mole fractionb $T/K^a$ $10^5 x_1$	Ostwald Coeff. <sup>C</sup> B $10^{2}L$ $10^{2}\alpha/cm$	unsen Coeff. <sup>3</sup> (STP)cm <sup>3</sup> atm <sup>-1</sup>
281.15 3.202	4.101	3.984
281.15 3.207	4.107	3.990
281.15 3.204 281.15 3.198	4.103 4.095	3.986 3.978
281.15 3.200	4.098	3.981
293.09 2.492	3.321	3.095
293.09 2.494	3.324	3.098
293.09 2.494	3.324	3.098
293.09 2.496 293.09 2.490	3.326 3.318	3.100 3.092
302.30 2.139	2.934	2.651
302.30 2.142	2.937	2.654
302.30 2.143	2.938	2.655
302.30 2.141 302.30 2.139	2.936 2.934	2.653 2.651
d <sub>Bunsen</sub> coefficient.		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIA	.LS :
The apparatus and procedures are	(1) No comment by auth	
based on the Scholander microgaso-	1	or.
	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled	(2) Double distilled.	or.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR:	
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes		
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.003$ , estimate $\delta T/T = \pm 0.01$ (to 0.02K	e by author.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.003$ , estimate	e by author.
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.003$ , estimate $\delta T/T = \pm 0.01$ (to 0.02K by author REFERENCES:	e by author. ), estimate
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.003$ , estimate $\delta T/T = \pm 0.01$ (to 0.02K by author	e by author. ), estimate
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.003$ , estimate $\delta T/T = \pm 0.01$ (to 0.02K by author REFERENCES: 1. Scholander, P.F. J.	e by author. ), estimate
metric apparatus (1). This version uses one arm with an expanded solvent reservoir. Degassed water is introduced into this reservoir and sealed over mercury. The water is then tipped into the absorption chamber. Gas is introduced and the entire apparatus is shaken in a water thermostat (controlled to 0.01K). Gas and liquid volumes are read on a micrometer syringe	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.003$ , estimate $\delta T/T = \pm 0.01$ (to 0.02K by author REFERENCES: 1. Scholander, P.F. J.	e by author. ), estimate

V	Va	ter

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	Water 25
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Carpenter, J.H.
(2) Water; H <sub>2</sub> O; [7732-13-5]	Limnol. Oceanog. <u>1966</u> , 11, 264-77.
VARIABLES:	PREPARED BY:
T/K = 274 - 308	R. Battino
EXPERIMENTAL VALUES:	
$t/^{\circ}C$ $T^{a}/K$ $10^{5}x$	$1$ $10^{2}$ L <sup>a,c</sup> s <sup>d</sup>
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
AUXILIA	RY INFORMATION
ME THOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Water in a plexiglass box was rocked in contact with the air. Equilibra ed water is transferred to a cali- brated 500 cm <sup>3</sup> bottle and the dissolved oxygen determined by the modified Winkler method described of reference (1). The precision of the titration technique is stated to be $\pm 0.02$ %, but with an estimated accuracy of $\pm 0.1$ %. Measurements made with 3 hr and 14 hr equilibra- tion times agreed within $\pm 0.1$ %. Details are given in reference (1).	<pre>at- (1) from all of for only on only on only one one</pre>
This paper also reports on oxygen solubility in seawater.	$\delta S/S = \pm 0.001$ , author's estimate. $\delta T/K = \pm 0.01$
	REFERENCES: 1. Carpenter, J.H. Limnol. Oceanog. <u>1965</u> , 10, 135-40.

			UNY	gen oolubilla	55 up to 200 ki	a			
COMPON	IENTS :		, , , , , , , , , , , , , , , , ,		ORIGINAL M	EASUREME	ENTS :		
(1)	Oxyger	1; 0 <sub>2</sub> ;	[7782-44-7	1	Carpenter	., Ј.Н.			
(2)	Water	; H <sub>2</sub> 0;	[7732-18-5	]	Limnol. (	)ce anog.	1966,	11,	264-77.
		-							
CRITIC	CAL EVALU	ATION:		conti	nued			<u></u>	
	t,	∕°C	т <sup>а</sup> /к	10 <sup>5</sup> x <sup>a,b</sup> 1	10 <sup>2</sup> L <sup>a, c</sup>	; ;	<sup>3</sup> d		
	34	9.81 1.76 1.82	302.96 307.91 307.97	2.135 1.988 1.989	2.933 2.772 2.773		367		
	a	Calc	ulated by c	ompiler.	<u></u>				
	b	note	fraction s sure of gas		at 101.325	kPa part	ial		
	с	Ostw	ald coeffic	ient.					
	đ	760 and	bility in c mm Hg total 20.94% oxyg given by:	pressure,	100% relat	ive humi:	dity,		
			$L = \frac{(T/273)}{273}$	$\frac{K}{15} \times \frac{7}{10 X}$	605 (760-P <sub>w</sub> )				
		wher pres	e X = % oxy sure of wat	gen and P <sub>w</sub> er.	= saturati	on vapor	5		
							`		
							-		

water
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COMPONENTS :			
		ORIGINAL ME	ASUREMENTS:
(1) Oxygen;	02; [7782-44-7]	Power,	G. G.
	H <sub>2</sub> O; [7732-18-5]	J. Appl	. Physiol. 1968,24,468-74.
VARIABLES:		PREPARED BY	
	Т/К =310 P/kPa =50-95		C. L. Young
EXPERIMENTAL V	/ALUES:		
т/к	P <sub>02</sub> /mmHg	P <sub>02</sub> /kPa	Bunsen coefficient, α/cm <sup>3</sup> (STP)cm <sup>-3</sup> atm <sup>-1</sup>
310.15	398	53.1	0.0239
020020	398	53.1	0.0237
	398	53.1 53.1	0.0240 0.0236
	398 398	53.1	0.0236
	711	94.8	0.0239
	371	49.5	0.0238
	371	49.5	0.0239
	395	52.7 52.7	0.0238 0.0237
	395		verage 0.0238 ± 0.0001
1.925 x	10-5 from these data.		
······	AUXILIA	RY INFORMATION	
METHOD /APPARA	AUXILIA TUS/PROCEDURE:		PURITY OF MATERIALS:
Liquid sam with gas a was stripp	TUS/PROCEDURE: ples were equilibrated nd then the dissolved gas wed out under vacuum and n a manometric Van Slyke	SOURCE AND	
Liquid sam with gas a was stripp measured i	TUS/PROCEDURE: ples were equilibrated nd then the dissolved gas wed out under vacuum and n a manometric Van Slyke	SOURCE AND	PURITY OF MATERIALS:
Liquid sam with gas a was stripp measured i	TUS/PROCEDURE: ples were equilibrated nd then the dissolved gas wed out under vacuum and n a manometric Van Slyke	SOURCE AND	PURITY OF MATERIALS: details given.
Liquid sam with gas a was stripp measured i	TUS/PROCEDURE: ples were equilibrated nd then the dissolved gas wed out under vacuum and n a manometric Van Slyke	SOURCE AND	PURITY OF MATERIALS: details given.
Liquid sam with gas a was stripp measured i	TUS/PROCEDURE: ples were equilibrated nd then the dissolved gas wed out under vacuum and n a manometric Van Slyke	SOURCE AND	PURITY OF MATERIALS: details given. ERROR: K = ±0.03.

COMPONENTS:	OPICINAL	MEASUREMENTS:
		arev, S.A.; Tolmacheva, T.A.
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		
(2) Water; H <sub>2</sub> O; [7732-18-5]	J. Stri	rukt. Khim. <u>1968</u> , 9, 21-8; uct. Chem. <u>1968</u> , 9, 16-21.
-		
VARIABLES:	PREPARED	BY:
т/к = 277-323		
P/kPa = 101.325	R. Bat	tino
EXPERIMENTAL VALUES:		
T/K <sup>a</sup>	Molefraction <sup>b</sup> $10^5 x_1$	Ostwald Coeff. <sup>C</sup> 10 <sup>2</sup> L
277.15	3.573	4.51
285.15	2.935	3.81
200.15	2,289	3.10
298.15		2,38 <sup>d</sup>
323.15	1.636 <sup>d</sup>	2.38~
<ul> <li><sup>b</sup> Mole fraction solubility gas calculated by compil</li> <li><sup>c</sup> Ostwald coefficient.</li> <li><sup>d</sup> This value off from smoo within 0.5%.</li> </ul>	er.	latm) partial pressure at 6%, other values are
· · · · · · · · · · · · · · · · · · ·	AUXILIARY INFORMATI	ON
METHOD/APPARATUS/PROCEDURE:		ND PURITY OF MATERIALS: epared by electrolysis of NaOH
Degassed water is transferrer absorption vessel. The water sealed over mercury. Gas is and stirring accomplished wi magnetic bob. Uptake is rea gas buret system which is th statted along with the absorvessel. Details of operation drawing are in the original The paper also reports the s of oxygen in water/ethanol s 0-100%.	er is so added of th a th d on a No ermo- ption (2) Di paper. solubility solutions, ESTIMATE	<pre>lution, followed by removal hydrogen traces, and oroughly dried before use. purity given. stilled. D ERROR: = ± 0.01, estimate by compiler</pre>

COMPONENTS :	ORIGINAL MEASUREMENTS:
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) Water; H<sub>2</sub>O; [7732-18-5]</pre>	Murray, C.N.; Riley, J.P.; Wilson, T.R.S. Deep-Sea Research <u>1969</u> ,16,297-310.
VARIABLES :	PREPARED BY:
т/к = 297-301	
P/kPa = 101.325	R. Battino
EXPERIMENTAL VALUES:	
T/K <sup>a</sup> Mole Fraction <sup>b</sup> C	$\begin{array}{ccc} \text{Stwald Coeff.}^{\texttt{C}} & \text{Bunsen Coeff.}^{\texttt{d}} \\ 10^2 \texttt{L} & 10^2 \alpha \end{array}$
286.75 2.838	3.704 3.528
298.87 2.269	3.079 2.814
301.46 2.166	2.963 2.685
gas calculated by compiler. <sup>C</sup> Ostwald coefficient calculated by <sup>d</sup> Bunsen coefficient.	25 kPa (latm) partial pressure of compiler. INFORMATION
METHOD / AP PARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The apparatus was a modification of the design by Ben-Naim and Baer (1). Degassed water is forced by centrifugal action up two outside tubes of the absorption vessel and down a center tube, contacting gas along the way. Gas uptake is read on a gas buret system. The whole apparatus is thermostatted to ±0.012°C. The degassing apparatus was a modification of the design of Battino and Evans utilizing a magnetically driven centrifugal pump.	<ul> <li>(1) British Oxygen Company; contains 0.05% Ar and less than 0.1% N<sub>2</sub>.</li> <li>(2) Distilled.</li> <li>ESTIMATED ERROR: δT = ±0.02K, estimate by compiler δα/α = ± 0.0019, estimate of authors</li> <li>REFERENCES:</li> <li>1. Ben-Naim, A.; Baer, S. Trans. Faraday Soc. <u>1963</u>,59,2735-8.</li> <li>2. Battino, R.; Evans, F.D. Anal. Chem. <u>1966</u>, 38,1627-9.</li> </ul>

COMPONENTS:		OPTCINAL MEASUPENENTS.		
	0 • [7782-44-7]	ORIGINAL MEASUREMENTS: Murray, C. N.; Riley, J. P.		
(1) Oxygen, O <sub>2</sub> ; [7732-44-7]				
(2) Water; H	2 <sup>0; [7732-18-5]</sup>	Deep-Sea Research <u>196</u>	<u>9</u> , 16, 311-20.	
ĺ				
VARIABLES:	······································	PREPARED BY:		
T/K = 2	74-303			
P/kPa = 1	01.325	R. Battino		
EXPERIMENTAL VA	LUES:	<u>i</u>	······	
	ole Fraction <sup>b</sup> Bunsen Co $10^5 x_1$ $10^{2} \alpha$	oeff. <sup>C</sup> Ostwald Coeff. 10 <sup>2</sup> L	d Solubility <sup>e</sup>	
273.89	3.871 4.81	4.829	10.021	
274.95	3.754 4.67	4.702	9.713	
278.05	3.450 4.29	4.369	8.910	
280.60	3.251 4.04	4.154	8.382	
283.10	3.065 3.812	3.951	7.887	
288.27	2.748 3.41	3.605	7.031	
293.15	2.503 3.10	3.337	6.360	
298.10	2.302 2.85	3.117	5.794	
302.95	2.136 2.64	2.935	5.312	
307.95	1.986 2.45	2.770	4.862	
Vi of oxygen water at	in the atmosphere and $P_w$	$\frac{1}{1000}$ where $x = 20.94$ or $\frac{1}{1000}$ is the saturation vapo	r pressure of	
		continued on fo	llowing page	
	AUXILIARY	INFORMATION		
METHOD/APPARATU	IS/PROCEDURE:	SOURCE AND PURITY OF MATER	IALS:	
solubility in	determination of oxygen nvolved analyzing water th air by the Winkler	(la) (Chemical Method saturating water		
method. A ma method (1) wa being taken	odification of Carpenter's as used, precautions to minimize the loss of	(1b) (Physical Method by mass spectrom from the British	etric analysis;	
	g the titration. Details the paper including the ents used.	(2) Distilled		
Ben-Naim and	method was that of Baer (2) as modified and Murray, et al. (3).			
	s uses a new degassing l on the design of	ESTIMATED ERROR:		
Battino and I are given wit	Evans (4). Details th drawings in (3).	$\delta T = \pm 0.02K$ , estimate $\delta$ (Solubility) = $\pm 0.01$ estimate by authors chemical and physic	cm <sup>3</sup> O <sub>2</sub> /dm <sup>3</sup> , s for both	
	lso reports the solubility sea water of various	REFERENCES:		
salinities.		<ol> <li>Carpenter, J.H. L. <u>1966</u>, 11, 264-77.</li> <li>Ben-Naim, A.; Baer Faraday Soc. <u>1963</u>,</li> <li>Murray, C.N.; Riley T.R.S. Deep-Sea Ro</li> </ol>	, S. Trans. 59, 2735-8. y, J.P.; Wilson,	
		16, 297-310.	<u> </u>	

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	: en; O <sub>2</sub> ; [7782-44-7 r; H <sub>2</sub> O; [7732-18-5 2	] Murray	NAL MEASUREMENTS: 7, C. N.; Riley, J. Sea Research <u>1969</u> ,	
CRITICAL EVALUATION: continued				
<ul> <li><sup>d</sup> Ostwald coefficient calculated by compiler.</li> <li><sup>e</sup> Solubility as ml/l from an atmosphere of 20.94% O<sub>2</sub> and 100% relative humidity. These measurements made <u>chemically</u>. See method section.</li> </ul>				
т/к <sup>а</sup>	Mole Fraction <sup>b</sup> 10 <sup>5</sup> ×1	Bunsen Coeff. <sup>c</sup> $10^{2}\alpha$	Ostwald Coeff. <sup>d</sup> $10^{2}$ L	Solubility <sup>e</sup>
279.05	3.374	4.198	4.289	9.71

3.528 3.704

3.323

3.079

2.963

a, b, c, d, e. Footnotes same as for previous table except that these solubilities were determined by physical means. See the methods section.

3.095

2.814

2.685

286.75 2.838

2.269

2.166

293.30 2.492

298.87

301.46

**REFERENCES:** 

 Battino, R.; Evans, F. D. Anal. Chem. <u>1966</u>, 38, 1627-9. 31

7.270

6.33

5.711

5.423

COMPONENT	S:		ORIGINAL MEASUREMENTS:	
(1)	(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7] Wise, D.L.; Houghton, L.			
(2) Water; H <sub>2</sub> 0; [7732-18-5]			Biophys, J. <u>1969</u> , 9,36-53	3.
	2			
VARIABLES	:		PREPARED BY:	
т/к =	283 - 333		R. Battino	
EXPERIMEN	TAL VALUES:			
L/00	_ /.,a	$10^{5} x_{1}^{a,b}$ $10^{2} L^{b}$	a,c $\frac{10^2 \alpha^d}{\text{cm}^3 (\text{STP}) \text{cm}^{-3} \text{atm}^{-1}}$	s。 <sup>e</sup>
t/°C				
10 20	283.2 293.2	3.00 3.8 2.49 3.3		37.3 30.9
30	303.2	2.07 2.8	4 2.56	25.7
40 50	313.2 323.2	1.87 2.6 1.69 2.4		23.3 21.0
60	333.2		-	19.5
	<u> </u>	······································		
	culated by			
l <sup>b</sup> 'lol	e fraction	solubility at 101.3	25 kPa partial pressure of (	gas.
c Ost	wald coeffi	cient.		
d Bun	sen coeffic	ient.		
1			solution. Solubilities fit	ted to:
501				
	log <sub>10</sub> s。	= -11.5783 + 1044.4	$0(T/K) + 3.8533 \log_{10}(T/K).$	
			<u></u>	
			INFORMATION	
	PARATUS/PROCE		SOURCE AND PURITY OF MATERIALS:	
Used a	n adantatic	on of the Morrison atus (1), but with	(1) No details given.	
the ga	s capacity	of the manometer-	(2) Boiled and deionize	d.
buret	system bein orage spira	ng about 15 cm <sup>3</sup> . 11, the absorption		
spiral	and the ma	nometer-buret		
svstem	were therr through w	ostatted in glass which water from a		
thermo	stat circul	ated.		
			ESTIMATED ERROR:	
			$\delta \alpha / \alpha = \pm 0.01$	
			$\delta T/K = \pm 0.1$	
1				
			REFERENCES:	++ 5
			<ol> <li>Morrison, T.J.; Bille J. Chem. Soc. <u>1952</u>, 3</li> </ol>	919-22.
l I				
1				

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Power, G.G.; Stegall, H.
(2) Water; H <sub>2</sub> O; [7732-18-5]	J. Appl. Physiol. <u>1970</u> , 29, 145-9.
VARIABLES:	PREPARED BY:
T/K = 310	C.L. Young
EXPERIMENTAL VALUES:	
EXFERIMENTAL VALUES:	
T/K Bunsen coefficient, $\alpha/cm^3$ (STP) $cm^{-3}$ $atm^{-1}$	S.D. <sup>a</sup> No. of measurements
310.15 0.02385 0.0	00039 4
a Standard deviation.	
b The compiler calculated an Os and a mole fraction solubilit pressure of gas of 1.930 x 10	stwald coefficient of 0.02708 ty at 101.325 kPa partial D <sup>-5</sup> from these data.
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
5 to 12 cm <sup>-3</sup> samples placed in a	(1) Matheson sample, purity better
stirrer cell and gas, saturated with water vapor passed through water	than 99.7 mole per cent.
for 30-60 mins. Samples of saturated liquid withdrawn and transferred to Van Slyke apparatus. Dissolved gas removed under reduced pressure.	(2) No details given.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1$
	01/1 - 1011
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
COM CALATO .	Novak, D.M.; Conway, B.E.
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	NOVAR, D.M., Conway, B.E.
(2) Water; H <sub>2</sub> 0; [7732-18-5]	Chem. Instrumentation <u>1974</u> ,5,79-90.
L L	
VARIABLES:	PREPARED BY:
T/K = 298	
P/kPa = 101.325	R. Battino
EXPERIMENTAL VALUES:	A,
	r b
T/K <sup>a</sup> 10	<sup>5</sup> x <sub>1</sub> b 10 <sup>3</sup> S <sup>c</sup>
298.15 2.	295 1.27
<sup>a</sup> Temperature reported as 25°C but	held to $\pm 0.1^{\circ}$ C
L .	
<sup>b</sup> Mole fraction solubility at 101. gas. Calculated by compiler.	325 kPa (latm) partial pressure of
<sup>C</sup> Solubility in units of mol dm <sup>-3</sup>	atm <sup>-1</sup> .
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Method is based on the evaluation of	
the Henry's law constant K <sub>H</sub> defined	
by $n_s = K_H P_g$ where $n_s$ is the mass of gas in moles dissolved by unit volume	No details given.
of solvent at the equilibrium gas	
pressure P <sub>g</sub> . The solubilities were obtained by measuring the (total)	
pressure in the gas phase and the	
volumes of the liquid and gas phases.	
This provided sufficient information	
to calculate the solubility. Measurements were made at different	
pressures on the same quantity of	ESTIMATED ERROR:
gas. Equilibrium takes about 12 hr to attain. The apparatus and	$\delta T = \pm 0.1^{\circ}C$
procedure are described in detail in	
the paper.	$\delta S/S = \pm 0.013$ , estimate by authors
	REFERENCES :

[7782-44-7] [7732-18-5]	ORIGINAL MEASUREMENTS: Wilcock, R.J.; Battino, R.	
	Wilcock, R.J.; Battino, R.	
	Nature <u>1974</u> , 252, 614-5.	
	PREPARED BY: R. Battino	<u> </u>
		(
т/к 10 <sup>5</sup> х	$(0_2)^a$ $10^5 x_1 (0_2/N_2)^b$	
298.15 2.	251 1.779	
49.5 mol per c	ent oxygen and 50.5 mol	
AUXILIARY	INFORMATION	
DURE :	SOURCE AND PURITY OF MATERIALS:	
otion spiral con- As the gas take is determined frements are made sure. Details are	<ul><li>(1) No details given.</li><li>(2) Distilled.</li></ul>	
-	$\delta T/K = \pm 0.05$ , compiler's es REFERENCES:	timate.
j	298.15 2. 298.15 2. 298.15 2. a Mole fraction pressure of ga b Mole fraction, 49.5 mol per c per cent nitro	R. Battino         T/K $10^5 x_1 (0_2/N_2)^b$ 298.15       2.261       1.775         298.15       2.251       1.779         298.15       2.284       1.757         a       Mole fraction at 101.325 kPa partial pressure of gas.         b       Mole fraction, but for a mixture of 49.5 mol per cent oxygen and 50.5 mol per cent nitrogen.         AUXILIARY INFORMATION         DURE:         is flowed slowly per cent nitrogen.         SOURCE AND PURITY OF MATERIALS:         (1) No details given.         (2) Distilled.         ESTIMATED ERROR: $\delta_T/K = t0.01$ , compiler's est $\delta_T/K = t0.05$ , compiler's est $\delta_T/K = t0$

COMPONENTS:			ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Benson, B. B.; Krause, D. Jr.		
		J. Chem. Phys. <u>1976</u> , 64, 689-709.		
(2) Water; H <sub>2</sub> O; [7732-18-5]		5. chem. 11gs. <u>1570</u> ,		
VARIABLES:			PREPARED BY:	
	- 274-308			
2, 11			R. Battino	
EXPERIMENTA				A
t/°C	т <sup>а</sup> /к	$10^{5} x_{1}^{a,b} \beta$	<sup>c</sup> /cm <sup>3</sup> (STP)1 <sup>-1</sup> atm <sup>-1</sup>	10 <sup>-4</sup> k <sup>u</sup> /atm
0.484	273.634	3.9008 3.7442	48.442 46.503	2.5636 2.6708
2.973	275.129 276.123		45.271	2.7435
2.973 4.947	278.097	3.6450 3.4632	43.013	2.8875
5.967	279.117	2 2760	41.929	2.9621
5.967 7.958	281.108	3.2166	39.946	3.1089
9.954 11.994	283.104	2 0705	38.127	3.2568
		2.9345	36.432	3.4077
12.969	286.119	2.8713	35.644	3.4827
13.979	287.129	2.8110	34.891	3.5574
14.963 16.983	288.113	2.7538	34.175 32.809	3.6314
17.959		2.6445	32.202	3.7814 3.8520
19.937	291.109 293.087	2.5961 2.4999	30.999	4.0002
21.967		2.4093	29.863	4.1505
22.952	296.102	2.3688	29.354	4.2216
26.949	300.099	2.2166	27.441	4.5114
28.945	302.095	2.1496	26.596	4.6521
29.948	303.098	2.1175	26.192	4.7225
32.965	306.115	2.0289	25.073	4.9288
34.953	308.103	1.9767	24.412	5.0589
			continued on fol	lowing page
		AUXILIARY	INFORMATION	
METHOD/APPA	ARATUS/PROCEDUR	E:	SOURCE AND PURITY OF MAT	ERIALS;
Gas-free water and the pure gas are equilibrated and volumetric samples of the liquid and gaseous phases are isolated. The gas dissolved in the water is extracted, and the number of moles determined in a special manometer. After removal of the water vapor, the number of moles in the sample of the gaseous phase is measured with the same manometer, from which the		No details given.		
pressur	e (and fugac	ity) above the		
solutio	n may be cal	culated.	ESTIMATED ERROR:	
used.	Real gas cor	0.9 atm are rections were	$\delta k/k = \pm 0.024$ , autho	or's estimate.
applied	•			
			REFERENCES:	
				_····.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Benson, B. B.; Krause, D. Jr.
-	
(2) Water; H <sub>2</sub> O; [7732-18-5]	J. Chem. Phys. <u>1976</u> , 64, 689-709.
	]
	l
cont	inued
<sup>a</sup> Calculated by compiler.	
b Mole fraction solubility at 101.3	325 kPa partial pressure of gas.
<sup>c</sup> Bunsen coefficient, but per liter	of solution.
d Henry's law constant in units of	atmospheres. Authors give the
following least squares fit with	a standard deviation of $\pm 0.024$ % in k:
$\ln(1/(k/atm)) = -4.0605 - 5.4167$	$\times 10^{3}/(T/K) + 10.261 \times 10^{5}/(T/K)^{2}$
]	
1	
{	
1	

COMPONENTS:	ORIGINAL MEASUREMENTS: Zander, R.; Euler, R.
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Measurement of Oxygen. [Proceedings of
(2) Water; H <sub>2</sub> O; [7732-18-5]	an Interdisciplinary Symposium Held at Odense University, Denmark, 26-27 Sep-
2	tember 1974]. Degn, H.; Balslev, I.; Brook, R.; Editors (Elsevier: Amster-
	dam Meth.). <u>1976</u> , p. 271-6. Chem. Abstr. 1976. 85. 43420j.
VARIABLES:	PREPARED BY:
т/К: 310.2	R. Battino
EXPERIMENTAL VALUES:	
Apparatus Soly. Coeff./(ml/m	nlatm) L 10 <sup>4</sup> x <sub>1</sub>
1 0.02407	0.02733 0.1715
2 0.02406 3 0.02418	0.02732 0.1714 0.02746 0.1723
Three different versions of the	apparatus were used.
Measurements were at 37.0° (310	
Solubility coefficient is the B	unsen coefficient.
The Ostwald coefficient, L, and	
x1, at 101.325 kPa partial pre by the compiler.	essure of gas were calculated
by the compiler.	
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;
The van Slyke (1) apparatus was used with a correction for the unextracted	No details given.
gas applied.	
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1$
	±1% in solubility (authors)
	REFERENCES :
	l. Van Slyke, D.D.; Neill J.M.
	J. Biol. Chem. <u>1924</u> , 61, 523.
	J. BLOL. Chem. $1924$ , 61, 523.

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	Wa	iter		3
COMPONENTS:		ORIGINA	L MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (also <sup>18</sup> 0 solubility ratios)			son, B.B.; Krause sterson, M.A.	, D.;
(2) Water; H <sub>2</sub> O; [7732-1	8-5)	J. S	Soln. Chem. <u>1979</u> ,	8, 655-90.
VARIABLES:		PREPARE	CD BY:	
T/K = 273 - 333			R. Battino	
EXPERIMENTAL VALUES:				<u> </u>
t/°C T <sup>a</sup> /K P <sup>b</sup> t/a	tm 10 <sup>-4</sup> k	c/atm	10 <sup>3</sup> 6 <sup>d</sup> 34/32	10 <sup>5</sup> x <sup>a,e</sup>
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	951 725 884 8870 085 350 571 904 2224 9016 772 152 497 719 2130 381 3877 496	0.820 0.838 0.810 0.826 0.816 0.809 0.820 0.859 0.787 0.787 0.795 0.781 0.812 0.749 - - 0.747 0.774 0.744 0.744 0.744 0.744 0.744 0.744 0.744 0.744 0.738 0.718 0.668 0.674 continued on for	3.95385 3.95333 3.85023 3.84906 3.74693 3.74714 3.64850 3.55429 3.46535 3.37947 3.29789 3.22031 3.07508 2.94104 2.81871 2.76127 2.70638 2.50803 2.42006 2.33973 2.33983 2.22927 2.12994 2.13057
	AUXILIARY	INFORMA	TION	
METHOD/APPARATUS/PROCEDURE:		SOURCE	AND PURITY OF MATER	IALS:
The equilibrator is composed of concentric spheres of 1 and 2 dm <sup>3</sup> capacity. A liquid phase sample bulb and a gas phase sample bulb are calibrated as to volume. Degassed liquid is pumped through the center of the inner sphere and flows in a gentle film through the gas. After equilibrium is attained (up to 48 hr), the gas in both bulbs is extracted separate- ly and the pressure, volume, and temperature determined in the dry state. Real gas corrections are applied. Details and drawings are given in the paper.		(2) ESTIMA	Linde research of impurity less the Distilled water give a resistive than 1.5 MΩ-cm.	han 40 ppm. redistilled to ity greater
		δτ/κ Refere	= ±0.005, author	cs' estimate.

(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (also <sup>18</sup> O solubility ratios) (2) Water; H <sub>2</sub> O; [7732-18-5] ITICAL EVALUATION: $t/^{\circ}C$ T <sup>a</sup> /K P <sub>t</sub> <sup>b</sup> /atm 10 <sup>-4</sup> k <sup>C</sup> , 33.003 306.153 0.9538 4.8921 36.003 309.153 0.9775 5.0883 38.998 312.148 0.9928 5.2744 42.000 315.150 1.0170 5.4555 44.998 318.148 1.0466 5.6263 47.996 321.146 1.0720 5.7886 43.000 321.150 1.0681 5.7873 50.999 324.149 1.0925 5.9414 53.991 327.141 1.1284 6.0855 57.000 330.151 1.1573 6.2233 59.993 333.143 1.1959 6.3493 59.998 333.148 1.1831 6.3466 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; f <sub>1</sub> = kx <sub>1</sub> ; unit (1 atm = 101.325kPa). d $\delta = \alpha -1$ , where $\delta = {}^{32}k/{}^{34}k$ , or the rest for ${}^{16}O_2$ to ${}^{18}O_2$ solubilities. e Mole fraction solubility at 101.3258 $\cdot$ $\Delta G^{\circ}/cal AH^{\circ}/cal MORCAL T/K MOL MOL AND AND AND AND AND AND AND AND AND AND$	atm $10^{3}\delta^{d}34/32$ $10^{5}x_{1}^{a}$ , 0.655 2.04379 0.636 1.96533 0.633 1.89600 0.631 1.83300 0.625 1.77736 0.602 1.72770 0.606 1.72798 0.591 1.68309 0.561 1.64325 - 1.60734 0.568 1.60692 0.553 1.57501 0.545 1.57569 essure plus saturation vapor s of atm/mole fraction atio of the Henry's constants
(also <sup>18</sup> 0 solubility ratios) (2) Water; H <sub>2</sub> O; (7732-18-5] ITICAL EVALUATION: $t/^{\circ}C$ $T^{a}/K$ $P_{t}^{b}/atm$ $10^{-4}k^{C}$ , 33.003 306.153 0.9538 4.8921 36.003 309.153 0.9775 5.088 38.998 312.148 0.9928 5.274 42.000 315.150 1.0170 5.4555 44.998 318.148 1.0466 5.6265 47.996 321.146 1.0720 5.788 43.000 321.150 1.0681 5.787 50.999 324.149 1.0925 5.941 53.991 327.141 1.1284 6.0855 57.001 330.151 1.1573 6.223 59.993 333.143 1.1959 6.349 59.998 333.148 1.1831 6.3466 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; $f_1 = kx_1$ ; unit (1 atm = 101.325kPa). d $\delta = \alpha - 1$ , where $\delta = {}^{32}k/{}^{34}k$ , or the rest for ${}^{16}O_2$ to ${}^{18}O_2$ solubilities. e Mole fraction solubility at 101.3254 $\frac{\Delta G^{\circ}/cal}{T/K}$ $\frac{\Delta H^{\circ}/cal}{mol^{-1}}$ $\frac{\Delta G^{\circ}/cal}{328.15}$ $5846.0$ $-3613$ 298.15 $6327.4$ $-2872313.15$ $6773.3$ $-2201328.15$ $7188.7$ $-1592$	Peterson, M.A. Soln. Chem. <u>1979</u> , 8, 655-90.
$\frac{(1)}{2} + \frac{1}{2} + $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
t/°C $T^{a}/K$ $P_{t}^{b}/atm$ $10^{-4}k^{c}$ , 33.003 306.153 0.9538 4.8924 36.003 309.153 0.9775 5.0888 38.998 312.148 0.9928 5.2744 42.000 315.150 1.0170 5.4559 44.998 318.148 1.0466 5.6263 47.996 321.146 1.0720 5.7884 43.000 321.150 1.0681 5.7877 50.999 324.149 1.0925 5.9414 53.991 327.141 1.1284 6.0855 57.000 330.150 1.1617 6.2214 57.001 330.151 1.1573 6.2233 59.993 333.143 1.1959 6.3499 59.998 333.148 1.1831 6.3464 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; $f_1 = kx_1$ ; unit (1 atm = 101.325kPa). d $\delta = \alpha - 1$ , where $\delta = {}^{32}k/{}^{34}k$ , or the rest of solubilities. e Mole fraction solubility at 101.3258 K = Mole fraction solubility at 101.3258 283.15 5846.0 -3613 298.15 6327.4 -2872 313.15 6773.3 -2201 328.15 7188.7 -1592	atm $10^{3}\delta^{d}34/32$ $10^{5}x_{1}^{a}$ , 0.655 2.04379 0.636 1.96533 0.633 1.89600 0.631 1.83300 0.625 1.77736 0.602 1.72770 0.606 1.72798 0.591 1.68309 0.561 1.64325 - 1.60734 0.568 1.60692 0.553 1.57501 0.545 1.57569 essure plus saturation vapor s of atm/mole fraction atio of the Henry's constants
$\frac{t/^{\circ}C}{1} \frac{T^{a}/K}{T^{K}} \frac{P_{t}^{b}/atm}{P_{t}^{b}/atm} \frac{10^{-4}k^{C}}{10^{-4}k^{C}}$ $\frac{33.003}{309.153} \frac{306.153}{0.9775} \frac{5.0883}{5.0883}$ $\frac{38.998}{312.148} \frac{0.9928}{0.9928} \frac{5.2743}{5.2743}$ $\frac{42.000}{315.150} \frac{1.0170}{1.0170} \frac{5.4559}{5.442}$ $\frac{42.000}{41.998} \frac{318.148}{1.0466} \frac{1.0720}{5.6261} \frac{5.7873}{5.7884}$ $\frac{43.000}{321.150} \frac{321.146}{1.0720} \frac{1.070}{5.7884}$ $\frac{43.000}{321.150} \frac{321.146}{1.0681} \frac{1.0720}{5.7873}$ $\frac{50.999}{324.149} \frac{1.0925}{1.0925} \frac{5.941}{5.991}$ $\frac{53.991}{327.141} \frac{1.1284}{1.1284} \frac{6.0856}{6.2233}$ $\frac{57.000}{330.151} \frac{1.1617}{1.1284} \frac{6.2233}{6.2233}$ $\frac{59.993}{333.143} \frac{1.1959}{1.1959} \frac{6.3493}{6.3493}$ $\frac{33.148}{59.998} \frac{1.1831}{33.148} \frac{6.3464}{1.1831} \frac{6.3464}{6.3464}$ $\frac{1}{101.32587a}$ $\frac{1}{102} to \frac{18}{02} solubilities.$ $\frac{1}{102} to \frac{18}{02} solubilities.$ $\frac{1}{102} to \frac{18}{02} solubilities.$ $\frac{1}{102} \frac{AH^{\circ}/ca1}{101.32587}$ $\frac{AG^{\circ}/ca1}{102} \frac{AH^{\circ}/ca1}{101.32587}$ $\frac{AG^{\circ}/ca1}{313.15} \frac{AH^{\circ}/ca1}{6.327.4} -\frac{2872}{283.15} \frac{313.15}{6.327.4} -\frac{2872}{283.15} \frac{313.15}{7188.7} -\frac{1592}{1592}$	atm $10^{3}\delta^{d}34/32$ $10^{5}x_{1}^{a}$ , 0.655 2.04379 0.636 1.96533 0.633 1.89600 0.631 1.83300 0.625 1.77736 0.602 1.72770 0.606 1.72798 0.591 1.68309 0.561 1.64325 - 1.60734 0.568 1.60692 0.553 1.57501 0.545 1.57569 essure plus saturation vapor s of atm/mole fraction atio of the Henry's constants
36.003 309.153 0.9775 5.088 38.998 312.148 0.9928 5.2743 42.000 315.150 1.0170 5.4555 44.998 318.148 1.0466 5.626 47.996 321.146 1.0720 5.788 43.000 321.150 1.0681 5.787 50.999 324.149 1.0925 5.941 53.991 327.141 1.1284 6.0855 57.000 330.150 1.1617 6.221 57.001 330.151 1.1573 6.223 59.993 333.143 1.1959 6.349 59.998 333.148 1.1831 6.3464 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; $f_1 = kx_1$ ; unit (1 atm = 101.325kPa). d $\delta = \alpha - 1$ , where $\delta = \frac{32}{k} \frac{34}{k}$ , or the rest for $\frac{16}{02}$ to $\frac{18}{02}$ solubilities. e Mole fraction solubility at 101.325 Mole fraction solubility at 101.325 $\frac{\Delta G^{\circ} \frac{cal}{cal}}{mol^{-1}} \frac{\Delta H^{\circ} \frac{cal}{cal}}{mol^{-1}}$ 283.15 5846.0 -3613 298.15 6327.4 -2872 313.15 6773.3 -2201 328.15 7188.7 -1592	0.636       1.96533         0.633       1.89600         0.631       1.83300         0.625       1.77736         0.602       1.72798         0.606       1.72798         0.501       1.68309         0.561       1.64325         1.60734       0.568         0.553       1.57501         0.545       1.57569
44.998 318.148 1.0466 5.6263 47.996 321.146 1.0720 5.7884 43.000 321.150 1.0681 5.7873 50.999 324.149 1.0925 5.9414 53.991 327.141 1.1284 6.0854 57.000 330.150 1.1617 6.2213 57.001 330.151 1.1573 6.2233 59.993 333.143 1.1959 6.3493 59.998 333.148 1.1831 6.3464 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; $f_1 = kx_1$ ; unit (1 atm = 101.325kPa). d $\delta = \alpha - 1$ , where $\delta = {}^{32}k/{}^{34}k$ , or the rest for ${}^{16}O_2$ to ${}^{18}O_2$ solubilities. e Mole fraction solubility at 101.325k K = Mole fraction solubility at 101.325k 283.15 5846.0 -3613 298.15 6327.4 -2872 313.15 6773.3 -2201 328.15 7188.7 -1592	0.625       1.77736         0.602       1.72770         0.606       1.72798         0.591       1.68309         0.561       1.64325         -       1.60734         0.568       1.60692         0.553       1.57501         0.545       1.57569
53.991 327.141 1.1284 6.0854 57.000 330.150 1.1617 6.2214 57.001 330.151 1.1573 6.2233 59.993 333.143 1.1959 6.3493 59.998 333.148 1.1831 6.3464 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; $f_1 = kx_1$ ; united (1 atm = 101.325kPa). d $\delta = \alpha - 1$ , where $\delta = \frac{32}{k} \frac{34}{k}$ , or the rest of $16_{02}$ to $18_{02}$ solubilities. e Mole fraction solubility at 101.325kPa . $\frac{\Delta G^{\circ} / cal}{mol - 1}$ $\frac{\Delta H^{\circ} / cal}{mol - 1}$ 283.15 5846.0 -3613 298.15 6327.4 -2872 313.15 6773.3 -2201 328.15 7188.7 -1592	9 0.561 1.64325 - 1.60734 0 0.568 1.60692 0 0.553 1.57501 0 0.545 1.57569 essure plus saturation vapor s of atm/mole fraction atio of the Henry's constants
59.998 333.148 1.1831 6.3464 a Calculated by compiler. b Total pressure, i.e., gas partial propressure of solvent. c Henry's law constant; $f_1 = kx_1$ ; united (1 atm = 101.325kPa). d $\delta = \alpha - 1$ , where $\delta = \frac{32}{k}/\frac{34}{k}$ , or the rest for $\frac{16}{02}$ to $\frac{18}{02}$ solubilities. e Mole fraction solubility at 101.325k Mole fraction solubility at 101.325k 283.15 5846.0 -3613 298.15 6327.4 -2872 313.15 6773.3 -2201 328.15 7188.7 -1592	essure plus saturation vapor s of atm/mole fraction atio of the Henry's constants
$\begin{array}{c} \text{Calculated by complier.} \\ \text{b} \\ \text{Total pressure, i.e., gas partial program of solvent.} \\ \text{C} \\ \text{Henry's law constant; } f_1 = kx_1; unity (1 atm = 101.325kPa). \\ \text{d} \\ \delta = \alpha - 1, \text{ where } \delta = \frac{32}{k}/\frac{34}{k}, \text{ or the program of the solubilities.} \\ \text{d} \\ \delta = \alpha - 1, \text{ where } \delta = \frac{32}{k}/\frac{34}{k}, \text{ or the program of the solubilities.} \\ \text{e} \\ \text{Mole fraction solubility at 101.325k} \\ \frac{\Delta G^{\circ}/cal}{T/K} \frac{\Delta H^{\circ}/cal}{mol^{-1}} \frac{\Delta H^{\circ}/cal}{mol^{-1}} \\ \frac{283.15}{298.15} \frac{5846.0}{6327.4} - \frac{3613}{287.2} \\ \frac{313.15}{328.15} \frac{6773.3}{7188.7} - \frac{1592}{1592} \end{array}$	s of atm/mole fraction atio of the Henry's constants
ΔG°/cal mol <sup>-1</sup> ΔH°/cal mol <sup>-1</sup> 283.15         5846.0         -3613           298.15         6327.4         -2872           313.15         6773.3         -2201           328.15         7188.7         -1592	a foretar brondere or dege
298.15       6327.4       -2872         313.15       6773.3       -2201         328.15       7188.7       -1592	$ \sum_{\substack{\Delta S^{\circ}/cal \\ mol^{-1}K^{-1} \\ mol^{-1}K^{-1} \\ mol^{-1}K^{-1} } \Delta C_{p}^{\circ}/cal $
	-33.41 52.03 -30.85 46.93 -28.66 42.54 -26.76 38.74
Authors' recommended smoothing equation	
1. $\ln(k/atm) = 3.71814 + 5.59617 \times 10^3$ 273-373 K.	$/(T/K) - 1.049668 \times 10^6 / (T/S)$
2. $\ln(k/atm) = -4.1741 + 1.3104 \times 10^4 / + 2.4749 \times 10^8 / (T/K)^3;$	bove 373 K.
3. $\ln({}^{34}k/atm) = 3.71937 + 5595.45/(T/$	x) - 1.049624 x $10^6/(T/K)^2$ .

COMPONENTS :	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Chen-Tung A. Chen School of Oceanography
(2) Seawater	Oregon State University Corvallis, OR 97331 U.S.A.

CRITICAL EVALUATION:

Many studies have been made of oxygen solubility in seawater (1-16). Unfortunately, among the early measurements (1-8) there exist serious discrepancies of as much as 4 per cent. These data often cover narrow salinity and temperature ranges, are less precise, and are sometimes subject to large systematic errors caused mainly by the loss of iodine and by the addition of oxygen from reagents (9-16). As a result, these early measurements will not be analyzed.

More recently, Carpenter (11) has made extremely careful measurements of oxygen solubility in pure water and seawater using the Winkler titration method. Subsequently, Green (10, 13) and Murray and Riley (16) also published oxygen solubility data in pure water and seawater using a similar method. The data of Carpenter and of Murray and Riley agree closely, the average difference being less than 0.01 ml/1. Green's data are of good quality but are approximately 0.1 ml/1 higher than those of Carpenter and Murray and Riley in the low temperature range. Because of the excellent agreement between these two sets of data and a possible systematic error in Green's measurements (11), his data are listed in this study for comparison purposes only and are excluded from further analysis. Murray and Riley (16) also measured oxygen solubility in pure and saline waters using gasometric method. However, they neglected to correct their gasometric data for the gas dissolution effect on the volume of the aqueous phase (17). Because of this and because there are few gasometric data, these values are not included in the analysis, although they are listed in this study.

The determined values of oxygen solubility of Carpenter (11) and Murray and Riley (16) are all reported as the volume of oxygen per unit volume of water (ml/1). However, the methods of smoothing and representing the results are quite different. The results are also difficult to use because they have been tabulated, but not reported, in the form of equations. Weiss recognized this problem (17) and suggested the use of the following equation to represent the gas solubility data:

 $\ln C = A_1 + A_2(100/(T/K)) + A_3 \ln(T/100K) + A_4(T/100K) + S[B_1 + B_2(T/100K) + B_3(T/100K)^2] \dots$ 

where C may be either the solubility in ml (STP)/l or in ml (STP)/kg from water saturated air at a total pressure of one atmosphere, T is the Kelvin temperature, the A's and B's are constants, and S is the salinity in parts per thousand.

The first four terms of eq. (1) are obtained from the integrated form of the Van't Hoff equation (18). The salinity dependence is obtained from the commonly used Setchenow relation although the choice of ST and  $ST^2$  terms seems to be somewhat arbitrary. Further, the  $S^2$  term is not included although Carpenter found that it was needed (11).

Chen and Carpenter (19) have since re-analyzed the data of Carpenter (11) and Murray and Riley (16). The analyses were performed by first using these two sets of data separately and then combined. It was found in all three cases that the  $ST^2$  term is not significant statistically and the precision of the fit improves by approximately 10 per cent after discarding the  $ST^2$  term and replacing the ST term by S/T. The ST term was found to be insignificant while the  $S^2$  term is, when the S/T term is included. This confirms the finding of Carpenter. It was also found that the  $1/T^2$  term is not significant for the gas solubility in pure water, contrary to the finding of Benson and Krause (20, 21). The final equation generated from the combined data sets of Carpenter and Murray and Riley is:

41

(1)

COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Seawater	Chen-Tung A. Chen School of Oceanography Oregon State University Corvallis, OR 97331 U.S.A.
CRITICAL EVALUATION:	·
con	tinued
$\ln C = -1268.9782 + 36063.19/(T/K)$	(T/K) = 0.351299 (T/K)

+  $S(6.229 \times 10^{-3} - 3.5912/(T/K))$ +  $3.44 \times 10^{-6} s^2$ 

where C is the solubility in ml/l at STP. The standard deviation of eq. (2) is  $\pm 0.012$  ml/l.

Since the analytical precision of the oxygen determination has improved over the last few years, the concentrations of oxygen in the oceans are more and more frequently reported as ml or  $\mu$ mol per unit mass of seawater. To avoid the tedious work of computing the densities of seawater in order to change the units in routine use, we have also fit the data in the form of ml/kg and  $\mu$ mol/kg (17, 21, 22). The equation presented by Millero, Gonzalez and Ward (23) is used to calculate seawater densities. The best fit equations are as follows:

ln C (ml/kg) = -1286.2408 + 36607.82/(T/K) + 223.0650 ln (T/K) - 0.354587 (T/K) + S(5.954 x  $10^{-3}$  - 3.7341/(T/K))+ 3.68 x  $10^{-6}$  s<sup>2</sup> ±0.012 ml/kg

ln C (µmol/kg) = -1282.8704 + 36619.96/(T/K) + 223.1396 ln (T/K)

-0.354707 (T/K) + S(5.957 x 10<sup>-3</sup> -3.7353/(T/K))

+ 3.68 x  $10^{-6}$  s<sup>2</sup> ±0.52 µmol/kg

These equations are valid over the range of 9 to  $35.5^{\circ}$ C and 0 to 40% salinity. The factor of 22393 ml/mol was used to convert the volume of oxygen to moles.

The solubility of oxygen in marine brines has recently been investigated by Kinsman, Boardman and Borcsik (24) at 22 and 50°C up to 144 parts per thousand in chlorinity. The precision of the data probably was not much better than 4 per cent.

The effect of pressure upon the solubility of oxygen in seawater up to 102 atm has been measured by Enns, Scholander and Bradstreet (25). They reported that the equilibrium pressure increase was approximately 14 per cent at 100 atm hydrostatic pressure. They predicted that at 1000 atm the equilibrium partial pressure of oxygen would be increased nearly fourfold.

Carey and Gibson (26) measured the activity of dissolved oxygen based on its rate of reaction with the excited singlet state of pyrene-1-butyric acid and reported that it is not changed by hydrostatic pressures up to 1000 atm. They concluded that the partial pressure of dissolved oxygen will have the same relation to concentration at abyssal depths as at the surface. Carey thought it likely that neither of the above two papers gave the whole story on the pressure effect on oxygen solubility (Carey, personal communication, 1976). More recently, Taylor (27) measured the molar oxygen concentration in an artificial seawater medium in equilibrium with a high pressure of oxygen of 1 atm or less, its concentration in the aqueous phase was adequately described by Henry's Law at total pressures of up to 600 atm. His work on seawater and pure water (28) seems to substantiate the results of Enns, Scholander and Bradstreet (25). Due to the scarcity of the data that are of satisfactory precision, meaningful equations cannot be derived

continued on following page

(4)

(3)

(2)

Sea	water 4
COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> [7782-44-7] (2) Seawater	Chen-Tung A. Chen School of Oceanography Oregon State University Corvallis, OR 97331 U.S.A.
CRITICAL EVALUATION:	La 2000 1000
conti	
More measurements are clearly in ord	t high salinities and high pressures. er.
References	
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<ol> <li>Grasshoff, K. Kieler Meeresforsc</li> <li>Montgomery, H. A. C.; Thom, N. S. 14, 280-96.</li> <li>Carpenter, J. H. Limnol. Oceanog</li> </ol>	h <u>1963</u> 19, 8-15. ; Cockburn, A. J. Appl. Chem. <u>1964</u> ,
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<ol> <li>Murray, C. N.; Riley, J. P. Deep</li> <li>Murray, C. N.; Riley, J. P. Deep</li> <li>Weiss, R. F. Deep-Sea Res. <u>1970</u>,</li> <li>Hildebrand, J. H.; Scott. R. L.</li> </ol>	-Sea Res. <u>1969</u> ,16 311-20. 17, 721-3 <del>5</del> .
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Explor. Mer. <u>1976</u> , 36, 295-6. 23. Millero, F. J.; Gonzalez, A.; Ward 24. Kinsman, D. J. J.; Boardman, M.;	d, G. K. J. Mar. Res. 1976, 34, 61.
1973, (Pub. 1974), 1, 325-7. 25. Enns, T.; Scholander, P. F.; Brad 69, 389-91.	street, E. D. J. Phys. Chem. <u>1965</u> ,
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COMPONENTS :				ORIGINAL M	EASUREMENTS:	
(l) Oxygen (2) Seawat	; 0 <sub>2</sub> ; [778 :er	2-44-7]			.; Scholander, D treet, E. D.	P. F.;
	н <sub>2</sub> 0; [773	2-18-5]	J. Phys	. Chem. <u>1965</u> ,	69, 389-91.	
VARIABLES:			PREPARED H	3Y:		
T/K = 27				Chen-Tu	ng A. Chen	
P/MPa (h	ydrostatic	() = 0 - 10				
EXPERIMENTAL V	ALUES:					
t/°C	т <sup>а</sup> /К	p <sup>b</sup> =0 (0 MPa)		34 atm 45 MPa)	P <sup>b</sup> = 68 atm (6.89 MPa)	P <sup>b</sup> =102 atm (10.34 MPa)
-		Dis	tille	d Water		
0.5	273.7	682				789
25	298.2	734.5		771	805	839.5
25 25	298.2 298.2	781 359		819 373	855 390	892 410.5
25	298.2	443		464	484	508
			Seaw	ater		
25	298.2	737		775	806	842
		AUX	ILIARY	INFORMATIO	N	· · · · · · · · · · · · · · · · · · ·
METHOD/APPARAT	US/PROCEDURE	:		SOURCE ANI	D PURITY OF MATERIA	LS:
initial pre at controll equilibrium to 1 hr dur The solution a syringe w attached to	Oxygen a essure was ed tempera ing the ox on was then which has a o it. Pres	t the desir dissolved i ture. The s shaken fo ygen uptake transferre teflon tub sure was th	ed n it or 0.5 d to oing nen	(l) No	details given.	
measured by of the pres	sure devel					
teflon tube	•			ESTIMATED	FPDOD.	
				STIRIED	DAAOA.	
				REFERENCE	S :	

CONDOURNERS -	OPICINAL MACUPATION				
$\begin{array}{c} \text{COMPONENTS:} \\ (1)  \text{Outpot}  \text{[7782-44-7]} \end{array}$	ORIGINAL MEASUREMENTS:				
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Green, E. J.				
(2) Seawater	Ph.D. thesis, Hassachusetts Institute of Technology, <u>1965</u> .				
VARIABLES:	PREPARED BY:				
T/K = 274-308 Salinity	Chen-Tung A. Chen				
EXPERIMENTAL VALUES:					
Chlor- $10^{3}\alpha/$ inity t/°C T <sup>a</sup> /K cm(STP)cm <sup>-3</sup> atm <sup>-1</sup>	Chlor- inity t/°C $T^{a}/K \text{ cm}(\text{STP})\text{ cm}^{-3}\text{ atm}^{-1}$				
48.633 48.598 48.669 0 0.59 273.74 48.661 48.665 48.618 43.118	30.066 29.938 29.945 30.026 29.996 29.981 29.913				
42.890 42.932 0 5.03 278.18 42.920 42.972 42.857 34.299	30.140 30.072 0 22.02 295.17 30.131 30.071 30.049 30.074				
0 15.09 288.24 34.228 34.244 34.208 34.153 34.356 30.061	30.083 29.990 30.092 30.080 30.103 30.156				
30.242 30.177 0 22.02 295.17 30.059 30.086	30.137 30.090 0 22.05 295.20 30.126 30.061 30.118 30.101				
	continued on following page				
AUXILIARY	INFORMATION				
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:				
Distilled and seawater were simultaneously saturated with air with two 12-1 round bottom long-neck flasks inclined at a 45° angle and arranged to rotate about their axes of symmetry. A thin film of water was drawn over the inside surface of the flask by its rotation. The reagents (MnCl <sub>2</sub> ·4H <sub>2</sub> O, NaI, NaOH, H <sub>2</sub> SO <sub>4</sub> ) were added to the equilibrated water (after at least 8 hours of rotation) and the thiosulfate titration end point determined by the Amperometric technique using a Keithley microammeter. A modified Winkler method was used.	ESTIMATED ERROR: $\delta T/K = \pm 0.01$ $\delta C1\$_0 < \pm 0.028\$$ $\delta \alpha / \alpha = \pm 0.0027$ REFERENCES: 1. Green, E.J., Ph.D. thesis Massachusetts Institute of Technology, 1965. 2. Green, E.J.; Carritt, D.E., J. Mar. Res. <u>1967</u> , 25, 140.				

COMPONEN	TS:			EVALUATOR:					
(1) Ox	ygen; O	2; 7782-4	14-7	Green, E. J.					
(2) Se	-				Ph.D. thesis, Massachusetts Institute of Technology, <u>1965</u> .				
		<u>,,,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
CRITICAL	EVALUATI	ON:		-					
			conti	nuea					
Chlor- inity	t/°C	T <sup>a</sup> /K cm	$10^{3} \alpha /$ (STP) cm <sup>-3</sup> atm <sup>-1</sup>	Chlor- inity	t/°C	T <sup>a</sup> /K cm(	$10^{3} \alpha/$ STP) cm <sup>-3</sup> atm <sup>-1</sup>		
0	24.92	298.07	28.494 28.549 28.730 28.682 28.670 28.661	17.551	15.09	288.24	28.177 28.161 28.206 28.162 28.203 28.067		
0	34.81	307.96	24.086 24.129 24.132 24.181 24.085 24.199	17.562	34.81	307.96	20.172 20.197 20.194 20.231 20.200 20.246		
6.349	22.02	295.17	28.099 28.139 28.165 28.262 26.324	17.632	24.92	298.07	23.652 23.865 23.901 23.905 23.856		
12.412	22.02	295.17	26.224 26.214 26.269 26.263 26.245	24.339	22.02	295.20	23.770 23.323 23.375 23.378 23.378 23.391		
17.419	5.03	278.19	34.860 34.930 34.890 34.695 34.723 34.821	30.804	22.02	295.20	21.965 21.912 21.874 21.825 21.930 21.855		
17.464	0.59	273.74	39.022 39.092 39.051 39.099 39.079 39.132		m <u>antar a</u> , , , , , , , , , , , , , , , , , , ,				
17.487	22.02	295.17	24.961 25.108 25.091						

<sup>a</sup> Calculated by compiler.

COMPONENTS :				ORIGINAL MEASUR	REMENTS :		
	[7700 4	4 7]					
(1) Oxygen; O <sub>2</sub>		Carpenter, J					
(2) Seawater	(2) Seawater					<u>6</u> , 11, 2	264-77.
VARIABLES:				PREPARED BY:			
T/K = 274-30 Chlorinity	9		i	Chen-Tung A	. Chen		
EXPERIMENTAL VALUES	3:						
		_	h				
Chlorinity /%。	t/°C	T <sup>a</sup> /K		Chlorinit er) /%。	y t/°C	т <sup>а</sup> /К	s <sup>b</sup> / (ml/liter)
		273.63				285.53	
		273.67				285.55 285.55	
	5.02	278.17	8.898	}	12.41	285.56	7.465
	5.07 5.08	275.22	8.903 8.898	}		285.56 285.58	
	5.10	275.25	8.890	)		285.58	
	5.11	275.26	8.875	5		287.87	
0.0			8.884 8.862			288.12 288.14	7.078 7.079
0.0	5.21	278.36	8.858	\$	15.12	288.27	7.054
		283.00 283.01	7.894 7.897			288.29	
		283.01		1		293.23 293.25	
		283.09	/.004		25.10	298.25	5.761
		283.25	7 830	1		298.50 298.51	
	11.68	284.83	7.584	l I	29.80	302.95	5.301
	12.04 12.36	285.19	7.531			302.96 307.91	
		285.52	7.491			307.97	
				continu	ued on fo	ollowing	page
AUXILIARY INFORMATION							
METHOD/APPARATUS/PF	OCEDURE:			SOURCE AND PURITY OF MATERIALS:			
The sample was o	contained	inar	lexi-	(1) From air collected in the			
glass (perspex)	box which	n was p	laced		y 32 km v ore, MD.		oxygen.
on a frame that mix air and liqu				Dar crim	ore, and.	20.998	orygen.
water was trans							
bottle and the m	reagents	(MnCL <sub>2</sub> .					
NaI, NaOH, H <sub>2</sub> SO	) added.	The <sup>-</sup> nen tit	rated				
with thiosulfate	resulting solution was then titrated with thiosulfate solution with the						
iodine endpoint detected by a Beckman DU spectrophotometer at 320							
-	and 350 $\mu\text{m}$ . The method was a modified Winkler method with a weight			ESTIMATED ERROL	De		
modified Winkler							
photometric titration. See references.			$\delta T/K = \pm 0.0$ $\delta S/S = \pm 0.0$		nor's es	timate	
				DEPENENCIA			<u></u>
				REFERENCES: (1) Carpent	ter. T I	I. Limno	l Oceanos
				1965, 1	10, 135.		-
				(2) Carpent	ter, J. H 11, 264.	I. Límno	l. Oceanog.
				(3) Carritt	t, D. E.;	Carpen	ter, J. H.
				J. Mar.	. Res. <u>19</u>	<u>, 24,</u>	286.
						······································	

Oxygen	Solubilities	up to	200 kPa	£	

COMPONENTS :			E	EVALUATOR:			
(1) Oxygen;	0 <sub>2</sub> ; [7782		Carpenter,	ј. н.			
(2) Seawater			1	Limnol. Oce	anog. 1	966, 11,	264-77.
					_		
			ļ				
EXPERIMENTAL	VALUES:		conti:	nued			
	11120201						-
	t∕°C	т <sup>а</sup> /к	s <sup>b</sup> /	Chlorinity	t∕°C	т <sup>а</sup> /к	s <sup>b</sup> /
/%。			(ml/liter)	/%。			(ml/liter)
		200 50	4 607		0.60		0 221
4.99	35.43 35.45	308.58 308.60			0.62 0.55	273.77 273.70	
4.55	35.45	308.60			5.39	278.54	7.408
	55.45	500.00	4.557	15.00	5.37	278.52	7.401
	20.08	293.23	6.017	13.00	10.16	283.31	6.618
	20.09	293.24	6.017		10.20	283.35	6.613
	25.02	298.17			14.10	287.25	5.982
5.07	25.05		5.475		14.97	288.12	5.971
	30.04		5.008		211.57	200122	5.512
	30.09	303.24	4.992		20.15	293.30	5.396
	35.18	308.33	4.592		20.11	293.26	
	000=-				25.24	298.39	4.924
	0.48	273.63	9.447		25.27	298.42	4.922
	0.49		9.443	15.18	29.99	303.14	4.542
	5.28	278.43			30.01	303.16	4.542
5.17	5.29	278.44	8.336		35.50	308.65	4, 162
	10.15	283.30			35.50	308.65	4.162
	10.19	283.34			35.50	308.65	4.161
	14.94	288.09	6.663				
	14.95	288.10			0.41	273.56	7.863
					0.44	273.59	7.856
10.02	35.48	308.63	4.363	20.32	1.09	274.24	7.729
	35.56	308.71			9.88	283.03	6.292
					35.53	308.68	3.961
	0.60	273.75	8.886		35.58	308.73	3.963
	0.64	273.79	8.851				
	5.30	278.45	7.883		20.18	293.33	5.115
10.13	5.35	278.50	7.873		20.18	293.33	5.117
	10.17	283.32	6.994	20.37	25.23	298.38	4.688
	10.14	283.29	6.993		25.25	298.40	4.685
	15.02	288.17	6.288		29.98	303.13	4.300
					29.99	303.14	4.304
	20.12	293.27	5.666		29.99	303.14	4.304
	20.14	293.29					
10.49	25.19	298.34	5.154		5,34	278.49	6.919
4	25.23	298.38	5.157		5.34	278.49	6.916
	29.97	303.12	4.753	20.88	10.18	283.33	6.196
	29.92	303.07	4.748		10.20	283.35	6.184
					14.97 15.02	288.12	5.602
5					1 . 07	288.17	5.590

<sup>a</sup> Calculated by compiler.

<sup>b</sup> Solubilities of oxygen in seawater assuming an oxygen volume of 22,400 ml/mol at STP. Observations were corrected by author to 101.325 kPa total pressure including water vapor and 20.94% oxygen excluding water vapor on the basis of individual gas analyses.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Murray, C. N.; Riley, J. P.
(2) Seawater	Deep-Sea Research, <u>1969</u> , 16, 311-20.
VARIABLES:	PREPARED BY:
T/K = 279-301 Salinity	Chen-Tung A. Chen

## EXPERIMENTAL VALUES:

Physically determined values of oxygen solubility in ml/l (from an atmosphere of 20.94%  $\rm O_2$  and 100% relative humidity).

t∕°C	T <sup>a</sup> /K	Salinity/(%°)	0 <sub>2</sub> /(ml/l)
5.90	279.05	0.000	8.71
5.90	279.05	32.995	7.03
13.60	286.75	0.000	7.27
13.70	286.85	31.981	5.96
20.00	293.15	36.725	5.11
20.15	293.30	0.000	6.33
25.72	298.87	0.000	5.71
24.65	297.80	34.261	4.77
28.31	301.46	0.000	5.42

<sup>a</sup> Calculated by compiler.

AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Saturation of samples with oxygen was carried out by stirring at such a rate that a vortex of ~ 3 cm in length was formed. The ratio of the volume of seawater (measured by weight) gives the solubility.	SOURCE AND PURITY OF MATERIALS: (1) > 99.9% purity.
	ESTIMATED ERROR: $\delta T/K = \pm 0.02$ $\delta S \hat{*}_{0} = \pm 0.01 \text{ ml/l}$ REFERENCES: 1. Murray, C. N.; Riley, J. P.; Wilson, T. R. S. Deep-Sea Research, <u>1969</u> , 16, 297. 2. Murray, C. N.; Riley, J. P. Deep-Sea Research, <u>1969</u> , 16, 311.

MEASUREMENTS: C. N.; Riley, J. P. a Research, <u>1969</u> , 16, 0. BY: Tung A. Chen. Salinity/ O <sub>2</sub> / (% <sub>0</sub> ) (m1/1) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172 29.102 5.863
a Research, <u>1969</u> , 16, 0. BY: Tung A. Chen. bility in ml/l. (from an midity). Salinity/ $O_2/$ (%) (ml/l) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172
0. BY: Tung A. Chen. Sility in ml/l. (from an midity). Salinity/ 0_/ (%°) (ml/l) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172
Tung A. Chen. fility in ml/l. (from an midity). Salinity/ O <sub>2</sub> / (% <sub>o</sub> ) (ml/l) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172
bility in ml/l. (from an midity). Salinity/ 0_/ (%_o) (ml/l) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172
midity). Salinity/ O <sub>2</sub> / (% <sub>o</sub> ) (m1/1) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172
midity). Salinity/ O <sub>2</sub> / (% <sub>o</sub> ) (m1/1) 0.000 7.031 10.090 6.618 15.084 6.395 20.774 6.172
(%)         (m1/1)           0.000         7.031           10.090         6.618           15.084         6.395           20.774         6.172
10.0906.61815.0846.39520.7746.172
0.000         6.360           10.090         5.971           15.446         4.788           28.781         5.362           39.020         5.045
0.000         5.794           8.712         5.464           12.646         5.348           22.169         5.098           33.894         4.765
0.000 5.312 8.682 5.064 16.690 4.831 25.435 4.611 33.626 4.400 39.120 4.254 ontinued on following page
DN
D PURITY OF MATERIALS: om air. D ERROR: $\pm 0.02$ $= \pm 0.02$ % $1/1) = \pm 0.01$ ES: y, C. N.; Riley, J. P.; on, T. R. S. Deep-Sea arch, 1968, 15, 237.

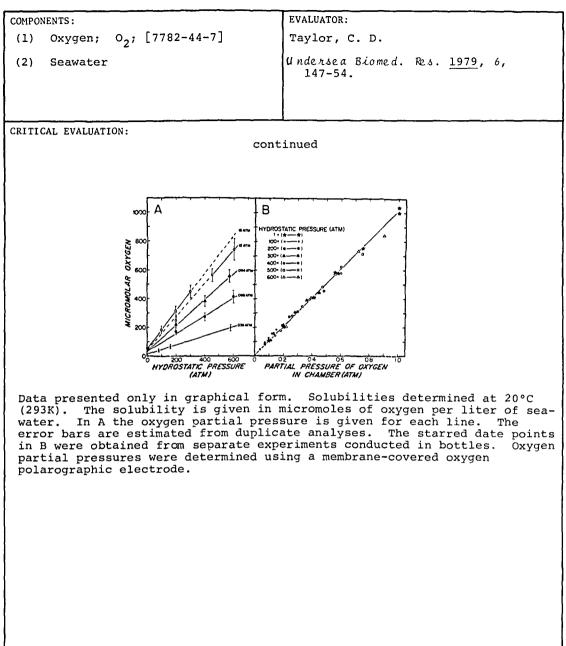
COMPONEN	rs :			EVALUAT	COR:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]				Murray, C. N.; Riley, J. P.		
(2) Seawater			Deep-Sea Research, 1969, 16,			
				311	-20.	
1						
EXPERIM	ENTAL VALUES					<u> </u>
t/°C	Salinity/		continu t/°		Salinity	0 (
(T <sup>a</sup> /K)	(%)	(m171)	(T <sup>a</sup> /	́к)	Salinity (%°)	02/ (m1/1)
	0.000	7.887			0.000	4.862
9.95	10.566	7.364 7.045	34.80	1	8.569	4.641
(283.10	) 23.355 31.935	6.775 6.445	(307.9	5)	14.019 23.651 34.205	4.528 4.293 4.067
	40.201	6.110			34.203	4.067
	<u></u>	<u></u>				
l						
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TOND ON THINK .			
COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kinsman, D.J.J.; Boardman, M.;		
-	Borcsik, M.		
(2) Artificial Seawater	Sump  Salt  (th = 1072  (nub = 1072)		
	Symp. Salt. 4th, <u>1973</u> (pub. 1973), 1, 325-7.		
	.,		
VARIABLES:	PREPARED BY:		
T/K = 293 - 323			
Chlorinity	Chen-Tung A. Chen		
EXPERIMENTAL VALUES:	h		
02 <sup>b</sup> t/°C T <sup>a</sup> /K Cl/%° (mg/kg water)	$0^{b}_{2}$		
t/°C T <sup>a</sup> /K Cl/%°(mg/kg water)	t/°C T <sup>a</sup> /K Cl/%。 (mg/kg <sup>2</sup> water)		
22.5 295.7 18.57 7.15	23.0 296.2 122.51 2.63		
23.0 296.2 18.59 7.28	22.5 295.7 122.53 2.60		
23.75 296.9 18.76 6.91	23.75 296.9 123.6 2.63		
22.0 295.2 18.81 6.83 21.0 294.2 20.45 7.01	21.0294.2128.192.4022.0295.2128.842.48		
22.0 295.2 20.60 7.12	22.0 <i>277.2</i> 120.03 2.30		
23.0 296.2 37.88 6.06			
22.0 295.2 38.31 5.67 23.75 296.9 38.54 5.69			
23.75 296.9 38.54 5.69 21.0 294.2 41.24 5.71			
22.0 295.2 41.54 5.85			
23.0 296.2 59.60 4.69			
22.0 295.2 60.27 4.57 23.75 296.9 61.23 4.57			
21.0 294.2 64.35 4.48			
22.0 295.2 64.63 4.56			
23.0 296.2 98.31 3.36	·		
22.0 295.2 98.48 3.60 22.5 295.7 98.53 3.33			
22.5 295.7 98.53 3.33 23.75 296.9 99.04 3.31			
21.0 294.2 104.60 3.10			
22.0 295.2 105.54 3.17			
22.0 295.2 121.69 2.58	continued on following page		
······			
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Standard Winkler Method.	Oxygen: air		
	Marine brines: unspecified		
	ESTIMATED ERROR:		
	$\delta T = 2^{\circ}C$		
	$\delta O_2 < 4\%$		
	REFERENCES:		
	1. Kinsman, D. J. Private		
	communication, <u>1981</u> .		

OMPONENTS:		EVALUATOR:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Kinsman, D.J.J.; Boardman, M.;		
2) Artificial Seawater		Symo. Salt. 4th,	Borcsik, M. Symo. Salt. 4th, <u>1973</u> (pub. 1973),	
		1, 325-7.		
RITICAL EVALUATION:	cont	inued		
	o b		o b	
C1/%。	02 <sup>b</sup> (mg/kg water)	C1/%。	02 <sup>b</sup> (mg/kg water)	
	t/°C = 50 (:	323K)		
18.20 18.90	5.03 4.94	96.08 97.04	2.63 2.61	
20.25	4.98	104.14	2.55	
20.74	4.90	104.80	2.55	
24.29 25.80	4.78 4.73	111.47 118.34	2.48	
25.80	4.63	118.34	2.34 2.27	
38.43	4.22	121.45	2.08	
39.67	4.20	127.85	2.14	
41.14 41.21	4.18 4.196	128.67 137.13	2.09 1.88	
51.85	3.80	140.79	1.89	
54.89	3.73	144.35	1.79	
58.52 63.65	3.59 3.40			
64.45	3.32			
74.78	3.43			
65.69	3.35			
01 61				
81.51 84.13	2.99 2.88			
84.13 90.23	2.88 2.85			
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85	0.2 atm.		
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85 compiler.	).2 atm.		
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85 compiler.	).2 atm.		
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85 compiler.	0.2 atm.		
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85 compiler.	0.2 atm.		
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85 compiler.	0.2 atm.		
84.13 90.23 <sup>a</sup> Calculated by o	2.88 2.85 compiler.	0.2 atm.		

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Taylor, C. D.
(2) Seawater	Undersea Biomed. Res. 1979, 6, 147-54.
VARIABLES:	PREPARED BY:
T/K = 293 P/MPa (Hydrostatic) = 1-61	Chen-Tung A. Chen, R. Battino
EXPERIMENTAL VALUES:	° <sub>2</sub> /
Oxygen Partial Pressure/atm Hydro	static Pressure/atm (µmole/liter)
0.036 (3.6 kPa) <sup>b</sup> 0.036 (3.6 kPa)	80 $(8.1 \text{ MPa})^{\text{C}}$ 40
	160 (16.2 MPa) 60 580 (58.8 MPa) 180
	200 (20.3 MPa) 170
	400 (40.5 MPa) 260 500 (60.8 MPa) 420
	200 (20.3 MPa) 220 400 (40.5 MPa) 380
	400 (40.5 MPa) 380 570 (57.8 MPa) 580
	200 (20.3 MPa) 250
	440 (44.6 MPa)         560           500 (60.8 MPa)         740
	LOO (10.1 MPa) 180 200 (20.3 MPa) 320
	300 (30.4 MPa) 460
<sup>C</sup> Calculated in MPa by compiler.	
	continued on following page
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Air-equilibrated artificial seawater was contained in a polycarbonate	(1) Union Carbide, 99.5% purity
vessel housed in a stainless steel pressure cylinder. Oxygen-helium	(2) Artificial seawater: 4% Seven Seas Marine Mix; 0.1% Tris-
mixture was used in flushing gas and	base; 0.05% ammonium sulfate;
the partial pressure of it was monitored by a membrane-covered	рН 7.2-7.4.
oxygen polarographic electrode. Flushing was continued until the	
partial O <sub>2</sub> pressure remained constant for at least 5 minutes,	
then the aqueous and gaseous phases	ESTIMATED ERROR:
were allowed to equilibrate with stirring at 20 °C for at least two	
hours prior to analysis by the Winkler method using undecompressed subsamples. Details also given in	$\delta O_2 < 12$ % , author's estimate
reference 1.	REFERENCES :
	l. Taylor, C.D. Appl. Environ. Microbiol. <u>1979</u> , 37, 42-9.

Seawater



COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	H. L. Clever Department of Chemistry
(2) Electrolyte(s)	Emory University
(3) Water; H <sub>2</sub> O; [7732-18-5]	Atlanta, GA 30322 USA 1981, April

CRITICAL EVALUATION:

An Evaluation of the Solubility of Oxygen in Aqueous Electrolyte Solutions.

Not enough workers have measured the solubility of oxygen in any one aqueous electrolyte system over common ranges of concentration and temperature to recommend solubility values. Most of the available data are classed as tentative.

In order to have a common basis for comparison, where possible the solubility data have been converted to Setschenow salt effect parameters at an oxygen partial pressure of 101.325 kPa in the form

 $k_{sca}/dm^3 mol^{-1} = (1/(c_2/mol dm^{-3}))\log(\alpha^{\circ}/\alpha)$ 

where  $c_2$  is the electrolyte concentration in mol dm<sup>-3</sup>, and  $\alpha^{\circ}$  and  $\alpha$  are the Bunsen coefficients in pure water and electrolyte solution, respectively. The Ostwald coefficient ratio,  $L^{\circ}/L$ , will give the same value, but the salt effect parameter is symbolized, k<sub>SCL</sub>. Both ratios are equivalent to

a molar gas solubility ratio,  $c_1^{\circ}/c_1$ , thus

$$k_{sc\alpha} = k_{scL} = k_{scc} = (1/(c_2/mol dm^{-3})) \log (c_{1,sat}^{\circ}/c_{1,sat})$$

Other forms of the salt effect parameter will be found on the data sheets that follow this discussion. They include

 $k_{sms}/kg \ mol^{-1} = (1/(m_2/mol \ kg^{-1}))\log(s^{\circ}/s)$ 

$$k_{scx}/dm^3 mol^{-1} = (1/(c_2/mol dm^{-3}))\log(x^{\circ}/x)$$

$$k_{smx}/kg \text{ mol}^{-1} = (1/(m_2/mol kg^{-1}))\log(x^{\circ}/x)$$

where  $m_2$  is the electrolyte molality, s°/s is the Kuenen coefficient ratio, and x°/x is the mole fraction gas solubility ratio usually calculated with respect to all ions in the solution. The Kuenen coefficient, s, is referenced to 1 g of water whether it is for pure water or the electrolyte solution. Thus the s°/s ratio is equal to a gas molality ratio  $m_1^{\circ}/m_1$ .

The density data required to convert the salt effect parameter from one form to another were taken from the *International Critical Tables*, McGraw-Hill Co., Inc., 1928, Vol. III.

The activity coefficient of the dissolved oxygen,  $y_1$ , is a function of the concentration of all solute species, which in the present systems are the electrolyte and the nonelectrolyte. At a given temperature log  $y_1$  can be represented as a power series in  $c_1$  and  $c_9$ 

$$\log y_1 = \sum_{nm} k_{nm} c_1^n c_2^m$$

If it is assumed that for low concentrations of both nonelectrolyte,  $c_1$ , and electrolyte,  $c_2$ , the only important terms are the linear ones,

$$\log y_1 = k_1 c_1 + k_2 c_2$$

The expression has been experimentally verified for moderately dilute solutions in which there is no chemical interaction between the solute species.

The measurements of the nonelectrolyte solubility in pure water,  $c_{1,sat}^{\circ}$ , and in a salt solution,  $c_{1,sat}$ , give directly the activity coefficient of the nonelectrolyte. Long and McDevit (7) show that

 $\log(y_1/y_1^\circ) = \log(c_{1,sat}^\circ/c_{1,sat}) = k_1(c_{1,sat} - c_{1,sat}^\circ) + k_2 c_2$ 

And if the nonelectrolyte solubility values are low, as they generally are for a gas, the term in  $k_1$  can be neglected, even though  $k_1$  is similar in magnitude to  $k_2$ . Thus for low nonelectrolyte concentration

 $\log(y_1/y_1^\circ) = \log(c_1^\circ, \operatorname{sat}/c_1, \operatorname{sat}) = k_2 c_2$ 

The solubility data which are evaluated in this section do not always meet the requirements set forth above. Thus, the experimental Setschenow salt effect parameters,  $k_s$ , may not be equivalent to the theoretically important salt effect parameter,  $k_2$ .

A plot of log( $\alpha^{\circ}/\alpha$ ) vs.  $c_2$  is usually linear over moderate concentrations of the electrolyte. However, curvature of the plot is often seen at above moderate concentrations, and in extreme cases one observes regions of both salting-out and salting-in over different concentration regions of the same isotherm, e.g.  $O_2$  + HNO<sub>3</sub> + H<sub>2</sub>O at 333 K.

The salt effect parameters,  $k_{sc\alpha}/dm^3 \text{ mol}^{-1}$ , are presented by several methods in the evaluation.

In the first method  $k_{sca}$  values are calculated for each experimental determination, and a graph is prepared of  $k_{sca}$  vs.  $c_2$ . If the plot is linear and of zero slope,  $k_{sca}$  is taken to be independent of concentration. In such cases an average value of  $k_{sca}$  is given. If the plot is linear, but of non-zero slope,  $k_{sca}$  is fitted to a linear equation in  $c_2$ .

In the second method a graph is prepared of  $\log(\alpha^{\circ}/\alpha) vs. c_2$ . A linear plot shows no concentration dependence of the salt effect parameter and the slope is  $k_{sc\alpha}$ . Recently Yasunischi (33,34) has fitted such plots that show curvature to a function

 $\log(\alpha^{\circ}/\alpha) = k_{SC\alpha}^{\circ} c_2/(1 + k_{SC\alpha}^{\prime} c_2)$ 

In a sense the first method, in which the salt effect parameter is given by a linear function of concentration,  $k_{ecc} = a + bc_2$ , is equivalent to

 $\log(\alpha^{\circ}/\alpha) = (a + bc_2)c_2 = ac_2 + bc_2^2$ 

however, the constants should be redetermined from the  $\log\left(\alpha^\circ/\alpha\right)$  and  $c_2$  data.

Salt effects on the solubility of oxygen have been studied at both large partial pressures of oxygen and at atmospheric pressure. In general  $k_{sca}$  values are calculated for only the atmospheric pressure measurements. An exception are the data of Bruhn, Gerlach, and Pawlek (17) who gave  $\alpha/\alpha^{\circ}$  ratio's for their measurements at high pressure.

The use of a salt effect parameter of the Setschenow type should not be taken to mean that it is necessarily the best way to represent the salt effect data. It is used here as a convenient parameter in the comparison of data from several sources.

The solubility of oxygen in water was usually taken from the paper under evaluation for the calculation of the salt effect parameter. The reason for using the water solubility value of the author, rather than the recommended value from this volume, is that systematic errors in a given author's work may cancel in the  $\alpha^{\circ}/\alpha$  ratio.

Studies of the solubility of oxygen in aqueous electrolyte solutions appear in over 30 papers. The seven papers which report salt effect data on oxygen solubility in four or more electrolyte solutions are discussed below. The papers which report data on only one or two systems are discussed with the system.

Geffcken (1) measured the solubility of oxygen in aqueous solutions of HCl,  $H_2SO_4$ ,  $HNO_3$ , NaOH, NaCl, KOH, and  $K_2SO_4$  at several concentrations up to about 2 mol dm<sup>-3</sup>. His average values of the Ostwald coefficient of oxygen in water of 0.03630 at 288.15 K and 0.03080 at 298.15 K were used to calculate the  $k_{\rm scL}$  values from his data. The  $k_{\rm scL}$  values from his work usually show a small decrease in magnitude as the electrolyte concentration increases. In general Geffcken's measurement compare well with more modern measurements, and they are classed as tentative.

MacArthur (4) measured the solubility of atmospheric oxygen in fifteen aqueous electrolytes. He analyzed 250 cm<sup>3</sup> samples of air saturated solution for oxygen by a modified Winkler procedure. The salt effect parameters calculated from his data are equivalent to  $k_{\rm scl}$  or  $k_{\rm sc\alpha}$  values. The

solubility values may be in error by as much as 10 per cent. Some of the aqueous electrolyte density values appear to be in error. The salt effect parameters show more than average scatter as a function of electrolyte concentration. In spite of the defects, some of the salt effect values compare well with more modern measurements. The data are classed as doubtful or tentative depending on the system.

Eucken and Hertzberg (6) measured the Ostwald coefficient of the solubility of oxygen in aqueous solutions of MgCl<sub>2</sub>, LiCl, NaCl, and KCl at several

temperatures and two or three electrolyte concentrations up to about 2.5 mol kg<sup>-1</sup>. Some doubt was cast on their work because of the poor agreement of their argon solubility values at 273.15 K with other workers values. However, the oxygen data appears reliable, and they are classed as tentative.

Bruhn, Gerlach and Pawlek (17) measured the solubility of oxygen in aqueous solutions of  $H_2SO_4$ ,  $NH_4OH$ ,  $(NH_4)_2SO_4$ ,  $CuSO_4$ ,  $NISO_4$ ,  $CoSO_4$ , and NaOH, usually at concentrations of 0.5, 1.0 and 1.5 mol dm<sup>-3</sup>, under pressure and up to temperatures of 523 K. They did not measure the solubility of oxygen in water but they did their own evaluation of the oxygen solubility in water from literature data. They reported a Bunsen coefficient,  $\alpha/cm^3$  (STP) cm<sup>-3</sup> atm<sup>-1</sup>, and the  $\alpha/\alpha^\circ$  ratio where  $\alpha^\circ$  is the Bunsen coefficient in water. From the reported  $\alpha$  and  $\alpha/\alpha^\circ$  values one can deduce the solubility values of oxygen in water used by them are:

T/K	$\alpha^{\circ}/\text{cm}^{3}(\text{STP})\text{cm}^{-3}\text{atm}^{-1}$	T/K	$\alpha^{\circ}/\text{cm}^{3}(\text{STP})\text{cm}^{-3}\text{atm}^{-1}$
298.15	0.02831	398.15	0.01775
323.15	0.02092	423.15	0.01959
348.15	0.01797	473.15	0.02690
373.15	0.01705	523.15	0.03782

The authors obtained smooth curves when they plotted  $\alpha/\alpha^{\circ} vs. c_2$ . However, the salt effect parameters,  $k_{sc\alpha}/dm^3mol^{-1}$ , calculated from the inverse of the  $\alpha/\alpha^{\circ}$  ratios scattered badly and do not appear to correlate well with either electrolyte concentration or temperature. Some of the scatter may be due to the choice of  $\alpha^{\circ}$  values, and some may be due to the difficulties encountered in making solubility measurements at high pressure. The tabulated values of  $k_{sc\alpha}$  are the average of the measured values at all

concentrations. The data are classed as tentative, however, they scatter more widely and are greater in magnitude than the values obtained by other workers.

Khomutov and Konnik (30) measured the solubility of oxygen from air, at 101 kPa (1 atm) at 298.15 K in forty four aqueous alkali metal salt solutions. They usually measured the oxygen solubility at 6 to 8 electrolyte concentrations up to either 0.5 or 1.2 mol dm<sup>-3</sup>. The air saturated solutions were analyzed for oxygen by the Winkler method with an accuracy of  $\pm 0.05 \text{ mg dm}^{-3}$ . The solubility of oxygen ranged from 2.8 to 8.15 mg dm<sup>-3</sup> and the maximum error was stated to be  $\pm 1.8$  per cent. They did not report numerical data, but they presented graphs of all 44 systems of log(solubility, mg dm<sup>-3</sup>) vs.  $e_2$ . Except for the lithium salts, the linearity of the log (solubility) vs.  $e_2$  plots was quite good. They did present a table of salt effect constants which appear to be the equivalent of  $k_{SCA}$  values. The salt effect parameters are classed as tentative.

Yasunischi (33, 34) measured the solubility of oxygen at a partial pressure of 101.325 kPa (1 atm) in 13 aqueous electrolyte solutions at temperatures of 288.15, 298.15 and 308.15 K and at electrolyte concentrations of about 1 to 6.4 mol dm<sup>-3</sup> depending on the electrolyte. He used an apparatus similar to that of Horiuti. He tabulated both the solubility data and his value of  $k_{\rm SCL}$  from a fit to the log L°/L and  $c_2$  data. When the log L°/L vs.  $c_3$  showed a definite curvature he fitted the data to an empirical relation

$$\log (L^{\circ}/L) = k_{SCL}^{\circ} c_2 / (1 + k_{SCL}^{\prime} c_2)$$

The solubility values were calculated taking into account the vapor pressure of the solvent and the increase in solution volume due to the dissolved gas. The results are classed as tentative, but should be preferred over the data of others where there is a choice.

Oxygen solubility measurements have been reported in over 70 aqueous electrolyte systems. Unless otherwise stated, the salt effect parameters are for a one mole  $dm^{-3}$  electrolyte solution at an oxygen partial pressure of 101.325 kPa.

The systems are given in the order of the standard arrangement for inorganic compounds used in the U.S. National Bureau of Standards publications. The number before each system is the standard order number for the electrolyte.

## 10(1) Oxygen + Hydrochloric acid [7647-01-0] + Water

Geffcken (1) measured the solubility of oxygen in aqueous hydrochloric acid at six acid concentrations up to 1.982 mol dm<sup>-3</sup> at 288.15 and 298.15 K. The k values scatter with no definite trend with acid concentration. The average values are taken as the tentative values

T/K	288.15	298.15
$k_{sc\alpha}/dm^3mol^{-1}$	0.0440	0.0307
standard deviation, $\sigma$	±0.0020	±0.0014

## 14(1) Oxygen + Sulfuric acid [7664-93-9] + Water

There are six reports on the solubility of oxygen in aqueous sulfuric acid solution. Three were carried out at atmospheric pressure near the turn of the century. Three were carried out at pressures up to 15 atm and reported in 1965 and 1967. Geffcken (1) measured the solubility of oxygen in ten solutions up to concentrations of 2.65 mol dm<sup>-3</sup> at temperatures of 288.15 and 298.15 K. Christoff (2) made measurements in two solutions at 293.15 K and Bohr (3) made measurements of oxygen solubility in eight solutions at concentrations between 2.45 and 17.9 mol dm<sup>-3</sup> at temperatures near 294 K. The three authors' data were converted to salt effect parameters,  $k_{sca}$ .

which are given in the following table. The salt effect parameter values form a consistent pattern. The data are classed as tentative.

Bruhn, Gerlach, and Pawlek (17) measured the solubility of oxygen in 0.5, 1.0, and 1.5 mol dm<sup>-3</sup> sulfuric acid solutions at five temperatures between 323 and 523 K. They report Bunsen coefficients and  $\alpha/\alpha^{\circ}$  ratios. The  $\alpha/\alpha^{\circ}$  values have been converted to  $k_{sc\alpha}$  values. The average of the three values at each temperature are given in the table. The  $k_{sc\alpha}$  values show little variation with temperature. There is some indication of a decrease in  $k_{sc\alpha}$  value as the acid concentration increases, but the trend is obscured by the random scatter of the data. The data are classed as tentative.

Sulfuric Acid Concentration	Salt Effe	ect Paramete	rs, k <sub>scα</sub> /d	$m^3 mol^{-1}$
concentration c2/mol dm <sup>-3</sup>	Geffcken 288.15 K	Christoff 293.15 K	Bohr 294.2 K <sup>1</sup>	Geffcken 298.15 K
0.245	0.134			0.115
0.264	0.120			0.114
0.489	0.109			0.099
0.509	0.103			0.098
0.915	0.102			0.085
0.948	0.105			0.087
1.474	0.100			0.088
1.756	0.102			0.083
2.45			0.082	
2.476	0.090			
2.647	0.092			0.078
4.45			0.068	
4.63		0.063		
5.35			0.063	
9.52		0.038		
10.2			0.041	
12.4			0.039	
14.8			0.030	
17.2			0.011	
17.9			0.003	
	Bru	hn, Gerlach	, and Pawl	ek
	323 К	373 к 423	к 473 к	523 K
1.0	0.088	0.102 0.1	02 0.105	0.100
	±0.013 ±	0.010 ±0.0	15 ±0.023	

Temperature ranges from 293.95 to 294.65, see data sheet.

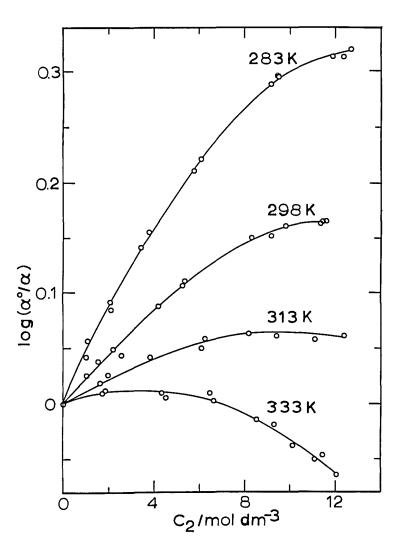
Klyueva (19) and Turchinov (20) measured oxygen solubilities in aqueous sulfuric acid solution at several pressures. Klyueva measured the oxygen solubility at oxygen partial pressures of 2.5 and 10 atm at six temperatures between 323 and 473 K in water and at 10 atm in 0.0125 mol dm<sup>-3</sup> sulfuric acid solution saturated with either Ni<sub>3</sub>S<sub>2</sub>, Cu<sub>2</sub>S or Co<sub>4</sub>S<sub>3</sub>. The sulfuric acid metal sulfide solutions decrease the oxygen solubility to less than 50 per cent its solubility in water. The sulfide concentrations are not given. Turchinov (20) measured the oxygen solubility at oxygen partial pressures of 5, 10 and 15 atm at 383 K in four sulfuric acid solutions up to a concentration of 2.30 mol dm<sup>-3</sup>. Values of k sca were calculated. At concentrations of 0.756 and 1.275 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub> the values scatter badly and they are much smaller than the values of Bruhn, Gerlach and Pawlek at similar temperatures. At the two higher acid concentrations the values of k sca are 0.111 ± 0.009 at 1.785 mol dm<sup>-3</sup> and 0.214 ± 0.006 at 2.30 mol dm<sup>-3</sup>. The first value agrees within experimental error with the Bruhn, *et al.* value, but the second value appears large for such a small increase in acid concentration.

18(1) Oxygen + Nitric acid [7697-37-2] + Water

Both Geffcken (1) and Pogrebnaya, Usov, Baranov, and Machigin (31) have measured the solubility of oxygen in aqueous nitric acid at an oxygen partial pressure near one atm (101 kPa). Geffcken made five to six measurements at acid concentrations up to near 2 mol dm<sup>-3</sup> at 288.15 and 298.15 K. Pogrebnaya *et al.* made up to 13 measurements at acid concentrations up to 12.5 mol dm<sup>-3</sup> at seven temperatures between 283.15 and 333.15 K.

Both data sets were converted to salt effect parameters,  $k_{sc\alpha}$ . The

 $\log(\alpha^{\circ}/\alpha) \ vs. \ c_2$  plots are reasonably linear up to concentrations of 3 to 4 mol dm<sup>-3</sup> but show definite curvature at the larger acid concentrations. At 323 and 333 K the nitric acid salts-in oxygen starting at about 10 mol dm<sup>-3</sup> and 8.5 mol dm<sup>-3</sup> respectively. A graph of  $\log(\alpha^{\circ}/\alpha) \ vs. \ c_2$  at temperatures of 283, 298, 313 and 333 K from the data of Pogrebnaya et al. (31) is shown.



Values of  $k_{sca}$  to use at acid concentrations from 0 to 2 mol dm<sup>-3</sup> acid are given below. All except the 288.15 K value were calculated from the data of Pogrebnaya *et al.* and they are classed as tentative.

T/K	$k_{sc\alpha}/dm^3 mol^{-1}$	Т/К	k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>
283.15	0.04400.034010.02550.02402	303.15	0.0175
288.15		313.15	0.0115
293.15		323.15	0.0090
298.15		333.15	0.0050

<sup>1</sup> Geffcken's value.

<sup>2</sup> Geffcken's value is 0.0176.

Pogrebnaya *et al.* give one value of  $k_{s\mu x}$  of 0.017 at 298.15 K. The solubility ratio  $x^{\circ}/x$  was calculated with respect to molecular nitric acid, HNO<sub>3</sub>. Inspection of the data shows that  $k_{s\mu x}$  values salt-in over most of the acid concentration range at both 323 and 333 K. The temperature coefficient of mole fraction solubility changes sign at about 16 mole provide the function of the function o

16 mol percent nitric acid. At lower mole fractions oxygen solubility decreases with temperature, at higher nitric acid concentration oxygen solubility increases with temperature.

Another paper of Pogrebnaya, Usov, and Baranov (27) which may contain additional data was not available to us.

Other measurements of the solubility of oxygen in nitric acid solution were carried out at higher oxygen partial pressure. They are classed as tentative. In 1955 both Robertson, Mason and Corcoran (10) and Sprague (11) reported oxygen solubility in pure nitric acid and in nitric acid containing up to 31 weight per cent water. More recently Shapka and Atroshchenko (25, 29) and Pogrebnaya, Usov and Baranov (32) reported oxygen solubility in nitric acid solutions over wide ranges of composition, temperature and pressure. The data are presented on data sheets following this section. No attempt was made to treat the data in terms of salt effect parameters. The data of Pogrebnaya, Usov and Baranov (32) are preferred not because there is evidence they are more accurate, but because they cover the greatest range of concentration, temperature and pressure in one self-consistent study.

18(2) Oxygen + Nitric acıd [7697-37-2] + Nitrogen dioxide/ Dinitrogen tetroxide

Both Robertson, Mason, and Corcoran (10) and Sprague report the solubility of oxygen in nitric acid containing  $NO_2/N_2O_4$ . The studies were carried out at different compositions and temperatures, and cannot be compared. Both are classed as tentative.

18(3) Oxygen + Ammonium hydroxide [1336-21-6] + Water

Bruhn, Gerlach, and Pawlek (17) measured the solubility of oxygen in aqueous solutions of ammonium hydroxide at concentrations of 2.87, 5.63 and 8.28 mol  $dm^{-3}$  at temperatures up to 423.15 K. Ammonium hydroxide shows only a small salt effect. The data shows no discernible trend with either concentration or temperature. The tentative salt effect parameter values are the average of the three values at each temperature.

T/K	323.15	348.15	373.15	423.15
$k_{sca}/dm^3mol^{-1}$	0.0063	0.0057	0.0088	0.0045
standard deviation, $\sigma$	±0.0012	±0.0027	±0.0033	±0.0013

18(4) Oxygen + Ammonium sulfate [7783-20-2] + Water

Bruhn, Gerlach, and Pawlek (17) measured the solubility of oxygen in aqueous ammonium sulfate solutions of concentrations 0.25, 0.75, 1.5 and 3.0 mol dm<sup>-3</sup> at temperatures up to 473.15 K. The tentative salt effect parameter values are the average of the four values at each temperature. There is no discernible trend of the salt effect parameters with either concentration or temperature.

T/K	298.15	323.15	373.15	423.15	473.15
k <sub>scα</sub> /dm <sup>3</sup> mol <sup>-1</sup>	0.212	0.196	0.203	0.193	0.198
standard deviation, $\sigma$	±0.021	±0.031	±0.035	±0.040	±0.036

18(5) Oxygen + Tetraethylammonium bromide [71-91-0] + Water

Morrison and Johnstone (9) measured the solubility of oxygen in water and in one mol kg<sup>-1</sup> aqueous tetraethylammonium bromide solution at 298.15 K. The work is classed as tentative. The salt effect parameter is  $k_{sms} = -0.046$  or  $k_{smx} = -0.031$ . The  $k_{sc\alpha}$  value is probably of similar magnitude. Oxygen is salted-in.

29(1) Oxygen + Hydrated aluminum oxide [1333-84-6] + Water

The data of Shkol'nikova (13) are classed as tentative. The solubility of oxygen in water was not measured. No salt effect parameters were calculated for the colloidal solutions.

29(2) Oxygen + Aluminum chloride [7446-70-0] + Water

Yasunischi (34) measured the solubility of oxygen in 12 aqueous solutions of aluminum chloride up to 2.204 mol dm<sup>-3</sup> at 298.15 K. The work is classed as tentative. The salt effect parameter shows a definite concentration dependence above 1.7 mol dm<sup>-3</sup> AlCl<sub>3</sub>. Yasunischi suggests that up to 1.7 mol dm<sup>-3</sup>

 $\log(L^{\circ}/L) = \log(\alpha^{\circ}/\alpha) = (k_{sc\alpha}/dm^{3}mol^{-1})(c_{2}/mol dm^{-3}) = 0.274 c_{2}$ 

over the entire concentration range

 $\log(L^{\circ}/L) = \log(\alpha^{\circ}/\alpha) = 0.303 c_{o}/(1 + 0.0859 c_{o})$ 

29(3) Oxygen + Aluminum sulfate [10043-01-3] + Water

Yasunischi (34) measured the solubility of oxygen in nine aluminum sulfate solutions over the 0 to 0.812 mol dm<sup>-3</sup> concentration range at 298.15 K. The work is classed as tentative. The salt effect parameter is independent of concentration and is  $k_{sca} = k_{scL} = 0.745 \text{ dm}^3 \text{mol}^{-1}$ .

36(1) Oxygen + Copper (II) sulfate [7758-98-7] + Water

Bruhn, Gerlach, and Pawlek (17) measured the solubility of oxygen in aqueous copper (II) sulfate of 0.5, 1.0 and 1.5 mol dm<sup>-3</sup> and temperatures up to 523 K. There is some tendency for the  $k_{sc\alpha}$  value to decrease with

concentration at each temperature. However, the tentative salt effect parameters below were obtained by averaging the values of the three concentrations.

T/K	298	323	373	423	473	523
k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>	0.114	0.123	0.106	0.119	0.122	0.103
standard deviation, $\sigma$	±0.014	±0.018	±0.019	±0.018	±0.011	±0.003

39(1) Oxygen + Nickel sulfate [7786-81-4] + Water

Bruhn, Gerlach, and Pawlek (17) measured the solubility of oxygen in aqueous nickel sulfate at 0.5, 1.0 and 1.5 mol dm<sup>-3</sup> and temperatures up to 423 K. There is a tendency of the salt effect parameters decreasing with concentration at most of the temperatures. However, the tentative salt effect parameters below were obtained by averaging the values at the three concentrations.

T/K	298	323	373	398	423
k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>	0.113	0.116	0.112	0.115	0.122
standard deviation, $\sigma$	±0.013	±0.009	±0.025	±0.009	±0.020

40(1) Oxygen + Cobalt (II) sulfate [10124-43-3] + Water

Bruhn, Gerlach, and Pawlek (17) measured the solubility of oxygen in aqueous cobalt (II) sulfate at 0.5, 1.0 and 1.5 mol dm<sup>-3</sup> at temperatures up to 423 K. There is a tendency of the salt effect parameter to decrease with concentration at each temperature. However, the salt effect parameters were obtained by averaging the values at the three concentrations.

T/K	298	323	373	398	423
k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>	0.115	0.128	0.105	0.113	0.117
standard deviation, $\sigma$	±0.015	±0.022	±0.006	±0,025	

41(1) Oxygen + Hydrated iron oxide [12259-21-1] + Water

The data of Shkol'nikova (13) are classed as tentative. She made no solubility measurements in pure water. No salt effect parameters were calculated for the colloidal solutions.

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48(1) Oxygen + Manganese chloride (MnCl<sub>2</sub>) [7773-01-5] + Water
48(2) Oxygen + Manganese sulfate (MnSO<sub>4</sub>) [7785-87-7] + Water
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Murray, Riley and Wilson (22) measured the solubility of oxygen in 2.69 mol dm<sup>-3</sup>  $MnCl_2$  and in 2.43 mol dm<sup>-3</sup>  $MnSO_4$  at 298.7 K. The two measurements were converted to tentative salt effect parameters of:

 $k_{sca} = 0.202$  for MnCl<sub>2</sub>, and  $k_{sca} = 0.194$  for MnSO<sub>4</sub>.

88(1) Oxygen + Uranyl fluoride (UO<sub>2</sub>F<sub>2</sub>)[13536-84-0] + Water 88(2) Oxygen + Uranyl sulfate (UO<sub>2</sub>SO<sub>4</sub>)[1314-64-3] + Water 88(3) Oxygen + Uranyl sulfate + Sulfuric acid + Copper (II) sulfate + Water

These systems were studied at high pressure. The evaluator made no attempt to convert the data into salt effect parameters. The data are classed as .tentative.

Stephan, Hatfield, Peoples, and Pray (12) reported the solubility of oxygen in water and solutions containing 40, 100, and 243 g dm<sup>-3</sup> of uranium as  $\rm UO_2F_2$  at temperatures of 373.15, 408.15, and 435.93 K over oxygen partial pressure ranges of 1.34 to 10.6 MPa.

Pray and Stephan (8), and Stephan, Hatfield, Peoples and Pray (12) reported the solubility of oxygen in water and in solutions containing 40, 100, and 243 g uranium as  $UO_2SO_4$  at temperatures of 373.15, 408.15 and 435.93 K in both references and at additional temperatures of 477.59, 533.15, and 560.93 K in the second reference (12). The oxygen partial pressures ranged from 1.0 to 17.5 MPa. The complete data set appears in reference 12.

Anderson, Keeler and Klach (15) measured the solubility of oxygen in water and two solutions, one of which was 0.02 mol  $dm^{-3}$  UO<sub>2</sub>SO<sub>4</sub>, 0.005 mol  $dm^{-3}$  $H_2SO_4$  and 0.005 mol dm<sup>-3</sup> CuSO<sub>4</sub>. The second solution was 0.04 mol dm<sup>-3</sup> UO2SO4, 0.01 mol dm<sup>-3</sup> H2SO4 and 0.01 mol dm<sup>-3</sup> CuSO4. The authors saw no evidence of salting out by these relatively dilute solutions over the 373 to 573 K and 386 to 5190 kPa temperature and pressure ranges.

## 93(1) Oxygen + Magnesium chloride [7786-30-3] + Water

Both MacArthur (4) and Yasunischi (34) have measured the solubility of oxygen in aqueous MgCl<sub>2</sub> solutions at 298.15 K. Eucken and Hertzberg (6) made measurements at 273.15 and 293.15 K. Their measurements are summarized in the table below.

The Eucken and Hertzberg salt effect parameters show little scatter at each temperature. They are classed as tentative.

At 298.15 K MacArthur's values fall into two distinct regions, salting out more between 0 and 1 mol  $dm^{-3}$  than between 2 and 5 mol  $dm^{-3}$ . Yasunischi more between 0 and 1 mor an c than between 2 and 5 mor an c to statistic fitted his data up to 2.5 mol dm<sup>-3</sup> to  $\log(\alpha^{\circ}/\alpha) = k \underset{sc\alpha}{sc\alpha} c_{2}$ , and over the entire concentration range to  $\log(\alpha^{\circ}/\alpha) = k \underset{sc\alpha}{s} c_{2}/(1 + k \underset{sc\alpha}{s} c_{2})$ .

MacArthur's data are classed as doubtful, and Yasunischi's data are classed tentative.

T/K	Number of Determinations <sup>1</sup>	Concentration	Salt Effect	Parameters
		Range, $c_2/mol dm^{-3}$	k° /dm <sup>3</sup> mol <sup>-1</sup>	k'_/dm <sup>3</sup> mol <sup>-1</sup>
273.15	4	0 - 1.64	0.290	
293.15	4	0 - 1.84	0.267	
298.15	5	0 - 1	0.258 <sup>2</sup>	
	3	2 - 5	$0.211^{2}$	
298.15	8	0 - 2.5	0.200	
	11	0 - 3.9	0.222	0.0566

Includes determination in pure water.

<sup>2</sup> MacArthur's values.

93(2) Oxygen + Magnesium sulfate [7487-88-9] + Water

Yasunischi (34) measured the solubility of oxygen in aqueous magnesium sulfate solutions up to concentrations of 2.608 mol  $dm^{-3}$  at temperatures of 288.15, 298.15 and 308.15 K. He found that  $\log(\alpha^{\circ}/\alpha)$  vs.  $c_2$  was linear up to concentrations between 1.3 and 1.7 mol dm<sup>-3</sup>. For the entire concentration range the data were better fitted by

$$\log(\alpha^{\circ}/\alpha) = k_{SC}^{\circ} c_2^{\prime} (1 + k_{SC}^{\prime} c_2)$$

The constants, which are classed as tentative, are summarized in the following table.

T/K	Number of	Concentration	Salt Effect	Parameters	
	Determinations <sup>1</sup>	Range, $c_2/mol dm^{-3}$	$k_{sca}^{\circ}/dm^{3}mol^{-1}$	$k'_{sca}/dm^3mol^{-1}$	
288.15	9	0 - 1.3	0.290		
	17	0 - 2.5	0.288	-0.0012	
298.15	7	0 - 1.7	0.273		
	14	0 - 2.4	0.250	-0.0583	
308.15	8	0 - 1.7	0.280		
	12	0 - 2.6	0.293	-0.0359	

Includes determination in pure water.

94(1) Oxygen + Calcium chloride [10043-52-4] + Water

Both MacArthur (4) and Yasunischi (34) measured the solubility of oxygen in aqueous calcium chloride solutions up to concentrations of 5 mol dm<sup>-3</sup> at 298.15 K. MacArthur worked with air saturated solutions at 101 kPa (1 atm) while Yasunischi worked with oxygen at a partial pressure of 101 kPa (1 atm). The two data sets show similar features but the Yasunischi data are preferred because he made more measurements that showed less scatter. Their results are summarized in the following table.

T/K	Number of	Concentration	Salt Effect Parameters	
	Determinations <sup>1</sup>	Range, $c_2^{/mol dm^{-3}}$	$\frac{k_{sca}^{\circ}/dm^{3}mol^{-1}}{}$	k'sca/dm <sup>3</sup> mol <sup>-1</sup>
298.15	3	0 - 1	0.191 <sup>2</sup>	<del></del>
	1	5	0.087²	
	11	0 - 2.7	0.204	
	14	0 - 4.5	0.226	0.0523

<sup>1</sup> Includes determination in pure water.

<sup>2</sup> MacArthur's values.

94(2) Oxygen + Calcium nitrate [10124-37-5] + Water

Yasunischi (34) measured the solubility of oxygen in seven aqueous calcium nitrate solutions at concentrations up to 2.4 mol dm<sup>-3</sup> at 298.15 K. The tentative salt effect parameter is  $k_{sca}/dm^3mol^{-1} = 0.194$ .

96(1) Oxygen + Barium chloride [10361-37-2] + Water

MacArthur (4) measured the solubility of oxygen in four air saturated aqueous barium chloride solutions up to concentrations of 1 mol dm<sup>-3</sup> at 298.15 K. Yasunıschi (34) measured the solubility of oxygen in seven oxygen saturated solutions up to concentrations of 1.54 mol dm<sup>-3</sup> at 298.15 K. The values of the salt effect parameters are

MacArthur  $k_{cco}/dm^3mol^{-1} = 0.270$ 

Yasunischi  $k_{sca}/dm^3mol^{-1} = 0.212$ 

The value of Yasunischi is preferred.

Oxygen + Lithium hydroxide [1310-65-2] + Water 98(1) Oxygen + Lithium fluoride [7789-24-4] + Water 98(2) Oxygen + Lithium chloride [7447-41-8] + Water 98(3) Oxygen + Lithium perchlorate [7791-03-9] + Water 98(4) 98(5) Oxygen + Lithium bromide [7550-35-8] + Water Oxygen + Lithium iodide [10377-51-2] + Water 98(6) Oxygen + Lithium sulfate [10377-48-7] + Water 98(7) 98(8) Oxygen + Lithium nitrate [7790-69-4] + Water 98(9) Oxygen + Lithium carbonate [554-13-2] + Water

Khomutov and Konnik (30) measured the solubility of oxygen in the air saturated lithium salt solutions above at 298.15 K by a chemical method. The solubility values are presented graphically as log(solubility/mg dm<sup>-3</sup>) vs.  $\sigma_2$ /mol dm<sup>-3</sup>, and the salt effect parameters, equivalent to  $k_{sca}$ , are tabulated.

In addition the solubility of oxygen in aqueous LiCl was measured by Eucken and Hertzberg (6) at 273.15 and 293.15 K and by MacArthur (4) at 298.15 K.

The most interesting feature of the solubility of oxygen in lithium salt solutions is the observation of Khomutov and Konnik of two linear regions of salt effects for the hydroxide, fluoride, chloride, perchlorate, bromide and nitrate of lithium. Between concentrations of 0 and about 0.07 mol dm<sup>-3</sup> (0.01 for LiF) the lithium salts "salt-out" more than they do at concentrations between 0.15 and 1.2 mol dm<sup>-3</sup>. Two of the salts, LiF and LiNO<sub>3</sub> "salt-out" in the low concentration region and "salt-in" in the high concentration region. LiI, Li<sub>2</sub>SO<sub>4</sub> and Li<sub>2</sub>CO<sub>3</sub> show a concentration range studied. This is a very interesting observation which deserves further study.

Neither Eucken and Hertzberg or MacArthur carried out studies at a low enough LiCl concentration to observe the effect. All of the results are summarized in the following table. At 298.15 K the results of Khomutov and Konnik are preferred over the result of MacArthur. All of the values are classed as tentative.

T/K	Electrolyte	Number of Determinations <sup>1</sup>	Range of Concentration, $c_2/mol dm^{-3}$	Salt Effect Parameter k <sub>scα</sub> /dm³mol <sup>-1</sup>
298.15	LiOH	4 5	0 - 0.07 0.015 - 1.2	0.332 0.091
	LiF	4 5 3 5	0.013 - 1.2 0 - 0.01 0.04 - 0.10	0.725
273.15 293.15 298.15	LiCl	4 6 4 6	$\begin{array}{r} 0 & - & 2.32 \\ 0 & - & 1.94 \\ 0 & - & 2 \\ 0 & - & 0.07 \\ 0.15 & - & 1.2 \end{array}$	0.163 <sup>2</sup> 0.140 <sup>2</sup> 0.100 <sup>3</sup> 0.112 0.070
298.15	LiClO <sub>4</sub> LiBr	3 5 4 5	0 - 0.07 0.15 - 1.2 0 - 0.07 0.15 - 1.2	0.218 0.066 0.252 0.084
	LiI Li <sub>2</sub> SO4	4 5 6 7	0 - 0.65 0 - 1.2	0.163 0.244
	LiNO <sub>3</sub>	(?) 5	0 - 0.07 0.15 - 1.2	0.196 -0.040
	Li2CO3	5 7	0 - 0.12	0.254

<sup>1</sup> Includes value in pure water.

<sup>2</sup> Eucken and Hertzberg's values.

<sup>3</sup> MacArthur's value, there are two additional measurements at 3 and 4 mol dm<sup>-3</sup> LiCl, for which  $k_{SC\alpha}$  is 0.156 and 0.178 respectively. The two values are classed as doubtful.

## 99(1) Oxygen + Sodium hydroxide [1310-73-2] + Water

Geffcken (4), Khomutov and Konnik (30), and Yasunischi (34) measured the solubility of oxygen in aqueous NaOH solutions around room temperature, and Bruhn, Gerlach, and Pawlek (17) measured the solubility in 0.5, 1.0, and 1.5 mol dm<sup>-3</sup> solutions at five temperatures between 323 and 523 K.

Recently Broden and Simonson (36) have measured the solubility of oxygen in water and in 0.01 and 0.10 mol dm<sup>-3</sup> NaOH. Their results are presented by graphs and fitted equations. The results indicate that oxygen is saltedout more effectively by 0.01 and 0.10 mol dm<sup>-3</sup> NaOH, in that the slope of log  $(\alpha^0/\alpha) vs. c_2$  is much larger up to 0.1 than at higher molarities. This reinforces the observation of Khomutov and Konnik of a larger salt effect parameter for certain lithium salts at concentrations below 0.07 mol dm<sup>-3</sup> than at larger concentrations. Broden and Simonson carried out their measurements at 323, 348, 373, 398, and 423 K and pressures of 1, 2, 3, 4, and 5 MPa. The results are summarized below.

T/K	Salt Effect Parameter, $k_{sca}/dm^3 mol^{-1}$				
	Geffcken	Khomutov, Konnik	Yasunischi	Bruhn, Gerlach and Pawlek	
288.15	0.190		0.158		
298.15	0.180	0.180	0.160		
308.15			0.167		
323				0.185	
373				0.171	
423				0.187	
473				0.187	
523				0.167	

Yasunischi also fitted his data to the relationship

 $\log(\alpha^{\circ}/\alpha) = k_{sc\alpha}^{\circ} c_{2}^{\prime}/(1 + k_{sc\alpha}^{\prime} c_{2}^{\prime})$ 

with the constants

T/K	k° scα	k'sca
288.15	0.171	0.0181
298.15	0.164	0.0049
308.15	0.181	0.0310

There is some concern that Yasunischi's parameters do not follow a more consistent pattern as the temperature increases. His data do cover a larger concentration range, up to 6.4 mol dm<sup>-3</sup>, than do the data of the others. Geffcken's measurements go to 2 mol dm<sup>-3</sup>, Khomutov and Konnik to 1.2 mol dm<sup>-3</sup>, and Bruhn *et al.* are at 0.5, 1.0, and 1.5 mol dm<sup>-3</sup>.

The data are classed as tentative with no reason to prefer one data set over another.

Broden and Simonson discuss in detail the salting out by NaOH at 373 K. The value of  $k_{sc\alpha}$  in the limiting slope region from 0 to 0.1 mol dm<sup>-3</sup> is 0.65 which is much larger than any of the values in the table above. They discuss in more detail the NaHCO<sub>3</sub> system which also exhibits the effect, and they point out that NaNO<sub>3</sub> does not show the effect, but gives a "normal" salt effect parameter at all concentrations.

99(2) Oxygen + Sodium fluoride [7681-49-4] + Water

Khomutov and Konnik (30) measured the solubility of oxygen in six aqueous sodium fluoride solutions at concentrations up to 0.6 mol dm<sup>-3</sup> at 298.15 K. The salt effect parameter is  $k_{sca}/dm^3 mol^{-1} = 0.284$ . It is classed as tentative.

99(3) Oxygen + Sodium chloride [7647-14-5] + Water

Geffcken (1), MacArthur (4), Eucken and Hertzberg (6), and Khomutov and Konnik (30) report measurement of the solubility of oxygen in aqueous sodium chloride solution. Mishnina, Avdeeva, and Bozhovakaya (14) present an extensive table of smoothed solubility data for the system. The source of their data is not clear to us. Recently Cramer (35) made extensive measurements of the solubility of oxygen in aqueous sodium chloride and in several brines at high temperature and pressure. He reports Henry's constants in water and aqueous sodium chloride of 0.87, 2.97 and 5.69 mol kg<sup>-1</sup> up to temperatures of 570 K. His Henry's constants are of the form K/MPa =  $(P_1/MPa)/X_1$ . No attempt was made to convert his data into salt effect parameters. The salt effect parameters are summarized in the following table. The values of Geffcken and of Eucken and Hertzberg agree well at 288.15 K. The values of Geffcken, of MacArthur, and of Khomutov and Konnik agree well at 298.15 K. The smoothed values of Mishnina *et al.* appear to be greater than the other values at all temperatures. Mishnina *et al.* did give values up to saturation, about 5.4 mol dm<sup>-3</sup> NaCl. None of the experimental data known to us go above 2.5 mol dm<sup>-3</sup>.

All of the data are classed as tentative with no preferance given to any one laboratories results. The data of Cramer appear to be very useful and deserve further analysis.

Т/К	Salt Effect Parameter, $k_{sca}/dm^3 mol^{-1}$						
	Geffcken	MacArthur	Eucken Hertzberg	Khomutov Konnik	Mishnina, Avdeeva Bozhovahoya		
273.15			0.169	<u> </u>	0.180 0.168		
283.15					0.160		
288.15	0.148		0.150		0.156		
293.15			0.145		0.149		
298.15	0.141	0.138	0.145	0.136	0.145		
303.15					0.139		

93(4) Oxygen + Sodium perchlorate [7601-89-0] + Water 93(5) Oxygen + Sodium bromide [7647-15-6] + Water 93(6) Oxygen + Sodium iodide [7681-82-5] + Water

Both Khomutov and Konnik (30) and MacArthur (4) measured the solubility of oxygen in air saturated solutions of the above solutions at 298.15 K by a chemical method. MacArthur measured solubilities only in the sodium bromide solutions. The salt effect parameters are given in the following table. All are classed as tentative, but Khomutov and Konnik's result is preferred for the sodium bromide solutions.

т/к	Electrolyte	Number of Determinations <sup>1</sup>	Concentration Range, $c_2/dm^3mol^{-1}$	Salt Effect Parameter k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>
298.15	NaClO4	8	0 - 1.2	0.160
	NaBr	8 9	$0 - 1.2 \\ 0 - 6$	0.131 0.115 <sup>2</sup>
	NaI	8	0 - 1.2	0.120

<sup>1</sup> Includes determination in pure water.

<sup>2</sup> MacArthur's value.

93(7) Oxygen + Sodium iodide [7681-82-5] + Sodium hydroxide [1310-73-2] + Water

Murray, Riley and Wilson (22) measured the solubility of oxygen in concentrated solutions of NaI + NaOH at 298.65 K. A salt effect parameter was calculated for the combined electrolyte concentration.

<i>т/</i> к	NaI $c_2^{/mol dm^{-3}}$	NaOH c <sub>3</sub> /mol dm <sup>-3</sup>	Total Concentration	Salt Effect Parameter k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>
298.65	4	8	12	0.181
	6	10	16	0.129

The results appear consistent with the salt effect parameters for the two electrolytes determined at lower concentrations.

93(8) Oxygen + Sodium sulfite [7757-83-7] + Water

Gestrich and Pontow (28) measured the solubility of oxygen in aqueous solutions of a 38:1 ratio of Na<sub>2</sub>SO<sub>3</sub> and Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub> at concentrations up to 1.2 mol dm<sup>-3</sup> and temperatures of 273.15, 288.15, 298.15, and 303.15 K. Yasunischi (33) estimated the solubility at 0.1 mol dm<sup>-3</sup> intervals up to 1.0 mol dm<sup>-3</sup> from his measurements of the solubility of oxygen in sodium sulfate and of nitrogen in sodium sulfite and sodium sulfate solutions. Both worker's results were recalculated as  $k_{sca}/dm^3 mol^{-1}$  values which are in the following table.

T/K	Salt Effect Parameter, $k_{sca}^{}/dm^3$ mol			
	Gestrich, Pontow	Yasunischi		
273.15 288.15 298.15 303.15	0.37 0.39 0.39 0.32	0.36		

The log( $\alpha^{\circ}/\alpha$ ) vs.  $c_2$  plots of Gestrich and Pontow show some scatter. Yasunischi's k<sub>sca</sub> values vary smoothly from a value of 0.43 at 0.1 mol dm<sup>-3</sup> to the 0.36 value at 1.0 mol dm<sup>-3</sup> Na<sub>2</sub>SO<sub>3</sub>. The system reacts slowly with oxygen. The results are classed as tentative.

99(9) Oxygen + Sodium sulfate [7757-82-6] + Water

MacArthur (4) and Khomutov and Konnik (30) have measured the solubility of oxygen in air saturated aqueous sodium sulfate at 298.15 K. Yasunischi (33) has measured the solubility of oxygen in the system at 288.15, 298.15, and 308.15 K. Linek and Mayrhoferova (24) have measured the solubility of oxygen in aqueous sodium sulfate solutions at 293.15 K.

Yasunischi found definite curvature in plots of  $\log(L^{\circ}/L)$ . Agreement among the work on this system is not good. All of the data, summarized in the following table, are classed as tentative.

T/K	Number of	Concentration	Salt Effec	t Parameter
	Determinations <sup>1</sup>	Range, $c_2$ /mol dm <sup>-3</sup>	$\frac{k_{SCO}^{\circ}}{dm^{3}mol^{-1}}$	$\frac{k_{sca}}{dm^3mol^{-1}}$
288.15	8	0 - 0.9	0.420	0.251
293.15	5	0 - 1.0	0.3554	
298.15	12	0 - 1.5	0.398	0.183
	5	0 - 0.5	0.325 <sup>2</sup>	
	8	0 - 1.2	0.376 <sup>3</sup>	
308.15	6	0 - 1.7	0.420	0.231

<sup>1</sup> Includes determination in pure water.

- $^2$  MacArthur's value, another value at 1 mol dm  $^3$  would have decreased the value to 0.29.
- <sup>3</sup> Khomutov and Konnik's value. <sup>4</sup> Linek and Mayrhoferova's value.
- 99(10) Oxygen + Sodium sulfate [7757-82-6] + Sulfuric acid [7664-93-9] + Water

The single measurement of Kobe and Kenton (5) is classed as tentative.

99(11) Oxygen + Sodium sulfate [7757-82-6] + Sodium dithionite [7775-14-6] + Sodium hydroxide [1310-73-2] + Water

The work of Jhaveri and Sharma (21) on this system is classed as tentative.

99(12) Oxygen + Sodium nitrate [7631-99-4] + Water 99(13) Oxygen + Sodium phosphate [7601-54-9] + Water 99(14) Oxygen + Sodium bicarbonate [144-55-8] + Water 99(15) Oxygen + Sodium carbonate [497-19-8] + Water

Khomutov and Konnik (30), Yasunischi (34), and Broden and Simonson (36) report the solubility of oxygen in aqueous sodium nitrate solutions. Broden and Simonson do not observe larger salt effect parameters at low concentration than at high concentrations as they did for NaOH and NaHCO<sub>3</sub>. Khomutov and Konnik's value accords better with Broden and Simonson's values than does the value of Yasunischi. All are classed as tentative.

The salt effect parameter for aqueous sodium phosphate of Khomutov and Konnik is classed as tentative.

Broden and Simonson (36) measured the solubility of oxygen in water and in 0.1 and 0.5 mol dm<sup>-3</sup> sodium bicarbonate at five temperature between 323 and 423 K and at pressures of 1, 2, 3, 4, and 5 MPa. They find that the salt effect parameter is much larger in the 0 to 0.1 mol dm<sup>-3</sup> NaHCO<sub>3</sub> region than the 0.5 mol dm<sup>-3</sup> region. At 323 K the limiting value is about  $k_{SCC}/dm^3 mol^{-1}$  0.3 at all pressures, but it changes with pressure at higher temperatures. Between concentrations of 0.1 and 0.5 the value is more normal and averages about 0.14. Both the solubilities and the salt effect parameters are presented graphically in the paper.

Both Khomutov and Konnik (30) and Yasunischi (34) have measured the oxygen solubility in aqueous sodium carbonate solutions. The agreement between the two is poor. There is no reason to prefer one set of data over the other, and both are classed as tentative.

T/K	Electrolyte	Number of Determinations <sup>1</sup>	Concentration Range, cg/mol dm <sup>-3</sup>	Salt Effect Parameter k <sub>SCQ</sub> /dm <sup>3</sup> mol <sup>-1</sup>
298.15 323 373	NaNO3	8 9 4 4	$\begin{array}{c} 0 & - & 1.2 \\ 0 & - & 5.1 \\ 0 & - & 1.0 \\ 0 & - & 1.0 \\ 0 & - & 1.0 \end{array}$	0.124 <sup>2</sup> 0.109 <sup>3</sup> 0.110 <sup>4</sup> 0.080 <sup>4</sup> 0.065 <sup>4</sup>
423 298.15	Na <sub>3</sub> PO <sub>4</sub>	4 8 7	0 - 0.6 0 - 1.3	$0.652^{2}$ $0.356^{3}$
288.15 298.15 308.15	Na2 <sup>CO3</sup>	10 7 9	$\begin{array}{c} 0 & - & 2 \cdot 1 \\ 0 & - & 1 \cdot 0 \\ 0 & - & 3 \end{array}$	0.338 <sup>3</sup> 0.464 <sup>4</sup> 0.353 <sup>3</sup>

<sup>1</sup> Includes determination in pure water. <sup>2</sup> Khomutov and Konnik's values.

<sup>3</sup> Yasunischi's values

4 Broden and Simonson's values.

99(1) Oxygen + Sodium acetate [127-09-3] + Water

Guseva, Konnik, Saifi, Kuz'min, and Mordukhovich (26) measured the solubility of oxygen in aqueous solutions and in 0.1 mol dm<sup>-3</sup> sodium acetate solutions at various pH's between 0 and 14. The pH was adjusted by addition of small amounts of either KOH or  $H_2SO_4$ . The evaluator made no attempt to convert the results to salt effect parameters. The work is classed as tentative.

100(1) Oxygen + Potassium hydroxide [1310-58-3] + Water

The solubility of oxygen in aqueous potassium hydroxide has been reported from five laboratories. Geffcken (1) measured the solubility in four solutions at concentrations up to 1.17 mol dm<sup>-3</sup> at 288.15 and 298.15 K. MacArthur (4) measured the solubility in solutions up to 4 mol dm<sup>-3</sup> at 298.15 K. Knaster and Apel'baum (16) measured the solubility in 1, 4, 7 and 10 mol dm<sup>-3</sup> KOH at temperatures of 244.15, 318.15, and 348.15 K. Shoor, Walker, and Gubbins (23) measured the solubility up to 16 mol dm<sup>-3</sup> KOH at the temperatures 298.15, 313.15, 333.15, 353.15 and 373.15 K. Khomutov and Konnik (30) made measurements up to 0.8 mol dm<sup>-3</sup> at 298.15 K.

The salt effect parameters are summarized in the following table.

T/K	Salt Effect Parameter, $k_{sca}/dm^3 mol^{-1}$					
	Geffcken	MacArthur	Knaster Apel'baum <sup>1</sup>	Shoor, Walker, Gubbins <sup>2</sup>	Khomutov, Konnik	
288.15	0.190			<u></u>		
294.15			0.160			
298.15	0.177	0.130		0.180	0.176	
313.15				0.168		
318.15			0.160			
333.15				0.159		
348.15			0.160			
353.15				0.157		
373.15				0.155		

 $^1$  The evaluator's judgement of the data, which scatters as individual  $k_{\mbox{sca}}$  values.

<sup>2</sup> Shoor *et al.* give their parameter as  $k_{SCX}/dm^3 mol^{-1} = (1/(c_2/mol dm^{-3}) log(x^{\circ}/x)$  where the  $x^{\circ}/x$  ratio is the mole fraction ratio. It may not differ much from the  $\alpha^{\circ}/\alpha$  ratio.

MacArthur's value should be rejected. The others are classed as tentative.

100(2) Oxygen + Potassium fluoride [7789-23-3] + Water

Khomutov and Konnik (30) measured the solubility of oxygen in six air saturated aqueous potassium fluoride solutions at concentrations up to 0.6 mol dm<sup>-3</sup> at 298.15 K. The salt effect parameter,  $k_{sca}/dm^{3}mol^{-1} = 0.203$  is classed as tentative.

100(3) Oxygen + Potassium chloride [7447-40-7] + Water

Four laboratories have reported on the solubility of oxygen in aqueous potassium chloride. MacArthur (4) and Khomutov and Konnik (30) measured the solubility of oxygen in air saturated solutions at concentrations up to 4 and to 1.2 mol dm<sup>-3</sup> respectively at 298.15 K. Eucken and Hertzberg (6) measured the solubility up to concentrations of 2.56 and 1.52 mol dm<sup>-3</sup> at 273.15 and 293.15 K, respectively. Yasunischi (34) made measurements up to concentrations of 4.1 mol dm<sup>-3</sup> at 288.15, 298.15, and 308.15 K.

At concentrations below 3.2 mol dm<sup>-3</sup> Yasunischi considered  $\log(\alpha^{\circ}/\alpha) vs. c_2$  to be linear, however he gave a two constant equation to fit his data over the entire concentration range.

T/K	Salt Effect Parameter, $k_{sc\alpha}/dm^3 mol^{-1}$				
	MacArthur	Eucken, Hertzberg	Khomutov, Konnik	Yasunischi <sup>1</sup>	
273.15		6.178			
288.15 293.15		0.151		0.106	
298.15 308.15	0.128	0.131	0.129	0.095 0.087	

The salt effect parameters are summarized in the following table.

<sup>1</sup> For use up to 3.3 mol dm<sup>-3</sup> KCl.

For the entire concentration range Yasunischi gives

T/K	Salt Effec	t Parameter
	$k_{sca}^{\circ}/dm^{3}mol^{-1}$	$k'_{sca}/dm^3mol^{-1}$
288.15	0.105	-0.0022
298.15	0.103	0.0378
308.15	0.092	0.0291

The data clearly fall into two groups. The data of MacArthur, Eucken and Hertzberg, and Khomutov and Konnik make one self-consistent group. Yasunischi's data makes up the other group. At present neither group can be preferred. The data are classed as tentative.

100(4)	Oxygen +	Potassium	perchlorate [7778-74-7] + Water
100(5)	Oxygen +	Potassium	bromide [7758-02-3] + Water
100(6)	Oxygen +	Potassium	iodide [7681-11-0] + Water

MacArthur (4) measured the solubility of oxygen in air saturated aqueous KBr and KI solutions, and Khomutov and Konnik (30) measured the solubility of oxygen in air saturated  $\text{KClO}_4$ , KBr and KI solutions. Both worked at a

temperature of 298.15 K and analyzed the saturated solutions by a modified Winkler chemical method. Their results agree well, but the MacArthur measurements show more random scatter, thus the Khomutov and Konnik values are preferred. The MacArthur value of  $k_{sca}$  for KI given below

uses the six data points up to a concentration of 2 mol dm<sup>-3</sup>. When the datum of the seventh determination at 5 mol dm<sup>-3</sup> KI is added the k value increases to 0.101.

т/к	Electrolyte	Number of Determinations <sup>1</sup>	Concentration Range, $c_2$ /mol dm <sup>-3</sup>	Salt Effect Parameter k sca/dm <sup>3</sup> mol <sup>-1</sup>
298.15	KClO <sub>4</sub>	8	0 - 0.12	0.150
	KBr	5 4	$0 - 1.2 \\ 0 - 4$	0.117 0.123 <sup>2</sup>
	KI	7 7	0 - 1.2 0 - 5	0.093 0.092 <sup>2</sup>

<sup>1</sup> Includes measurement in pure water.

<sup>2</sup> MacArthur's values.

100(7) Oxygen + Potassium sulfate [7778-80-5] + Water

Three laboratories report data on this system. Geffcken (1) made measurements at both 288.15 and 298.15 K temperatures. Both MacArthur (4) and Khomutov and Konnik report measurements at 298.15 K. Their results, obtained from the slope of  $log(\alpha^{\circ}/\alpha)$  vs.  $c_2$  plots, are in the table below.

The data are classed as tentative. At 298.15 K the agreement in the results of Geffcken and MacArthur may be misleading as MacArthur's individual data points scatter badly, while Geffcken's results fall on the line. There appears to be no reason to prefer either the Geffcken or the Khomutov and Konnik data.

T <b>/ K</b>	Electrolyte	Number of Determinations <sup>1</sup>	Concentration Range, $c_2$ /mol dm <sup>-3</sup>	Salt Effect Parameter $k_{sc\alpha}/dm^3 mol^{-1}$
288.15	K <sub>2</sub> SO <sub>4</sub>	5	0 - 0.5	0.375 <sup>2</sup>
298.15	κ <sub>2</sub> so <sub>4</sub>	4	0 - 0.5	0.345 <sup>2</sup>
	к <sub>2</sub> so <sub>4</sub>	4	0 - 0.5	0.345 <sup>3</sup>
	<sup>k</sup> 2 <sup>so</sup> 4	5	0 - 0.6	0.2974
<sup>1</sup> Inclu	des measureme	nt in pure water.		
<sup>2</sup> Geffc	ken			
<sup>3</sup> MacAr	thur			
4 Khomu	tov and Konni	k		
Khomuto rated p present	Oxygen + Pot Oxygen + Pot v and Konnik otassium salt ed the solubi	solutions at 298 lity values on a	[7778-53-2] + W [584-08-7] + Wa we solubility of 1.15 K by a chem graph and tabul	ater ter oxygen in aır satu-
measure nitrate paramet	d the solubil solutions at er of Khomuto ithin 3 per c	ity of oxygen in 298.15 K by a ch v and Konnik an	several air sat memical method. d of MacArthur	urated potassium
<i>т/</i> К	Electrolyte	Number of Determinations <sup>1</sup>	Concentration Range, $c_2/mol dm^{-3}$	Salt Effect Parameter k <sub>sca</sub> /dm <sup>3</sup> mol <sup>-1</sup>
298.15	KNO3	6 5	0 - 1.2 0 - 2	0.105 0.102 <sup>2</sup>
	K <sub>3</sub> PO <sub>4</sub>	7	0 - 0.6	0.507
	к <sub>2</sub> со <sub>3</sub>	7	0 - 1.2	0.379
Inclu	des measureme	nt in pure water.		
MacAr	thur's value.			
101(1) L01(2) L01(3)	Oxygen + Rub: Oxygen + Rub:	idium hydroxide [ idium fluoride [1 idium chloride [7 idium perchlorate	3446-74-7] + Wa 791-11-9] + Wat	ter er

101(4) Oxygen + Rubidium perchlorate [13510-42-4] + Water 101(5) Oxygen + Rubidium bromide [7789-39-1] + Water 101(6) Oxygen + Rubidium iodide [7790-29-6] + Water 101(7) Oxygen + Rubidium sulfate [7488-54-2] + Water 101(8) Oxygen + Rubidium nitrate [13126-12-0] + Water

Khomutov and Konnik (30) measured the solubility of oxygen in air saturated rubidium salt solutions by a chemical method at 298.15 K. Their solubility values were presented on a graph and the salt effect parameter for each salt was tabulated. The salt effect parameters are classed as tentative. MacArthur (4) measured the solubility of oxygen in air saturated 0.125 mol dm<sup>-3</sup> rubidium chloride at 298.15 K. The value of the salt effect parameter is classed as tentative. The salt effect parameter of Khomutov and Konnik for rubidium chloride solutions is preferred because they made measurements of the oxygen solubility in solutions of several RbCl concentrations with consistent results.

	Electrolyte	Number of Measurements <sup>1</sup>	Concentration Range, c <sub>2</sub> /mol dm <sup>-3</sup>	Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$
298.15	RbOH	8	0 - 0.5	0.168
	RbF	8	0 - 0.5	0.146
	RbCl	7	0 - 0.5	0.120
	-1 -1 -0	2	0 - 0.125	0.0792
	RbClO4	8	0 - 0.1	0.150
	RbBr	7	0 - 0.5	0.104
	RbI	8	0 - 0.5	0.086
	$Rb_2SO_4$	8	0 - 0.3	0.290
	RbNO <sub>3</sub>	5	0 - 0.5	0.096
	Oxygen + Ces Oxygen + Ces Oxygen + Ces Oxygen + Ces ov and Konnik( salt solution	ium iodide [778 ium sulfate [10 ium nitrate [77 30)measured the s by the Winkle	r chemical meth	er r oxygen in air saturated od at 298.15 K. Theır
solubil for eac oxygen chemica salt ef is pref	h salt was ta in air satura 1 method at 2 fect paramete erred because	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a	thur (4) measure m <sup>-3</sup> cesium chlo alue is classed and Konnik for c measurements o	e salt effect parameter ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt
solubil for eac oxygen chemica salt ef is pref concent	h salt was ta in air satura 1 method at 2 fect paramete erred because rations with	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu	thur (4) measure m <sup>-3</sup> cesium chlo: alue is classed and Konnik for c measurements o lts.	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt
solubil for eac oxygen chemica salt ef is pref	h salt was ta in air satura 1 method at 2 fect paramete erred because	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu	thur (4) measure m <sup>-3</sup> cesium chlo alue is classed and Konnik for c measurements o	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt
solubil for eac pxygen chemica salt ef is pref concent T/K	h salt was ta in air satura 1 method at 2 fect paramete erred because rations with	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of	thur (4) measure m <sup>-3</sup> cesium chlor alue is classed and Konnik for c measurements o lts. Concentration Range,	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt  Salt Effect Parameter
solubil for eac pxygen chemica salt ef is pref concent T/K	h salt was ta in air satura 1 method at 2 fect paramete erred because rations with Electrolyte	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8	thur (4) measure m <sup>-3</sup> cesium chlor alue is classed and Konnik for c measurements of lts. Concentration Range, c <sub>2</sub> /mol dm <sup>-3</sup>	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter k <sub>scα</sub> /dm <sup>3</sup> mol <sup>-1</sup>
solubil for eac pxygen chemica salt ef is pref concent T/K	h salt was ta in air satura l method at 2 fect paramete erred because rations with Electrolyte 	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8 8	thur (4) measure $m^{-3}$ cesium chlos value is classed and Konnik for c measurements of lts. Concentration Range, $c_2/mol dm^{-3}$ 0 - 0.5 0 - 0.5 0 - 0.5 0 - 0.5	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$ 0.158 0.114 0.098
solubil for eac pxygen chemica salt ef is pref concent T/K	h salt was ta in air satura l method at 2 fect paramete erred because rations with Electrolyte CsOH CsF CsCl	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8 8 8 8 2	thur (4) measure $m^{-3}$ cesium chlos value is classed and Konnik for c measurements of lts. Concentration Range, $c_2/mol dm^{-3}$ 0 - 0.5 0 - 0.5 0 - 0.5 0 - 0.5 0 - 0.125	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$ 0.158 0.114 0.098 0.067 <sup>2</sup>
solubil for eac pxygen chemica salt ef is pref concent T/K	h salt was ta in air satura l method at 2 fect paramete erred because rations with Electrolyte CSOH CSF CSC1 CSBr	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8 8 8 2 6	thur (4) measure $m^{-3}$ cesium chlor alue is classed and Konnik for c measurements of lts. Concentration Range, $\frac{c_2/mol \ dm^{-3}}{0 - 0.5}$ 0 - 0.5 0 - 0.5 0 - 0.5 0 - 0.125 0 - 0.5	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$ 0.158 0.114 0.098 0.067 <sup>2</sup> 0.078
solubil for eac oxygen chemica salt ef is pref concent <i>T/K</i>	h salt was ta in air satura l method at 2 fect paramete erred because rations with Electrolyte CsOH CsF CsCl CsBr CsI	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	thur (4) measure $m^{-3}$ cesium chlor alue is classed and Konnik for c measurements of lts. Concentration Range, $c_2/mol \ dm^{-3}$ 0 - 0.5 0 -	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$ 0.158 0.114 0.098 0.067 <sup>2</sup> 0.078 0.062
solubil for eac oxygen chemica salt ef is pref concent	h salt was ta in air satura l method at 2 fect paramete erred because rations with Electrolyte CsOH CsF CsCl CsBr CsI Cs2 <sup>SO</sup> 4	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8 8 8 2 6	thur (4) measure $m^{-3}$ cesium chlor alue is classed and Konnik for c measurements of lts. Concentration Range, $\frac{c_2/mol \ dm^{-3}}{0 - 0.5}$ 0 - 0.5 0 - 0.5 0 - 0.5 0 - 0.125 0 - 0.5	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$ 0.158 0.114 0.098 0.067 <sup>2</sup> 0.078
solubil for eac oxygen chemica salt ef is pref concent <i>T/K</i>	h salt was ta in air satura l method at 2 fect paramete erred because rations with Electrolyte CsOH CsF CsCl CsBr CsI	bulated. MacAr ted 0.125 mol d 98.15 K. The v r of Khomutov a they made more consistent resu Number of Measurements <sup>1</sup> 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	thur (4) measure $m^{-3}$ cesium chlor alue is classed and Konnik for c measurements of lts. Concentration Range, $c_2/mol \ dm^{-3}$ 0 - 0.5 0 -	ed the solubility of ride solution by a as tentative. The esium chloride solution ver a range of salt Salt Effect Parameter $k_{sca}/dm^3 mol^{-1}$ 0.158 0.114 0.098 0.067 <sup>2</sup> 0.078 0.062

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Salt Solution	ns (Aqueous) 77
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen, O₂; [7782-44-7]	Geffcken, G.
<pre>(2) Hydrochloric acid; HCl; [7647-01-0]</pre>	Z. Phys. Chem. <u>1904</u> , 49, 257-302.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K = 288-298 Concentration	PREPARED BY: C. L. Young; R. Battino
EXPERIMENTAL VALUES:	
T/K Conc of acid/mol dr	n <sup>3</sup> (soln) Ostwald coefficient, L
288.15 0.578 0.579 1.170 1.176 1.736 1.982	0.03431 0.03410 0.03217 0.03209 0.03069 0.02988
298.15 0.578 0.578 1.170 1.176 1.736 1.982	0.02963 0.02960 0.02817 0.02833 0.02733 0.02674
AUXILIARY	INFORMATION
	SOURCE AND PURITY OF MATERIALS:
METHOD /APPARATUS/PROCEDURE: Volumetric method using simple adsorption pipet and buret. Diagram and detailed description given in original paper.	<ul> <li>(1) Prepared by heating potassium chlorate and manganese dioxide. Washed with potassium hydroxide solution. Dried.</li> </ul>
	(3) Degassed.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \ \delta L = \pm 1$ %.
	(estimated by compiler).
	REFERENCES:
L	L

COMPONENTS :	10	RIGINAL MEASUREMENTS:
(1) Oxygen; $O_2$ ; [7782-44-7]		Geffcken, G.
(2) Sulfuric acid; $H_2SO_4$ ; [7664		Z. Phys. Chem. 1904, 49, 257-302.
	[6-22-2]	
<sup>(3)</sup> Water; H <sub>2</sub> O; [7732-18-5]		
VARIABLES:	P	REPARED BY:
T/K = 288-298		
Concentration		C.L. Young; R. Battino
EXPERIMENTAL VALUES:		
	.d/mol dm	$\Gamma^3$ (soln) Ostwald coefficient, $L$
288.15	.2445	0.03366
	0.2635	0.03375
	).4885 ).5085	0.03210 0.03217
	0.9480	0.02886
	0.9145	0.02930
	L.4735	0.02584 0.02399
	L.7560 2.4755	0.02399
	2.6465	0.02067
	0.2445	0.02887
	).2635 ).4885	0.02875 0.02757
	0.5085	0.02745
	0.9480	0.02545
	).9145 L.4735	0.02577 0.02285
	L.7560	0.02198
ļ :	2.6465	0.01918
AL	XILIARY IN	NFORMATION
METHOD /APPARATUS/PROCEDURE:	s	OURCE AND PURITY OF MATERIALS:
Volumetric method using simple adsorption pipet and buret. Diagram and detailed descripti given in original paper.	on	<ol> <li>Prepared by heating potassium chlorate and manganese dioxide. Washed with potassium hydroxide solution. Dried.</li> </ol>
	(	3) Degassed.
	E	STIMATED ERROR:
		$\delta T/K = \pm 0.1; \ \delta L = \pm 1$ %.
		(estimated by compiler).
	R	REFERENCES :
		·

(1)			ORIGINAL MEASURE	MENTS:
(1) Oxygen; (	0 <sub>2</sub> ; [7782-4	4-7]		
(2) Sulfuric [7664-93·	acid; H_SC		Christoff, A Z. Phys. Che	m. <u>1906</u> , 55, 622-34.
(3) Water; H <sub>2</sub> O; [7732-18-5]				
P/kPa	K = 293.15 a = Atmosph % = 0 - 95.	eric 6		M. E. Derrick H. L. Clever
EXPERIMENTAL VAL	UES:			
	т/к	H <sub>2</sub> SO <sub>4</sub> /wt %	m <sub>H2SO4</sub> /mol kg <sup>-</sup>	1 Ostwald Coefficient L x 10 <sup>2</sup>
	293.15	0.0 35.82 61.62 95.6	0.0 5.690 16.37 222.	3.046 1.561 1.330 3.166
		<u> </u>	<u></u>	
METHOD/APPARATUS The apparatus		AUXILIARY	INFORMATION	

		ORIGINAL MEASUREMENTS:	
	792-44-7]		
(1) Oxygen; O <sub>2</sub> ; [7		Bohr, C.	
(2) Sulfuric acid; [7664-93-9]	<sup>H</sup> 2 <sup>SO</sup> 4;	Z. Physik. Chem. <u>1</u>	<u>1910</u> , 77, 47-50.
(3) Water; H <sub>2</sub> O; 7	732-18-5]		
VARIABLES: T/K = 294		PREPARED BY:	
P/kPa = 101.325 c/N = 0 - 36		R. Battino	
EXPERIMENTAL VALUES:			
T/K <sup>a</sup> N	Normality <sup>b</sup>	Ostwald Coeff. <sup>C</sup> 10 <sup>2</sup> L	Bunsen Coeff. <sup>d</sup> $10^{2}\alpha$
294.05	0.0	3.34	3.10
294.05	4.9	2.10	1.95
294.05	8.9	1.67	1.55
294.35	10.7	1.54	1.43
294.25	20.3	1.28	1.19
294.65	24.8	1.11	1.03
293.95	29.6	1.26	1.17
294.05	34.3	2.16	2.01
294.25	35.8	2.96	2.75
a		by compiler.	
<sup>d</sup> Bunsen coefficien		by compiler.	
		by compiler.	
	t. AUXILI	_	MATERIALS:
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	ARY INFORMATION SOURCE AND PURITY OF M	MATERIALS:
<sup>d</sup> Bunsen coefficien METHOD/APPARATUS/PROCEDUR	AUXILI	ARY INFORMATION SOURCE AND PURITY OF M	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	SOURCE AND PURITY OF N	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	SOURCE AND PURITY OF N	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	SOURCE AND PURITY OF N	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	SOURCE AND PURITY OF N	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	SOURCE AND PURITY OF N	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	SOURCE AND PURITY OF N	
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	EARY INFORMATION SOURCE AND PURITY OF M NO details given ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.03$ , es Normality to 0.1	timate by author.
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	EARY INFORMATION SOURCE AND PURITY OF M No details given ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.03$ , es Normality to 0.1 author.	timate by author.
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	EXAMPLINFORMATION SOURCE AND PURITY OF M NO details given ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.03$ , es Normality to 0.1 author. REFERENCES: 1. Bohr, C. Saue des Blutfarbs	timate by author. , estimate by rstoffaufnahme toffes, Kopenhagen Archiv f. (Anat. u.
d Bunsen coefficien METHOD/APPARATUS/PROCEDUR The absorption meas	AUXILI	EARY INFORMATION SOURCE AND PURITY OF M NO details given ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.03$ , es Normality to 0.1 author. REFERENCES: 1. Bohr, C. Saue des Blutfarbs 1895. Jolin,	timate by author. , estimate by rstoffaufnahme toffes, Kopenhagen Archiv f. (Anat. u.

COMPONENTS :		ORIGINAL MEASUREMENTS:
(1) Oxygen; $O_2$ ;	[7782-44-7]	Bruhn, G.; Gerlach, J.; Pawlek, F.
	H <sub>2</sub> SO <sub>4</sub> ; [7664-93-9]	Z. Anorg. Allgem. Chem. 1965, 337, 68-79.
(3) Water; H <sub>2</sub> O; [77]		
(3) Water, 1120, [77.	52-10-51	
VARIABLES:		PREPARED BY:
Conce	323-523 ntration	C.L. Young
EXPERIMENTAL VALUES:		
т/к	Conc of acid/mol 1-	Bunsen coefficient, $\alpha/cn^3$ (STP) cm <sup>-3</sup> atm <sup>-1</sup>
323.15	0.5 1.0 1.5	0.01858 0.0172 0.0160
373.15	0.5	0.01499
	1.0	0.01379 0.01205
423.15	0.5	0.01712
	1.0 1.5	0.01545 0.01453
473.15	0.5	0.0234 0.02193
523.15	1.0 0.5	0.0337
	AUXILIARY	INFORMATION
METHOD: / APPARATUS/	PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Static equilibri to that describe Stephan (1). Co liquid determine solution of gas volumetrically.	mposition of d by stripping	No details given.
		ESTIMATED ERROR:
		$\delta_{T}/K = \pm 2; \ \delta \alpha = \pm 2 \varepsilon.$
		(estimated by compiler).
		REFERENCES: 1. Pray, H.A.; Stephan, E.L. Battelle Memorial Institute
		Report BMI-840, <u>1953</u> .

oz Oxygen Solubiliti	
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Turchinov, V.V.
(2) Sulfuric acid; H <sub>2</sub> SO <sub>4</sub> ; [7664-93-9]	Nauch. Tr., Irkutsk. Irkutsk. Gos. NauchIssled. Inst. Redk. Tsvet. Metal., <u>1967</u> , (16), 293–9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	Chem. Abstr. <u>1969</u> , 70, 61694Z.
VARIABLES:	PREPARED BY:
T/K = 383 $P_{0_2}/MPa = 0.5-1.5$	V. Katovic
Cońcentration	
EXPERIMENTAL VALUES:	/atm S <sup>b</sup>
$g\ell^{-1}$ mole $\ell^{-1}$	
0 0 5	
0 0 10 0 0 15	
75 0.756 5 75 0.756 10	
75 0.756 15	0.255
125 1.275 5 125 1.275 10	
125 1.275 15 175 1.785 5	
175 1.785 10	0.115
175 1.785 15 225 2.30 5	
225 2.30 10 225 2.30 15	0.055 0.087
a Partial pressure o b Solubility of oxygo temperature and pro solution at given p	en in ml (at standard essure) per ml of
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Sulfuric acid (400 ml) was degassed by bubbling with oxygen. The oxygen pressure was increased to desired value and the temperature was raised to 110°C. After stirring for 30 minutes, 20 ml of solution was trans- ferred into a measuring device and cooled to room temperature. Volumes of oxygen and liquid were measured using burets.	
	ESTIMATED ERROR:
	$\delta S/S = \pm 0.02$ , author's estimate.
	REFERENCES :

COMPONENTS:		ORIGINAL MEASURE	MENTS:		
(1) Oxygen; O <sub>2</sub> ; [778	2-44-7]	Klyueva, A.	v.		
(2) Sulfuric acid; H [7664-93-9]	2 <sup>SO</sup> 4;	Tr. Ural. Pol <i>i</i> tekh. Inst., <u>1967</u> , No. 155, 39-44.			
(3) Water; H <sub>2</sub> O; [773	2-18-5]	Chem. Abstr	. <u>1969</u> , 70,	23521e.	
VARIABLES:		PREPARED BY:		<u> ·</u>	
T/K = 50-200		v	. Katovic		
P/kPa = 202-1013					
EXPERIMENTAL VALUES:	Solubility of c	xygen <sup>a</sup> in wate	r		
P <sub>0</sub> <sup>b</sup> /atm (323K)	100°C 125 (373K) (39	°C 150°C 8K) (423K)		200°C (473K)	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.0118 0.0 0.01436 0.0 0.02667 0.0	00685 0.0059 0913 0.0092 131 0.0101	6 0.00973		
a solubility of or	waen in ma O r				
<sup>a</sup> Solubility of ox	-	$= 1 m_1 m_2 0.$			
Parcial pressure					
Solubility of	oxygen <sup>b</sup> in 0.01	25M sulfuric a	cid (P <sub>02</sub> /10	atm)	
Sulfide <sup>a</sup> 100 (37	°C 125°C 3K) (398K)	150°C (423K)	175°C (448K)	200°C (473)	
	0917 0.00730	0.00561		0.00633	
	0956 0.00825 0941 0.00653	0.00621 0.0059	0.0059 0.00483	0.0057 0.00479	
	· ·				
Amounts not					
- Solubility o	f oxygen in mg	0 <sub>2</sub> per ml solu	tion.		
	AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURIT	Y OF MATERIALS	3:	
Oxygen was determine Winkler method.	d by the	No details	given.		
		ESTIMATED ERROR:			
		REFERENCES:			
L		I			

COMPONENTS:		ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [77	182-44-71	Geffcken, G.
•	NO <sub>3</sub> ; [7697-37-2]	Z. Phus. Chem. <u>1904</u> , 49, 257-302.
(3) Water; H <sub>2</sub> O; [77	/32-18-5]	
VARIABLES:		PREPARED BY:
T/K = 288-298 Concentration		C.L. Young; R. Battino.
EXPERIMENTAL VALUES:	<u></u>	
T/K	Conc of acid/mol	$dm^3$ (soln) Ostwald coefficient, L
288.15	0.492 0.494 1.00 1.008 1.88	0.03478 0.03490 0.03354 0.03365 0.03175
298.15	1.901 0.492 0.494 1.00 1.008 1.88	0.03166 0.03021 0.03016 0.02954 0.02964 0.02853
1000 ( (		INFORMATION
METHOD /APPARATUS/PR Volumetric method adsorption pipet a Diagram and detail given in original p	using simple nd buret. ed description	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Prepared by heating potassium chlorate and manganese dioxide. Washed with potassium hydroxide solution. Dried.</li> <li>(3) Degassed.</li> </ul>
		ESTIMATED ERROR: δT/K = ±0.1; δL = ±1%. (estimated by compiler). REFERENCES:

Salt Solutions (Aqueous)

COMPONENTS:	ORIGINAL MEASUREMENTS:				
(1) Oxygen; $0_2$ ; [7782-44-7]	Robertson, G.D., Jr.; Mason, D.M.; Corcoran, W.H.				
(2) Nitric acid HNO <sub>3</sub> ; [7697-37-2]	Ind. Eng. Chem. <u>1955</u> , 47, 1470-2.				
(3) Nitrogen oxide; NO <sub>2</sub> ; [10102-44-0]	,,,,,				
(4) Water; H <sub>2</sub> O; [7732-18-5]					
VARIABLES:	PREPARED BY:				
T/K = 310.9 - 361.0 Pressure	R. Battino				
Composition EXPERIMENTAL VALUES:					
t/°C T/K	$10^3 \alpha$ /mol dm <sup>-3</sup> atm <sup>-1</sup>				
HNO	3				
37.7 310.9 54.4 327.6	5.55 5.80				
85 wt. per cent HNO <sub>3</sub> –	+ 15 wt. per cent NO <sub>2</sub>				
37.7 310.9	3.60				
37 7 310 9	3.70				
54.4 327.6 54.4 327.6	3.84 3.86				
94 wt. per cent HNO3 -					
37.7 310.9	4.44				
37.7 310.9	4.16				
37.7 310.9 37.7 310.9	4.17 4.05				
54.4 327.6	4.05				
71.1 344.3	4.98				
87.8 361.0	5.63 [0 <sub>2</sub> ]/mol dm <sup>-3</sup>				
Henry's Law Constant	$\alpha = \frac{P_{02}/\text{atm}}{P_{02}/\text{atm}}$				
AUXILIARY	INFORMATION				
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:				
A sample of acid and oxygen was	(1) Commercial grade.				
confined in a 3 mm i.d. precision-	(2) Durnand as in reference 1				
bore glass tube by Fluorolube S. The system was pressurized to ca.	(2) Prepared as in reference 1.				
40 atm by adjusting the volume and	(3) No details given.				
then agitated. The pressure was lowered to ca. 22 atm while con-					
tinuing agitation. At equilibrium					
the solubility was determined from measurements of the liquid and gas					
phase volumes and the total pressure	2.				
	ESTIMATED ERROR:				
	$\delta P/atm = 0 \pm 0.005$ (authors)				
	$\delta T / X = \pm 0.05$ (authors)				
	$\delta \alpha / \alpha = \pm 0.04$ (compiler)				
	REFERENCES:				
	1. Reamer, H.H.; Corcoran, M.H.; Sage, B.H. Ind. Eng. Chem. 1953, 45, 2699-704.				

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COMPONEN	NTS:				ORIGINAL	MEASUREME	NTS:		
(1)	(1) Oxygen; O <sub>2</sub> ; [7782-44-7]					Shapka, A.V.; Atroshchenko, A.V.			
(2)	Nitric acid; HNO <sub>3</sub> ; [7697-37-2]					Vyssh. l	Icheb. Z	avod., Khi	m.
(3)	(3) Water; H <sub>2</sub> O; [7732-18-5]							<u>71</u> , 14, 13 6, 28296u.	30-8.
							1972, /	o, 20290u.	
VARIABLES: T/K = 291-333 P/MPa = 1.1-5.2 Concentration					PREPARED		Katovic		
EXPERIM	ENTAL VALUES		_						
	C <sub>HNO3</sub> ∕∜	t∕°C	т <sup>а</sup> /К	P/atm	P/atm	P/atm	P/atm	P/atm	
				<u>11</u> s <sup>b</sup>	21 s <sup>b</sup>	<u>31</u>		<u>51</u>	
	30 30 30 30 50 50 50 50 50 60 60 60 60 60 70 70	18 18 40 60 18 40 60 18 40 60 18 40 60 18 40 60 18 40 60 18 40	291 291 313 333 291 291 313 333 291 313 313 313 313 313 313 313 313 313 3	0.182 0.199 0.140 0.173 0.142 0.280 0.331 0.183 0.218 0.398 0.37 0.34 0.468 0.370 0.315 0.320 0.276 0.312 0.274	0.422 0.417 0.417 9.335 0.335 0.529 0.424 0.434 0.596 0.600 0.530 0.527 0.427 0.454 0.630 0.620	0.708 0.733 0.737 0.827 0.750 0.840 0.770 0.750 0.750 0.785 0.820	0.712 0.626 0.680 0.870 0.986 0.803 0.908 0.906 0.935 0.960 0.991 1.000 0.980 0.910 1.070 1.080 0.970	1.044 1.002 0.879 0.890 0.788 0.885 1.130 1.183 0.988 0.914 1.027 1.016 1.019 0.975 1.200 1.090 0.910 0.943 1.180 1.220 1.020 following	öage
				AUXILIARY	INFORMAT	LON			
METHOD/	APPARATUS/P	ROCEDURE			SOURCE A	ND PURITY	OF MATERI	ALS:	
appar The t	bilities d ratus desc technique mes on bur	cribed i involve	in the p	paper.	No ć	letails <u>c</u>	jiven.		
					DOBTION	P. 1799.00-			
					ESTIMATED ERROR: $\delta S/S = \pm 0.03$ , compiler's estimate.				
					REFERENC	CES:			
L								•	

(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Nitric acid; HNO <sub>3</sub> ; [7697-37-2] (3) Water; H <sub>2</sub> O; [7732-18-5] CRITICAL EVALUATION: $C_{HNO_3}/{\$} t/{\degree}C T^{\texttt{a}}/{\texttt{K}} P/atm P/atm P/atm P/atm P/atm P/atm P/atm Math P/atm Math P/atm Math Math P/atm Math Math Math Math Math Math Math Math$	COMPONENTS:					EVALUATOR:				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	(1)	Oxygen; O <sub>2</sub> ; [7782-44-7]					pka, A.V	., Atros	hchenko,	A.V.
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	(2)	-								
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5				1					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	CRITICA				con	tinued				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	(	C <sub>HNO</sub> /%	t∕°C	т <sup>а</sup> /к	P/atm	P/atm	P/atm	P/atm	P/atm	[
70         40         313         0.310         0.710         0.880         0.975         1.000           70         60         333         0.346         0.590         0.900         1.120         1.390		3			11	21		41		
70 60 333 0.346 0.590 0.900 1.120 1.390					s <sup>b</sup>					
					••					

<sup>a</sup> Calculated by compiler.

<sup>b</sup> Solubility in  $\ell O_2(STP)/\ell$  solution.

COMPONENTS :	ORIGINAL MEASUREMENTS:			
	Pogrebnaya, V.L.; Usov, A.P.;			
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Baranov, A.V.; Machigin, A.A.			
(2) Nitric acid; HNO <sub>3</sub> ; [7697-37-				
(3) Water; H <sub>2</sub> O; [7732-18-5]	Khim. Tekhnol. <u>1972</u> , 15(1), 16-20.			
	Chem. Abstr. <u>1972</u> , 76,132165m.			
VARIABLES: T/K = 283-333	PREPARED BY:			
P/kPa = 101	V. Katovic			
Concentration				
EXPERIMENTAL VALUES:				
Concentration of acid	d Solubility of oxygen			
wt % mole %	$10^{3}\alpha^{a}$ $10^{5}x_{1}^{b}$			
	10°C			
0.0 0.0	38.1 3.07			
6.1 1.8	34.5 2.80			
6.5 2.0 12.2 3.8	33.9 2.75 30.9 2.53			
12.3 3.8	31.4 2.57			
19.4 6.4 21.3 7.2	27.5 2.29 26.7 2.23			
30.6 11.2	23.5 2.03			
32.1 11.9 44.8 18.8	22.9 1.98 19.6 1.79			
46.2 19.7	19.3 1.78			
55.3 26.1 57.1 27.5	18.5 1.81 18.5 1.83			
58.4 28.6	17.8 1.78			
	20°C			
0.0 0.0	30.9 2.49			
6.9 2.1 9.1 2.8	29.0 2.36 28.2 2.31			
15.1 2.8	28.2 2.31 26.6 2.21			
16.1 5.2	26.1 2.18			
	continued on following page			
AUXII	LIARY INFORMATION			
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
Solubilities determined using an				
apparatus described in the paper	. (2) No details given.			
	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.03$ , authors' estimate.			
	$\delta \alpha / \alpha = \pm 0.03$ , authors' estimate. $\delta T/K = \pm 0.1$			
	01/K - 10.1			
	REFERENCES :			
1				
}				

Salt Solutions (Aqueous)

r			T			
COMPONENTS:		• • • - •	EVALUATOR:			
	gen; 0 <sub>2</sub> ; [778		Pogrebnaya, V.L.; Usov, A.P.; Baranov, A.V.; Machigin, A.A.			
<pre>(2) Nitric acid; HNO<sub>3</sub>; [7697-37-2] (3) Water; H<sub>2</sub>O; [7732-18-5]</pre>			Izv. Vyssh. Uchebn. Zavod., Khim. Khim. Tekhnol. <u>1972</u> , 15(1), 16-20			
(3) Wate	er; H <sub>2</sub> 0; [//3	52-10-2]		r. 1 <u>972</u> , 76,132		
			Chem. 1032	<u>1972</u> , 70,192	105 11.	
CRITICAL EVA	ALUATION:	cont	inued			
	Concontrat	ion of said	Colubility	• <b>F</b>		
	wt %	ion of acid mole %	Solubility 10 <sup>3</sup> α <sup>a</sup>	10 <sup>5</sup> x1 <sup>b</sup>		
	wc 8	more 4	10 4	10 1		
}	21.7	7.3	25.0 24.6	2.10 2.08		
	21.1 31.1	7.0 11.4	22.3	1.94		
}	33.2	12.4	22.0 20.3	1.93 1.84		
1	40.7 41.4	16.4 16.8	20.3	1.82		
	56.8	27.3	19.0	1.91 1.75		
1	58.1 58.7	28.4 28.9	19.2 18.8	1.91		
(	-		25°C			
	0.0	0.0	28.5	2.29		
	6.6 9.4	2.0 2.9	26.8 26.1	2.19 2.15		
	12.8	4.0	25.5	2.11		
	15.0 23.4	4.7 8.0	25.8 23.3	2.08 1.98		
1	28.5	10.2	22.3	1.93		
	28.7 41.7	10.3 17.0	22.1	1.91		
	45.3	19.1	20.2 20.1	1.85 1.87		
	47.9 53.8	20.8 24.9	19.7 19.6	1.86		
	54.2	25.3	19.6	1.93 1.93		
	54.8	25.7	19.5	1.94		
1	0.0	0.0	0°C 26.2	2.12		
	0.0 6.9	2.1	25.0	2.05		
	8.0 13.1	2.4 4.1	24.6 23.9	2.02 1.98		
(	23.4	8.0	22.4	1.91		
	25.1 32.1	8.7 11.9	21.9 20.8	1.88 1.83		
	35.5	13.6	20.5	1.83		
	42.4 44.3	17.4 18.5	19.8 19.9	1.82 1.86		
	49.6	22.0	20.0	1.92		
	54.0 54.1	25.4 25.2	20.2 19.9	2.00 1.97		
	57.3	27.7	20.0	2.04		
		40°	с			
	0.0	0.0	23.0 22.1	1.86		
	9.6 10.3	2.9 3.2	22.1 21.9	1.83 1.81		
	12.0	3.7	21.7 21.0	1.81 1.79		
	20.4 20.9	6.8 7.0	20.9	1.78		
	21.5	7.3	20.6 20.5	1.76 1.81		
	32.4 33.1	12.0 12.4	20.1	1.79		
	41.5 46.7	16.8 20.0	19.9 20.0	1.84 1.90		
	53.3	24.6	20.1	2.00		
	57.8 58.3	28.1 28.5	21.0 20.0	2.16 2.13		
				tinued on follo	wing nage	
L					many puye	

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COMPONENTS:			EVALUATOR:
(2) Nitr	en; O <sub>2</sub> ; [7 ic acid; H r; H <sub>2</sub> O; [7	NO <sub>3</sub> ; [7697-37-	Pogrebnaya, V.L.; Usov, A.P.; Baranov, A.V.; Machigin, A.A. Izv. Vyssh, Uchbn. Zavod., Khim. Khim. Tekhnol. <u>1972</u> , 15(1), 16-20. Chem. Abstr. <u>1972</u> , 76, 132165m.
CRITICAL EVALU	continued		
	Concentra wt ६	tion of acid mole %	Solubility of oxygen $10^3 \alpha^a \qquad 10^5 x_1^b$
		5(	50°C
	$\begin{array}{c} 0.0\\ 5.9\\ 7.2\\ 14.3\\ 14.9\\ 22.7\\ 23.4\\ 34.3\\ 35.1\\ 52.3\\ 53.4\\ 57.6\\ 58.8 \end{array}$	0.0 1.8 2.2 4.6 4.8 7.7 8.0 12.5 13.0 13.4 23.9 24.7 28.0 29.0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
			60°C
	$\begin{array}{c} 0.0\\ 10.6\\ 11.4\\ 22.1\\ 24.7\\ 25.6\\ 34.8\\ 35.3\\ 43.9\\ 47.2\\ 50.4\\ 54.5\\ 55.9\\ 58.3 \end{array}$	0.0 3.3 3.6 7.5 8.6 8.9 13.2 13.5 18.3 20.4 22.5 25.5 26.6 28.6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

a Bunsen coefficient.

 $^{\rm b}$  Mole fraction solubility at 101 kPa partial pressure of gas. Mole fraction is for O\_2, HNO\_3, and H\_2O as components.

Salt Solutions (Aqueous)

	_						3
COMPONENT	rs :			ORIGINAL	MEASUREM	ENTS:	
		(7782-44 HNO <sub>3</sub> ; [76		Zh. Pri	kl. Khi	m. <u>1973</u> , 4	nenko, A. V. 16, 2759-61. L. trans.)
(3)Wate	r; H <sub>2</sub> 0;	[7732-18-5	5]		, 46, 2		·
VARIABLES				PREPARED	BY:	<u></u>	
		- 291-332 r = 11-52		с. г. ч	oung		
	•	entration			<b>,</b>		
EXPERIMEN	NTAL VALUE	S: Conc. <sup>b</sup> of				Conc. <sup>b</sup> of	
		nitric			а	nitric	
т/к	P <sup>9</sup> bar	acid, %	Solubility <sup>C</sup>		P/bar	acid, %	Solubility <sup>C</sup>
291.15	11.1	80	0.41	313.15	41.5	90	2.37
	21.1 31.4		0.84 1.27	333.15	51.7 11.1		2.93 0.74
	41.5		1.70		21.1		1.35
	51.7		2.12		31.4		1.96
313.15	$11.1 \\ 21.1$		0.47 0.96		41.5 51.7		2.58 3.18
	31.4		1.44	291.15	11.1	98	0.97
	41.5		1.92		21.1		1.80
	51.7		2.40		31.4		2.63
333.15	11.1 21.1		0.57 1.05		41.5 51.7		3.45 4.27
	31.4		1.55	313.15	11.1		1.10
	41.5		2.17		21.1		2.0
	51.7		2.70		31.4		2.89
291.15	$11.1 \\ 21.1$	90	0.57 1.05		41.5 51.7		3.78 4.65
	31.4		1.55	333.15	11.1		1.35
	41.5		2.03		21.1		2.35
	51.7		2.51		31.4		3.34
313.15	$11.1 \\ 21.1$		0.67 1.24		41.5 51.7		4.32 5.29
	31.4		1.80				
					Conti	nued on fo	llowing page
			AUXILIARY	INFORMATI	ON		······
		PROCEDURE		SOURCE AN	ND PURITY	OF MATERIAI	-S :
Oxygen a atmosphe Pressure and solu equilib:	admitted eres wit e reduce ution ra ration l lysed vo	d to requi pidly stir iquid samp	re of 100 stirring. red pressure		No deta:	ils given.	
				ESTIMATE			
				δТ/К =	±l; δP,	$bar = \pm 0.$	$3;  \delta \alpha = \pm 2 \vartheta$
				(estima	ted by d	compiler).	
				REFERENCI	ES:		<u></u>
					<u></u>		
					••••••••••••••••••••••••••••••••••••••	<u> </u>	

COMPONENTS:			EVALUATOR:
	(1)	Oxygen; O <sub>2</sub> ; [7782-44-7]	Shapka, A.V.; Atroshchenko. A.V.
	(2)	Nitric acid; HNO <sub>3</sub> ; [7797-37-2]	Zh. Prikl. Khim. <u>1973</u> , 46, 2759-61.
	(3)	Water; H <sub>2</sub> O; [7732-18-5]	J. Appl. Chem. USSR (Engl. trans.) 1973, 46, 2915-7.

CRITICAL EVALUATION:

## continued

- <sup>a</sup> Pressure reported as 11, 21, 31, 41, 51 atm.
- b Although the authors do not identify the %, it appears to be wt %.
- <sup>c</sup> Solubility is in dm<sup>3</sup>(STP) dm<sup>-3</sup> at the pressure of the measurement. Divide by the pressure (in atm) to obtain the Bunsen coefficient.

Salt Solutions (Aqueous)

COMPONENT	S:			ORIGINAL	. MEASUREM	ENTS:		
• • •	-	; [7782.		Pogrebnaya, V. L.; Usov, A. P.; Baranov, A. V.				
(2) Nit	ric acid	; HNO <sub>3</sub> ;	[7697-37-2]	Zhur.	Prikl. K	him. 197	7, 50, 12-16.	
(3) Wat	er; H <sub>2</sub> O;	[7732-18	3-5]	J. App.		USSR (E)	ngl. trans.)	
VARIABLES		293-353		PREPAREI	BY:			
	• .	= 10 - 61		с. г.	Young			
EXPERIMEN	TAL VALUE	-						
	_	Conc. of nitric			2	Conc. of nitric		
т/к	P/bar	acid, wt-%	Solubility <sup>b</sup>	т/к	P/bar	acid, wt-%	Solubility <sup>b</sup>	)
293.15	10.1	11	0.215	333.15		11	0.154	
	20.2 30.4		0.477 0.703		20.2 30.4		0.343 0.509	
	40.5		0.924		40.5		0.683	
	50.7 60.8		1.169 1.374		50.7 60.8		0.848 1.003	
303.15	10.1		0.209	353.15	10.1		0.165	
	20.2 30.4		0.426 0.633		20.2 30.4		0.316 0.484	
	40.5		0.838		40.5		0.629	
	50.7 60.8		1.022 1.226		50.7 60.8		0.796 0.911	
313.15	10.1		0.198	293.15	10.1	21	0.227	
	20.2 30.4		0.398 0.578		20.2 30.4		0.439 0.659	
	40.5		0.764		40.5		0.840	
	50.7		0.948 1.11		50.7 60.8		1.058 1.264	
323.15	60.8 10.1		0.192	303.15	10.1		0.185	
	20.2 30.4		0.376		20.2		0.414	
	40.5		0.535 0.705		30.4 40.5		0.581 0.775	
	50.7		0.892		50.7		0.951	
<u></u>	60.8		1.049 AUXILIARY	INFORMAT		ed_on_fo]	llowing page	
METHOD/A1	PPARATUS	/PROCEDUF	Æ :	SOURCE A	ND PURITY	OF MATERI	ALS:	
						•••••••••••••••••••••••••••••••••••••••		
Static cell of l l capacity fitted with electromagnetic stirrer. Temperature measured with mercury thermometer and pressure with a Bourdon gauge. Liquid sample analysed by stripping out oxygen and measuring amount volumetrically.					No det	ails give	en.	
Details	5 in sou:	rce.		ESTIMATE				
					tD ERROR:	SP/bar =	±0.3;	
				1 .	-	-	compiler).	
				REFERENC	CES:	<u></u>		

COMPONE	NTS :			ORIGINAL MEASUREMENTS:			
(1) Oxyg	en; 02	; [7782-	-44-7]	Pogrebnaya, V. L.; Usov, A. P.; Baranov, A. V.			
(2) Nitr	ic acid	; hno <sub>3</sub> ;	7697-37-2]				
(3) Wate	er; H <sub>2</sub> 0;	[7732-19	3-5]	Zhur. Prikl. Khim. <u>1977</u> , 50, 12-16. J. Appl. Chem. USSR (Engl. trans.) <u>1977</u> , 50, 10-13			
EXPERIM	ENTAL VA	LUES:	con	tínued	<u>// 30/ 1</u>	<u> </u>	
		Conc. of				Conc. of	
т/к	P <b>7</b> bar	nitric acid, wt-%	Solubility <sup>b</sup>	т/к	P/bar	nitric acid, wt-%	Solubility <sup>b</sup>
303.15	60.8	21	1.135	353.15	50.7	30	0.826
313.15	10.1 20.2		0.189 0.371	293.15	60.8 10.1	42	1.002 0.190
	30.4		0.566		20.2		0.367
	40.5 50.7		0.579 0.724		30.4 40.5		0.538 0.708
	60.8		1.099		50.7		0.888
323.15	10.1 20.2		0.168 0.353	303.15	60.8 10.1		1.069 0.186
	30.4		0.550		20.2		0.354
	40.5		0.687		30.4		0.533
	50.7 60.8		0.859 1.062		40.5 50.7		0.698 0.896
333.15	10.1		0.168		60.8		0.988
	20.2		0.383 0.529	313.15	10.1 20.2		0.178 0.354
	30.4 40.5		0.686		30.4		0.529
	50.7		0.840		40.5		0.698
353.15	60.8 10.1		0.976 0.179		50.7 60.8		0.896 0.988
222.12	20.2		0.335	323.15	10.1		0.185
	30.4		0.495		20.2		0.355
	40.5 50.7		0.661 0.833		30.4 40.5		0.527 0.718
	60.8		0.966		50.7		0.886
293.15	10.1	30	0.237	222 15	60.8 10.1		1.014
	20.2 30.4		0.406 0.602	333.15	20.2		0.177 0.370
	40.5		0.806		30.4		0.515
	50.7 60.8		0.978 1.164		40.5 50.7		0.703 0.891
303.15	10.1		0.186		60.8		1.036
	20.2		0.381	353.15	10.1		0.211
	30.4 40.5		0.588 0.777		20.2 30.4		0.383 0.572
	50.7		0.931		40.5		0.793
212 15	60.8		1.078 0.244		50.7 60.8		0.896 1.056
313.15	10.1 20.2		0.402	293.15	10.1	53	0.200
	30.4		0.561		20.2		0.369
	40.5 50.7		0.719 0.886		30.4 40.5		0.527 0.689
	60.8		1.053		50.7		0.886
323.15	10.1		0.209	202 35	60.8		1.039
	20.2 30.4		0.374 0.539	303.15	10.1 20.2		0.186 0.365
	40.5		0.722		30.4		0.536
	50.7		0.895 1.007		40.5 50.7		0.671 0.861
333.15	60.8 10.1		0.165		60.8		1.033
	20.2		0.350	313.15	10.1		0.195
	30.4 40.5		0.547 0.691		20.2 30.4		0.394 0.561
	50.7		0.858		40.5		0.714
252 15	60.8		1.037		50.7		0.856
353.15	10.1 20.2		0.179 0.353	323.15	60.8 10.1		1.048 0.207
	30.4		0.513		20.2		0.389
	40.5		0.682		Cont	inued on	following page

Salt Solutions (Aqueous)

COMPONE	NTS:			ORIGINA	L MEASU	REMENTS :		
		[7782-4	4-7]	Pogrebnaya, V. L.; Usov, A. P.;				
(2)Nitric acid; HNO <sub>3</sub> ; [7697-37-2]				Baranov, A. V.				
(3) Water; H O; [7732-18-5]				J. Appl		USSR (En	, 50, 12-16. Igl. trans.)	
EXPERIMENTAL VALUES: Continued								
	а	Conc. of nitric				Conc. of nitric		
т/к	P/bar	acıd, wt-%	${\tt Solubility}^{{\tt b}}$		₽∜bar	acid, wt-%	${\tt Solubility}^{{\tt b}}$	
323.15	30.4	53	0.581	313.15	20.2	85	0.85	
	40.5 50.7		0.731 0.945		30.4 40.5		1.48 1.69	
	60.8		1.078		50.7		1.94	
333.15	10.1		0.204		60.8		2.20	
	20.2 30.4		0.396 0.604	323.15	10.1 20.2		0.66 0.89	
	40.5		0.787		20.2 30.4		1.307	
	50.7		0.969		40.5		1.748	
	60.8		1.078		50.7		2.133	
293.15	10.1	70	0.225	<b></b>	60.8		2.538	
	20.2 30.4		0.425 0.631	333.15	20.2 30.4		0.99 1.460	
	40.5		0.839		40.5		1.950	
	50.7		1.057		50.7		2.379	
	60.8		1.243		60.8		2.780	
303.15	10.1 20.2		0.234 0.448	353.15	20.2 30.4		1.101 1.619	
	30.4		0.448		40.5		2.116	
	40.5		0.856	293.15	10.1	99	0.761	
	50.7		1.082		20.2		1.498	
313.15	60.8 10.1		1.289 0.259		30.4 40.5		2.191 3.017	
212.12	20.2		0.513		40.5 50.7		3.594	
	30.4		0.764		60.8		4.398	
	40.5		0.970	303.15	10.1		0.741	
	50.7 60.8		1.174 1.443		20.2 30.4		1.539 2.246	
323.15	10.1		0.255		40.5		2.994	
	20.2		0.526		50.7		3.219	
	30.4		0.792		60.8		4.481	
	40.5 50.7		1.048 1.309	313.15	10.1 20.2		0.789 1.709	
	60.8		1.508		30.4		2.391	
333.15	20.2		0.557		40.5		3.119	
	30.4		0.829		50.7		3.841	
	40.5		1.070	323.15	60.8		4.739	
	50.7 60.8		1.320 1.576	323.13	10.1 20.2		0.847 1.776	
353.15	10.1		0.311		30.4		2.516	
	20.2		0.688		40.5		3.452	
	30.4		1.011		50.7		4.273	
293.15	60.8 20.2	85	1.774 0.75	333.15	60.8 10.1		4.774 0.877	
	30.4		1.086		20.2		1.733	
	40.5		1.438		30.4		2.451	
	50.7		1.794		40.5		3.503	
303.15	60.8 20.2		2.154 0.74		50.7 60.8		4.191 4.993	
	30.4		1.17	353.15	10.1		0.984	
	40.5		1.45		20.2		1.895	
	50.7 60.8		1.82 2.23		30.4		2.793	
a produ								
Pres:			paper as 10,					
	bility i sure lis		rs of O <sub>2</sub> per	liter of	solutio	on under	the oxygen	

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Sprague, R.W.
(2) Nitric acid; HNO <sub>3</sub> ; [7697-37-2]	Ind. Eng. Chem. <u>1955</u> , 47, 2396-8.
(3) Dinitrogen Tetroxide; N <sub>2</sub> O <sub>4</sub> ; [10544-72-6]	<u> </u>
(4) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
Composition	R. Battino
T/K = 298	
EXPERIMENTAL VALUES:	
All measurement	
$10^{2} \alpha/cm^{3}$	<sup>2</sup> /cm <sup>3</sup> (ŞTP) 10 <sup>3</sup> /moles 10 <sup>4</sup> /moles
$\begin{array}{c c} & 10^{2} \alpha/cm^{3} \\ & (STP) cm^{-3} \\ & (STP) cm^{-3} \\ & & 10^{2} \alpha/cm^{3} \\ & (STP) cm^{-3} \\ & & atm^{-1} \end{array}$	$0^{2/\text{cm}^{3}(\text{STP})}$ $10^{3/\text{moles}}$ $10^{4/\text{moles}}$ $0_{2} g^{-1}$ $0_{2} 1it^{-1}$ $0_{2} g^{-1}$ $atm^{-1}$ $atm^{-1}$
	<sup>2</sup> atm <sup>-1</sup> atm <sup>-1</sup>
100         0         6.59           93.94         0         6.06         4.57           90.10         0         9.90         2.99	4.37         2.94         1.95           3.08         2.04         1.37
90.10 0 9.90 2.99	2.03 1.33 0.904
80.97 0 19.03 1.58	1.270.8280.5661.080.7030.483
69.11 0 30.89 1.99	1.42 0.886 0.632
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4.30         2.94         1.92           3.72         2.67         1.66
85.64 14.36 0 4.26	2.68 1.90 1.20
79.99         20.01         0         3.82           0         0         100         2.3	2.44 1.71 1.09
a All compositions are in weight per	cent
b $\alpha$ is the Bunsen coefficient.	cent.
<sup>C</sup> In the fifth column g refers to gr	ams of solvent or solution.
d The sixth and seventh columns are indicated.	Henry's law constants in the units
e All values are the author's.	
AUXILIARY	INFORMATION
ME THOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A borosilicate glass cell of volume	(1) "Used directly from the cylinder."
ca. 25cm <sup>3</sup> and with graduated end	(2) Dropanod by low-programs distill
sections was used. A sample of acid was weighed into the cell and frozen	ation from potassium nitrate and
solid. A magnetically-driven	concentrated sulfuric acid and condensed at dry ice-alcohol
stirrer sealed in glass did the stirring. The liquids were con-	temperature.
fined over perfluorinated kerosine.	(3) Prepared by the method of
Gas was introduced. Pressures were read on a Heise gage to 0.5 psi, and	Whittaker et al. (1). (4) Distilled. 1 to 2 ppm conductive
volumes to ±0.001 cm <sup>3</sup> . After equilibration the solubility was	materials.
determined by measuring the pressure	ESTIMATED ERROR:
and the gas and liquid volumes.	$\delta \alpha / \alpha = \pm 0.2$ (compiler's estimates).
	REFERENCES:
	1. Whittaker, A.G.; Sprague, R.W.;
	Skolnik, S.; Smith, G.B.L. J. Am. Chem. Soc. <u>1952</u> , 74, 4794-7.

	ns (Aqueous) 97
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Bruhn, G.; Gerlach, J.; Pawlek, F.
(2) Ammonium hydroxide; NH4OH;	Z. Anorg. Allgem. Chem. <u>1965</u> , 337,
[1336-21-6]	68-79.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 323 - 423	C.L. Young
EXPERIMENTAL VALUES:	
T/K Conc of hydroxide/mc	ol 1 <sup>-1</sup> Bunsen coefficient,
	a/cm <sup>3</sup> (STP) cm <sup>-3</sup> atm <sup>-1</sup>
323.15 2.87	0.02025
5.63 8.28	0.01908 0.01840
348.15 2.87	0.01765
5.63	0.01619
8.28	0.01593
373.15 2.87 5.63	0.01570 0.01575
8.28	0.01469
423.15 2.87 5.63	0.01918 0.01833
8.28	0.01760
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Static equilibrium cell. Similar to that described by Pray and Stephan (1). Composition of liquid determined by stripping solution of gas and estimating volumetrically.	No details given.
	ESTIMATED ERROR:
	$\delta T/K = \pm 2;  \delta \alpha = \pm 2$ %. (estimated by compiler).
	REFERENCES :
	<ol> <li>Pray, H.A.; Stephan, E.L. Battelle Memorial Institute Report BMI-840, 1953.</li> </ol>

	ORIGINAL MEASUREMENTS:
2-44-7]	Bruhn, G.; Gerlach, J.; Pawlek, F.
nonium salt;	Z. Anorg. Allgem. Chem. <u>1965</u> , 337, 68-79.
-18-5]	
	PREPARED BY:
	C.L. Young
onc of salt/mol l	$\alpha^{a}/cm^{3}$ (STP) $cm^{3}$ atm <sup>-1</sup>
0.25 0.75 1.5 3.0	0.0248 0.0195 0.0133 0.0081
0.25 0.75 1.5 3.0	0.0186 0.0148 0.0095 0.0072
0.25 0.75 1.5 3.0	0.0149 0.0131 0.0082 0.0050
0.75 1.5 3.0	0.01429 0.00865 0.00656
1.5 3.0	0.01241 0.00812
icient.	
AUXILIARY	INFORMATION
DURE :	SOURCE AND PURITY OF MATERIALS:
ell. Similar Pray and ition of stripping estimating	No details given.
	<pre>ESTIMATED ERROR:</pre>
	20-2] -18-5] onc of salt/mol 1 0.25 0.75 1.5 3.0 0.25 0.75 1.5 3.0 0.25 0.75 1.5 3.0 0.25 0.75 1.5 3.0 0 0.75 1.5 3.0 0 0 0 0 0 0 0 0 0 0 0 0 0

COMPONENTS :			ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7	782-44-71		Yasunishi, A.		
(2) Aluminum chlor		;	Kagadu Kogaku Rombunshu <u>1978</u> , 4,		
[7446-70-0]			185-9.		
(3) Water; H <sub>2</sub> O; [7	//32-18-5]				
VARIABLES: $T/K = 298$	15		PREPARED BY:		
$0_{2} P/kPa = 101$	.325		H. L. Clever		
$c_3/mol dm^{-3} = 0 -$					
			1		
EXPERIMENTAL VALUES:	T/K A	luminum c	hloride Ostwald		
	1/10 1	c <sub>3</sub> /mol			
	<u> </u>	3/			
	298.15	0.0	0.031141		
		0.309 0.365			
		0.599			
		0.606			
}		0.724			
		0.831			
		1.182 1.524			
		1.696			
		1.732	0.01058		
1		1.897			
		2.204	0.00887		
	<sup>1</sup> Value fro	m referen	ce l.		
	AICI <sub>3</sub> the Setschenow Over the e empirical $0.303 c_3/($	data corr equation entire con equation 1 + 0.085	on of 1.7 mol dm <sup>-3</sup> elates with the $log(L_0/L) = 0.274 c_3$ . iccentration range the $log(L_0/L) =$ 9 c_3) correlates the		
	data bette	er.			
		AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCE The apparatus and described in refer Horiuti type appar	procedure cence (1).	А	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Aluminum chloride.		
The aqueous salt s	solution is	-	(2) Aluminum chiolide.		
degassed by boilir under vacuum.			(3) Water. No information.		
The gas phase volu volume are measure of mercury.	nme and the ad by displ	solvent acement			
Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dissolution vessel and the gas volume remaining in the buret are recorded.			ESTIMATED ERROR:		
The salt solution density are determ solubility measure solution vapor pre- taken from the life estimated. A corr increase of the life the dissolved gas	nined after ment. The essure is e cerature or rection for iquid volum	the salt ither the	REFERENCES: 1. Yasunishi, A. J. Chem. Eng. Jpn. <u>1977</u> , 10, 89.		

	lontotuus versonen
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Yasunishi, A.
(2) Aluminum sulfate; Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> ; [10043-01-3]	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: $T/K = 298.15$ O <sub>2</sub> P/kPa = 101.325	PREPARED BY: H. L. Clever
$c_3/mol dm^{-3} = 0 - 0.812$	
EXPERIMENTAL VALUES:	
T/K Aluminum su c_3/mol dm	
298.15 0.0 0.138 0.236 0.378 0.430 0.501 0.643 0.674 0.812	0.03114 <sup>1</sup> 0.02466 0.02115 0.01639 0.01528 0.01340 0.01024 0.00964 0.00766
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Aluminum sulfate.</li> </ul>
by boiling under reflux and under vacuum.	(3) Water. No information.
The gas phase volume and the solvent volume are measured by displacement of mercury.	
Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dissolution vessel and the gas volume remaining in the buret are recorded.	ESTIMATED ERROR:
The salt solution concentration and	1
density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the increase of the liquid volume by the dissolved gas is made.	REFERENCES: 1. Yasunishi, A. <i>J. Chem. Eng. Jpn.</i> <u>1977</u> , 10, 89.

COMPONENTS:	ORIGINAL MEASUREMENTS: Shkol'nikova, R. I.
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	
(2) Hydrates aluminum oxide; Al <sub>2</sub> 0 <sub>3</sub> ·xH <sub>2</sub> 0; [1333-84-2]	Uch. Zap. Leningr. Gos. Univ., Ser. Khim. Nauk. <u>1959</u> , Nr. 18, 64-86.
(3) Water; H <sub>2</sub> O; [7732-18-5]	Chem. Abstr. <u>1961</u> , 55, 25443b.
VARIABLES:	PREPARED BY:
T/K = 293.15 - 313.15 P/kPa = 101.325 $Al_2O_3/Wt = 0.1 - 0.42$	A. L. Cramer H. L. Clever
EXPERIMENTAL VALUES:	
T/K Al <sub>2</sub> O <sub>3</sub> /1	Wt % Bunsen Coefficient α x 10 <sup>3</sup>
293.15 0.1 0.3	31.0
0.4	2 26.0
303.15 0.1 0.3 0.4	5 26.5
313.15 0.1 0.3 0.4	5 23.1
	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure of Lannung were modified (1).	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given. Stated to be 99.98 - 99.99 per cent.
	(2) Aluminum oxide. No information.
	(3) Water. No. information.
	ESTIMATED ERROR:
	REFERENCES: 1. Lannung, A. J. Am. Chem. Soc. <u>1930</u> , 52, 68.

COMPONENTS :		ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-4	4-7]	Bruhn, G.; Gerlach, J.; Pawlek, F.
(2) Sulfuric acid, coppe (1:1); CuSO <sub>4</sub> ; [7758-	r (2+) salt 98-7]	Z. Anorg. Allgem. Chem. <u>1965</u> , 337, 68-79.
(3) Water; H <sub>2</sub> O; [7732-18	-5]	
VARIABLES:		PREPARED BY:
T/K = 298-523 Concentration EXPERIMENTAL VALUES:		C.L. Young
	of salt/mol 1	$\alpha^{a}/cm^{3}(STP) cm^{3} atm^{-1}$
298.15	0.5 1.0 1.5	0.02440 0.02193 0.01991
323.15	0.5 1.0 1.5	0.01775 0.01585 0.01449
373.15	0.5 1.0 1.5	0.01491 0.01299 0.01270
423.15	0.5 1.0 1.5	0.01670 0.01511 0.01366
473.15	0.5 1.0 1.5	0.02330 0.01988 0.01844
523.15	0.5 1.0 1.5	0.03355 0.02970 0.02680
<sup>a</sup> Bunsen coefficient.		
<u></u>	AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDUR	Æ	SOURCE AND PURITY OF MATERIALS:
Static equilibrium cell to that described by Pr Stephan (1). Compositi of liquid determined by solution of gas and est volumetrically.	ay and on stripping	No details given.
		<pre>ESTIMATED ERROR:</pre>

Salt Solutions (Aqueous)

		· · · · · · · · · · · · · · · · · · ·		
COMPONENTS:	_,	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-	7]	Bruhn, G.; Gerlach, J.; Pawlek, F.		
(2)Sulfuric acid, nickel( (1:1); N <u>î</u> SO <sub>4</sub> ; [7786-81-	2+) salt -4]	Z. Anorg. Allgem. Chem. <u>1965</u> , 337, 68-79.		
(3)Water; H <sub>2</sub> O; [7732-18-5	]			
VARIABLES:		PREPARED BY:		
т/к = 298-423		C.L. Young		
Concentration				
EXPERIMENTAL VALUES:				
T/K Conc of a	salt/mol 1-	$\alpha^{a}/cm^{3}$ (STP) $cm^{3}$ atm <sup>-1</sup>		
298.15	0.5	0.02450		
	1.0 1.5	0.02175 0.02006		
323.15	0.5	0.01830		
	1.0 1.5	0.01571 0.01447		
373.15	0.5	0.01447		
212*72	1.0	0.01336		
	1.5	0.01240		
398.15	0.5 1.0	0.01565 0.01329		
	1.5	0.01215		
423.15	0.5	0.01661		
	1.0 1.5	0.01492 0.01370		
a Bunsen coefficio	ent.			
	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	<u> </u>	SOURCE AND PURITY OF MATERIALS:		
Static equilibrium cell. to that described by Pray Stephan (1). Composition liquid determined by stri solution of gas and estim volumetrically.	and of pping	No details given.		
		ESTIMATED ERROR:		
		$\delta T/K = \pm 2; \ \delta \alpha = \pm 2 \&.$		
		(estimated by compiler).		
		REFERENCES: 1. Pray, H.A.; Stephan, E.L.; Battelle Memorial Institute Report BMI-840, <u>1953</u>		

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Bruhn, G.; Gerlach, J; Pawlek, F.
<pre>(2) Sulfuric acid, cobalt salt; CoSO<sub>4</sub>; [10124-43-3]</pre>	Z. Anorg. Allgem. Chem. <u>1965</u> , 337, 68-79.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K - 298-423	C.L. Young
Concentration	
EXPERIMENTAL VALUES:	
T/K Conc of salt/mol 1 <sup>-1</sup>	$\alpha^{a}/cm^{3}$ (STP) $cm^{3}$ atm <sup>-1</sup>
298.15 0.5 1.0 1.5	0.02448 0.02150 0.02020
323.15 1.0 1.5	0.01772 0.01521 0.01467
373.15 1.0 1.5	0.01520 0.01320 0.01190
398.15 1.0 1.5	0.01513 0.01355 0.01308
423.15 0.5	0.01712
<sup>a</sup> Bunsen coefficient	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Static equilibrium cell. Similar	SOURCE AND PURITY OF MATERIALS:
to that described by Pray and Stephan (1). Composition of liquid determined by stripping solution of gas and estimating volumetrically.	No details given.
	<pre>ESTIMATED ERROR:</pre>
L	

COMPONENTS:		ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Shkol'nikova, R. I.
(2) Hydrated iron oxide; Fe <sub>2</sub> O <sub>3</sub> . [12259-21-1]	<sup>xH</sup> 2 <sup>O;</sup>	Uch. Zap. Leningr. Gos. Univ., Ser. Khim. Nauk. <u>1959</u> , Nr. 18, 64-86.
(3) Water; H <sub>2</sub> O; [7732-18-5]		Chem. Abstr. 1961, 55, 25443b.
VARIABLES: T/K= 293.15 - 313.15		PREPARED BY:
P/kPa = 101.325 Fe <sub>2</sub> O <sub>3</sub> /wt %= 0.1 - 0.8		A. L. Cramer H. L. Clever
EXPERIMENTAL VALUES:		
Т/К	Fe <sub>2</sub> 0 <sub>3</sub> /W	t % Bunsen Coefficient α x 10 <sup>3</sup>
293.15	0.1 0.5 0.8	30.1 29.6 27.9
303.15	0.1 0.5 0.8	25.3 21.5 20.1
313.15	0.1 0.5 0.8	21.3 16.1 13.0
AU	JXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS;
The apparatus and procedure of Lannung were modified (1).		<ul> <li>(1) Oxygen. Source not given.</li> <li>Stated to be 99.98 - 99.99</li> <li>per cent.</li> </ul>
		(2) Iron oxide. No information.
		(3) Water. No information.
		ESTIMATED ERROR:
		REFERENCES :
		REFERENCES: 1. Lannung, A. <i>J. Am. Chem. Soc.</i> <u>1930</u> , <i>52</i> , 68.

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COMPONENTS :				ORIGINAL MEASURE	EMENTS:	· · · · · · · · · · · · · · · · · · ·		
	n; 0 <sub>2</sub> : [			Murray, C.N	.; Riley,	, J.P.;		
		phate;	MnS0 <sub>4</sub> ·4H <sub>2</sub> O;	Wilson, T.R.S.				
	5-87-7] ; н <sub>2</sub> 0; [	7732-18	3-51	Deep-Sea Re	search <u>19</u>	968, 15, 237-8.		
	,							
VARIABLES:				PREPARED BY:				
T/K = 323.	7			R	. Batting	C		
EXPERIMENTAL	VALUES:		_			_		
t/	°C T	/K	$10^3 \alpha/cm^3$ (STP	$) \text{cm}^{-3} \text{atm}^{-1}$	10 <sup>3</sup> L	<sup>10<sup>6</sup>×1</sup>		
			<u></u>	· · · · · · · · · · · · · · · · · · ·				
	11	anganou	is sulphate (	480 g MnSO <sub>4</sub> •4	<sup>H</sup> 2 <sup>O/L)</sup>			
25	.5 29	8.7	9.52		11.28	7.67		
	м	anganou	ns chloride (	600 g MnCl <sub>2</sub> ·4	H,0/l);	[13446-34-9]		
25		8.7	8.03	_	9.51			
	• -							
				600 g NaI)/l				
25	.5 29	8.7	0.19		0.23	0.16		
		(	(400 g NaOH +	900 g NaI)/l				
25	.5 29	8.7	0.24		0.28	0.19		
α	= Bunsen	coeffi	cient.	<u>.                                    </u>	· · · · · · · · · · · · · · · · · · ·			
				ulated by com	piler.	-		
v	= mole	fractio	n solubility	at 101.325 k	Pa nartia	-1		
î	press	ure of	gas; calcula	ted by compile	er.			
			or undissoci					
Na	ОН; [131	0-73-2	] - NaI; [768	1-82-5]				
			AUXILIARY	INFORMATION				
METHOD /APPARA	-			SOURCE AND PURI	TY OF MATE	RIALS:		
Used the B apparatus.				No details	given			
is dissolv	ed in th	e stirr	ed solution.					
The volume			letermined ment is done					
at constan								
				ESTIMATED ERROR	•			
-						rst two solu-		
				two	solution			
				BY REFERENCES:	compiler.	······································		
					im, A.; E	Baer, S.		
				Trans.	Faraday	Soc. 1963,		
{				59,27:	50-0.			

•

		ORICINAL	ME ACHIDEMENIC					
(9900				-	A N C			
		Stephan, E. L.; Hatfield, N. S.; Peoples, R. S.; Prav. H. A. H.						
<pre>(2) Uranium, difluorodioxo-, (Uranyl fluoride); UO<sub>2</sub>F<sub>2</sub>; [13536-84-0]</pre>			Peoples, R. S.; Pray. H. A. H. Battelle Memorial Institute Report					
[7732-18-	-5]	ВМІ-	1067, <u>1956</u>	•				
		PREPARED	BY:					
106		С. L.	Young					
		I						
<i>P<sup>†</sup>/</i> bar	Solubility*	т/к	g Uranium per liter	P <sup>†</sup> /bar	Solubility*			
25.5 25.5 25.5 39.6 39.6 39.6	0.406 0.418 0.413 0.62 0.590 0.644	373.15	100	21.7 65.5 65.5 65.5 65.5 96.2	0.530 0.91 0.899 0.91 0.91 1.26			
66.2 66.2 104.8 104.8 104.8	0.975 0.985 1.02 1.58 1.545 1.51		243	95.5 17.9 19.0 19.7 31.7 33.4	1.30 1.31 0.203 0.222 0.231 0.323 0.368 0.372			
21.7 21.7 21.7 21.7 21.7 21.7 21.7	0.313 0.318 0.315 0.534 0.493 0.515			67.6 67.6 67.6 105.8 105.8	0.750 0.715 0.730 0.740 1.095 1.090			
	gen.		contin	ued on fol	llowing page			
		INFORMATI	ON	····				
equilibra re measure nd tempera nermocoup liquid es od. Deta al pressu	ted for 18 ed with ature le. timated by ails in re estimated							
		δ <b>Τ/Κ =</b> δ <b>.(</b> Solu	• ±0.6; δP, ability) =	±3% (est				
	fluorodic: pride); Ud [7732-18- 36 106 107 25.5 25.5 25.5 39.6 39.6 39.6 39.6 39.6 39.6 39.6 39.6 39.6 39.6 39.6 39.6 26.2 66.2 66.2 66.2 104.8	pride); $UO_2F_2$ ; [7732-18-5]	[7782-44-7] Stepha fluorodioxo-, pride); UO <sub>2</sub> F <sub>2</sub> ; BatteZ BMI- [7732-18-5] PREPARED C. L. PREPARED C. L. PREPARED C. L. PREPARED C. L. PREPARED C. L. PREPARED C. L. PREPARED C. L. PREPARED C. L. PREPARED C. L.	[7782-44-7] Stephan, E. L.; Peoples, R. S. Battelle Memoria BMI-1067, <u>1956</u> [7732-18-5]	Fluorodioxo-, pride); $UO_2^F 2;$ [       Peoples, R. S.; Pray. Battelle Memorial Instit $BMI-1067, 1956.$ [7732-18-5]       PREPARED BY: C. L. Young         26 27.5       0.406 25.5       373.15         25.5       0.406 25.5       373.15         25.5       0.413 36.6       65.5         39.6       0.622 39.6       65.5         39.6       0.624 96.2       65.5         39.6       0.624 96.2       95.5         66.2       0.975 95.5       243       17.9         66.2       0.975 95.5       19.7       104.8       1.545 97.1         104.8       1.545 11.7       33.4       17.9         104.8       1.545 11.7       33.4       17.9         104.8       1.545 11.7       33.4       17.6         21.7       0.313 21.7       67.6       67.6         21.7       0.315 21.7       67.6       67.6         21.7       0.515       105.8       105.8         atmosphere and 273.15 K/g of solution. re of oxygen.       continued on fol         ESTIMATED ERROR: $\deltaT/K = ±0.6; \delta P/bar = ±         od(Solubility) = ±3% (est       0.6115         idquid estimated $			

COMPONE	NTS:			ORIGINA	L MEASUREM	ENTS:			
• • •	(1) Oxygen; O <sub>2</sub> ; [7782-44-7]				Stephan, E. L.; Hatfield, N. S.; Peoples, R. S.; Pray, H. A. H.				
(Ur	<pre>2) Uranium, difluorodioxo-, (Uranyl fluoride); UO<sub>2</sub>F<sub>2</sub>;</pre>				Battelle Memorial Institute				
	536-84-0]		-	BMI-1	<i>067, <u>1956</u>.</i>				
(3) Wat	er; H <sub>2</sub> O; [7	732-18-5	]						
EXPERIM	ENTAL VALUE	S:	continu	ed					
т/к	g Uranium per liter	<i>P<sup>†</sup>/</i> bar	Solubility	т/к	g Uranium per liter	P <sup>†</sup> /bar	Solubility		
373.15	243	105.8	1.120	435.93	40	16.2	0.34		
		105.8	1.100			19.3	0.376		
408.15	40	18.3	0.28			19.3	0.384		
		18.3	0.32			33.1	0.61		
		18.3 30.3	0.29 0.489			33.1 33.1	0.635		
		30.3	0.489			33.1	0.67 0.647		
		30.3	0.480			33.8	0.665		
		62.1	0.982			60.0	1.12		
		62.1	1.00			60.0	1.17		
		62.1	0.96			60.0	1.12		
		62.1	0.97			60.9	1.21		
		98.9	1.485			60.9	1.16		
		98.9	1.58			61.3	1.16		
	100	98.9	1.51			94.7	1.80		
	100	20.3 20.3	0.271 0.281			97.5 99.0	1.93 1.93		
		20.3	0.281		100	15.9	0.28		
		20.0	0.281		100	15.9	0.248		
		34.1	0.540			15.9	0.285		
		33.8	0.505			15.9	0.252		
		33.8	0.510			33.1	0.56		
		33.8	0.507			33.8	0.515		
		66.2	0.969			33.8	0.56		
		66.2	0.940			34.5	0.58		
		66.8	0.949			60.3	1.0		
		97.6 97.6	1.393 1.380			60.3 60.3	0.998		
		97.6	1.380			82.7	1.02 1.43		
		97.6	1.390			84.5	1.43		
	243	23.4	0.260			85.8	1.48		
		24.8	0.291			87.9	1.51		
		23.4	0.272		243	21.0	0.306		
		33.8	0.405			22.4	0.33		
		34.1	0.408			22.4	0.295		
		34.1	0.416			22.4	0.31		
		33.8	0.405			37.2	0.54		
		65.5 65.2	0.74 0.76			37.6 37.6	0.55 0.53		
		65.2	0.765			63.8	0.53		
		95.5	1.06			63.8	0.84		
		95.5	1.06			63.8	0.925		
		95.5	1.10			63.8	0.84		
435.93	40	13.4	0.283			100.0	1.40		
		14.1	0.276			100.3	1.30		
		16.2	0.31			102.4	1.33		
		16.2	0.32						

ml oxygen at 1 atmosphere and 273.15 K/g of solution.

 $P^{\dagger}$  partial pressure of oxygen.

COMPONENTS:					MEASUREMENTS:			
	en; 0 <sub>2</sub> ; [778		_	Pray,	H.A.; Stephan	n, E.F.		
sulfa	osulfatouran ate); UO <sub>2</sub> SO	4; [1314	anyl -64-3]	U. S. Atomic Energy Commission <u>1953</u> , BMI-840.				
(3) Water	с; II <sub>2</sub> 0; [77:	52-10-51						
VARIABLES:	<u> </u>			PREPARED	BY:			
T/K = 373	- 436				R. Battin	10		
P/MPa = 0.	96 - 10.5							
EXPERIMENTAL	VALUES:	 L		_			L	
P <sub>O2</sub> /psia	P <sub>0</sub> <sup>a</sup> /MPa	s <sup>D</sup>	10 <sup>4</sup> ×1 <sup>4</sup>	.c	P <sub>02</sub> /psia	<i>L</i> .	s <sup>b</sup>	
Wate	er. 212°H	r (37	3K)		40gU/dm <sup>3</sup>	212°F	(373K)	
332	2.29	0.380	3.06		277	1.91	0.290	
355	2.45	0.435	3.50 3.74		287	1.98	0.290	
374 453	2.58 3.12	0.465 0.550	3.74		295 310	2.03 2.14	0.310 0.320	
433	3.37	0.570	4.59		621	4.28	0.643	
500	3.45	0.650	5.23		643	4.43		
526	3.63	0.665	5.35		664	4.58	0.685	
671	4.63	0.870	7.00		918	6.33	0.965	
808	5.57	0.995 1.130	8.00		955	6.58	0.975	
887 933	6.11 6.43	1.130	9.09 9.49		988 1020	6.81 7.03	1.020	
1292	8.91	1.600	12.87		1337	7.03 9.22 9.56	1.400	
1335	9.20	1.600	12.87		1386	9.56	1.370	
1410	9.72	1.820	14.64		1447	9.98	1.560	
c <sub>Mole f</sub> Henry fracti	's constant	lubility is 6397	at parti (±240)MPa	al press A/mole fr	ure of oxygen action or 6.1 continued of	807 x 10 <sup>4</sup> a	atm/mole	
		· · · · · · · · · · · · · · · · · · ·	AUXILIARY	INFORMATIC	N			
	TUS/PROCEDURE		AUXILIARI		D PURITY OF MAT	EDIAL C.		
	•			1		ERIALS:		
withdrawn pressuriz clave and gas conte	of saturate from a sta ed and ther analyzed f ent. Detail in the pag	inless a mostatte for the o ls and a	steel ed auto- dissolved		ails given.			
				ESTIMATED	ERROR:			
				δS/S =	±0.03, compi	iler's est	imate.	
				REFERENCE	· · · · · · · · · · · · · · · · · · ·			
				REFERENCE	.5 :			
				L				

MPONENTS:	ORIGINAL MEASUREMENTS:				
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Pray, H.A.; Stephan, E.F. U. S. Atomic Energy Commission <u>1953</u> , BMI-840.				
<ul> <li>Dioxosulfatouranium (Uranyl sulfate); U02504; [1314-64-3]</li> <li>(3) Water; H20; [7732-18-5]</li> </ul>					
conti	nued				
P <sub>O2</sub> /psia P <sup>a</sup> <sub>O2</sub> /MPa S <sup>b</sup>	P <sub>O2</sub> /psia P <sup>a</sup> <sub>O2</sub> /MPa S <sup>b</sup>				
100g U/dm <sup>3</sup> 212°F (373K)	243g U/dm <sup>3</sup> 212°F (373K)				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$				
$\frac{P_{O_2}/psia}{Water} \frac{P_{O_2}/MPa}{275^{\circ}F} (408K)$	$\frac{P_{O_2}/psia}{40g U/dm^3} \frac{P_{O_2}^a/MPa}{275°F} (408K)$				
510         3.52         0.655         5.04           525         3.62         0.645         4.97           555         3.83         0.685         5.28           590         4.07         0.73         5.62           1090         7.51         1.42         10.94           1145         7.89         1.45         11.17           1173         8.09         1.51         11.63           1180         8.13         1.60         12.32           1195         8.24         1.60         12.32           1215         8.38         1.55         11.94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$				
100g U/dm <sup>3</sup> 275°F (408K) 575 3.96 0.540 595 4.10 0.555 617 4.25 0.60 1288 8.88 1.23 1310 9.03 1.21 1334 9.20 1.25	243g U/dm <sup>3</sup> 275°F (408K 538 3.71 0.398 563 3.88 0.398 585 4.03 0.400 600 4.14 0.400 1278 8.81 0.86 1305 9.00 0.87 1352 9.32 0.88				

<sup>b</sup> Solubility in units of ml 0<sub>2</sub>(STP)/g of solvent or solution.

<sup>C</sup> Mole fraction solubility at partial pressure of oxygen indicated. Henry's constant is 6995(±232)MPa/mole fraction or 6.904 x 10<sup>4</sup> atm/ mole fraction.

continued on following page

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Pray, H.A.; Stephan, E.F.
<pre>(2) Dioxosulfatouranium (Uranyl sulfate); UO<sub>2</sub>SO<sub>4</sub>; [1314-64-3]</pre>	U. S. Atomic Energy Commission 1953, BMI-840.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
cont	inued
$P_{O_2}/psia P_{O_2}^a/MPa S^b 10^4 x_1^{a,c}$	P <sub>O2</sub> /psia P <sub>O2</sub> /MPa s <sup>b</sup>
Water. 325°F (436K)	40g U/dm <sup>3</sup> 325°F (436K)
195 1.34 0.303 2.44	146 1.01 0.171
195 1.34 0.306 2.46 195 1.34 0.314 2.53	304 2.10 0.339 279 1.92 0.327
530 3.65 0.830 6.68	392 2.70 0.471
560 3.86 0.880 7.08	448 3.09 0.576
600 4.14 0.905 7.28	474 3.27 0.638
950 6.55 1.41 11.34	593 4.09 0.755
950 6.55 1.42 11.42 960 6.62 1.51 12.15	
1410 9.72 2.12 17.06	709 4.89 0.951 719 4.96 0.925
1440 9.93 2.28 18.34	719 4.56 0.525 758 5.23 1.001
	939 6.47 1.335
100g U/dm <sup>3</sup> 325°F (436K)	984 6.78 1.301
139 0.96 0.174	993 6.85 1.390
145 1.00 0.177	1300 8.96 1.765
150 1.03 0.179	1320 9.10 1.770 1346 9.28 1.716
333 2.30 0.396	1468 10.12 1.920
352 2.43 0.351 550 3.79 0.614	1475 10.17 1.850
575 3.96 0.596	1514 10.44 1.85
605 4.17 0.669	1520 10.48 1.98
782 5.39 0.842	243g U/dm <sup>3</sup> 325°F (436K)
866 5.97 0.865	
975 6.72 0.996 1020 7.03 1.081	599 4.13 0.457 610 4.21 0.436
1030 7.10 1.061	631 4.35 0.445
1333 9.19 1.451	666 4.59 0.515
1331 9.18 1.410	1355 9.34 0.954
1363 9.40 1.400	1378 9.50 0.955
1431 9.87 1.432	1409 9.71 0.984 1436 9.90 1.00
) 	1436 9.90 1.00
<sup>a</sup> Calculated by compiler.	
<sup>b</sup> Solubility in units of ml O <sub>2</sub> (STP),	'g of solvent or solution.
C Mole fraction solubility at partia Henry's constant is 5537 (±158)MPa atm/mole fraction.	Il pressure of oxygen indicated. A/mole fraction or 5.465 x $10^4$
d Solution concentrations given as g	grams of uranium per liter of solution.
	_

COMPONENTS :	· ·		ORIGINAL	MEASUREMENTS :			
<pre>(1) Oxygen; O<sub>2</sub>; (2) Uranium, diox (Uranyl sulfa [1314-64-3]</pre>	o[sulfato	(2-)-0-]-,	<pre>Stephan, E. L.; Hatfield, N. S.; Peoples, R. S.; Pray, H. A. H. Battelle Memorial Institute Report BMI-1067, 1956.</pre>				
(3) Water; H <sub>2</sub> O; [	7732-18-5	5]	DM1 1	<i>iiii</i> .			
VARIABLES:			PREPARED	BY:			
P/har	373-561 = 10-175 tration		с. г. т	oung			
EXPERIMENTAL VALUES: g Uranium T/K per liter	P <sup>†</sup> /bar	Solubility*	т/к	g Uranium per liter	P <sup>†</sup> /bar	Solubility*	
373.15 40 100 * ml of oxygen $P^{\dagger}$ partial press		osphere and	373.15 273.15 К	243 /g of solut		0.368 0.565 0.551 0.570 0.585 0.935 0.915 1.010 1.26 1.18 1.32 1.80 1.85 1.95 1.97 2.10 0.338 0.340 0.360 0.430	
			TNEODI/AMT/		ed on foll	owing page	
		AUXILIARY					
METHOD /APPARATUS/I Gas and liquid equider hours. Pressure Bourdon gauge and measured with the Composition of lic volumetric method source. Partial by subtracting van total pressure.	uilibrate measured temperat mocouple quid estin Detai pressure	d for 18 with ure mated by ls in estimated	SOURCE AN	NO DURITY OF N			
				±0.6; δP/b ility) = ±3	% (estim		

COMPONE	NTS:			ORIGIN	AL MEASUREM	ENTS :			
_		17782-44	-71	Stepha	n. E. L. • 1	Hatfield	NSI		
_	<pre>Dxygen; O<sub>2</sub>; [7782-44-7] Jranium, dioxo[sulfato(2-)-0-]-,</pre>			Stephan, E. L.; Hatfield, N. S.; Peoples, R. S.; Pray, H. A. H.					
(Ur	nium, diox anyl sulfa 14-64-3]	o[sulfato te); UO <sub>2</sub> S	9(2-)-0-]-, 80 <sub>4</sub> ;	Battel	Battelle Memorial Institute Repor BMI-1067, <u>1956</u> .				
(3) Wat	er; H <sub>2</sub> 0; [	7732-18-5	]						
EXPERIM	ENTAL VALU	ES:	conti	Lnued					
т/к	g Uranium per liter	P <sup>†</sup> /bar	Solubility*	T/K	g Uranium per liter	P <sup>†</sup> /bar	Solubility*		
373.15	243	44.8	0.450	408.15	234	20.3	0.234		
		45.7	0.435			53.7	0.585		
		47.2	0.480			56.1	0.630		
		51.2 73.8	0.490			74.7	0.812		
		73.8	0.670 0.730			76.5 91.3	0.815 0.980		
		83.1	0.790			93.0	0.970		
		85.2	0.800			99.6	1.06		
		88.0	0.800			100.9	1.00		
		94.1	0.868			103.0	1.07		
		109.3	0.990			119.6	1.21		
		112.0 128.6	1.00 1.13			120.9 129.2	1.22 1.28		
		133.4	1.23			131.3	1.31		
		135.5	1.16			148.5	1.44		
		136.5	1.20			150.0	1.43		
		139.6	1.22			152.0	1.50		
		141.0	1.23	435.93	40	10.1	0.171		
		154.0 156.2	1.32 1.36			30.9 32.7	0.576 0.638		
		158.2	1.38			40.9	0.755		
408.15	40	33.7	0.535			42.0	0.814		
		34.5	0.565			48.9	0.951		
		36.7 38.7	0.555			49.6	0.925		
		48.3	0.585 0.765			52.3 64.7	1.001 1.335		
		50.9	0.830			67.8	1.301		
		52.7	0.830			68.5	1.390		
		71.2	1.160			89.6	1.770		
		72.8	1.185			89.6	1.765		
		74.0 99.3	1.220 1.610			91.0 91.3	1.770 1.76		
		101.2	1.580			94.7	1.87		
		103.1	1.675			101.2	1.920		
		104.9	1.660			104.8	1.980		
		144.4	2.320			115.4	2.260		
	100	147.2	2.400			117.5	2.240 2.270		
	100	39.6 41.0	0.540 0.555			118.9 120.2	2.220		
		42.5	0.600			123.0	2.260		
		88.8	1.23			130.9	2.320		
		90.3	1.21			132.7	2.340		
		92.0	1.25			146.4	2.48		
		120.9 123.6	1.64 1.69			150.6 158.9	2.54 2.61		
		125.0	1.71			158.9	2.61		
		148.2	1.95			161.6	2.67		
		148.7	1.94			163.0	2.55		
		159.5	2.03		100	176.8	2.74		
		162.2 166.4	2.10 2.12		100	9.6 10.0	0.174 0.177		
	234	18.6	0.231			10.3	0.179		
	of oxygen a	it 1 atmos	sphere and 27	73.15 K/	'g of soluti	on.	<u></u>		
P <sup>†</sup> part	tial pressu	re of oxy	/gen.		contin	und on fol	lowing nage		

continued on following page

[1314-64-3] (3) Water; H <sub>2</sub> O; [7732-18-5]					e Memorial 067, 1956.	Institut	e Report
			-		· ••••••		
EXPERI	MENTAL VALU	ES:	conti	nued			
т/к	g Uranium per liter	₽ <sup>†</sup> ∕bar	Solubility*	Т/К	g Uranium per liter	<i>P<sup>†</sup>/bar</i>	Solubilit
135.93	100	23.0	0.396	435.93	243	157.5	1.65
		37.9	0.614	177 50	40	158.9	1.73
		39.6 41.7	0.596	477.59	40	7.8 8.5	0.29
		53.9	0.669 0.842			9.2	0.31 0.33
		59.7	0.842			22.3	0.69
		67.2	0.996			23.0	0.72
		70.3	1.081			24.3	0.74
		71.0	1.061			37.4	1.12
		91.8	1.451			38.5	1.14
		91.8	1.410			40.9	1.14
		94.0	1.400			51.9	1.48
		98.7	1.432			54.7	1.55
		123.7	1.88			76.0	1.76
		126.8	1.91			80.9	1.80
		128.5 149.2	1.83			113.3 115.3	2.34 2.30
		152.0	2.04 2.14			117.4	2.38
		155.4	2.14			136.0	2.60
		156.1	2.08			140.2	2.66
		159.2	2.10			147.1	2.83
		162.3	2.21			151.2	2.88
	243	15.4	0.22			154.6	2.93
		16.8	0.239		100	45.4	1.04
		38.9	0.508			46.4	1.06
		40.3	0.52			58.7	1.29
		41.6	0.534			60.9	1.30
		54.1 55.4	0.70 0.68			62.9 86.4	1.44 1.67
		56.8	0.705			87.8	1.70
		75.8	0.90			102.2	1.84
		77.5	0.94			103.6	1.85
		80.3	0.97			120.9	1.96
		83.4	1.02			125.0	2.04
		85.1	1.03			128.4	2.08
		92.7	1.06			132.0	2.20
		94.0	1.11			148.4	2.24
		100.2	1.18			150.9	2.34
		102.3	1.18			151.9	2.31
		103.7 105.1	1.23 1.21			154.0 159.5	2.34 2.48
		105.1	1.21		243	27.4	2.48
		105.8	1.22			28.1	0.48
		106.5	1.22			29.2	0.51
		109.1	1.34			45.0	0.78
		110.6	1.30			64.3	1.10
		114.0	1.27			65.7	1.05
		116.1	1.32			74.0	1.12
		130.6	1.46			76.7	1.17
		132.7	1.50			85.7	1.22
		153.7 155.4	1.65 1.67			88.5	1.31
* ml	of oxygen a	t 1 atmos	sphere and 27	/3.15 K/	g of soluti	on.	

ORIGINAL MEASUREMENTS:

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COMPONENTS:

continued on following page

Peor Battel BMI-	n, E. L.; ples, R. S.; <i>le Memorial</i> 1067, <u>1956</u> . g Uranium per liter 100	Pray, H	. A. H.
Battel BMI-	le Memorial 1067, <u>1956</u> . g Uranium per liter 100	<i>P<sup>†</sup>/bar</i> 86.8 90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	Solubility 1.77 1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
BMI-	g Uranium per liter 100	<pre>P<sup>†</sup>/bar 86.8 90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2</pre>	Solubility 1.77 1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
* т/к	per liter	86.8 90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	1.77 1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
* т/к	per liter	86.8 90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	1.77 1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
* т/к	per liter	86.8 90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	1.77 1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
т/к	per liter	86.8 90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	1.77 1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
533.15		90.9 94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	1.84 1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
	243	94.4 115.1 116.5 139.2 142.0 146.1 147.5 150.2	1.84 2.22 2.14 2.44 2.42 2.42 2.42 2.42
	243	115.1 116.5 139.2 142.0 146.1 147.5 150.2	2.22 2.14 2.44 2.42 2.42 2.42 2.42
	243	116.5 139.2 142.0 146.1 147.5 150.2	2.14 2.44 2.42 2.42 2.42 2.42
	243	139.2 142.0 146.1 147.5 150.2	2.44 2.42 2.42 2.42
	243	142.0 146.1 147.5 150.2	2.42 2.42 2.42
	243	146.1 147.5 150.2	2.42 2.42
	243	147.5 150.2	2.42
	243	150.2	
	243		2 50
	243	10 -	
			0.58
			0.62
			0.64
			0.84
			0.90 0.97
			1.00
			1.05
			1.14
			1.16
		60.6	1.18
		74.4	1.25
		76.1	1.26
		77.8	1.24
			1.36
			1.48
			1.51
			1.50
			1.60
			1.66
			1.73
560 93	4.0		1.75 0.65
500.55	40		0.73
			0.79
			1.03
			1.12
			1.17
			1.81
		32.1	1.96
		43.4	2.15
		44.8	2.21
		46.5	2.21
		74.1	2.36
		78.9	2.49
		80.3	2.52
		83.1	2.62
		93.4	2.70
		94.8	2.72
			3.12
		120.5	3.24
73.15 K	/g of soluti	.on.	
			$\begin{array}{c} 74.4\\ 76.1\\ 77.8\\ 85.4\\ 96.5\\ 97.8\\ 110.9\\ 111.6\\ 133.7\\ 135.1\\ 136.2\\ 560.93  40 \qquad 8.6\\ 10.3\\ 11.0\\ 14.1\\ 15.5\\ 16.2\\ 31.4\\ 32.1\\ 43.4\\ 44.8\\ 46.5\\ 74.1\\ 78.9\\ 80.3\\ 83.1\\ 93.4\\ \end{array}$

continued on following page

COMPON	ENTS :			ORIGIN	AL MEASUREM	ENTS :	
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) Uranium, dioxo[sulfato(2-)-0-]-, (Uranyl sulfate); UO<sub>2</sub>SO<sub>4</sub>; [1314-64-3] (3) Water; H<sub>2</sub>O; [7732-18-5] </pre>					n, E. L.; les, R. S.; <i>le Memorial</i> 1067, <u>1956</u> .	Pray, H Institu	I. A. H.
EXPERI	MENTAL VALU	ES:	continu	ied	<u> </u>		
T/K	g Uranium per liter	P <sup>†</sup> /bar	Solubility*	т/к	g Uranium per liter	<i>P<sup>†</sup>/bar</i>	Solubility*
560.93	40	129.3	3.28 3.28	560.93	100	62.1	1.85
	100	11.4 12.4 22.4 23.8 24.5 41.0	3.23 0.76 0.81 1.37 1.47 1.53 1.71 1.82 1.88			76.9 79.3 82.4 101.0 104.5 107.2 122.4 126.5 130.7	2.03 2.06 2.14 2.22 2.22 2.38 2.42

 $^{\star}$  ml of oxygen at 1 atmosphere and 273.15 K/g of solution.

 $p^{\dagger}$  partial pressure of oxygen.

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COMPONENTS:				ORIGINAL	MEASI	IDEME	MTC .		
(1) Oxygen	, 0 <sub>2</sub> ; [77	82-44-7]		5					
(2) Uranyl			1314-64-3	] Anderso			; Ke	eler, R.A.	.;
	Sulfate;						0	1000 7	200 4
	cic Acid;H			J. Che	m. El	ng.	vaza	<u>1962</u> , 7,	290-4.
(5) Water;									
WARTARING		<u></u>		PREPARED	BY:				
VARIABLES: T/K = 3	272-573				51.				
	= 0.4-5.2			1	R. Ba	atti	no		
EXPERIMENTAL V	VALUES:			I					
	t/°C	т <sup>а</sup> /к	10 <sup>4</sup> x <sub>1</sub>	b P <sub>O</sub>	°/p	sia		10 <b>-</b> 5K <sup>d</sup>	
	105	200	Wat	er	246		- o h	10.0	
	125 150	398 423	2.46 2.55	•	246 226	(1, (1, 1))	70) <sup>h</sup> 56)	10.0 8.86	
}	200	473	3.65	:	210	(1.	45)	5.75	
	100 150	373 423	3.77 3.69		395 341			10.2 9.24	
	190						,	5121	
	250	Uran 523	yl Sulfa 13.5		10n 1 534	A <sup>0</sup> (3.	68)	3.95	
	300	573	16.3		343	(2.	36)	2.10	
	250 275	523 548	17.2 20.5		733	(5.	05) 29)	4.25 3.03	
	300	573	22.9		622 508	(3.	50)		
	250	523	14.6		753	(5.	19) 84)	5.14 3.49	
	275 300	548 573	20.1 23.5		623	(4.	30)	2.65	
	100	373	0.980		100	(0.	689)	10.2	
	125 150	398 423	0.763		76.3	3(0.	526) 386)	10.0 8.6	
	100	373	3.47		350	(2.	41)	10.1	
	125 150	398 423	3.40 2.99		316 246	(2.	18) 70)	9.30 8.50	
						· · · · · ·			
					cor	ntin	ued o	on followi	ng page
			AUXILIARY	TNEOPMATI				1	, , , , , , , , , , , , , , , , , , , ,
			AUXILIARI	,					
METHOD/APPARAT Kr/ <sup>85</sup> Kr st			are	SOURCE AN	ID PUR	KI TY	OF MA	TERIALS:	
added sepa	rately to	a <sup>2</sup>		Ì	_				
thermostat vessel con	ted stain:	less stee bout 275	1 cm <sup>3</sup>	N	o det	tail	s gi	ven.	
of solutio	n. At equ	uilibrium	both						
liquid and									
the krypto determined	by count:	ing the 8	5 <sup>5</sup> Kr taq.						
No details	were give	en on how	the						
oxygen sol	ubilities	were cal	culated.						
				ESTIMATEL				11 1	
				$\delta K/K = \delta T/K =$		03,	comp:	iler's est	imate.
1					_				
				REFERENCE	S:		·		
1									

COMPONENTS	) :		ORIGINAL MEASUREM	ENTS:
(l) Oxyg	en; 0 <sub>2</sub> ; [778	32-44-7]	Anderson, C.J.; Kee	eler, R.A.;
(2) Uran	yl Sulfate;	UO2SO4;[1314-64-3]	Klach, S.J.	
(3) Copp	er Sulfate;	CuSO <sub>4</sub> ;[7758-98-7]	J. Chem. Eng. Data	<u>1962</u> , 7, 290-4.
		1 <sub>2</sub> SO <sub>4</sub> ;[7664-93-9]		
(5) Wate	r; H <sub>2</sub> O; [773	2-18-5]		
		conti		
		Conci	inueu	
	t/°C	$T^{a}/K = 10^{4}x_{1}^{b}$	P <sub>02</sub> /psia	10 <sup>-5</sup> K <sup>d</sup>
		Ŧ	02	
			n a l tran f	
	100	Uranyl Sulfat 373 3.209	$335.3 (2.31)^{h}$	10.45
	150	423 3.88	341 (2.35)	8.80
	250 300	523 8.04 573 9.59	283 (1.95) 233 (1.61)	3.52 2.43
	100	373 3.400	233 (1.61) 340.3 (2.35)	10.01
	150	423 3.92	331 (2.28)	8.45
	250 300	523 8.27 573 10.9	283 (1.95) 238 (1.64)	3.42 2.19
	100	373 3.529	365.3 (2.52)	10.35
	150 250	423 4.30 523 10.2	376 (2.59) 329 (2.26)	8.74 3.23
	300	573 14.7	329 (2.26) 258 (1.78)	1.75
	250 300	523 7.92 573 10.0	248 (1.71)	3.13
	300	573 10.0	193 (1.33)	1.93
	100	Mean Va	lues <sup>g</sup>	10.0
	100 125	373 398		10.2 9.75
	150	423		8.66
	200 250	473 523		5.75 3.45
	300	573		2.10
				<u></u>
a Cal	culated by c	compiler.		
L.			a partial pressure c	of gas.
~		pressure in psia.	- <u>-</u>	
đ		stant in psia per 1	molo fraction	
~ ·				1 -3
Solu Sul	ution A: 0.0 fate, 0.005	mol dm <sup>-3</sup> sulfuric a	sulfate, 0.005 mol	am <sup>3</sup> copper
~				- <sup>3</sup> copper
sul	fate, 0.01 m	ol dm <sup>-3</sup> sulfuric ad	sulfate, 0.01 mol dm cid.	copper
~			nt for water and the	
	utions.	•		
h pros	souro in nar	ontheses in MPa a	alculated by compile	~
rie.	soure in part	encheses in hra, ca	requared by compile	1.

	Uuit	Solution				
COMPONENTS :			ORIG	INAL MEASUREMENTS	•	
(1) Oxygen; 0 <sub>2</sub> ; [77	782-44-7]		Mac	Arthur, C. G.		
(2) Magnesium chlor [7796-30-3]	ride; MgCl <sub>2</sub> ;		J.	Phys. Chem. <u>19</u>	<u>16</u> , 20, 495-502	2.
(3) Water; H <sub>2</sub> O; [77	732-18-5]					
VARIABLES: T/K = 298.1	15		PREP.	ARED BY:		
$O_2 P/kPa = \sqrt{21}$ $C_3/mol dm^{-3} = 0 - 5$	2 (O <sub>2</sub> in air one	at atm)		H. L. C	lever	
EXPERIMENTAL VALUES:				· · · · · · · · · · · · · · · · · · ·		<u></u>
т/к	Magnesium	Solut	ion	Solubility <sup>2</sup>	Setschenow	
	Chloride	densi		$cm^3$ (STP) $O_2$	Constant <sup>3</sup>	
	$c_3/mol dm^{-3}$	p∕g c	m <sup>-5</sup>	per dm <sup>3</sup>	k s	
298.15		1 00				
290.15	0.0 0.125	1.00		5.78 5.35	0.269	
	0.25	1.02		5.04	0.238	
	0.5	1.04		4.37	0.243	
	1 2	1.08		3.18 2.22	0.260 0.208	
	4	1.28		0.78	0.217	
	5	1.34		0.54	0.206	
1 mb a st b ave and 1 mb a			6			
<sup>1</sup> The author calcul Critical Tables. appear to be in e	Use the dens					
k <sub>s</sub> = (l/c <sub>3</sub> ) log (			,		,	
	AUX	KILIARY	INFOR	MATION		
METHOD/APPARATUS/PROCEI	DURE:		SOUR	CE AND PURITY OF		
The solutions were		in	(1)		MATERIALS:	
tall cylinder open They were shaken b times a day for a	y hand severa		(2)	Oxygen. Air		
days. A sample of 250 cm				Oxygen. Air Magnesium chl information.	at one atm.	
for oxygen by a mo method.		d	(3)	Magnesium chl	at one atm. oride. No	
		d	ESTI The 10 tra	Magnesium chl information. Water. No in MATED ERROR: solubility va per cent error	at one atm. oride. No formation. lues may be in . The salt con e mol dm <sup>-3</sup> may 1	cen-

COMPONENTS :		ORIGINAL MEA	SUREMENTS:
(1) Oxygen; O <sub>2</sub> ;	[7782-44-7]	Eucken, A.	; Hertzberg, G.
(2) Magnesium ( [7786-30-3]	Chloride; MgCl <sub>2</sub> ; ]	Z. Physik.	Chem. <u>1950</u> , 195, 1 - 23.
(3) Water; H <sub>2</sub> 0	; [7732-18-5]	:	
VARIABLES: T/H	x= 273.15, 293.15	PREPARED BY:	
P/kPa	a = 101.325		P. L. Long H. L. Clever
m <sub>MgCl2</sub> /mol kg <sup>-1</sup>	<sup>-</sup> _ 0 - 1.93		
EXPERIMENTAL VALUE	S:		
т/к	Magnesium Chloride mol kg <sup>-1</sup> H <sub>2</sub> 0	Ostwald Defficient	Setschenow Constant $k = (1/m) \log (L^{O}/L)$
273.15	0 0.49	0.0490 0.0358	- 0.280
	1.13 1.70	0.0234 0.0163	0.284 0.281
293.14	0	0.0332	-
	0.65 1.24	0.0225 0.0158	0.260 0.259
	1.93	0.0107	0.255
	AUXILIARY	INFORMATION	
METHOD/APPARATUS/P		1	PURITY OF MATERIALS:
sists of a gas tion flask conn tube. The whol The capillary t helix. An amou at STP and plac After shaking,	The apparatus con- buret and an adsorp- mected by a capillary a apparatus is shaken. Sube is a 2m-long glass ant of gas is measured and the gas buret. the difference from mount of gas placed in a determined.	Component purity gi	s. Neither source nor ven.
		ESTIMATED E	RROR:
			$\delta L/L = 0.01$
		REFERENCES :	
		REFERENCES:	
		REFERENCES :	
		REFERENCES :	
		REFERENCES :	

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [77	82-44-7]	ORIGINAL MEASUREMENTS: Yasunishi, A.
(2) Magnesium chlor [7786-30-3]	ide; MgCl <sub>2</sub> ;	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
(3) Water; H <sub>2</sub> O; [77	32-18-5]	
VARIABLES: $T/K = 298.1$ O <sub>2</sub> P/kPa = 101.3	25	PREPARED BY: H. L. Clever
$c_3/mol dm^{-3} = 0 - 3$	.872	
EXPERIMENTAL VALUES:	T/K Magnesium	chloride Ostwald
	T/K Magnesium c <sub>3</sub> /mol	
1	298.15 0.0 0.336 0.546 0.599 1.178 1.778 2.126 2.485 2.871 3.304 3.872 7alue from referenc	0.03114 <sup>1</sup> 0.02676 0.02383 0.02368 0.01841 0.01363 0.01171 0.00987 0.00857 0.00740 0.00635
•	arde from fororono	
log(L <sub>O</sub> /L) = 0.222 c	<sub>3</sub> /(1 + 0.0566 C <sub>3</sub> /.	
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCED The apparatus and p described in refere Horiuti type appara The aqueous salt so by boiling under re vacuum.	procedure are ence (l). A tus is used. Plution is degassed	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Magnesium chloride.</li> <li>(3) Water. No information.</li> </ul>
The gas phase volum volume are measured of mercury.		
Dry gas is intermit equilibrium is atta time the total pres solution vessel and remaining in the bu	ined. At that sure in the dis- the gas volume	ESTIMATED ERROR:
The salt solution of density are determined solubility measurements solution vapor press	ned after the	REFERENCES :
taken from the lite mated. A correction increase of the lig dissolved gas is ma	sure is either crature or esti- on for the uid volume by the	l. Yasunishi, A. J. Chem. Eng. Jpn. <u>1977</u> , 10, 89.

COMPONENTS: (1) Oxygen; O2; [7782-44-7]ORIGINAL MEASUREMENTS: Yasunishi, A.(2) Magnesium sulfate; MgSO4; [7487-88-9]Kagaku Kogaku Rombunshu 1978, 4, 185-9.(3) Water; H2O; [7732-18-5]Regaku Kogaku Rombunshu 1978, 4, 185-9.VARIABLES: $O_2$ P/kPa = 101.325 $C_3/mol dm^{-3} = 0 - 2.608$ PREPARED BY: H. L. CleverEXPERIMENTAL VALUES: For the entire concentration range the data correlated better with the empirical equation $log(L_0/L) = AC_3/(1 + BC_3)$ with the values:T/KA/dm <sup>3</sup> mol <sup>-1</sup> $A/dm^3 mol^{-1}$ Magnesium Sulfate; MgSO4; Magnesium Sulfate; MgSO4; National Magnesium Sulfate; MgSO4; Mater, H2O; [7732-18-5]
(2) Magnesium sulfate; MgSO <sub>4</sub> ; [7487-88-9] (3) Water; H <sub>2</sub> O; [7732-18-5] VARIABLES: $T/K = 288.15 - 308.15$ $O_2 P/kPa = 101.325$ $C_3/mol dm^{-3} = 0 - 2.608$ EXPERIMENTAL VALUES: For the entire concentration range the data correlated better with the empirical equation $\log(L_0/L) = AC_3/(1 + BC_3)$ with the values: $T/K A/dm^3 mol^{-1} B/dm^3 mol^{-1}$
VARIABLES: T/K = 288.15 - 308.15 $O_2 P/kPa = 101.325$ $C_3/mol dm^{-3} = 0 - 2.608$ EXPERIMENTAL VALUES: For the entire concentration range the data correlated better with the empirical equation $\log(L_0/L) = AC_3/(1 + BC_3)$ with the values: $T/K A/dm^3 mol^{-1} B/dm^3 mol^{-1}$
$\begin{array}{c} O_2 \ P/kPa = \ 101.325 \\ C_3/mol \ dm^{-3} = \ 0 \ - \ 2.608 \end{array}$ EXPERIMENTAL VALUES: For the entire concentration range the data correlated better with the empirical equation $\log(L_0/L) = AC_3/(1 + BC_3)$ with the values: $\begin{array}{c} \hline T/K \ A/dm^3 \ mol^{-1} \ B/dm^3 \ mol^{-1} \end{array}$
For the entire concentration range the data correlated better with the empirical equation $\log(L_0/L) = AC_3/(1 + BC_3)$ with the values: $\frac{1}{T/K} = \frac{A/dm^3 \text{ mol}^{-1}}{M^2 \text{ mol}^{-1}} = \frac{B/dm^3 \text{ mol}^{-1}}{M^2 \text{ mol}^{-1}}$
288.15       0.288       -0.0012         298.15       0.250       -0.0583         308.15       0.293       -0.0359

continued on following page

AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade The apparatus and procedure are described in reference (1). A stated to be 99.995 per cent. Horiuti type apparatus is used. (2) Magnesium sulfate. The aqueous salt solution is degassed by boiling under reflux and (3) Water. No information. under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that ESTIMATED ERROR: time the total pressure in the dissolution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the **REFERENCES:** solubility measurement. The salt 1. Yasunishi, A. solution vapor pressure is either J. Chem. Eng. Jpn. 1977, 10, 89. taken from the literature or estimated. A correction for the increase of the liquid volume by the dissolved gas is made.

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COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-	-7]	RIGINAL MEASUREMENTS: Yasunishi, A.
(2) Magnesium sulfate; Mo [7487-88-9]	JS0 <sub>4</sub> ;	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
(3) Water; H <sub>2</sub> O; [7732-18-	-5]	
EXPERIMENTAL VALUES:	contín	ued
T/K	Magnesium sul c <sub>3</sub> /mol dm	
288.15	$\begin{array}{c} 0.0\\ 0.280\\ 0.364\\ 0.581\\ 0.617\\ 1.082\\ 1.213\\ 1.228\\ 1.239\\ 1.314\\ 1.500\\ 1.746\\ 2.102\\ 2.130\\ 2.431\\ 2.450\\ 2.456\end{array}$	0.03643 <sup>1</sup> 0.03065 0.02867 0.02481 0.02384 0.01777 0.01605 0.01611 0.01584 0.01504 0.01386 0.01131 0.00881 0.00881 0.00860 0.00701 0.00712 0.00699
298.15	0.0 0.172 0.284 0.583 0.994 1.302 1.422 1.742 1.784 2.007 2.120 2.156 2.291 2.339	0.03114 <sup>1</sup> 0.02786 0.02609 0.02150 0.01671 0.01368 0.01284 0.01058 0.01000 0.00847 0.00773 0.00752 0.00667 0.00640
308.15	0.0 0.306 0.577 0.580 0.672 0.711 1.218 1.422 1.728 2.096 2.351 2.608	0.02764 <sup>1</sup> 0.02235 0.01896 0.01875 0.01753 0.01746 0.01270 0.01113 0.00918 0.00672 0.00570 0.00463
<sup>1</sup> Values	from reference	1.
		Setschenow equation $\log (L_0/L) = KC_3$ .7 mol dm <sup>-3</sup> and temperatures of

288.15, 298.15 and 308.15 K respectively. The values of K are:

T/K	K/dm <sup>3</sup> mol <sup>-1</sup>
288.15	0.290
298.15	0.273
308.15	0.280

$\begin{array}{c} \text{COMPONENTS:} \\ (1)  \text{Owngons}  0  \text{to}  [7782-44-7] \\ \end{array}$	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Yasunishi, A.
<pre>(2) Calcium nitrate; Ca(NO<sub>3</sub>)<sub>2</sub>; [10124-37-5]</pre>	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K = 298.15 O <sub>2</sub> P/kPa = 101.325	PREPARED BY: H. L. Clever
$c_3/mol \ cm^{-3} = 0 - 2.416$	
EXPERIMENTAL VALUES:	
T/K Calcium nit c <sub>3</sub> /mol dr	
298.15 0.0	0.031141
0.514	
0.694	
1.031	0.01976
1.496 1.513	0.01595 0.01593
2.040	0.01253
2.416	0.01059
<sup>1</sup> Value from reference	e 1.
The author correlated	
Setschenow equation	$\log(L_0/L) = 0.194 c_3.$
	-
AUXILIARY	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS;
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A	
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used.	SOURCE AND PURITY OF MATERIALS; (1) Oxygen. High purity grade
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used.	SOURCE AND PURITY OF MATERIALS; (1) Oxygen. High purity grade stated to be 99.995 per cent.
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury.	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> <li>(3) Water. No information.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> <li>(3) Water. No information.</li> </ul>
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METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis-	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> <li>(3) Water. No information.</li> </ul>
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METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. High purity grade stated to be 99.995 per cent.</li> <li>(2) Calcium nitrate.</li> <li>(3) Water. No information.</li> </ul>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR:</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solubility measurement. The salt	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES:</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES: 1. Yasunishi, A.</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solution vapor pressure is either taken from the literature or esti-	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES:</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES: 1. Yasunishi, A.</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the increase of the liquid volume by the	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES: 1. Yasunishi, A.</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES: 1. Yasunishi, A.</pre>
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement of mercury. Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded. The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the increase of the liquid volume by the	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Calcium nitrate. (3) Water. No information. ESTIMATED ERROR: REFERENCES: 1. Yasunishi, A.</pre>

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COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: MacArthur, C. G.
<ul><li>(1) Oxygen; O<sub>2</sub>, (1) OL 11 (1)</li><li>(2) Calcium chloride; CaCl<sub>2</sub>;</li></ul>	J. Phys. Chem. <u>1916</u> , 20, 495-502.
[10043-52-4]	
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: $T/K = 298.15$ $O_2 P/kPa = \sim 21.2$ ( $O_2$ in air at $C_3/mol dm^{-3} = 0 - 5$ one atm)	PREPARED BY: H. L. Clever
S' EXPERIMENTAL VALUES:	L
	tion Solubility <sup>2</sup> Setschenow
Chloride dens c <sub>3</sub> /mol dm <sup>-3</sup> ρ/g	
298.15 0.0 1.0	
0.25 1.0	
5 1.3	4 2.14 0.087
<sup>1</sup> The author calculated the densitie <i>Critical Tables</i> . Use the density appear to be in error.	
k <sub>s</sub> = (l/c <sub>3</sub> ) log (Solubility in wat	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm.
tall cylinder open to the air. They were shaken by hand several	(2) Calcium chloride. No information
times a day for a period of four days.	(3) Water. No information.
A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	
	ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in
	error by 10 per cent. REFERENCES:
	REFERENCES:
1	

COMPONENTS:			MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Yasuni	shi, A.	
<pre>(2) Calcium chloride; CaCl<sub>2</sub>; [10043-52-4]</pre>		<i>Kagaku</i> 185•	Kogaku Rombunsh -9.	u <u>1978</u> , 4,
(3) Water; H <sub>2</sub> O; [7732-18-5]				
VARIABLES: T/K = 298.15		PREPAREI	BY:	
$O_2 P/kPa = 101.325$			H. L. Cl	ever
$c_3/mol dm^{-3} = 0 - 4.489$				
T/K C	alcium chl		Ostwald Coefficient	
	c <sub>3</sub> /mol dm	1-2	L	
298.15	0.0		0.031141	
	0.397		0.02510	
	0.624		0.02364 0.02171	
	0.806 1.263		0.01721	
	1.271		0.01668	
	1.521		0.01501	
	1.696 2.069		0.01367 0.01192	
	2.282		0.01067	
	2.706		0.00894	
	3.724 4.123		0.00597 0.00561	
	4.489		0.00490	
The author correlated the da 0.204 c <sub>3</sub> up to concentration concentration range he corre $log(L_0/L) = 0.226 c_3/(1 + 0.$	of 2.7 mc lated the	$pl dm^{-3}$	CaCl <sub>2</sub> . For the	entire
	AUXILIARY	INFORMAT	ION	
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure described in reference (1). Horiuti type apparatus is us	are A	(1) Ox		
	ed.		ND PURITY OF MATER ygen. High puri ated to be 99.99	ty grade
The aqueous salt solution is by boiling under reflux and vacuum.	degassed		ygen. High puri	ty grade 5 per cent.
by boiling under reflux and	degassed under solvent		ygen. High puri ated to be 99.99 lcium chloride.	ty grade 5 per cent.
by boiling under reflux and vacuum. The gas phase volume and the volume are measured by displ	degassed under solvent acement ded until that he dis- volume	(3) Wa	ygen. High puri ated to be 99.99 lcium chloride.	ty grade 5 per cent.
by boiling under reflux and vacuum. The gas phase volume and the volume are measured by displ of mercury. Dry gas is intermittently ad equilibrium is attained. At time the total pressure in t solution vessel and the gas remaining in the buret are r The salt solution concentrat density are determined after	degassed under solvent acement ded until that he dis- volume ecorded. ion and the	(3) Wa	ygen. High puri ated to be 99.99 lcium chloride. ter. No informa	ty grade 5 per cent.
by boiling under reflux and vacuum. The gas phase volume and the volume are measured by displ of mercury. Dry gas is intermittently ad equilibrium is attained. At time the total pressure in t solution vessel and the gas remaining in the buret are r The salt solution concentrat	degassed under solvent acement ded until that he dis- volume ecorded. ion and the salt ither esti-	(3) Wa ESTIMAT REFEREN 1. Ya	ygen. High puri ated to be 99.99 lcium chloride. ter. No informa	ty grade 5 per cent.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: MacArthur, C. G.
(2) Barium chloride; BaCl <sub>2</sub> ; [10361-37-2]	J. Phys. Chem. <u>1916</u> , 20, 495-502.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K = 298.15	PREPARED BY:
$O_2 P/kPa = \sim 21.2$ ( $O_2$ in air at $C_3$ /mol dm <sup>-3</sup> = 0 - 1 one atm)	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Barium Solut Chloride densi c <sub>3</sub> /mol dm <sup>-3</sup> p/g c	ty <sup>1</sup> cm <sup>3</sup> (STP) Constant <sup>3</sup>
298.15 0.0 1.00 0.125 1.01 0.25 1.04 0.5 1.08 1 1.17	.9       5.40       0.236         .2       5.04       0.238         .2       4.27       0.263
<ul> <li><sup>2</sup> The solubility in water is about 3 per cent smaller than the presently accepted value.</li> <li><sup>3</sup> The Setschenow constant (salt effect parameter) is calculated from k<sub>s</sub> = (1/c<sub>3</sub>) log (Solubility in water/Solubility in solution).</li> </ul>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm.
They were shaken by hand several times a day for a period of four	(2) Barium chloride. No information.
days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	(3) Water. No information.
	ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in error by 10 per cent. REFERENCES:

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Yasunishi, A.
<pre>(2) Barium chloride; BaCl<sub>2</sub>; [10361-37-2]</pre>	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:T/K = 298.15 O <sub>2</sub> P/kPa = 101.325	PREPARED BY: H. L. Clever
$c_3/mol dm^{-3} = 0 - 1.536$	
EXPERIMENTAL VALUES:	
T/K Barium chlo c_3/mol dr	
298.15 0.0 0.270 0.530 0.738 0.913 1.168 1.324 1.536	0.03114 <sup>1</sup> 0.02726 0.02363 0.02202 0.02008 0.01744 0.01654 0.01458
<sup>1</sup> Value from reference	<u> </u>
The author correlated Setschenow equation	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used.	(1) Oxygen. High purity grade stated to be 99.995 per cent.
The aqueous salt solution is degassed by boiling under reflux and under vacuum.	<ul><li>(2) Barium chloride.</li><li>(3) Water. No information.</li></ul>
The gas phase volume and the solvent volume are measured by displacement of mercury.	
Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded.	ESTIMATED ERROR:
The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the increase of the liquid volume by the dissolved gas is made.	REFERENCES: 1. Yasunishi, A. J. Chem. Eng. Jpn. <u>1977</u> , 10, 89.

0 <sub>2</sub> ; [7782-44-7	נ	ORIGINAL ME		
0 <sub>2</sub> ; L7782-44-7	1	I MacArthu	r C C	
-hlowidow Ticl				
chloride; LiCl L-8]		<i>J. Phys.</i> 495-50	Chem. <u>1916</u> , 20, 2.	
H <sub>2</sub> O; [7732-18-5	]			
$Y_{\rm K} = 298.15$ $P_{\rm a} = \sim 21.2$ (O <sub>2</sub> -3 = 0 - 4	in air at one atm)	PREPARED BY	: H. L. Clever	
LUES:				
Lithium chloride c <sub>3</sub> /mol dm <sup>-3</sup>	Solution S density <sup>1</sup> c $\rho/g \text{ cm}^{-3}$ p	m <sup>3</sup> (STP) O <sub>2</sub>	Setschenow Constant <sup>3</sup> k <sub>S</sub>	
0.0 0.125 0.25 0.5 1 2 3 4	1.000 1.0004 1.0035 1.0091 1.021 1.044 1.113 1.22	5.78 5.63 5.49 5.17 4.59 3.63 1.97 1.12	0.091 0.089 0.097 0.100 0.101 0.156 0.178	
accepted value. <sup>3</sup> The Setschenow constant (salt effect parameter) is calculated from k <sub>g</sub> = (1/c <sub>3</sub> ) log (Solubility in water/Solubility in solution)				
	AUXILIARY	INFORMATION		
er open to the by hand several eriod of four da 250 cm <sup>3</sup> was an	air. They l times a ays. alyzed for	<pre>(1) Oxyg (2) Lith (3) Wate ESTIMATED E The solul 5 to 10 p concentra</pre>	en. Air at one atm. ium chloride. No infor r. No information. RROR: pility values may be i per cent error. The sa ations above one mol d	n lt m-3
	X = 298.15 $Pa = \sim 21.2 (O_2)$ $rac{-3}{=} 0 - 4$ LUES: Lithium chloride $c_3/mol dm^{-3}$ 0.0 0.125 0.25 0.5 1 2 3 4 thor calculated <i>Tables</i> . Use t to be in error. Lubility in wat to value. Schenow consta $L(c_3) \log (Solu)$ S/PROCEDURE: Is were thermos er open to the by hand severa eriod of four d 250 cm <sup>3</sup> was an	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	I20; $[7732-18-5]$ $Y_{R} = 298.15$ $2a = \sim 21.2$ ( $O_2$ in air at one atm)PREPARED BYPREPARED BYLithium Solution Solubility2 chloride density1 cm³(STP) $O_2$ c3/mol dm-3 $\rho/g$ cm-3 per dm30.00.01.0005.780.1251.00045.630.251.00915.1711.0214.5921.0443.6331.1131.9741.221.12Chor calculated the densities from d Tables. Use the density values wit to be in error.AUXILIARY INFORMATIONSource AND(1) Oxyg by hand several times a triod of four days.250 cm³ was analyzed for modified Winkler method.(1) Oxyg (2) Lith (3) WateESTIMATED E The solud 5 to 10 1 concentriant	$i_20; [7732-18-5]$ PREPARED BY: H. L. Clever $X = 298.15$ $a = \circ 21.2$ ( $O_2$ in air at one atm)PREPARED BY: H. L. CleverLUES:Lithium Solution Solubility² Setschenow chloride density¹ cm³(STP) $O_2$ Constant³ $c_3/mol dm^{-3}$ p/g cm <sup>-3</sup> per dm³ ks $0.0$ $0.25$ $1.0000$ $5.78$ $-$ $0.125$ $1.0035$ $5.49$ $0.091$ $0.5$ $1.0091$ $1.123$ $1.0021$ $4.59$ $0.100$ $2$ $1.044$ $3.63$ $0.101$ $3$ $1.113$ $1.97$ $0.156$ $4.122$ $1.12$ $0.178$ thor calculated the densities from data in the Internation $2 Tables.$ Use the density values with caution, some of the co be in error.ubility in water is about 3 per cent smaller than the present of value.schenow constant (salt effect parameter) is calculated fr (/c3) log (Solubility in water/Solubility in solution)AUXILIARY INFORMATION S/PROCEDURE: by hand several times a triod of four days.250 cm³ was analyzed for

COMPONENTS: (1) Oxygen; O <sub>2</sub> ;	[7782-44-7]		EASUREMENTS: A.; Hertzberg, G.
(2) Lithium Chlo [7447-41-8]	oride; LiCl;	Z. Physik	k. Chem. <u>1950</u> , 195, 1 - 23.
(3) Water; H <sub>2</sub> O;	[7732-18-5]		
VARIABLES: T/K = P/kPa = m <sub>LiCl</sub> /mol kg <sup>-1</sup> =	=273.15, 293.15 =101.325 0 - 2.32	PREPARED B	Y: P. L. Long H. L. Clever
EXPERIMENTAL VALUES			
T/K	Lithium Chloride	Ostwald efficient L	Setschenow Constant $k = (1/m) \log (L^{O}/L)$
273.15	0 0.58 1.64 2.32	0.0490 0.0397 0.0334 0.0211	- 0.159 0.161 0.155
293.15	0 0.37 0.88 1.94	0.0332 0.0295 0.0251 0.0182	- 0.140 0.137 0.135
	AUXILIARY	INFORMATION	N
METHOD/APPARATUS/PR			PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: Gas absorption. The apparatus con- sists of a gas buret and an adsorp- tion flask connected by a capillary tube. The whole apparatus is shaken. The capillary tube is a 2m-long glass helix. An amount of gas is measured at STP and placed in the gas buret. After shaking, the dif- ference from the original amount of gas placed in the gas buret is determined.		Componer purity o	nts. Neither source nor
		ESTIMATED REFERENCES	δL/L = 0.01
	_		

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.	
<ul> <li>(2) Alkali metal hydroxides; LiOH,</li> <li>NaOH, KOH, RbOH, and CsOH</li> </ul>	Zh. Fiz. Khim. <u>1974</u> , 48, 620-5.	
(3) Water; H <sub>2</sub> O; [7732-18-5]	Russ. J. Phys. Chem. <u>1974</u> , 48, 359-62.	
VARIABLES: $T/K = 298.15$	PREPARED BY:	
$O_2 P/kPa = 290.13$ $O_2 P/kPa = 21$ (air at 1 atm) $C_3/mol dm^{-3} = 0 - 1.2$	H. L. Clever	
EXPERIMENTAL VALUES:		
Salt E	Imber ofSalt EffectkperimentalParameterpints $k = (1/c_3) \log(5^0/S)$	
Lithium hydroxide; 1	LiOH; [1310-65-2]	
298.15 1.2	9 (0.332 to 0.091) <sup>1</sup>	
Sodium hydroxide; Na	aOH; [1310-73-2]	
298.15 1.2	7 0.180	
Potassium hydroxide	; KOH; [1310-58-3]	
298.15 0.8	7 0.176	
Rubidium hydroxide;	RbOH; [1310-82-3]	
298.15 0.5	7 0.168	
Cesium hydroxide; C	sOH; [21351-79-1]	
298.15 0.5	7 0.158	
<sup>1</sup> Lithium hydroxide salts out. The salting out is linear in logS from 0 to about 0.07 mol dm <sup>-3</sup> ( $k = 0.332$ ) and linear above about 0.12 mol dm <sup>-3</sup> ( $k = 0.091$ ).		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE: Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>3</sup> of solution. Three samples are taken and analyzed	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air treated to free from dust and any foreign gases.</li> <li>(2) Salts. No information.</li> <li>(3) Water. No information.</li> </ul>	
by the Winkler chemical method.		
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .		
The results are presented graphically as log S $vs$ . dm <sup>-3</sup> . The slope is given as the salt effect parameter (Sechenow constant) k.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.	
	REFERENCES :	

COMPONENTS :	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.	
(2) Alkali metal fluorides;	Zh. Fiz. Khim. <u>1974</u> , 48, 620-5.	
LiF, NaF, KF, RbF, and CsF	Russ. J. Phys. Chem. 1974, 48,	
(3) Water; H <sub>2</sub> O; [7732-18-5]	359-62.	
VARIABLES: $T/K = 298.15$	PREPARED BY:	
$O_2 P/kPa = \sim 21$ (air at 1 atm)	H. L. Clever	
$c_3/mol dm^{-3} = 0 - 0.6$		
EXPERIMENTAL VALUES:		
Salt	Number of Sechenow Experimental Constant Points k = (1/c <sub>3</sub> )log(S <sup>0</sup> /S)	
Lithium fluoride;	LiF; [7789-24-4]	
298.15 0.10	8 $(0.725 \text{ to } -0.385)^{1}$	
Sodium fluoride; N	aF; [7681-49-4]	
298.15 0.6	6 0.284	
Potassium fluoride	; KF; [7789-23-3]	
298.15 0.6	5 0.203	
Rubidium fluoride;	RbF; [13446-74-7]	
298.15 0.5	7 0.146	
Cesium fluoride; C	sF; [13400-13-0]	
298.15 0.5	7 0.114	
<sup>1</sup> Lithium fluoride salts out bewteen 0 and 0.02 mol dm <sup>-3</sup> (k = 0.725) and salts in above 0.04 mol dm <sup>-3</sup> (k = -0.385).		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Air (dust free and foreign gas free), saturated with water vapor from the salt solution, is bubbled for sever- al hours through 500 cm <sup>3</sup> of solution.	<ul> <li>(1) Oxygen. Air treated to free from dust and any foreign gases.</li> <li>(2) Salts. No information.</li> </ul>	
Three samples are taken and analyzed	(3) Water. No information.	
by the Winkler chemical method. For fluoride solutions a stoichimetric amount of boric acid was added before anaylsis to bind the fluoride as tetrafuoroborate ion.		
The solubility unit is mg dm <sup>-3</sup> at the	ESTIMATED ERROR:	
normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .	$\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S 1.8 per cent.	
The results are presented graphically as log S $vs$ . c <sub>3</sub> . The slope is given as the salt effect parameter (Sech- enow constant) k.	REFERENCES :	

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.
(2) Alkali metal chlorides; LiCl,	Zh. Fiz. Khim. <u>1974</u> , 48,620-5.
NaCl, KCl, RbCl, and CsCl (3) Water; H <sub>2</sub> O; [7732-18-5]	Russ. J. Phys. Chem. <u>1974</u> , 48, 359-62.
VARIABLES:	
$\pi/\kappa = 298.15$	PREPARED BY:
$O_2 P/kPa = \sqrt{21}$ (air at 1 atm) $C_3/mol dm^{-3} = 0 - 1.2$	H. L. Clever
EXPERIMENTAL VALUES:	
Salt	Number of Salt Effect Experimental Parameter Points $k = (1/c_3)\log(S^0/S)$
Lithium chloride; Lit	Cl; [7447-41-8]
298.15 1.2	9 $(0.112 \text{ to } 0.070)^{1}$
Sodium chloride; NaC	1; [7647-14-5]
298.15 1.2	7 0.136
Potassium chloride;	KCl; [7447-40-7]
298.15 1.2	6 0.129
Rubidium chloride; R	bCl; [7791-11-9]
298.15 0.5	7 0.120
Cesium chloride; CsC	1; [7647-17-8]
298.15 0.5	7 0.098
<sup>1</sup> Lithium chloride salts out 1 (k = 0.112) and above 0.2 mo	inearly from 0 to about 0.1 mol $dm^{-3}$ 1 $dm^{-3}$ (k = 0.070).
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>3</sup> of solution.	<ul> <li>(1) Oxygen. Air treated to free from dust and any foreign gases.</li> <li>(2) Salts. No information.</li> </ul>
Three samples are taken and analyzed	(3) Water. No information.
by the Winkler chemical method.	
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .	
The results are presented graphically as log S $vs. c_3$ . The slope is given as the salt effect parameter (Sech- enow constant) k.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.	
(2) Alkali metal bromides, LiBr,	Zh. Fiz. Khim. 1974, 48,620-5.	
NaBr, KBr, RbBr, and CsBr	Russ. J. Phys. Chem. 1974, 48,	
(3) Water, H <sub>2</sub> O; [7732-18-5]	359-62.	
VARIABLES: T/K= 298.15	PREPARED BY:	
$O_2 P/kPa = \sim 21$ (air at 1 atm) $C_3/mol dm^3 = 0 - 1.2$	H. L. Clever	
EXPERIMENTAL VALUES:		
Salt	Number of Salt Effect Experimental Parameter Points $k = (1/c_3) \log(5^{\circ}/5)$	
Lithium bromide; LiB	r; [7550-35-8]	
298.15 1.2	10 $(0.252 \text{ to } 0.084)^{1}$	
Sodium bromide; NaBr	; [7647-15-6]	
298.15 1.2	7 0.131	
Potassium bromide; Kl	Br; [7758-02-3]	
298.15 1.2	6 0.117	
Rubidium bromide; Rb	Br; [7789-39-1]	
298.15 0.5	7 0.104	
Cesium bromide; CsBr	; [7787-69-1]	
298.15 0.5	7 0.078	
<sup>1</sup> Lithium bromide salts out linearly between 0 and about 0.07 mol dm <sup>-3</sup> (k = 0.252) and above about 0.15 mol dm <sup>-3</sup> (k = 0.084).		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Air, saturated with water vapor from the salt solution, is bubbled for	(1) Oxygen. Air treated to free from dust and any foreign gases.	
several hours through 500 cm <sup>3</sup> of solution.	(2) Salts. No information.	
Three samples are taken and analyzed by the Winkler chemical method.	(3) Water. No information.	
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air		
of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .		
The results are presented graphically	ESTIMATED ERROR: $\delta T/K = 0.1$	
as log S $vs$ . $c_3$ . The slope is given as the salt effect parameter (Sech-	$\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.	
enow constant) k.	REFERENCES :	

COMPONENTS:	ORIGINAL MEASUREMENTS:
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) Alkali metal iodides; LiI, NaI,</li> </ul>	Khomutov, N. E.; Konnik, E. I. <i>Zh. Fiz. Khim.</i> <u>1974</u> , 48, 620-5.
KI, RbI, and CaI	
(3) Water; H <sub>2</sub> O; [7732-18-5]	Russ. J. Phys. Chem. <u>1974</u> , 48, 359-62.
VARIABLES: T/K = 298.15 $O_2 P/kPa = \sqrt{21}$ (air at 1 atm)	PREPARED BY: H. L. Clever
$c_3/mol dm^{-3} = 0 - 1.2$	
EXPERIMENTAL VALUES:	
	Number of Salt Effect Experimental Parameter Points $k = (1/c_3)\log(S^0/S)$
Lithium iodide; LiI;	[10377-51-2]
298.15 0.6	5 0.163
Sodium iodide; NaI;	[7681-82-5]
298.15 1.2	7 0.120
Potassium iodide; KI;	; [7681-11-0]
298.15 1.2	6 0.093
Rubidium iodide; RbI;	; [7790-29-6]
298.15 0.5	7 0.086
Cesium iodide; CsI;	[7789-17-5]
298.15 0.5	7 0.062
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>3</sup> of	(1) Oxygen. Air treated to free from dust and any foreign gases.
solution.	(2) Salts. No information.
Three samples are taken and analyzed by the Winkler chemical method.	(3) Water. No information.
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air	
of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .	ESTIMATED ERROR:
The results are presented graphically as log S $vs. c_3$ . The slope is given as the salt effect parameter (Sech-	$\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.
enow constant) k.	REFERENCES :

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.
(2) Alkali metal perchlorates; LiClO <sub>4</sub> , NaClO <sub>4</sub> , KClO <sub>4</sub> , and RbClO <sub>4</sub>	Zh. Fiz. Khim. <u>1974</u> , 48, 620-5. Russ. J. Phys. Chem. <u>1974</u> , 48,
(3) Water; H <sub>2</sub> O; [7732-18-5]	359-62.
VARIABLES: $T/K = 298.15$ $O_2 P/kPa = \sim 21$ (air at 1 atm) $C_3/mol dm^{-3} = 0 - 1.2$	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
Salt Ex	amber ofSalt Effect $(perimental)$ Parameterpintsk = $(1/c_3)\log(S^0/S)$
Lithium perchlorate;	: LiClO <sub>4</sub> ; [7791-03-9]
298.15 1.2	7 $(0.218 \text{ to } 0.066)^{1}$
Sodium perchlorate;	NaClO <sub>4</sub> ; [7601-89-0]
298.15 1.2	7 0.160
Potassium perchlora	te; KClO <sub>4</sub> ; [7778-74-7]
298.15 0.12	7 0.150
Rubidium perchlorate	e; RbClO <sub>4</sub> ; [13510-42-4]
298.15 0.10	7 0.138
$0.15 \text{ mol } dm^{-3}$ (k = 0.066).	$n^{-3}$ (k = 0.218) and linear above
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>-3</sup> of solution.	<ul><li>(1) Oxygen. Air treated to free from dust and any foreign gases.</li><li>(2) Salts. No information.</li></ul>
Three samples are taken and analyzed by the Winkler chemical method.	(3) Water. No information.
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .	
The results are presented graphically as log S $vs$ . dm <sup>-3</sup> . The slope is given as the salt effect parameter (Sechenow constant) k.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.
	REFERENCES :

COMPONENTS:       ORIGINAL MEASUREMENTS:         (1) Oxygen; O2; [7782-44-7]       Khomutov, N. E.; Konnik, E. I.         (2) Dialkali metal sulfates;       Zh. Fiz. Khim. 1974, 48, 620-5.	
(2) Dialkali metal sulfates; Zh. Fiz. Khim. 1974. 48.620-5.	
(2) Dialkali metal Sullates, $Zh$ . Fiz. Khim. <u>1974</u> , 48, 620-5.	
Li <sub>2</sub> SO <sub>4</sub> , Na <sub>2</sub> SO <sub>4</sub> , $K_2$ SO <sub>4</sub> , $Rb_2$ SO <sub>4</sub> , and Cs <sub>2</sub> SO <sub>4</sub> Russ. J. Phys. Chem. 1974, 48,	
(3) Water; H <sub>2</sub> O; [7732-18-5] 359-62.	
VARIABLES: T/K = 298.15 $O_2 P/kPa = \sim 21$ (air at 1 atm) $C_3/mol dm^{-3} = 0 - 1.2$ PREPARED BY: H. L. Clever	,
EXPERIMENTAL VALUES:	
T/K Maximum Number of Salt Effect Salt Experimental Parameter Concentration Points $k = (1/c_3)\log(S^0/S)$ 	-
Dilithium sulfate; Li <sub>2</sub> SO <sub>4</sub> ; [10377-48-7]	
298.15 1.2 6 0.244	
Disodium sulfate; Na <sub>2</sub> SO <sub>4</sub> ; [7757-82-6]	
298.15 1.2 7 0.376	
Dipotassium sulfate; K <sub>2</sub> SO <sub>4</sub> ; [7778-80-5]	
298.15 0.6 5 0.297	
Dirubidium sulfate; Rb <sub>2</sub> SO <sub>4</sub> ; [7488-54-2]	
298.15 0.3 7 0.290	
Dicesium sulfate; Cs <sub>2</sub> SO <sub>4</sub> ; [10294-54-9]	
298.15 0.45 8 0.255	
	-
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:	
Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>3</sup> of solution. (1) Oxygen. Air treated to fr from dust and any foreign	
(2) Salts. No information. Three samples are taken and analyzed by the Winkler chemical method. (3) Water. No information.	
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .	
The results are presented graphically as log S vs. dm <sup>-3</sup> . The slope is given as the salt effect parameter (Sechenow constant) k. ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per ce	nt.
REFERENCES :	

oxygen Solubiliti		
COMPONENTS :	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.	
(2) Alkali metal nitrates; LiNO <sub>3</sub> NaNO <sub>3</sub> , KNO <sub>3</sub> , RbNO <sub>3</sub> , and CSNO <sub>3</sub>	Zh. Fiz. Khim. <u>1974</u> , 48, 620-5.	
(3) Water; H <sub>2</sub> O; [7732-18-5]	Russ. J. Phys. Chem. <u>1974</u> , 48, 359-62.	
VARIABLES: T/K= 298.15	PREPARED BY:	
$0_2 \text{ P/kPa} \sim 21 \text{ (air at 1 atm)} $ $c_3/\text{mol dm}^{-3} = 0 - 1.2$	H. L. Clever	
EXPERIMENTAL VALUES:		
	imber of Salt Effect	
	$\begin{array}{llllllllllllllllllllllllllllllllllll$	
Lithium nitrate; LiN	10 <sub>3</sub> ; [7790-69-4]	
298.15 1.2	7 $(0.196 \text{ to } -0.040)^{1}$	
Sodium nitrate; NaNC	0 <sub>3</sub> ; [7631-99-4]	
298.15 1.2	6 0.124	
Potassium nitrate; k	(NO <sub>3</sub> ; [7757-79-1]	
298.15 1.2	6 0.105	
Rubidium nitrate; Rh	DNO <sub>3</sub> ; [13126-12-0]	
298.15 0.5	6 0.096	
Cesium nitrate; CsNC	D <sub>3</sub> ; [7789-18-6]	
298.15 0.5	6 0.066	
<sup>1</sup> Lithium nitrate salts out between 0 and about 0.10 mol dm <sup>-3</sup> (k = 0.196); it salts in at concentrations above about 0.15 mol dm <sup>-3</sup> (k = -0.040).		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Air, saturated with water vapor from the salt solution, is bubbled for	<ol> <li>Oxygen. Air treated to free from dust and any foreign gases.</li> </ol>	
several hours through 500 cm <sup>3</sup> of solution.	(2) Salts. No information.	
Three samples are taken and analyzed by the Winkler chemical method.	(3) Water. No information.	
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .		
The results are presented graphically as log S $vs$ . $c_3$ . The slope is given as the salt effect parameter (Sech- enow constant) k.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.	
	REFERENCES :	

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.
(2) Dialkali metal carbonates; $Li_2CO_3$ , $Na_2CO_3$ , and $K_2CO_3$	Zh. Fiz. Khim. <u>1974</u> , 48, 620-5.
(3) Water; H <sub>2</sub> O; [7732-18-5]	Russ. J. Phys. Chem. <u>1974</u> , 48, 359–62.
VARIABLES:	PREPARED BY:
T/K = 298.15 O <sub>2</sub> P/kPa = $\sim$ 21 (air at 1 atm) C <sub>3</sub> /mol dm <sup>-3</sup> = 0 - 1.2	H. L. Clever
EXPERIMENTAL VALUES:	
Salt E	umber ofSalt EffectkperimentalParameterpints $k = (1/c_3) \log(S^0/S)$
Dilithium carbonate;	Lì <sub>2</sub> CO <sub>3</sub> ; [554-13-2]
298.15 0.12	6 0.254
Disodium carbonate; 1	Na <sub>2</sub> CO <sub>3</sub> ; [497-19-8]
298.15 1.0	6 0.464
Dipotassium carbonate	∋; К <sub>2</sub> CO <sub>3</sub> ; [584-08-7]
298.15 1.2	7 0.379
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>3</sup> of solution.	<ol> <li>Oxygen. Air treated to free from dust and any foreign gases.</li> <li>Salts. No information.</li> </ol>
Three samples are taken and analyzed by the Winkler chemical method.	(3) Water. No information.
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .	
The results are presented graphically as log S $vs$ . dm <sup>-3</sup> . The slope is given as the salt effect parameter (Sechenow constant) k.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.
	REFERENCES :

COMPONENTS :		ORIGINAL MEASUREME	NTS:			
(1) Oxygen; O <sub>2</sub> ; [7782	-44-7]	Geffcken, G.				
			1904, 49, 257-302.			
,		2. Phys. Chem.	<u>1904</u> , 47, 257-502.			
(3) Water; H <sub>2</sub> O; [7732	2-18-5]					
VARIABLES:	<u> </u>	PREPARED BY:				
T/K = 288		C.L. Young; R.	Battino			
Concentra	tion					
EXPERIMENTAL VALUES:		· · · · · · · · · · · · · · · · · · ·				
т/к	Conc of salt/mol	dm <sup>3</sup> (soln)	Ostwald coefficient,L			
288.15	0.530		0.03045			
	0.535		0.03052			
1	1.020 1.034		0.02601 0.02557			
	1.880		0.01898			
	1.890		0.01904			
298.15	1.921 0.530		0.01869 0.02598			
270.13	0.535		0.02604			
	1.020		0.02226			
	1.034 1.890		0.02202 0.01663			
	1.921		0.01654			
	AUXILIARY	INFORMATION				
METHOD /APPARATUS/PROC	EDURE :	SOURCE AND PURITY	OF MATERIALS:			
Volumetric method us adsorption pipet and Diagram and detailed given in original pay	ing simple buret. description	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Prepared by heating potassium chlorate and manganese dioxide. Washed with potassium hydroxide solution. Dried.</li> <li>(3) Degassed.</li> </ul>				
		ESTIMATED ERROR: δT/K = ±0.1; (estimated b REFERENCES:	$\delta L = \pm 1$ %. y compiler).			

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [778]	2-44-71			NAL MEASUREMENTS Arthur, C. G.	:		
(2) Sodium chloride;				·	<u>16</u> , 20,495-502.		
[7647-14-5]	7						
(3) Water; H <sub>2</sub> O; [773	2-18-5]						
VARIABLES: $T/K = 298.15$			PREPA	RED BY:			
$O_2 P/kPa = 0.21.2$	(O. in air	at		H. L. Cl	ever		
$c_3/mol dm^{-3} = 0 - 4$	one one	atm)	i				
EXPERIMENTAL VALUES:			_	·····			
Ci	odium loride <sub>3</sub> /mol dm <sup>-3</sup>	Solut densi p/g c	tyl	Solubility <sup>2</sup> cm <sup>3</sup> (STP) O <sub>2</sub> per dm <sup>3</sup>	Setschenow Constant <sup>3</sup> <sup>k</sup> s		
·							
298.15	0.0 0.125	1.00		5.78	-		
	0.125	1.00		5.52 5.30	0.160 0.151		
	0.5	1.01		4.92	0.140		
	1	1.03	8	4.20	0.139		
	2	1.07		3.05	0.139		
	3 4	1.11 1.14		2.24 1.62	0.137 0.138		
J							
<sup>3</sup> The Setschenow cons k <sub>s</sub> = (l/c <sub>3</sub> ) log (Sc							
	AUX	ILIARY	INFOR	1ATION			
METHOD/APPARATUS/PROCEDURE	•		SOURC	E AND PURITY OF	MATERIALS.		
The solutions were the tall cylinder open to	ermostated	in		Oxygen. Air			
They were shaken by h times a day for a per	and several		(2)	Sodium chlori	de. No information.		
days.			(3)	Water. No inf	ormation.		
A sample of 250 cm <sup>3</sup> w for oxygen by a modif method.	as analyzed ied Winkler						
			ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in error by 10 per cent.				
			REFEI	LENCES:			

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COMPONENTS :		0	RIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ;	[7782-44-7]	E	Eucken, A.; Hertzberg, G.
(2) Sodium Chlo [7647-14-5]	ride; NaCl;	Z	Z. Physik. Chem. <u>1950</u> , 195, 1 – 23.
(3) Water; H <sub>2</sub> O;	[7732-18-5]		
	=273.15 - 298.15	Р	PREPARED BY:
m <sub>NaCl</sub> /mol kg <sup>-1</sup> =	=101.325 0 - 2.49		P. L. Long H. L. Clever
EXPERIMENTAL VALUES	:		
T/K			vald Setschenow Constant icient $k = (1/m) \log (L^{O}/L)$
273.15	0.48 1.23	0.04 0.04 0.03 0.01	409 0.165 306 0.166
288.15	0.69	0.03 0.02 0.02	289 0.148
293.15	0.81	0.03 0.02 0.01	0.139
298.15	0.64	0.03 0.02 0.01	0.139
	AUXILIA	RY IN	NFORMATION
METHOD / APPARATUS / PI	ROCEDURE :	s	SOURCE AND PURITY OF MATERIALS:
sists of a gas l tion flask connectube. The whole The capillary to helix. An amoun at STP and place After shaking,	The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken ube is a 2m-long glas nt of gas is measured ed in the gas buret. the difference from punt of gas placed in s determined.	1. 55 1	Components. Neither source nor purity given.
		E	ESTIMATED ERROR:
			$\delta L/L = 0.01$
		F	REFERENCES :

NaCl/g eq dr	m <sup>-3</sup>				Bunse	n Coef	ficien	t, α >	10 <sup>3</sup>		• • • • • •			XPEF	'ARIA	(3)	(1) (2)	COMPONENTS
<u>т/к</u>	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.4	Salt Effect Parameter <sup>k</sup> s	EXPERIMENTAL	VARIABLES: T P/k c3/mol dm		Oxygen; Sodium	••
273.15	48.9	39.8	32.1 31.2 <sup>1</sup>	26.3	21.4 $22.5^{1}$	17.4	$14.1 \\ 15.1^{1}$	11.5	9.2	7.6	6.2	5.2 6.1 <sup>1</sup>	0.180	VALUES	r/k = kPa = n−3 =	H <sub>2</sub> 0;	chlor	
278.15	42.9	35.4	29.1 27.9 <sup>1</sup>	24.0	19.8 20.41	16.3	13.4 13.6 <sup>1</sup>	11.1	9.1	7.5	6.2	5.3 5.91	0.168	JES:	273. 101. 0 -	[773	L778 ride;	
283.15	38.5	32.0	26.6 25.31	22.2	$18.4 \\ 18.6^{1}$	15.3	$12.8 \\ 12.5^{1}$	10.6	8.8	7.3	6.1	5.3 5.61	0.160		15 325 54	32-18-	12-44- NaCl	
288.15	34.2	28.6	23.9 23.1 <sup>1</sup>	20.0	16.7 17.0 <sup>1</sup>	13.9	$11.6 \\ 11.7^{1}$	9.7	8.1	6.8	5.7	4.9 5.4 <sup>1</sup>	0.156		303	-5 Ĵ	1 î 1 `	
293.15	30.8	25.9	21.9 21.4 <sup>1</sup>	18.4	15.5 15.7 <sup>1</sup>	13.1	11.0 11.0 <sup>1</sup>	9.3	7.8	6.6	5.5	4.8 5.2 <sup>1</sup>	0.149		.15			
298.15	28.2	23.9	20.2 20.0 <sup>1</sup>	17.1	14.5 14.7 <sup>1</sup>	12.2	10.4 10.4 <sup>1</sup>	8.8	7.4	6.3	5.3	4.7 5.0 <sup>1</sup>	0.145					
303.15	26.3	22.5	19.1 18.7 <sup>1</sup>	16.3	$13.9 \\ 14.0^{1}$	11.8	$10.0 \\ 10.0^{1}$	8.6	7.3	6.2	5.3	4.7 4.8 <sup>1</sup>	0.139		PRE	) 1911	Mat	ORI
<sup>1</sup> Appears to The table of solutions wa clear. The A 1958 report compiler.	f smoothed as prepare data of L	Bunse d by t . Wink	n coef he aut ler (Z	ficien hors. . ange	ts of The c	oxygen omplet m. 191	$\begin{array}{c} \text{e sour} \\ 1. 24. \end{array}$	ce of 341)	data ) are	for t ment	he ta ioned	ble i	s not		REPARED BY: A. L. Crame H. L. Cleve	Geol. Inst. 1961, 46,	na, T. A.; Avd ovskava, T. K.	MEASURE

OAO - K

Salt Solutions (Aqueous)

A.; Avdeeva, O. 1, T. K.

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*Issled*. 93-110.

Cramer Clever

COMPONENTS :		ORIGINAL MEASUREMENTS:						
(1) Oxygen; O <sub>2</sub> ; [7782-4	4-7]	Cramer, S. D.						
(2) Sodium chloride; Na [7647-14-5] or geothermal brine		Ind. Eng. Chem. Pevelop., <u>198</u>	, Process Design 10, 19. 300-5.					
(3) Water; H <sub>2</sub> 0; [7732-1	9-5]							
VARIABLES: T/K = 274.65 - $O_2 P/MPa = 4.3 - 5.2$ $m_3/mol kg^{-1} = 0 - 5.69$	583.15	PREPARED BY: H. L. Clever						
Brine Ch	aracteristics							
Brine	Molality Ma m/mol kg <sup>-1</sup> c,	olarity Ionic /mol dm <sup>-3</sup> Streng I <sup>1</sup>						
Water NaC1-1 NaC1-2 NaC1-3 EMGB SSGB	0 0.87 2.97 5.69 0.57 4.87	0         0           0.85         0.87           2.78         2.97           5.09         5.69           0.56         0.60           4.19         7.34	NaCl NaCl Mixed chlorides <sup>2</sup>					
<sup>1</sup> Based on <sup>2</sup> Compositi	molal concentration in the table	ations. e below. Also see	footnotes on page before.					
Composition (in ppm by Constituent EMGB	weight) of the SSGB		MGB SSGB					
Na 11 000	53 000		1.7 70					
Ca 1 370	28 800	Cs	4 20					
К 1430	16 500	Mg	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					
Fe 0.2 Mn 0.9		Cu	$0.03$ $3$ $-1^{1}$					
2n $0.9$		Ag Cl 18	000 155 000					
Sr 226	440	NH <sub>4</sub>	3.9 Not det'n.					
SiO <sub>2</sub> 101	400	Br	35 " "					
В 27	390	F	1.5 " "					
Ba 58	250	so <sub>4</sub>	16 " " t det'n. 30					
Li 55 Pb 0.3	210 80	S No	c dec n. 50					
<sup>1</sup> Not included in the	AUXILIARY	INFORMATION	d on following page					
synthetic brine. METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY O						
The oxygen solubilities mined from PVT measurem technique of gas extrac	ents using the	(1) Oxygen. Sour to be 99.5 p	ce not given, stated er cent.					
apparatus consists of (	l) a high		ide and SSGB. Prevare					
pressure, high temperat		1	grade chemicals					
steel stirred reactor f Pyrex liner for dissolv		arssorved in	demineralized water.					
the brine, (2) a heat e		(3) Water. Demi	neralized water.					
cooling samples of gas								
brine to room temperatu		EMGB. Natur	al sample.					
low-pressure, constant-		ł						
unit for PVT measuremen gas and liquid samples.		ESTIMATED ERROR:						
			s of experimental					
Henry's constant is def	ined as $K^{\vee} =$	error.	Exp					
$\overline{f}_{g}/a_{g}$ . The fugacity, $\overline{f}_{g}$ $\phi_{g}$ is the fugacity coef	ficient. and	Variable	Uncertainty Error					
$P_{q}$ is the oxygen partia			<u>%</u>					
activity, $a_{q} = \gamma x_{q}$ , whe	reγis the	Reactor pressure	0.068 MPa 1.4					
activity coefficient of	the dissolved	Reactor temperat	ure 2°C 4.2					
gas, and $x_{g}$ is the mole mole fraction is calcul		Sample volume:	$n 0.4 \text{ cm}^3 2.6$					
respect the gas, the io		liquid fractio gas fraction	$0.4 \text{ cm}^3$ 2.6					
and the water.	The shoese	Gas buret temp	2°C 0.6					
		Atmospheric pres						
$x' = mg/(mg + \Sigma mj \Sigma \nu ij +$	1000/M <sub>H2</sub> O)	Brine conc	0.2 m 0.5					

Water	Sodium Chlori m <sub>3</sub> /mol kg <sup>-1</sup> = (		Sodium Ch 1 <sub>3</sub> /mol kg <sup>-1</sup>		Sodium Ch m <sub>3</sub> /mol kg <sup>-1</sup>		XPERI	(2) S (3) W	(1) Oxy	
Temperature Henry's T/K t/°C Constant K x 10 <sup>-3</sup> , MPa	T/K t/°C Cor K X MPa	$x 10^{-3}$	emperature C/K t/°C	Henry's Constant K x $10^{-3}/$ MPa	Temperature T/K t/°C	Henry's Constant K x 10 <sup>-3</sup> / MPa	EXPERIMENTAL VAI	Sodium chloride; [7647-14-5] or geothermal br Water; H <sub>2</sub> O; [773	: yen; 0 <sub>2</sub>	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	279.85       6.7       4         286.65       13.5       5         293.35       20.2       5         303.35       30.2       5         315.15       42.0       5         315.65       42.5       5         322.75       49.6       6         323.15       50.0       3         324.15       51.0       5         334.65       61.5       8         336.05       62.9       8	4.98       280         5.09       284         5.68       292         7.02       296         7.51       300         7.52       322         8.06       332         8.01       348         7.76       368         8.92       390         8.92       410	4.65       1.5         0.65       7.5         4.95       11.8         2.15       19.0         5.65       23.5         0.55       27.4         2.75       49.6         2.25       59.1         3.35       75.2         3.85       95.7         0.55       117.4         0.55       137.4	10.02 10.28 11.24 11.78 12.14 12.77 14.55 15.95 14.73 14.29 12.21 12.79	$\begin{array}{cccccc} 276.15 & 3.0 \\ 280.55 & 7.4 \\ 286.85 & 13.7 \\ 299.45 & 26.3 \\ 321.05 & 47.9 \\ 332.25 & 59.1 \\ 346.65 & 73.5 \\ 357.25 & 84.1 \\ 368.35 & 95.2 \\ 385.85 & 110.7 \\ 390.55 & 117.4 \\ 401.65 & 128.5 \\ \end{array}$	20.29 22.77 22.98 23.69 26.16 26.29 26.95 26.52 28.39 24.80 23.90 23.94	VALUES:	pride; NaCl; ] mal brines ; [7732-18-5]	; [7782-44-7]	Salt Solution
323.15 50.0 5.65 324.15 51.0 5.83 333.85 60.7 7.34 344.95 71.8 7.06 348.35 75.2 7.06 363.35 90.2 7.27 373.35 100.2 7.52 387.75 114.6 7.50 396.05 122.9 6.91 413.35 140.2 6.89 438.35 165.2 5.88 461.05 187.9 4.38 513.85 240.7 2.94 561.15 288.0 1.35 1 Author designated Nac 2 Author designated Nac	357.15 84.0 372.15 99.0 398.15 125.0 423.85 150.7 439.95 166.8 476.05 202.9 514.35 241.2 530.45 257.3 559.05 285.9 2 2 2 2 2 2 2 2 2 2 2 2 2	9.44         458           9.58         513           8.57         513           7.79         513           6.79         542	0.65 157.5 3.35 185.2 3.65 240.5 3.85 240.7 2.75 269.6 3.35 296.2	13.18 9.45 6.72 6.89 4.96 4.04	438.85 165.7 461.05 187.9 481.05 207.9 514.95 241.8 532.95 259.8 543.15 270.0 562.15 289.0	16.49 14.72 14.69 19.90 9.89 10.25 8.16	continued	Ind. Eng. Chem., Process Design Develop. <u>1930</u> , 19, 300-5.	ORIGINAL MEASUREMENTS: Cramer, S. D.	Salt Solutions (Aqueous)

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	Wate	r		Wate	r	m/mc	EMGB <sup>1</sup> ol kg <sup>-1</sup>	= 0.57	m/mc	$\frac{\text{SSGB}^2}{\text{m/mol kg}^{-1}} = 4.87$		XPERII	(3) <sup>I</sup> Va	(2) (2) 0]	(1) Oxy
Temper T/K	ature t/°C	Henry's Constant K x $10^{-3}/$ MPa	Temper T/K	ature t/°C	Henry's Constant K x 10 <sup>-3</sup> / MPa	Temper T/K	• • •	Henry's Constant K x 10 <sup>-3</sup> / MPa	Temper T/K	····· ·	Henry's Constant K x 10 <sup>-3</sup> / MPa	EXPERIMENTAL VALUES	water; H <sub>2</sub> O;	Sodium chlor [7647-14-5] or geotherma	Oxygen; O <sub>2</sub> ;
276.15 279.65 280.65 286.85 292.15	3.0 6.5 7.5 13.7 19.0	2.53 2.92 3.33 3.67 4.06	348.35 363.35 373.35 387.75	75.2 90.2 100.2 114.6	7.06 7.27 7.52 7.50	275.45 279.95 286.65 319.65	2.3 6.8 13.5 46.5	3.65 3.87 4.34 7.26	274.95 280.65 285.15 292.15	1.8 7.5 12.0 19.0	12.41 14.64 15.99 15.90	UES:	[7732-18	loride; NaCl 5] rmal brines	[7782-44
292.15 295.55 297.45 301.65 305.15	22.4 24.3 28.5 32.0	4.08 4.63 4.31 4.98 5.11	396.05 413.35 438.35 461.05	122.9 140.2 165.2 187.9	6.91 6.89 5.88 4.38	333.85 352.35 372.95 379.15	60.7 79.2 99.8 106.0	7.48 7.88 7.87 8.70	294.45 301.65 321.05 334.45	21.3 28.5 47.9 61.3	18.02 18.64 18.03 19.77		8-5]	Cl; S	4-7]
315.15 315.65 322.75 323.15	42.0 42.5 49.6 50.0	5.25 5.27 6.48 5.65	513.85 561.15	240.7 288.0	2.94 1.35	391.15 428.15 473.75 475.15 495.15	118.0 155.0 200.6 202.0	7.57 6.14 4.34 4.66	349.95 367.15 396.65 411.05	76.8 94.0 123.5 137.9	19.77 19.77 17.76 15.67	continued			
324.15 333.85 344.95	51.0 60.7 71.8	5.83 7.34 7.06				495.15	222.0	3.79	423.35 425.55 461.05 503.25	150.2 152.4 187.9 230.1	14.49 13.87 11.10 9.36	e ನೆ		Ind. Eng Develo	Cramer,
									545.55 559.65 583.15	272.4 286.5 310.0	6.10 7.20 5.63			. Chem., p. <u>1980</u> ,	S. D.
The com Salton geothern the nex FERENCE	positio Sea geo mal wei t page. S:	thermal brin on of the lo othermal bri ll IID-2 on . E.; Hadzer	ow-salini ine, a sy the Salt	ty brin nthetic on sea	ne is given c brine base geothermal	on the n ed on an field (2	ext pag analysi ). The	e. s of unflas compositio	hed hype n of the	brine	brine from is given on	n		., Process Des. 0, 19, 300-5.	. D.

"Process Technology for Recovering Geothermal Brine Minerals", PB-241867, Hazen Research, Inc., Golden, Co., 1975, Feb. 4. 2. Helgeson, H. C. Am. J. Sci. <u>1968</u>, 266, 129.

Oxygen Solubilities up to 200 kPa

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [77	82-44-71			INAL MEASUREMENTS: Arthur, C. G.	:		
(2) Sodium bromide; [7647-15-6]				Phys. Chem. <u>19</u>	<u>16</u> , 20, 495-5	02.	
(3) Water; H <sub>2</sub> O; [77	32-18-5]						
VARIABLES: T/K = 298.1	.5		PREP.	ARED BY:	_		
$O_2 P/kPa = \sqrt{21}$ $C_3/mo1 dm^{-3} = 0 - 6$	2 (O <sub>2</sub> in air one	at atm)		H. L. C	lever		
EXPERIMENTAL VALUES:				······································	· · · ·		
· · ·	Sodium Bromide c <sub>3</sub> /mol dm <sup>-3</sup>	Solut densi	tyl	Solubility <sup>2</sup> cm <sup>3</sup> (STP) O <sub>2</sub>	Setschenow Constant <sup>3</sup> k <sub>s</sub>	-	
	c <sub>3</sub> /mol dm	p/g c	:m	per dm <sup>3</sup>	S		
298.15	0.125 1. 0.25 1. 0.5 1. 1 1. 2 1.		00 07 17 36 75 50 19	5.78 5.65 5.52 5.15 4.47 3.37 2.57	0.079 0.080 0.117 0.112 0.117 0.117		
					0.114 0.109		
<sup>3</sup> The Setschenow co k <sub>s</sub> = (l/c <sub>3</sub> ) log (							
	AUX	(ILIARY	INFOR	MATION			
METHOD / APPARATUS / PROCEDU	PF •		SOUR	CE AND PURITY OF	MATEDIALS.		
The solutions were tall cylinder open They were shaken by times a day for a p	thermostated to the air. hand severa	1	(1)	Oxygen. Air Sodium bromid	at one atm.	ation.	
days.		-	(3)	Water. No in	formation.		
A sample of 250 cm <sup>3</sup> for oxygen by a mod method.							
			ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in error by 10 per cent.				
				RENCES :			

COMPONENTS:	ORIGINAL MEASUREMENTS:								
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	MacArthur, C. G.								
(2) Sodium sulfate; Na <sub>2</sub> SO <sub>4</sub> ; [7757-82-6]	J. Phys. Chem. <u>1916</u> , 20, 495-502.								
(3) Water; H <sub>2</sub> O; [7732-18-5]									
VARIABLES: T/K = 298.15	PREPARED BY:								
$O_2 P/kPa = \sim 20.2$ ( $O_2$ in air at	H. L. Clever								
$c_3/mol dm^{-3} = 0 - 1$ one atm)									
EXPERIMENTAL VALUES:	J								
sulfate dens	tion Solubility <sup>2</sup> Setschenow ity <sup>1</sup> cm <sup>3</sup> (STP) O <sub>2</sub> k <sub>s</sub> per dm <sup>3</sup> s								
298.15 0.0 1.0									
0.125 1.0 0.25 1.0									
0.5 1.0									
1 1.1									
<ul> <li><sup>1</sup> The author calculated the densities from data in the International Critical Tables. Use the density values with caution, some of them appear to be in error.</li> <li><sup>2</sup> The solubility in water is about 3 per cent smaller than the presently accepted value.</li> <li><sup>3</sup> The Setschenow constant (salt effect parameter) is calculated from k<sub>s</sub> = (1/c<sub>3</sub>) log (Solubility in water/Solubility in solution).</li> </ul>									
AUXILIARY	INFORMATION								
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in									
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several	SOURCE AND PURITY OF MATERIALS:								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm.								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Sodium sulfate. No information.								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Sodium sulfate. No information. (3) Water. No information.								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Sodium sulfate. No information. (3) Water. No information. ESTIMATED ERROR:								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Sodium sulfate. No information. (3) Water. No information.								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Sodium sulfate. No information. (3) Water. No information. (3) Water. No information. ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm<sup>-3</sup> may be in</pre>								
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Sodium sulfate. No information. (3) Water. No information. (3) Water. No information. ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm<sup>-3</sup> may be in error by 10 per cent.</pre>								

COMPONENTS:									
	ORIGINAL MEASUREMENTS:								
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kobe, K. A.; Kenton, F. H.								
(2) Sodium sulfate; Na <sub>2</sub> SO <sub>4</sub> ; [77 <b>57-82-6</b> ]									
(3) Sulfuric acid; H <sub>2</sub> SO <sub>4</sub> ; [7664-93-9]	Ind. Eng. Chem., Anal. Ed. <u>1938</u> ,10, 76-7.								
(4) Water; H <sub>2</sub> O; [7732-18-5]									
<u>_</u>									
VARIABLES: T/K = 298.15	PREPARED BY: P. L. Long								
$O_2 P/kPa = 101.325$	H. L. Clever								
EXPERIMENTAL VALUES:									
Temperature Solvent Oxygen	Bunsen Ostwald								
Volume Volume									
$t / C T/K cm^3 Absorb$	ed $\alpha \times 10^2$ L x $10^2$								
25 298.15 49.54 0.44									
49.54 0.44	0.81 av. 0.89 av.								
The solvent was a mixture of 800 g $H_2O$ 200 g $Na_2SO_4$ (anhydrous)									
Thus the solution molality was									
m <sub>Na2SO4</sub> /mol	$ka^{-1}$ 1.76								
m <sub>H2SO4</sub> /mol k	g <sup>-1</sup> 0.90								
AUXILIARY	INFORMATION								
	· · · · · · · · · · · · · · · · · · ·								
AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:								
METHOD/APPARATUS/PROCEDURE: The apparatus was described in detail	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given.								
METHOD/APPARATUS/PROCEDURE: The apparatus was described in detail in an earlier paper (1). The appara-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given.								
METHOD/APPARATUS/PROCEDURE: The apparatus was described in detail in an earlier paper (1). The appara- tus consists of a gas buret, a pres-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given. Purity stated to be 99 <sup>+</sup> per cent.								
METHOD/APPARATUS/PROCEDURE: The apparatus was described in detail in an earlier paper (1). The appara-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given.								
METHOD/APPARATUS/PROCEDURE: The apparatus was described in detail in an earlier paper (1). The appara- tus consists of a gas buret, a pres- sure compensator, a 200 cm <sup>3</sup> absorp- tion bulb, and a mercury leveling bulb. The absorption bulb is attached	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Source not given. Purity stated to be 99<sup>+</sup> per cent.</li> <li>(2,3) Sodium sulfate and sulfuric acid. Sources not given.</li> </ul>								
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COMPONENTS :				OPICINAL NEACHDENENDE.
(1) Oxygen; (	Da: [7782	-44-77		ORIGINAL MEASUREMENTS:
	2			Linek, V.; Mayrhoferova, J.
(2) Sodium su [7757-82-	111ate; N -6]	a2504;		Chem. Eng. Sci. <u>1970</u> , 25,
(3) Water; H	.0. [7733	-18-57		787 - 800.
(J) water; n	20, 17732	, TO-2]		
VARIABLES:				PREPARED BY:
	K = 288 - 101 - 201 -		a t m )	H. L. Clever
c <sub>2</sub> /kmol m <sup>-1</sup>	a = 101.3 3 = 0 -		atm)	
EXPERIMENTAL VAL				
	Temper	ature	Sodium	Oxygen
	t∕°c	T/K	Sulfate <sup>1</sup> c <sub>2</sub> /kmol	$m^{-3^2}$ Solubility $c_1/kmol m^{-3^2}$
	15	288	0.50	9.88
	20	293	0	13.60
			0.25 0.50	
			0.75	7.42
			1.00	6.06
	25 298		0.50	8.15
	30	303	0.50	7.49
	35	308	0.50	7.03
	labeled were ma assumed	l sodium de in s l they v	n sulfite, sodium sul vere the s	e original paper is however, the measurements fate solution and it was ame in sodium sulfite. mber as mol dm <sup>-3</sup> .
				THEODIARTON
			AUXILIARY	INFORMATION
METHOD/APPARATUS	S/PROCEDURE	:		SOURCE AND PURITY OF MATERIALS:
The details	of the m	ethod w	vere not	(1) Oxygen. No information.
given.				(2) Sodium sulfate. No information.
				(3) Water. Distilled in all glass apparatus.
				ESTIMATED ERROR:
				REFERENCES:
The second s				

		Salt Solution	io () (quoou		15		
COMPONENTS	5:		ORIGINAL	MEASUREMENTS:			
(1) Oxy	gen; 0 <sub>2</sub> ; [7782-4	4-7]	Yasuni	shi, A.			
(2) Sod [77	ium sulfate; <sup>Na</sup> 2 57-82-6]	SO <sub>A</sub> ;	J. Chem. Eng. Jpn. <u>1977</u> , 10, 89-94.				
(3) Wat	er; H <sub>2</sub> O; [7732-1	.8-5]					
VARIABLES	: T/K= 288.15-30	18.15	PREPARED	BY:			
O2 c3/mol	P/kPa= 101.325 dm <sup>-3</sup> = 0 - 1.65	6		H. L. Clev	ver; C. L. Youn		
EXPERIMEN	TAL VALUES:						
т/к	Sodium sulfate c <sub>3</sub> /mol dm <sup>-3</sup>	Ostwald Coefficient	Т/К	Sodium sulfate c <sub>3</sub> /mol dm <sup>-3</sup>	Ostwald Coefficient L		
288.15	0.0	0.03643	298.15	0.762	0.01704		
	0.105 0.216	0.03370 0.03058		0.988 1.228	0.01455 0.01244		
	0.315	0.02734		1.240	0.01225		
	0.479 0.594	0.02386 0.02183		1.498 1.517	0.01067 0.01040		
	0.701	0.02030		1.317	0.01040		
	0.891	0.01823	308.15	0.0	0.02764		
298.15	0.0	0.03114		0.317 0.609	0.02043 0.01650		
	0.155	0.02732		0.967	0.01286		
	0.239 0.510	0.02489 0.02018		1.301 1.656	0.01055 0.00860		
	0.513	0.02032		1.030	0.00000		
	0.618	0.01855					
	<u> </u>	15 0.420 15 0.398	0.25 0.18 0.23	 1 3			
		AUXILIARY	INFORMATI	ON			
	PARATUS/PROCEDURE:	<u></u>		ND PURITY OF MATERIA			
	aratus is simila d by Horiuti (l)			ygen. Extra pure ated to be 99.99			
	eous salt soluti ing under reflux		1 (2) .50	dium sulfate. " agent".	Gauranteed		
	phase volume an are measured by a		(3) Wa	ter. No informat	ion.		
equilibri total privessel a	is intermittent rium is attained ressure in the d and the gas volu et are recorded.	. At that time	ESTIMATEI	D ERROR: e deviation 0.3	to 0.5 per cen		
are dete Salt so taken fr tion for	t concentration a ermined after the lution vapor pre- rom the literat r the increase o by the dissloved	e measurement. ssure is ure. A correc- f the liquid	REFERENCES :				
			Res	. Tokyo <u>1931</u> , 1	7, 125.		

COMPONENTS :	·	ORIGINAL MEASUREMENTS:		
	-44-7]	Gestrich, W.; Pontow, B.		
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-</li> <li>(2) Sodium sulfite; National States</li> </ul>		ChemIngTech. <u>1977</u> , 49,564-5.		
[7757-83-7]	-			
(3) Water; H <sub>2</sub> O; [7732	-18-5]			
VARIABLES: $T/K = 273.1$	5-303.15	PREPARED BY:		
P/kPa = 60.0	- 200		H. L. Clever	
$c_3/mo1 dm^{-3} = 0.05$	- 2 bar) - 1.2			
EXPERIMENTAL VALUES:			······	
T/K	Sodium sulfi	te Henry's constant	Measured pH at 293.15 K	
	$c_3/mol dm^{-3}$	K x 10		
273.1	5 0.05	2.08	8.30	
	0.2	1.61 1.33	8.15	I
	0.6	1.03	8.03 7.97	
	1.2	0.747	7.78	
288.1		1.50	8.30	
	0.2 0.6	1.32 0.995	8.15 8.03	
	0.8	0.831	7.97	
	1.2	0.518	7.78	
298.1		1.25	8.30	
	0.2 0.6	1.12 0.872	8.15 8.03	
	0.8	0.600 0.463	7.97	
	1.2		7.78	
303.1	5 0.05 0.2	1.08 1.03	8.30 8.15	
ĺ	0.6	0.775	8.03	
	0.8 1.2	0.647 7.97 0.476 7.78		
<sup>1</sup> Honry	's constant, 10			
henry		INFORMATION		
METHOD/APPARATUS/PROCEDURE		<del>,</del>	ITY OF MATERIALS:	_
	e of an absorn-	No details given.		
The apparatus consist tion flask (ca. 40 cm	<sup>3</sup> ) with a			
magnetic stirrer, a m and a motor controlle	ercury manometer	= ,		
and a motor controlle oxygen.	a parec for che			
Five to six measureme	nts were made			
at each temperature a	nd salt	]		
concentration at pres o.6 and 2 bar. Only t	sures between he measure-			
ments at 298.15 K wer	e shown in a gr			
graph. The Henry's co tabulated, and are gi	nstants were ven above. No	ESTIMATED ERROR:		
value for water was g	iven.	$\delta K/K = 0.05$		
The salt solution was	prepared in a			
38:1 ratio of Na <sub>2</sub> SO <sub>3</sub>	and Na2S2O5.	REFERENCES :		
The temperature coeff Henry's constant give	s an enthalpy			
of solution of (-3.07 mol <sup>-1</sup> .	± 0.05) kcal			
		}		

CONTONENTS -	OPT CTNAT NE ACUPENCINE		
COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Yasunishi, A.		
(2) Sodium nitrate; NaNO <sub>3</sub> ; [7631-99-4]	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-89.		
(3) Water; H <sub>2</sub> O; [7732-18-5]			
VARIABLES: $T/K = 298.15$ O <sub>2</sub> P/kPa = 101.325 C <sub>3</sub> /mol dm <sup>-3</sup> = 0 - 5.121	PREPARED BY: H. L. Clever		
EXPERIMENTAL VALUES:			
	itrate Ostwald dm <sup>-3</sup> Coefficient L		
298.15 0.0 0.480 1.04 2.030 2.05 3.08 3.10 4.05 5.12	7       0.02407         3       0.01842         7       0.01849         1       0.01436         2       0.01419         5       0.01144		
the Setschnow equat 0.109 c <sub>3</sub> . <sup>1</sup> From reference 1.			
0.109 c <sub>3</sub> .			
0.109 c <sub>3</sub> . <sup>1</sup> From reference 1.			
0.109 c <sub>3</sub> . <sup>1</sup> From reference 1.	,		
0.109 c3. <sup>1</sup> From reference 1. AUXILIAN	RY INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade		
0.109 c <sub>3</sub> . <sup>1</sup> From reference 1. AUXILIAN METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiut	XY INFORMATION SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Sodium nitrate.		
0.109 c <sub>3</sub> . <sup>1</sup> From reference 1. AUXILIAN METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horius type apparatus is used. The aqueous salt solution is degassed by boiling under reflux and under	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Sodium nitrate. (3) Water. No information.		
0.109 c <sub>3</sub> . <sup>1</sup> From reference 1. AUXILIAN METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiut type apparatus is used. The aqueous salt solution is degasse by boiling under reflux and under vacuum. The gas phase volume and the solvent volume are measured by displacement	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent. (2) Sodium nitrate. (3) Water. No information. ESTIMATED ERROR:		

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Geffcken, G.
(2) Sodium hydroxide; NaOH; [1310-73-2]	Z. Phys. Chem. <u>1904</u> , 49, 257-302.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 288-298 Composition	C.L. Young; R. Battino
EXPERIMENTAL VALUES:	
T/K Conc of hydroxide	/mol dm <sup>-3</sup> (soln) Ostwald coefficient, L
288.15 0.55 0.60 1.03 1.05 2.07 2.08	1 0.02784 3 0.02291 9 0.02262 7 0.01479
298.15 0.55 0.60 1.03 1.05 2.07 2.08	1 0.02424 3 0.02020 9 0.01991 7 0.01295
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE: Volumetric method using simple adsorption pipet and buret. Diagram and detailed description given in original paper.	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Prepared by heating potassium chlorate and manganese dioxide. Washed with potassium hydroxide solution. Dried.</li> <li>(3) Degassed.</li> </ul>
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \delta L = \pm 1$ %.
	(estimated by compiler).
	REFERENCES:

	······································		
COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Levina, M.I.; Stisibarovskaya, N. P.		
<pre>(2) Sodium hydroxide; NaOH; [1310-73-2]</pre>	Russ. J. Phys. Chem. <u>1939</u> , 12, <b>653-</b> 9.		
(3) Water; H <sub>2</sub> O; [7732-18-5]			
VARIABLES:	PREPARED BY:		
T/K = 273-533 P/MPa = 9.81 Concentration	V. Katovic		
EXPERIMENTAL VALUES:	Oxygen Solubility <sup>b</sup> NaOH Solution/N		
t/°C T <sup>a</sup> /K H <sub>2</sub> O	0.5 2 4		
Total pressure of 100 kg/cm	n <sup>2</sup> (9.81 MPa)		
0   273   0.66	0.54 0.28 0.09		
25 298 0.51	0.40 0.19 0.08		
35 308 0.44	0.34 0.16 0.07		
50 323 0.34	0.30 0.12 0.07		
75 348 0.31 100 373 0.33	0.27 0.11 0.07 0.28 0.13 0.08		
100   373   0.33   125   398   0.34	0.27 $0.14$		
150 423 0.41	0.32 0.17 0.08		
200 473 0.51	0.37 0.20 0.11		
240 513 0.57	0.48 0.25 0.14		
	continued on following page		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Solubility determined by an	(1) From air.		
apparatus described in the paper by			
measuring the volume of liquid and air. Oxygen was determined with pyrogallol.	(2,3) No details given.		
	ESTIMATED ERROR:		
	ESTIMATED ERROR: REFERENCES:		

COMPONENTS:			T			
<b>/</b> • <b>·</b> ·			EVALUATOR:			
<pre>(1) Oxygen; O<sub>2</sub>;</pre>	[7782-44-7]		Levina, M	.I.; Stisib	arovskaya, N. P.	
(2) Sodium hydr [1310-73-2]	oxide; NaOH;		Russ. J. 653-9.	Phys. Chem.	<u>1939</u> ,12,	
(3) Water; H <sub>2</sub> O;	[7732-18-5]					
CRITICAL EVALUATION:					······································	
		contin	ued		,, b	
			Solubil:	ity Coeffic	ient	
t/°C	т <sup>а</sup> к	H <sub>2</sub> O	0.5	lution/N 2	4	
		~		-		
Partial	pressure of 273	0, of 100	$kg/cm^2$ (0	.81 MPa)		
0	273	<sup>2</sup> 3.14	2.55	1.32	0.43	
25	298	2.45	1.91	0.89	0.33	
35	308	2.09	1.62	0.78	0.33	
50	323	1.78	1.41	0.59	0.33	
75	348	1.46	1.30	0.51	0.33	
100 125	373 398	1.55 1.62	1.34 1.32	0.61 0.66	0.38	
125	423	2.05	0.82	0.40	1.06	
200	473	2.88	2.12	1.09	1.06 <sup>c</sup>	
240	513	4.09	3.50	1.76	0.95	
<ul> <li><sup>a</sup> Calculated by compiler.</li> <li><sup>b</sup> Solubility coefficient of cm<sup>3</sup>(STP) per 1 gram of solution at a partial oxygen pressure of 100 kg/cm<sup>2</sup> (9.81 MPa).</li> <li><sup>c</sup> Value reported in paper was 10.61 which must be a typographical error.</li> </ul>						

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; $O_2$ ; [7782-44-7]	Bruhn, G.; Gerlach, J.; Pawlek, F.
<pre>(2) Sodium hydroxide; NaOH; [1310-73-2]</pre>	Z. Anorg. Allgem. Chem. <u>1965</u> , 337, 68-79.
(3) Water; $H_2O$ ; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 323-523 Concentration	C.L. Young
EXPERIMENTAL VALUES:	
T/K Conc of hydroxide/mo	l 1 <sup>-1</sup> Bunsen coefficient, α/cm <sup>3</sup> (STP)cm <sup>-3</sup> atm <sup>-1</sup>
323.15 0.5 1.0 1.5	0.01692 0.01356 0.01104
373.15 0.5 1.0 1.5	0.01369 0.01199 0.00954
423.15 0.5 1.0 1.5	0.0160 0.01225 0.01052
473.15 0.5 1.0 1.5	0.02133 0.01698 0.01568
523.15 0.5 1.0 1.5	0.03160 0.02563 0.02078
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Static equilibrium cell. Similar to that described by Pray and Stephan (1). Composition of liquid determined by stripping solution of gas and estimating volumetrically.	No details given.
	<pre>ESTIMATED ERROR:</pre>

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COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Yasunishi, A.
(2) Sodium hydroxide; NaOH;	Kagaku Kogaku Rombunshu 1978, 4,
[1310-73-2]	185-9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K = 288.15 - 308.15 $O_2 P/kPa = 101.325$	PREPARED BY: H. L. Clever
$c_3/mol dm^{-3} = 0 - 6.423$	
EXPERIMENTAL VALUES:	
	continued on following page
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are described in reference (1). A Horiuti type apparatus 1s used.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade stated to be 99.995 per cent.
The aqueous salt solution is degassed by boiling under reflux and under vacuum.	<ul><li>(2) Sodium hydroxide.</li><li>(3) No information.</li></ul>
The gas phase volume and the solvent volume are measured by displacement of mercury.	
Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dis- solution vessel and the gas volume remaining in the buret are recorded.	ESTIMATED ERROR:
The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the increase of the liquid volume by the dissolved gas is made.	REFERENCES: 1. Yasunishi, A., J. Chem. Eng. Jpn. 1977, 10, 89.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Sodium hydroxide; NaOH; [1310-73-2] (3) Water; H <sub>2</sub> O; [7732-18-5]	ORIGINAL MEASUREMENTS: Yasunishi, A. Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
EXPERIMENTAL VALUES: CO	ntinued
T/K Sodium hy C <sub>3</sub> /mol	droxide Ostwald dm <sup>-3</sup> Coefficient L
288.15 0.0 0.58 1.06 1.99 2.67 3.54 4.09 4.44 5.18 5.41	4       0.02375         7       0.01686         5       0.01353         7       0.01039         5       0.00815         7       0.00723         8       0.00551         9       0.00524
298.15 0.0 0.62 1.02 1.95 3.61 4.11 4.77 6.42	5 0.02099 0.01490 3 0.00800 5 0.00688 0 0.00530
308.15 0.0 0.67 0.77 0.98 1.63 2.15 2.47 3.42	0.02033 0.01817 0.01445 0.01201 0.01079

<sup>1</sup> Values from reference 1.

The author correlated the data by the Setschenow equation  $\log(L_0/L) = KC_3$ . Values of K are 0.158, 0.160, and 0.167 for temperatures of 288.15, 298.15, and 308.15 K, respectively. The data were also correlated by the empirical equation  $\log(L_0/L) = AC_3/(1 + BC_3)$ . Values of A and B are

T/K	$A/dm^3 mol^{-1}$	B/dm <sup>3</sup> mol <sup>-1</sup>
288.15	0.171	0.0181
298.15	0.164	0.0049
308.15	0.181	0.0310

-

.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Broden, A.; Simonson, R.
<pre>(2) Sodium hyároxide; NaOH; [1310-73- Sodium nitrate; NaNO<sub>3</sub>; [7631-99-4] Sodium bicarbonate; NaHCO<sub>3</sub>; [144-55-8]</pre>	2] Sven. Papperstidn. <u>1978</u> , 81, 541 - 544; <u>1979</u> , 82, 487 - 491.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 323 - 423 p/MPa = 1 - 5 $c_2/mol dm^{-3} = up to 1.0$	H. L. Clever
EXPERIMENTAL VALUES: The experimental dat	a are presented by graphs and by
the constants of an equation. The eq	uation is
$c_1/\text{mmol dm}^{-3} = \alpha_1 + \alpha_2 (T/K) + \alpha_3 (p/M)$	-
$\alpha_{5}(p/MPa)/(T/K) + \alpha_{6}(p)$	$p/MPa)^{2} + \alpha_{7}(p/MPa)^{2}/(T/K)$ .
p/MPa is the oxygen partial pressure was fitted to both a five and a seve five constants were used for the ele the equation are given below.	
$\alpha_1 \qquad 10^2 \alpha_2 \qquad 10^{-1} \alpha_3 \qquad 10^4$	$\alpha_4  10^{-4}\alpha_5 \qquad \alpha_6  10^{-2}\alpha_7$
Water, standard deviation 0.45 mmol 5.351 -1.252 -7.954 2.1	
Water, standard deviation 0.42 mmol the pressure dependence of the data -2.545 0.807 -8.414 2.0	at low temperatures.
Sodium hydroxide, 0.10 mol dm <sup>-3</sup>	
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consisted of a stain- less steel autoclave of 3 dm <sup>3</sup> volume, connected to a centrifugal pump which circulated the solvent at a rate of 2 dm <sup>3</sup> min <sup>-1</sup> and sprayed the solvent back into the top of the autoclave. The system was attached to controls to measure and control the temperature and pressure.	<ol> <li>(1) Oxygen.</li> <li>(2) Electrolytes.</li> <li>(3) Water.</li> <li>No information on the source and</li> </ol>
Equilibration was reached within 30 min. Samples of 0.426 cm <sup>3</sup> were taken under conditions of no change in temperature or pressure. The gas was stripped from the solvent and analysed by GC on a 200 x 0.46 cm column filled with 80 - 100 mesh 5 A Molecular sieve. The column temperature was 40 °C, the detector temperature was 75 °C, the carrier gas was helium. All salt concentrations are referred to 298 K and atmospheric pressure.	ESTIMATED ERROR: $\delta T/K = \pm 0.3$ $\delta p/MPa = \pm 0.005$ Sodium nitrate. No equation was given for the solubility of oxygen in aqueous sodium nitrate. There is a graph of log $c_1^g/c_1$ vs. c, showing measurements were made in 0.1, 0.5, and 1.0 mol dm <sup>-3</sup> solutions at temp- eratures of 323, 373, and 423 K and pressures of 1, 3, and 5 MPa.

Salt Solutions (Aqueous)

	ORIGINAL MEA Jhaveri, A.S	SUREMENTS:
	1 .	
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]		
<ul> <li>(2) Disodium sulfate; Na<sub>2</sub>SO<sub>4</sub>; [7757-82-6]</li> <li>(3) Sodium hydroxide; NaON; [1310-73-2]</li> <li>(4) Sodium dithionite; Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub>; [7775-14-6]</li> <li>(5) Water; H<sub>2</sub>O; [7732-18-5]</li> </ul>		
PREPAR	ED BY:	
	R. Bat	tino
	··· ··· ··· ··· ··· ··· ··· ··· ··· ··	_
Na2 <sup>SO4</sup> /mol l <sup>-1</sup>	10 <sup>5</sup> ×1	10 <sup>7</sup> c* /mol cm <sup>-3</sup>
0.0254 0.0342 0.0720 0.084 0.131 0.169 0.276 0.0955 0.218 0.286 0.0167 0.0261 0.09 0.182 K) ity at 101 mpiler. lubility.	1.83 1.87 1.31 1.90 1.70 1.66 1.52 0.699 0.627 0.594 0.147 0.191 0.380 0.695	10.4 10.35 10.0 9.92 9.38 9.17 8.40 3.86 3.46 3.28 0.81 1.055 2.10 3.84
LIARY INFORM	ATION	
		4ATEDIALS.
SC*/( REFERE 1. (	C* = ±0.02 (co ENCES: Committee on A Am. Dyestuff 3	omoiler's estimate) Analytical Methods, Reptr. <u>1957</u> , 46,
	Na2SO4 /mol l-1         0.0254         0.0342         0.0720         0.0341         0.169         0.276         0.0955         0.218         0.286         0.0167         0.0261         0.09         0.182         K)         ity at 101         npiler.         lubility.         LLARY INFORM         SOURCE         put         SOURCE         put         SOURCE         National Content         SOURCE         Part International Content         SOURCE         Part International Content         Charter International Content         Charter International Content         Source         Part International Content         Charter International Content         Charter International Content         Source         Part International Content         Charter International Content         REFERN         1.         International Content	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

		0.75	,	165 UP 10 200 KI a		
COMPONEN	TS:			ORIGINAL MEASURE	MENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]				Guseva, M.S.; Konnik, E.I.; Saifi,		
(2)	(2) Sodium acetate; C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> Na; [127-09-3]			R.N.; Kuz'min, A.A.; Mordukhovich, I.L.		
<ul> <li>(3) Potassium hydroxide and sul- furic acid to control pH</li> <li>(4) Water; H<sub>2</sub>O; [7732-18-5]</li> <li>VARIABLES:</li> </ul>			Ed. by Sa	moilov,	, 1972, 105-8. O.Ya. "Nauka"	
			Chem. Abstr.	Moscow, USSR, Chem. Abstr. <u>1972</u> , 77, 157007v.		
			PREPARED BY:			
T/K = 293-313 pH = 0-14			v	. Katovi	c	
EXPERIMENTAL VALUES: 20°C (293K) 30°C			C (303K) 40°C (313K)			
рН		10 <sup>3</sup> C/ q-equiv ℓ <sup>-1</sup>	c <sup>a</sup> ∕mg ℓ-1	10 <sup>3</sup> C/ q-equiv l <sup>-1</sup>	c <sup>a</sup> /mg ℓ-1	$10^{3}$ C/ q-equiv $\ell^{-1}$
			Aqueous	solutions <sup>b</sup>		
0	7.6	0.95	6.4	0.79	5.7	0.71
1	8.6	1.07	6.9	0.87	6.3	0.78
2-12	8.9	1.12	7.5	0.93	6.4	0.80
13	8.9	1.11	7.4	0.92	6.2	0.78
14	6.6	0.83	5.5	0.63	4.3	0.54
		0.1	N Sodium	acetate solut	ion <sup>b</sup>	
0	7.2	0.90	5.9	0.74	5.5	0.69
1	8.4	1.04	6.8	0.85	6.3	0.78
2-12	8.8	1.10	7.4	0.93	6.3	0.79
13	8.4	1.04	7.1	0.89	6.2	0.78
14	6.4	0.80	5.5	0.68	4.3	0.54
a so	lubilitio	c at 101 325kt	a nartia	l pressure of a		
ъ			-	-		
~ Th	e pH was	adjusted by th	ne additio	on of KOH or H	2 <sup>50</sup> 4 ·	
		<u> </u>	AUXILIARY	INFORMATION		
METHOD /A	PPARATUS/PI	ROCEDURE		SOURCE AND PURIT		
						(IAD),
		of oxygen was air through t		1 (1) From a:	ir.	
solut	ion for 3	0 minutes. Th	ie	(2,3) No de	etails gi	lven.
dissolved oxygen was determined by the Winkler method. The pH of the			(4) Double distilled, specific			
solut	ions was	adjusted by th	ie	conductance of 2 x 10-6ohm-1 cm <sup>-1</sup> .		
addition of KOH or $H_2SO_4$ .			Cm <sup>-</sup> .			
				ESTIMATED ERROR:	:	
				$\delta T/K = \pm 0.1$	, authors	s' estimate.
				$\delta c/c = \pm 0.05$	5, author	rs' estimate.
				REFERENCES:		
				l		

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Yasunishi, A.
(2) Sodium carbonate; Na <sub>2</sub> CO <sub>3</sub> ; [497-19-8]	Kagaku Kogaku Rombunshu <u>1978</u> , 4, 185-9.
(3) Water: H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 288.15 - 308.15 O <sub>2</sub> P/kPa = 101.325	H. L. Clever
$c_3/mol dm^{-3} = 0 - 2.958$	
EXPERIMENTAL VALUES: T/K Sodium carbonate Ostwald	
c <sub>3</sub> /mol dm <sup>-3</sup> Coefficient	
$\frac{3}{288.15}$ $\frac{3}{0.0}$	$\frac{L}{0.03643}$
200.15 0.0	0.02990
0.421	0.02524
0.647	0.02139
0.868	0.01794 0.01552
1.043	0.01255
298.15 0.0	0.031141
298.15 0.0	0.02621
0.379	0.02288
0.798	0.01623
1.235	0.01155 0.01137
1.593	0.00917
1.636	0.00840
1.906	0.00703
2.128	0.00613
308.15 0.0	0.027641
0.407	0.01973 0.01350
0.858	0.00979
1.631	0.00722
2.086	0.00512
2.337 2.532	0.00406 0.00354 <sup>1</sup> Values from
2.952	0.00255 reference 1.
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: The apparatus and procedure are	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. High purity grade
described in reference (1). A	stated to be 99.995 per cent.
Horiuti type apparatus is used.	
The aqueous salt solution is degassed	(2) Sodium carbonate.
by boiling under reflux and under vacuum.	(3) Water. No information.
The gas phase volume and the solvent volume are measured by displacement of mercury.	
Dry gas is intermittently added	
until equilibrium is attained. At	
that time the total pressure in the	ESTIMATED ERROR:
dissolution vessel and the gas volume remaining in the buret are	
recorded.	
The salt solution concentration and	
density are determined after the	REFERENCES:
solubility measurement. The salt	1. Yasunishi, A.
solution vapor pressure is either taken from the literature or esti-	J. Chem. Eng. Jpn. <u>1977</u> , 10, 89.
mated. A correction for the increase	The author correlated the data with
of the liquid volume by the dissolved	the Setschnow equation $\log(L_O/L) =$
gas is made.	KC3. Values of K are 0.356, 0.338,
1	and 0.353 at 288.15, 298.15 and 308.15 K, respectively.
	Loverto My respectively.

oxygen Solubiliti			
COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Khomutov, N. E.; Konnik, E. I.		
(2) Trialkali metal phosphates; Na <sub>3</sub> PO <sub>4</sub> and K <sub>3</sub> PO <sub>4</sub>	Zh. Fiz. Khim. <u>1974</u> , 48, 620-5.		
(3) Water; H <sub>2</sub> O; [7732-18-5]	Russ. J. Phys. Chem. <u>1974</u> , 48, 359-62.		
VARIABLES: T/K = 298.15 $O_2 P/kPa = \sim 21$ (air at 1 atm) $C_3/mol dm^{-3} = 0 - 0.6$	PREPARED BY: H. L. Clever		
EXPERIMENTAL VALUES:			
	Imber ofSalt Effect $(perimental)$ Parameter $pints$ $k = (1/c_3) \log(S^{\circ}/S)$		
Trisodium phosphate;	Na <sub>3</sub> PO <sub>4</sub> ; [7601-54-9]		
298.15 0.6	7 0.652		
Tripotassium phospha	ate; K <sub>3</sub> PO <sub>4</sub> ; [7778-53-2]		
298.15 0.6	6 0.507		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Air, saturated with water vapor from the salt solution, is bubbled for several hours through 500 cm <sup>3</sup> of solution.	<ul> <li>(1) Oxygen. Air treated to free from dust and any foreign gases.</li> <li>(2) Salts. No information.</li> </ul>		
Three samples are taken and analyzed by the Winkler chemical method.	(3) Water. No information.		
The solubility unit is mg dm <sup>-3</sup> at the normal oxygen partial pressure in air of 0.21 atm. The solubility in water is 8.15 mg dm <sup>-3</sup> .			
The results are presented graphically as log S $vs$ . dm <sup>-3</sup> . The slope is given as the salt effect parameter (Sech- enow constant) k.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta S/mg dm^{-3} = 0.05$ Max error in S is 1.8 per cent.		

COMPONENTS :		
	<u></u>	ORIGINAL MEASUREMENTS:
(1) Oxygen; $O_2$ ;	[7782-44-7]	Geffcken, G.
(2) Potassium h	ydroxide; KOH;	Z. Phys. Chem. <u>1904</u> , 49, 257-302.
[1310-58-3	3]	
(3) Water; H <sub>2</sub> O;	[7732-18-5]	
VARIABLES:	••••••••••••••••••••••••••••••••••••••	PREPARED BY:
т/к	= 288-298	
Conc	entration	C.L. Young; R. Battino
EXPERIMENTAL VALUES	:	······································
т/к	Conc of hydroxide/mo	l dm <sup>3</sup> (soln) Ostwald coefficient,L
288.15	0.577	0.02791
	0.579	0.02791
	1.157 1.170	0.02191 0.02181
298.15	0.577	0.02447
	0.579 1.157	0.02435 0.01920
	1.170	0.01914
	AUXILIARY	INFORMATION
METHOD /APPARATUS		INFORMATION SOURCE AND PURITY OF MATERIALS:
Volumetric meth adsorption pipe	PROCEDURE: nod using simple at and buret. cailed description	

COMPONENTS :		ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Knaster, M. B.; Apel'baum, L. A.		
(2) Water; H <sub>2</sub> O; [7732-18-5]		Zh. Fiz. Khim. <u>1964</u> , 38, 223 - 225.		
<pre>(3) Potassium hydroxide; KOH [1310-58-3]</pre>	(;	Russ. J. Phys. Chem. <u>1964</u> , 38, 120 - 122.		
VARIABLES: T/K: 294.15,318.15, P/kPa: 101.325 (1 atm c <sub>3</sub> /mol dm <sup>-3</sup> : 0 - 10		PREPARED BY: H. L. Clever		
EXPERIMENTAL VALUES:		·····		
Ну	tassium droxide mol dm <sup>-3</sup>	Bunsen Coefficient $10^3 \alpha$	Salt Effect Parameter <sup>1</sup> k <sub>sc</sub> /dm <sup>3</sup> mol <sup>-1</sup>	
<del></del>				
21 294.15	0 1 4 7 10	30.20 20.10 7.52 2.29 0.52	0.177 0.151 0.160 0.128	
45 318.15	0 1 4 7 10	21.88 15.94 6.45 1.98 0.456	0.138 0.133 0.149 0.168	
75 348.15	0 1 4 7 10	17.97 13.38 5.46 1.82 0.411	0.128 0.129 0.142 0.164	
<sup>1</sup> Salt effect para log (α°/α) where	eα°isth	ie Bunsen coeff	ficient for water.	
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURIT		
The KOH solution was introduce the saturating vessel. The was saturated with gas, whice bubbled through the solution rate of 15 dm <sup>3</sup> h <sup>-1</sup> for 5 h. stream was turned off and the tion was allowed to stand for to allow suspended gas bubble escape. A known amount of the saturated solution was transited to an evacuated flask. The evolved from the solution was	solution th was that a The gas the solu- or one h tes to the gas- tferred gas ts with-	<ol> <li>Oxygen. by electr to a star process.</li> <li>Water. N</li> <li>Potassium informati</li> </ol>	The gas was produced rolysis and subjected ndard purification No information. n hydroxide. No lon.	
drawn, together with water w into an evacuated and calibr portion of the apparatus. T vapor was frozen out in a li oxygen trap. The pressure ( 1 mmHg) of the residual gas known temperature and volume measured on a McLeod gage.	ated The water quid ca. at a		<pre></pre>	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Davis, R.E.; Horvath, G.L.; Tobias, C.W.
(2) Potassium hydroxide; KOH; [1310-58-3]	Electrochim. Acta <u>1967</u> , 12, 287-97.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K = 298	PREPARED BY:
P/kPa = 101.325 C/N = 0-12	R. Battino
EXPERIMENTAL VALUES:	
Mole fraction T/K <sup>a</sup> 10 <sup>5</sup> x1	n <sup>b</sup> Ostwald Coefficient <sup>C</sup> Molarity <sup>C</sup> 10 <sup>2</sup> L 10 <sup>3</sup> C
298.15 2.276	2.823 1.26
a Temperature reported to 0.2°C.	
	25 kPa (latm) partial pressure of gas
<sup>C</sup> Calculated by compiler.	
d At 1 atm partial pressure of gas.	
where S is the oxygen solubility : of KOH in g-mol dm <sup>-3</sup> . This is for for O°C and 60°C. Both the solub the above equation decrease as the	in g-mol dm <sup>-3</sup> , and C the concentration r 25°C. Data are given graphically ility and the coefficient of C in a temperature increases.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Solubility measurements were made by the Van Slyke manometric method	<ul><li>(1) 99.6% pure</li><li>(2) Reagent grade</li></ul>
(1).	(3) Distilled
	ESTIMATED ERROR: $\delta C/C = \pm 0.01$ , estimate by authors
	DEEEDENCIC
	REFERENCES :
	<pre>1. Van Slyke, D.D; Neill, J.M. J. Biol. Chem. <u>1924</u>, 61, 523.</pre>

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Shoor, S. K.; Walker, R. D. Jr.;
<pre>(2) Potassium Hydroxide; KOH; [1310-58-3]</pre>	Gubbins, K. E. J. Phys. Chem. <u>1969</u> , 73, 312-7.
(3)Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 298.15 - 353.15 Total P/kPa = 101.325 KOH/wt % = 0 - 41.40	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
	continued on following page
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A gas chromatographic method was used (1). All analyses were made with a thermal conductivity detector and with helium as the carrier gas. The oxygen saturated solutions were prepared by bubbling the gas through presaturators and then through the KOH solution. Samples were drawn from the solution over a 48 hour period to determine whether or not equilibrium was estab- lished. Samples were transferred from	<ul> <li>mum purity 99.99 %.</li> <li>(2) Potassium Hydroxide. Baker Anal- yzed Reagent Grade. Contained a maximum of 1% K<sub>2</sub>CO<sub>3</sub>. The KOH solutions were protected from atm CO<sub>2</sub>.</li> <li>(3) Water. Distilled and degassed in glass-teflon still.</li> </ul>
the saturator to the gas chromotograph in gas tight Hamilton syringes.	ESTIMATED ERROR:
The results are reported as activity coefficients, which are the mole frac- tion solubility ratio, $X^O/X$ , where $X^O$ is the argon mole fraction solubility in water and X is the argon mole frac-	$\begin{array}{l} \delta T/K = 0.05 \\ \delta \gamma/\gamma = 0.01 \end{array}$
tion solubility in the aqueous KOH solution, both at a gas partial pres- sure of 1 atm. Solubility values were corrected to 1 atm assuming Henry's law is obeyed. The activity coeffi- cients are the average of at least four measurements.	1. Gubbins, K. E.; Carden, S. N.;

COMPONENT	CS: (en; 0 <sub>2</sub> ; [7	782-44-7]			UATOR: por, S. K.; W	Jalker, R. D. Jr.;
(2) Pota	-	oxide; KOH;		J.	Gubbins, K. Phys. Chem.	E. 1969, 73, 312-7.
(3)Wate	er; H <sub>2</sub> O; [7	732-18-5]		:		
EXPERIM	IENTAL VALU	ES:	contin	nued		
Т/К	Potassium	Hydroxide			Solubility Ratio	Salt Effect
	Wt %	mol dm <sup>-3</sup>	0 <sub>2</sub> /X <sub>1</sub> x :	L0 <sup>3</sup>	$\gamma = X^{O}/X$	Parameter $k_s = (1/C) \log (X^{O}/X)$
298.15	0.0 5.00 13.50 23.00 31.61 40.70 50.65	0.0 0.92 2.67 5.00 7.35 10.12 13.75	0.0225		1.00 1.53 3.06 8.15 20.1 70.1 230.	0.201 0.182 0.182 0.177 0.182 0.172 0.180 (authors)
313.15	0.0 5.0 13.50 23.00 31.61 40.70	0.0 0.92 2.67 5.00 7.35 10.12	0.0190		1.00 1.54 2.87 7.24 17.8 53.3	0.204 0.171 0.172 0.170 0.171 0.168 (authors)
333.15	0.0 5.00 13.50 23.00 31.61 40.70 50.65	0.0 0.92 2.67 5.00 7.35 10.12 13.75	0.0160		1.00 1.45 2.58 6.30 15.6 45.3 162.	- 0.175 0.154 0.160 0.162 0.164 0.161 0.159 (authors)
353.15	0.0 5.00 13.50 23.00 31.61 40.70 50.65	0.0 0.92 2.67 5.00 7.35 10.12 13.75	0.0144		1.00 1.35 2.50 5.73 14.4 40.1 143.	- 0.142 0.149 0.152 0.158 0.158 0.157 0.155 (authors)
373.15	0.0 40.70 50.65 56.50	0.0 10.12 13.75 16.20	0.0142		1.00 38.4 141. 338.	0.157 0.156 0.156 0.155 (authors)

		•			
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44	-7]	1	NAL MEASUREMENTS: Arthur, C. G.	:	
<pre>(2) Potassium chloride; KCl; [7447-40-7]</pre>		J. Phys. Chem. <u>1916</u> , 20, 495-502.			
(3) Water; H <sub>2</sub> O; [7732-18	8-5]				
		ŀ			
VARIABLES: $T/K = 298.15$ O <sub>2</sub> P/kPa = $\sim$ 20.2 (O <sub>2</sub>	in air at one atm)	PREPA	RED BY: H. L.	Clever	
$c_3/mol dm^{-3} = 0 - 4$	one atm)				
EXPERIMENTAL VALUES:		.t			
T/K Potas	sium Solut	tion	Solubility <sup>2</sup>	Setschenow	
Chlor c <sub>3</sub> /mo	ide densi 1 dm <sup>-3</sup> p/g d	ity <sup>1</sup> cm <sup>-3</sup>	cm <sup>3</sup> (STP) O <sub>2</sub> per dm <sup>3</sup>	Constant <sup>3</sup> k s	
$\frac{1}{298.15}$ 0.	0 1.00		5.78		
	0 1.00 125 1.00		5.52	0.160	
	25 1.00	086	5.30	0.151	
0.	5 1.02	20	4.98	0.129	1
	1.04		4.26	0.133	
23	1.08	86 34	3.21 2.36	0.128 0.130	
4	1.17		1.86	0.123	
<sup>3</sup> The Setschenow constan $k_{g} = (1/c_{3}) \log (Solub)$	t (salt effec ility in wate	ct par er/Sol	cameter) is ca ubility in so	lculated from lution).	
	AUXILIARY	INFORM	1ATION		
METUOD /ADDADATUS /DROCEDURE		Icours		MATERIAL C.	
METHOD/APPARATUS/PROCEDURE: The solutions were therm tall cylinder open to th			E AND PURITY OF Oxygen. Air		
They were shaken by hand times a day for a period	several	(2) Potassium chloride. No information.			
days. A sample of 250 cm <sup>3</sup> was for oxygen by a modified method.	analyzed Winkler	(3)	Water. No inf	ormation.	
		The 10 p trat erro	MATED ERROR: solubility va er cent error tions above on or by 10 per c ÆNCES:	. The salt c e mol dm <sup>-3</sup> mag	oncen-

	ons (Aqueous)	
COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Bikov, M. M.	
(2) Potassium Chloride; KCl; [7447-40-7]	Tr. Voronezhsk. Gos. Univ. <u>1937</u> , 9, 29-57.	
(3) Water; H <sub>2</sub> O; [7732-18-5]		
VARIABLES: $T/K = 273-510$	PREPARED BY:	
P/MPa = 9.81 Concentration	V. Katovic	
EXPERIMENTAL VALUES:	Oxygen Solubility b	
t/°C T <sup>a</sup> /K H <sub>2</sub> O 0.	KCl Solution/N .5 1.0 2.0	
Total pressure of 100 kg/cm <sup>2</sup>	2 (9.81MPa)	-
25 298 0.51 0. 50 323 0.34 0.	.6350.5100.331.3960.3360.232.2900.2650.206.2610.2300.172	
100         373         0.33         0.           150         423         0.41         0.           200         473         0.51         0.	.265         0.233         0.174           .321         0.253         0.211           .372         0.309         0.245           .465         0.386         0.272	
	continued on following page	
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Details of the method and a drawing	(l) From air.	
of the apparatus are given in the paper.	(2) No details given.	
	(3) Distilled.	
	(3) Distilled.	
	(3) Distilled.	
	ESTIMATED ERROR:	
	ESTIMATED ERROR: $\delta T/K = \pm 0.2$ $\delta S/S = \pm 0.01$ compiler's estimate	
	ESTIMATED ERROR: $\delta T/K = \pm 0.2$ $\delta S/S = \pm 0.01$ compiler's estimate for solubility.	
	ESTIMATED ERROR: $\delta T/K = \pm 0.2$ $\delta S/S = \pm 0.01$ compiler's estimate for solubility.	

OMPONENTS :			EVAI	UATOR:	
(1) Oxygen;	) Oxygen; O <sub>2</sub> ; [7782-44-7]			ov, M. M.	
(2) Potass: [7447-4		.de; KCl; Tr. Voronezhsk. Gos. Univ 9, 29-57.			. Gos. Univ. <u>1937</u> ,
(3) Water;	н <sub>2</sub> 0; [773	2-18-5]			
RITICAL EVALU	JATION:		continue	d	
			Solu	bility Coef Cl Solution	ficient <sup>b</sup>
t/°C	т <sup>а</sup> /к	<sup>н</sup> 2 <sup>0</sup>	0.5	1.0	2.0
0 25 50 75 100 150 200	273 298 323 348 373 423 473	3.24 2.45 1.78 1.46 1.55 2.05 2.88	3.023 1.885 1.380 1.249 1.273 1.605 2.094	2.430 1.601 1.265 1.100 1.121 1.276 1.735	1.575 1.106 0.981 0.820 0.836 1.046 1.370

<sup>a</sup> Calculated by compiler.

<sup>b</sup> The solubility coefficient is  $cm^3$  (STP) of oxygen dissolved per 1 gram of solution at an oxygen partial pressure of 100 kg/cm<sup>2</sup> (9.81MPa).

	·····	· · · · · · · · · · · · · · · · · · ·			
COMPONENTS:	17700 44 71	1	CASUREMENTS:		
<pre>(1) Oxygen; O2;</pre>	[//82-44-/]	Eucken, A.; Hertzberg, G.			
(2) Potassium C [7447-40-7]		Z. Physik. Chem. <u>1950</u> , 195, 1 - 23.			
(3) Water; H <sub>2</sub> O;	[7732-18-5]				
	273.15, 293.15	PREPARED BY	· · · · · · · · · · · · · · · · · · ·		
	101.325	P. L. Long H. L. Clever			
m <sub>KCl</sub> /mol kg <sup>-1</sup> =	0 - 2.76				
EXPERIMENTAL VALUES	S:				
т/к		Ostwald efficient L	Setschenow Constant $k = (1/m) \log(L^{O}/L)$		
273.15		0.0490			
		0.0387 0.0309	0.167 0.170		
		0.0172	0.165		
293.15		0.0332	-		
		0.0285 0.0243	0.142 0.140		
		0.0196	0.144		
	AUXILIARY	INFORMATION			
METHOD / APPARATUS / PJ			PURITY OF MATERIALS.		
sists of a gas tion flask conn tube. The whol The capillary t helix. An amou at STP and plac After shaking,	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND	PURITY OF MATERIALS: ts. Neither source nor iven.		
Gas absorption. sists of a gas tion flask conn tube. The whol. The capillary t helix. An amou at STP and plac After shaking, the original am	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND Componen	ts. Neither source nor iven.		
Gas absorption. sists of a gas tion flask conn tube. The whol. The capillary t helix. An amou at STP and plac After shaking, the original am	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND Componen purity g	ts. Neither source nor iven.		
Gas absorption. sists of a gas tion flask conn tube. The whol. The capillary t helix. An amou at STP and plac After shaking, the original am	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND Componen purity g	ts. Neither source nor iven. GRROR: δL/L = 0.01		
Gas absorption. sists of a gas tion flask conn tube. The whol. The capillary t helix. An amou at STP and plac After shaking, the original am	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND Componen purity g	ts. Neither source nor iven. GRROR: δL/L = 0.01		
Gas absorption. sists of a gas tion flask conn tube. The whol. The capillary t helix. An amou at STP and plac After shaking, the original am	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND Componen purity g	ts. Neither source nor iven. GRROR: δL/L = 0.01		
Gas absorption. sists of a gas tion flask conn tube. The whol. The capillary t helix. An amou at STP and plac After shaking, the original am	ROCEDURE: The apparatus con- buret and an adsorp- ected by a capillary e apparatus is shaken. ube is a 2m-long glass nt of gas is measured ed in the gas buret. the difference from ount of gas placed in	SOURCE AND Componen purity g	ts. Neither source nor iven. SRROR: δL/L = 0.01		

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Yasunishi, A.
(2) Potassium chloride; KCl; [7447-40-7]	Kagaku Kogaku Rombunshu <u>1978</u> , 4(2), 185-9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
$\frac{\text{VARIABLES: T/K}}{2} = 288.15 - 308.15$	PREPARED BY:
$O_2 P/kPa = 101.325$	H. L. Clever
$c_3/mol dm^{-3} = 0 - 4.124$	
EXPERIMENTAL VALUES:	
See followi	ng page.
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus and procedure are described in reference (1). A Horiuti type apparatus is used.	(1) Oxygen. High purity grade stated to be 99.995 per cent.
The aqueous salt solution is degassed	(2) Potassium chloride.
by boiling under reflux and under vacuum.	(3) Water. No information.
The gas phase volume and the solvent volume are measured by displacement of mercury.	
Dry gas is intermittently added until equilibrium is attained. At that time the total pressure in the dissolution vessel and the gas volume remaining in the buret are recorded.	ESTIMATED ERROR:
The salt solution concentration and density are determined after the solubility measurement. The salt solution vapor pressure is either taken from the literature or esti- mated. A correction for the increase of the liquid volume by the dis- solved gas is made.	REFERENCES: 1. Yasunishi, A. J. Chem. Eng. Jpn. <u>1977</u> , 10, 89.

COMPONENTS:			ORIGINAI	MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7	782-44-7	]	Yasunis	shi, A.	
<pre>(2) Potassium chloride; KCl; [7447-40-7]</pre>			Kagaku 185-9	Kogaku Rombunshu 9.	<u>1978</u> , 4(2),
(3) Water; H <sub>2</sub> O; [7	732-18-5	]			
EXPERIMENTAL VALUE	S:				
-	т/к	Potassium c <sub>3</sub> /mol		Ostwald Coefficient L	
	288.15	0.0 0.421 0.821 1.295 1.725 2.258 3.162 3.192 3.797		0.03643 <sup>1</sup> 0.03270 0.02996 0.02670 0.02368 0.02127 0.01685 0.01675 0.01417	
	298.15	$\begin{array}{c} 0.0\\ 0.413\\ 0.595\\ 1.050\\ 1.172\\ 1.256\\ 1.295\\ 1.501\\ 1.972\\ 2.099\\ 2.558\\ 3.092\\ 3.604\\ 4.035\end{array}$		0.03114 <sup>1</sup> 0.02844 0.02720 0.02452 0.02360 0.02348 0.02249 0.01973 0.01951 0.01745 0.01641 0.01427 0.01405	
1	308.15	0.0 0.454 1.018 1.400 1.725 2.054 3.039 3.254 3.865 4.124 from referent		0.02764 <sup>1</sup> 0.02497 0.02253 0.02120 0.01962 0.01827 0.01507 0.01419 0.01307 0.01330	

Values from reference 1.

The author correlated the data by the Setschenow equation,  $\log(L_0/L) = KC_3$ , up to concentrations of 3.2 mol dm<sup>-3</sup> KCl. Values of K are 0.106, 0.095, and 0.087 at temperatures of 288.15, 298.15 and 308.15 K, respectively. For the entire concentration range the data are correlated better by the empirical equation  $\log(L_0/L) = AC_3/(1 + BC_3)$ . The values of A and B are

T/K	$A/dm^3 mol^{-1}$	B/dm <sup>3</sup> mol <sup>-1</sup>
288.15	0.105	-0.0022
298.15	0.103	0.0378
308.15	0.0919	0.0291

	•		
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: MacArthur, C. G.		
(2) Potassium bromide; KBr; [7758-02-3]	J. Phys. Chem. <u>1916</u> , 20, 495-502.		
(3) Water; H <sub>2</sub> O; [7732-18-5]			
VARIABLES: $T/K = 298.15$ $O_2 P/kPa = v 21.2$ ( $O_2$ in air at $c_3/mol dm^{-3} = 0 - 4$ one atm)	PREPARED BY: H. L. Clever		
EXPERIMENTAL VALUES:			
T/K Potassium Solut bromide densi c <sub>3</sub> /mol dm <sup>-3</sup> ρ/g c	.ty <sup>1</sup> m <sup>3</sup> (smp) Constant <sup>3</sup>		
298.15         0.0         1.00           0.25         1.01           2         1.07           4         1.16	.9 5.29 0.154 29 3.27 0.124		
<ul> <li><sup>1</sup> The author calculated the densities from data in the International Critical Tables. Use the density values with caution, some of them appear to be in error.</li> <li><sup>2</sup> The solubility in water is about 3 per cent smaller than the presently accepted value.</li> <li><sup>3</sup> The Setschenow constant (salt effect parameter) is calculated from k<sub>s</sub> = (1/c<sub>3</sub>) log (Solubility in water/Solubility in solution).</li> </ul>			
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The solutions were thermostated in	(1) Oxygen. Air at one atm.		
tall cylinder open to the air. They were shaken by hand several times a day for a period of four	(2) Potassium bromide. No information.		
days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	(3) Water. No information.		
	ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in error by 10 per cent. REFERENCES:		

COMPONENTS:			OPTC	INAL MEASUREMENTS	•	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Arthur, C. G.	•		
(2) Potassium iodi [7681-11-0]	de; KI;		J.	Phys. Chem. <u>19</u>	<u>16</u> , <i>20</i> , 495-502.	
(3) Water; H <sub>2</sub> O; [7	732-18-5]					
VARTABLES:			PPED	ARED BY:		
VARIABLES: $T/K = 298$ .	$\frac{15}{2} (0 \text{ in sim})$	• at	L KEP.		Clever	
$\begin{array}{c} O_2 \ P/kPa = \sim \ 21 \\ c_3/mol \ dm^{-3} = 0 \ - \end{array}$	$5^{\circ}$	e atm)		п. Б.	CIEVEI	
EXPERIMENTAL VALUES:					<u>.</u>	
т/к		Solut		-	Setschenow	
	iodide	densi		cm <sup>3</sup> (STP) O <sub>2</sub>	Constant <sup>3</sup>	
	$c_3^{/mol dm^{-3}}$	p∕g d	-3 m	per dm <sup>3</sup>	<sup>k</sup> s	
298.15	0.0	1.00	0	5.78		
2,0,13	0.125	1.01		5.65	0.079	
	0.25	1.02	7		0.089	
	0.5	1.05	6	5.20	0.092	
	1	1.11		4.75	0.085	
	2	1.23		3.77	0.093	
	5	1.46	•	1.81	0.101	
k <sub>s</sub> = (1/c <sub>3</sub> ) log	(Solubility 1	n wate	r/50	lubility in so	lution).	
	AUX	ILIARY	INFOR	MATION		
METHOD ADDADATUS (DDOCED)	IDE .		COUR		//mpaties /	
METHOD/APPARATUS/PROCED				CE AND PURITY OF 1		
The solutions were tall cylinder open		in		Oxygen. Air	at one atm.	
They were shaken by times a day for a	y hand severa		(2)	Potassium iod information.	ide. No	
days. A sample of 250 cm for oxygen by a moo method.	3 was analyze lified Winkle	d r	(3)	Water. No in	formation.	
			The 10 tra err	per cent error	lues may be in 5 . The salt conc e mol dm <sup>-3</sup> may be ent.	en-

COMPONENTS :		ORIGINAL MEASUREMENTS:		
(1) Oxygen; $O_2$ ; [7782-44-7]		Geffcken, G.		
<pre>(2) Sulfuric acid, dipotassium salt; (Potassium sulfate); K<sub>2</sub>SO<sub>4</sub>; [7778-80-5]</pre>		Z. Phys. Chem. <u>1904</u> , 49, 257-302.		
(3)Water; H <sub>2</sub> O; [773	2-18-5]			
VARIABLES:		PREPARED BY:		
T/K = 2 Concent		C.L. Young, R. Battino		
EXPERIMENTAL VALUES:				
T/K (	Conc of salt/mol dm	<sup>-3</sup> (soln) Ostwald coefficient,L		
288.15	0.2495 0.2530 0.4840 0.4850	0.02944 0.02922 0.02395 0.02377		
298.15	0.2495 0.2530	0.02528		
	0.4850	0.02530 0.02096		
	AUXILIARY	INFORMATION		
METHOD /APPARATUS/PR Volumetric method simple adsorption buret. Diagram an description given paper.	using pipet and d detailed	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Prepared by heating potassium chlorate and manganese dioxide. Washed with potassium hydroxide solution. Dried.</li> <li>(3) Degassed.</li> <li>ESTIMATED ERROR:</li> </ul>		
		$\delta T/K = \pm 0.1; \ \delta L = \pm 1\%.$		
		(estimated by compiler).		
		REFERENCES:		

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: MacArthur, C. G.
(2) Potassium sulfate; K <sub>2</sub> SO <sub>4</sub> ; [7778-80-5]	J. Phys. Chem. <u>1916</u> , 20, 495-502.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: $T/K = 298.15$ $O_2 P/kPa = \sim 20.2$ ( $O_2$ in air at $O_2 P/kPa = 0.5$ one atm)	PREPARED BY: H. L. Clever
$c_3$ /mol dm = 0 = 0.5	
EXPERIMENTAL VALUES:	
T/K Potassium Solu sulfate dens c <sub>3</sub> /mol dm <sup>-3</sup> p/g	
298.15 0.0 1.0 0.125 1.0 0.25 1.0 0.5 1.0	16 5.11 0.428 32 4.66 0.374
<pre><sup>3</sup> The Setschenow constant (salt effe k<sub>s</sub> = (1/c<sub>3</sub>) log (Solubility in wat</pre>	er/Solubility in solution).
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm.
They were shaken by hand several times a day for a period of four days.	(2) Potassium sulfate. No information.
A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	(3) Water. No information.
	ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in
	error by 10 per cent. REFERENCES:

COMPONENTS :			ORIGI	NAL MEASUREMENTS:		7
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		MacArthur, C. G.				
<pre>(2) Potassium nitrate; KNO<sub>3</sub>;     [7757-79-1]</pre>		J.	Phys. Chem. <u>19</u>	<u>16</u> , <i>20</i> , 495-50	2.	
(3) Water; H <sub>2</sub> O; [7	732-18-5]					
VARIABLES: T/K = 298.	15		PPFP	ARED BY:		
$0_{2} P/kPa = \sqrt{21}$		• at	1 1.517	H. L. C	lever	
$c_3/mo1  dm^{-3} = 0 -$	one one	e atm)				
EXPERIMENTAL VALUES:			_			
т/к	Potassium nitrate	Solut dens:	ity'	Solubility <sup>2</sup> cm <sup>3</sup> (STP) O <sub>2</sub>	Setschenow Constant <sup>3</sup> k <sub>s</sub>	
	$c_3/mol dm^{-3}$	p∕g ¢	zm	per dm <sup>3</sup>	S	
298.15	0.0 0.25 0.5 1 2	1.00 1.02 1.02 1.03 1.13	L5 29 59	5.78 5.49 5.11 4.61 3.65	- 0.089 0.107 0.098 0.100	
<sup>1</sup> The author calcu Critical Tables. appear to be in	Use the den					
<sup>2</sup> The solubility i accepted value.	n water is ab	out 3	per	cent smaller t	han the presen	tly
<sup>3</sup> The Setschenow c						
	AUX	ILIARY	INFOR	MATION		
METHOD/APPARATUS/PROCED			COUR	TE AND DUBITY OF A	AMEDIALCA	
The solutions were		in		CE AND PURITY OF N Oxygen. Air	at one atm.	
tall cylinder open		+	(1)	oxygen. hit	ac one aca.	
They were shaken b times a day for a days.	y hand severa		(2)	Potassium nit information.	rate. No	
A sample of 250 cm for oxygen by a mo method.	3 was analyze dified Winkle	d r	(3)	Water. No in	formation.	
		i	The 10 tra err	AATED ERROR: solubility va per cent error tions above on or by 10 per co RENCES:	. The salt come mol dm <sup>-3</sup> may	ncen-
				-		

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	MacArthur, C. G.
<pre>(2) Rubidium chloride; RbCl; [7791-11-9]</pre>	J. Phys. Chem. <u>1916</u> , 20, 495-502.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K = 298.15	PREPARED BY:
$O_2 P/kPa = v 21.2$ (O <sub>2</sub> in air at	H. L. Clever
$c_3/mol dm^{-3} = 0.125$ one atm)	n. h. cievei
	· · · · · · · · · · · · · · · · · · ·
EXPERIMENTAL VALUES:	
T/K Rubidium Solut: chloride densit	· · · · · · · · · · · · · · · · · · ·
	$-2$ Cm (STP) $0_2$ $\nu$
c <sub>3</sub> /mol dm <sup>-3</sup> ρ/g cr	n per dm <sup>3</sup> s
298.15 0.0 1.00	0 5.78 -
0.125 1.00	
<sup>1</sup> The author calculated the densities <i>Critical Tables</i> . Use the density appear to be in error.	values with caution, some of them
<sup>2</sup> The solubility in water is about 3 accepted value.	per cent smaller than the presently
<sup>3</sup> The Setschenow constant (salt effective k <sub>s</sub> = (1/c <sub>3</sub> ) log (Solubility in wate	er/Solubility in solution).
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm.
tall cylinder open to the air. They were shaken by hand several times a day for a period of four days.	(2) Rubidium chloride. No information.
A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	(3) Water. No information.
	ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm <sup>-3</sup> may be in error by 10 per cent.
	REFERENCES :

COMPONENTS:	OPTCINAL MEACUPENTING
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: MacArthur, C. G.
(2) Cesium chloride; CsCl; [7647-17-8]	J. Phys. Chem. <u>1916</u> , 20, 495-502.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: $T/K = 298.15$ $O_2 P/kPa = v 21.2$ ( $O_2$ in air at $C_3/mol dm^{-3} = 0.125$ one atm)	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
T/K Cesium Solu chloride dens c <sub>3</sub> /mol dm <sup>-3</sup> p/g	ity <sup>1</sup> cm <sup>3</sup> (STP) O. Constant <sup>3</sup>
298.15 0.0 1.0 0.125 1.0	
<sup>1</sup> The author calculated the densities <i>Critical Tables</i> . Use the density appear to be in error.	
<sup>2</sup> The solubility in water is about 3 accepted value.	per cent smaller than the presently
k <sub>s</sub> = (l/c <sub>3</sub> ) log (Solubility in wate	er/Solubility in solution).
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solutions were thermostated in tall cylinder open to the air. They were shaken by hand several times a day for a period of four days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air at one atm. (2) Cesium chloride. No information. (3) Water. No information. (3) Water. No information. ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol dm<sup>-3</sup> may be in error by 10 per cent. REFERENCES:</pre>

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					103		
OMPONENTS:		ORIGI	NAL MEASUREN	ENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]					ova, G. I.; edrinskii,	I. A.	
<pre>(2) 4-Methyl-1,3-dioxolan-2-one or propylene carbonate; C<sub>4</sub>H<sub>6</sub>O<sub>3</sub>; [108-32-7]</pre>		Ruse	s. J. Phys		<i>53</i> , 1189-9 <u>1979</u> , <i>53</i> ,	2.	
(3) Lithium chlori	ide; LiCl; [	7447-41-8		133-4.			
VARIABLES:			2	RED BY:			
	298.15 (?) 21.3 - 101. 0.2	325		H	. L. Cl	ever	
EXPERIMENTAL VALUES:			L			······	
т/к	Oxygen Pressure <sup>2</sup> p/atm	Lithium Chloride m3/mol k	3 g-1	Absorp Coeffic cm <sup>3</sup> c	tion ient m-3		
298.15 <sup>1</sup>	air-satu- rated	0		0.144 ± 0	.016		
	0.3	0		$0.128 \pm 0$			
	0.5 0.7	0 0		$0.169 \pm 0$ $0.239 \pm 0$			
	1.0	ŏ		$0.319 \pm 0$			
	air-satu- rated	0.2		0.115 ± 0	.001		
	0.3	0.2		$0.107 \pm 0$			
	0.5	0.2		$0.147 \pm 0$			
	0.7 1.0	0.2		$0.181 \pm 0$ $0.214 \pm 0$			
were made wit pressure was <sup>3</sup> The authors d <sup>4</sup> The airsatura	apparently d lid not defin	one atm. ne m. The	comp	oiler asum	ed m/mo	l kg <sup>-l</sup> .	
• The airsatura	ited absorpt.	ion coeli					
		AUXILIARY	INFORM	LATION			
METHOD/APPARATUS/PROCH	EDURE:		SOURC	E AND PURITY	OF MATE	RIALS:	
The oxygen concer mined by an elect	rochemical :	sensor.	(1)	Oxygen. E mixture.	ither a	ir or a He/	°2
The sensor was ca oxygen saturated The Bunsen coeffi	ethanol sol icient was t	ution.	(2)	Propylene distilled purificat	after	ate. Freshl special	У
0.213 cm <sup>3</sup> cm <sup>-3</sup> at			(3)	-		. No inform	ation.
Solutions were sa hours without sti	aturated in Erring.	three					
The solvent water content was determined by the Fisher method. Water content of 0.0053 - 0.017 % had no effect on the oxygen solubilit			ATED ERROR:	<u></u>			
The sensitivity of respect to oxygen	The sensitivity of the method with respect to oxygen is 3 $\mu g \ dm^{-3}$ .		REFER	The auth error in be 4 - 5 ENCES:	102 cor	ate the relancentration	tive to
		······································			·	······	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Chaenko, N. V.; Sukhova, G. I.;
<pre>(2) 4-Methyl-1,3-dioxolan-2-one or propylene carbonate; C<sub>4</sub>H<sub>6</sub>O<sub>3</sub>; [108-32-7]</pre>	Naumenko, N. K.; Kedrinskii, I. A. Zh. Fiz. Khim. <u>1979</u> , 53, 1189-92.
<pre>(3) Lithium aluminum chloride; LiAlCl<sub>4</sub>; [17611-22-2]</pre>	Russ. J. Phys. Chem. <u>1979</u> , 53, 1133-4.
VARIABLES: T/K= 298.15 (?) P/kPa= $\sim 21.3 - 101.325$ m <sub>3</sub> /mol kg <sup>-1</sup> = 0, 0.2	PREPARED BY: H. L. Clever

EXPERIMENTAL VALUES:

т/к	Oxygen Pressure <sup>2</sup> p/atm	Lithium Chloride <sup>3</sup> m <sub>3</sub> /mol kg <sup>-1</sup>	Absorption Coefficient cm <sup>3</sup> cm <sup>-3</sup>
298.15 <sup>1</sup>	air-saturated	0	$0.144 \pm 0.0164$
	0.3	0	$0.128 \pm 0.005$
	0.5	0	$0.169 \pm 0.005$
	0.7	0	$0.239 \pm 0.017$
	1.0	0	0.319 ± 0.003
	air-saturated	1.0	0.089 ± 0.009
	0.7	1.0	$0.185 \pm 0.004$
	1.0	1.0	$0.255 \pm 0.005$

- <sup>1</sup> The temperature is not given in the paper. However, the authors quote values from another of their papers in which the data were measured at 298.15 K.
- $^2$  Dry air has an oxygen partial pressure of  ${\sim}0.21$  atm. The other runs were made with a mixture of helium and oxygen. In all cases the total pressure was apparently one atm.
- $^{3}$  The authors did not define m. The compiler assumed m/mol  $\rm kg^{-1}.$
- $^{\rm 4}$  The air-saturated absorption coefficient corresponds to a mole fraction of 5.45 x  $10^{-4}$  .

AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The oxygen concentration was deter- mined by an electrochemical sensor. The sensor was calibrated against an oxygen saturated ethanol solution. The Bunsen coefficient was taken as $0.213 \text{ cm}^3 \text{ cm}^{-3} \text{ atm}^{-1}$ .	<ul> <li>(1) Oxygen. Either air or a He/O<sub>2</sub> mixture.</li> <li>(2) Propylene carbonate. Freshly distilled after special puri- fication.</li> </ul>
Solutions were saturated in three hours without stirring.	(3) Lithium aluminum chloride. No information.
The sensitivity of the method with respect to oxygen is 3 $\mu$ g dm <sup>-3</sup> .	ESTIMATED ERROR:
The solvent water content was determined by the Fisher method. Water content of 0.0053 - 0.017 % had no effect on the oxygen solubil- ity.	The authors state that the relative error in O <sub>2</sub> concentration is 4-5 %. REFERENCES:

	((10)) (10)
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Baird, W. R.; Foley, R. T.
<ul> <li>(2) Dihydro-2(3H)-furanone or Butrolactone; C<sub>4</sub>H<sub>6</sub>O<sub>2</sub>; [96-48-0]</li> <li>(3) Lithium perchlorate; LiClO<sub>4</sub>;</li> </ul>	J. Chem. Eng. Data <u>1972</u> , 17, 355-7.
[7791-03-9]	
VARIABLES:	PREPARED BY:
T/K = 298.15 P/kPa = 101.325	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
	action Bunsen Ostwald $10^3$ Coefficient Coefficient $\alpha \times 10^2$ Lix $10^2$
298.15 0.00 0.1 0.20 0.45 0.60 0.80	70 $4.99 \pm 0.25^{1}$ 5.45 5.13 5.31 4.95 5.13
<sup>1</sup> Average of four measurements <u>+</u> av	erage deviation.
The mole fraction and Ostwald coef	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus and procedure used	(1) Oxygen. No information.
were based on those described by Morrison and Billett (1). Gas satura- tion is achieved by allowing a thin film of solvent to flow down a glass helix containing the gas and solvent vapor at a total pressure of one atm. About 100 cm <sup>3</sup> of solvent is saturated at a flow rate of $2 - 3 \text{ cm}^3 \text{ m}^{-1}$ .	<ul> <li>(2) Butrolactone. Matheson, Coleman and Bell. Fractionally distilled under reduced pressure through spinning band column. Use 40 percent from the center of an initial one liter sample.</li> <li>(3) Lithium perchlorate. No information.</li> </ul>
The authors solubility values for oxygen dissolved in water and in dimethylsulfoxide were 3.5 and 21	
per cent lower, respectively, than values reported by other workers.	ESTIMATED ERROR: $\delta T/K = 0.5$ $\delta \alpha/\alpha = 0.023 - 0.050$ (authors)
The authors reported a Bunsen coeffi- cient which they had calculated from their measured Ostwald coefficients.	REFERENCES:
	<ol> <li>Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u>, 2033.</li> </ol>
	1

00	Oxygen	Solubiliti				
COMPONENTS :	<u>, , ,</u>		ORIGINAL	MEASUREMENTS:		
(1) Oxygen; O	2; [7782-44-7]		Baird, W. R.; Foley, R. T.			
	l,3-dioxolan-2-one carbonate; C <sub>4</sub> H <sub>6</sub> O <sub>3</sub> ]		J. Chem. Eng. Data <u>1972</u> , 17, 355-7.			
(3) Lithium p [7791-03-	erchlorate; LiClO <sub>4</sub> 9]	; 7				
VARIABLES:	······································		PREPARED	BY:	<u></u>	
	YK = 298.15 Pa = 101.325			P. L. H. L.	Long Clever	
EXPERIMENTAL VALU	UES:					
т/к	C <sub>LiClo4</sub> /mol dm <sup>-3</sup>		raction x 10 <sup>3</sup>	Bunsen Coefficient $\alpha \times 10^2$		
298.15	0.00 0.50	0.	058	$     1.53 \pm 0.04^{1}     1.40     1.50   $	1.67	
	1.00			1.50 1.60		
	AU	XILIARY	INFORMATI	ION		
METHOD/APPARATUS	/PROCEDURE:		SOURCE A	ND PURITY OF MAT	ERIALS:	
The apparatus	and procedure use	eđ	(1) 0x	kygen. No info	ermation.	
were based on Morrison and tion is achie film of solve helix contain vapor at a to About 100 cm <sup>3</sup> at a flow rat The authors s	A those described b Billett (1). Gas s eved by allowing a ent to flow down a hing the gas and so that pressure of on of solvent is sat the of 2 - 3 cm <sup>3</sup> m <sup>-1</sup> colubility values f yved in water and i	by satura- thin glass blvent he atm. curated	Co di th Us of (3) Li	oleman and Bel stilled under brough spinnin se 40 percent	nate. Matheson, 1. Fractionally reduced pressure g band column. from the center ne liter sample. prate. No	
dimethylsulfo per cent lowe values report	er, respectively, t ed by other worker eported a Bunsen c	21 chan cs.	ESTIMATE	CD ERROR: δτ/κ = δα/α =	0.5 0.023 - 0.050 (authors)	
cient which t	they had calculated d Ostwald coeffici	l from	REFERENC	CES: crison, T. J.; Chem. Soc. <u>19</u>	Billett, F. 48, 2033.	
			1			

	······································							
COMPONENTS:			ORIGINA	L MEASUREME	INTS:			
	[7782-44-7] 3-dioxolan-2-one ( arbonate; C <sub>4</sub> H <sub>6</sub> O <sub>3</sub> ;	or	Naun	ko, N. V. Menko, N. Z. Khim.	К.; Ке	edrinsl	kii, I.	Α.
	(3) Lithium perchlorate; LiClO <sub>4</sub> ;			J. Phys.				3-4
	98.15 (?) 21.3 - 101.325 , 0.2		PREPARE		L. Clev	ver		
EXPERIMENTAL VALUES	:							· · · ·
т/к	Oxygen I Pressure <sup>2</sup> C p/atm r	Lithiu Chlor: m <sub>3</sub> /mo:	um ide³ 1 kg-1	Absor Coeff cm <sup>3</sup> c	ption icient m <sup>-3</sup>			
298.15 <sup>1</sup>	air-saturated 0.3 0.5 0.7 1.0	0 0 0 0		0.144 ± 0.128 ± 0.169 ± 0.239 ± 0.319 ±	0.005 0.005 0.017	•		
	air-saturated 0.3 0.5 0.7 1.0	1 1 1	.0	0.077 ± 0.080 ± 0.115 ± 0.164 ± 0.206 ±	0.0025	5		
pressure was <sup>3</sup> The authors d <sup>4</sup> The air-satur	were made with a mixture of helium pressure was apparently one atm. <sup>3</sup> The authors did not define m. The <sup>4</sup> The air-saturated absorption coeff of 5.45 x 10 <sup>-4</sup> .				ed m/mc	ol kg-l	L.	
	AUXI	LIARY	INFORMAT	ION			u	
METHOD/APPARATUS/PRO								
The oxygen conce mined by an elec The sensor was c oxygen saturated	entration was dete trochemical sense alibrated against ethanol solution icient was taken tm <sup>-1</sup> .	er- or. an	(1) O m (2) P d	ND PURITY xygen. E ixture. ropylene istilled ication.	ither carbon	air or	Freshly	2
Solutions were s hours without st	aturated in three irring.		(3) Lithium perchlorate. No information.			1		
The sensitivity respect to oxyge	of the method wit n is 3 $\mu$ g dm <sup>-3</sup> .	h	Pomtici					
The solvent water content was determined by the Fisher method. Water content of 0.0053 - 0.017 % had no effect on the oxygen solubil- ity.		The a error	ED ERROR: uthors st in O <sub>2</sub> co					
			REFERENC					

	· · · · · · · · · · · · · · · · · · ·			
COMPONENTS:			ORIGINAL MEASUREMENTS:	
(1) Oxygen;	0 <sub>2</sub> ;[7782-44-7]		Pospisil, J.; Luzny, Z.	
	m hydroxide; KOH	; [1310-58-3]	Czech. Chem. Comm. 196	<u>50, 25, 589-92.</u>
	; CH <sub>4</sub> 0; [67-56-1]		1	
			1	
(4) water; n	2 <sup>0</sup> ; [7732-18-5]			
	<u></u>			
VARIABLES: T/K = 293.15			PREPARED BY:	
P/kPa = 101.2	325		R. W. CARGILL	
Concentratio	on		1	
EXPERIMENTAL	VALUES:	<u> </u>		<u></u>
SOLVENT COM	POSITION			
СНЗОН	H <sub>2</sub> O	KOH added	Bunsen Coefficient	Ostwald Coefficient
wt %	wt %	mol dm <sup>-3</sup>	$\alpha/cm^3(STP)cm^{-3}atm^{-1}$	L
0	100	0.0	0.0300	0.0322
		0.179	0.0272	0.0292
		0.893	0.0223	0.0239
		1.786	0.0173	0.0186
		3.571 5.357	0.0127 0.0112	0.0136 0.0120
		,	U • U + Z	0.0120
20	80	0.0	0.0814	0.0874
		0.179	0.0751	0.0806
		0.893	0.0583	0.0626
		1.786	0.0470	0.0504
		3.571 5.357	0.0357 0.0313	0.0383 0.0336
		5.557	0.0013	0.0000
44	56	0.0	0.1610	0.1728
		0.179	0.1540	0.1653
		0.893	0.1335	0.1433
		1.786	0.1201	0.1289
		3.571 5.357	0.1052 0.1003	0.1129 0.1076
			continu	ed on following page
		AUXILIARY	INFORMATION	
METHOD / APPARA	TUS/PROCEDURE:		SOURCE AND PURITY OF MAT	ERIALS:
	was stirred magn bottomed flask,		(1) Oxygen. Electrochem cylinder.	ical oxygen from a
the gas. Eq	quilibrium was es	stablished in	(2) KOH. Analytical put	
	es. A gas burett			-
measure the	absorption of gasolution. The ab	is in up to	(3) Methanol. Twice red at 293.15K = 0.7932.	
	were thermostat			
			(4) Water. Distilled.	
	was degassed by			
	inder reflux. Ea - 5 times, and th			
is given.	- J LIMES, and tr	e averaye Value		
			ESTIMATED ERROR:	
			δL/L= ±0.01 (authors)	
			REFERENCES:	
			.ł	

COMPONENTS	ORIGINAL MEASUREMENTS
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) Potassium hydroxide; KOH; [1310-58-3]</li> <li>(3) Methanol; CH<sub>4</sub>O; [67-56-1]</li> <li>(4) Water; H<sub>2</sub>O; [7732-18-5]</li> </ul>	Pospisil, J.; Luzny, Z. Czech. Chem. Comm. <u>1960</u> , 25, 589-92.

EXPERIMENTAL VALUES:

continued

## SOLVENT COMPOSITION

CH <sub>3</sub> OH wt %	H <sub>2</sub> O wt %	KOH added mol dm <sup>-3</sup>	Bunsen Coefficient α/cm <sup>3</sup> (STP)cm <sup>-3</sup> atm <sup>-1</sup>	Ostwald Coefficient L
67.5	32.5	0.0	0.2158	0.2316
		0.179	0.2050	0.2200
		0.893	0.1820	0.1953
		1.786	0.1704	0.1829
		3,571	0.1599	0.1716
		5.357	0.1551	0.1664
100	o	0.0	0.2359	0.2532
		0.179	0.2258	0.2423

The Ostwald coefficients were calculated by the compiler as were the solvent compositions, using density data given in the paper, by reference to *International Critical Tables*, <u>1928</u> Vol. *III*, p 115-116.

COMPONENTS: (1) Oxygen; $O_2$ ; [7782-44-7]	EVALUATOR: R.W. Cargill
<pre>(2) Water; H<sub>2</sub>O; [7732-18-5] (3) Polar organic compounds</pre>	Department of Molecular & Life Sciences Dundee College of Technology Bell Street, Dundee
	December 1980

CRITICAL EVALUATION:

The solubility of oxygen in mixtures of water with polar organic compounds has been measured in several laboratories. As is usual different solubility units are employed by different workers, which sometimes makes it difficult to compare their results. However, a comparative study has been made where possible and some reliable conclusions have been drawn.

Most of the papers report only the solubility data and tabulate the variables carefully. Some authors (1, 8, 9), however, also attempt to explain the variation in solubility caused by different parameters and relate their studies to current models of the structure of water. In one case (1) thermodynamic functions of the solubility process were also calculated and are presented graphically in the original paper.

Each of the mixed solvent systems is described below, along with relevant comments and an evaluation. Much more work is necessary on most of these systems, however, before complete confidence may be placed in the results.

First of all it is worth mentioning the work which was done by Mejane  $et \ all$ .(5) and by Enders  $et \ all$ .(2) on the solubility of oxygen in various aqueous alcohol mixtures (including drinks), and also the work by Joslyn and Supplee (3) on its solubility in aqueous sugar solutions. These measurements, however, were not sufficiently accurate nor were the variables properly controlled to make the results useful for scientific purposes. Of more quantitative use are the data on the following systems.

## 1. Oxygen + water + methanol

Pospisil and Luzny (6) in 1960 determined the solubility of oxygen at 293.15 K in water + methanol mixtures of five different compositions. Tokunaga (9) also studied this system in 1975 and gave data for several different solvent compositions between 0.0 and 1.0 mole fraction of methanol, at 273.15 K, 293.15 K, and 313.15 K. The data from both laboratories agree well for the pure water and pure methanol solvents at the common temperature of 293.15 K, but the three values given by Pospisil and Luzny for intermediate compositions are very high compared with Tokunaga's which are more numerous and conform to the pattern expected for this system. A data sheet has been prepared for Tokunaga's work and the results may be accepted tentatively. Pospisil and Luzny's results are given in the system oxygen + water + methanol + potassium hydroxide referred to later, even though they are in some doubt.

## 2. Oxygen + water + ethanol

This system has been studied more than any other of this type. The experimental work which was reported in 1968 by Shchukarev and Tolmacheva (8) was done in 1939-1941. The whole range of solvent composition was covered at four temperatures between 273.15 K and 323.15 K. Kretschmer *et al.* (4) in 1946 reported the solubility of oxygen in a 95% ethanol-water mixture at four temperatures between 248.15 K and 323.15 K. Tokunaga's work (9) reported in 1975 again covers the whole range of solvent composition at temperatures of 273.15 K, 293.15 K, and 313.15K, as does Cargill's (1) in 1976 for several temperatures in the wider range of 276-335 K.

OMPON	NENTS:	EVALUATOR:	
<u>(1)</u>	Oxygen; 0 <sub>2</sub> ;[7782-44-7]	R.W. Carg	111
	Water; H <sub>2</sub> O; [7732-18-5]	Dundee Col	c of Molecular & Life Sciences llege of Technology et, Dundee
(3)	Polar organic compounds	Dell Stree	sc, 20000
. ,		December	1980
CRITI	CAL EVALUATION:	continued	
	convert the units in Cargill's coefficient) used by the other	work from S <sub>o</sub> (cm° kg workers. The convers	tion formula is
	coefficient) used by the other	t x $\frac{T}{273.15}$ x $10^{-3}$	tion formula is
	coefficient) used by the other L = S <sub>0</sub> x β	t x $\frac{T}{273.15}$ x $10^{-3}$	ill's work.
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected	workers. The converse $\frac{T}{273.15} \times 10^{-3}$ d values of L from Carge	ill's work.
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol	workers. The converse $\frac{T}{273.15} \times 10^{-3}$ d values of L from Carg: Ostwald coeffic:	ill's work. ient x 10 <sup>3</sup> at
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $\frac{x_3}{2}$	workers. The converse $D_t = \frac{T}{273.15} \times 10^{-3}$ I values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3	tion formula is ill's work. ient x 10 <sup>3</sup> at 313.15 K 26.4 26.7
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $\frac{x_3}{0}$ 0.008 0.032	workers. The converse $D_t \propto \frac{T}{273.15} \propto 10^{-3}$ I values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3 34.4	tion formula is iill's work. ient x 10 <sup>3</sup> at 313.15 K 26.4 26.7 28.0
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063	workers. The converse $D_t \propto \frac{T}{273.15} \propto 10^{-3}$ I values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3 34.4 33.9	tion formula is ill's work. ient x 10 <sup>3</sup> at 313.15 K 26.4 26.7 28.0 29.1
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063 0.097	workers. The converse $\frac{T}{273.15} \times 10^{-3}$ I values of L from Carge Ostwald coeffice 293.15 K 33.1 33.3 34.4 33.9 33.3	tion formula is ill's work. ient x 10 <sup>3</sup> at 313.15 K 26.4 26.7 28.0 29.1 30.6
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063 0.097 0.120	workers. The converse $\frac{T}{273.15} \times 10^{-3}$ d values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3 34.4 33.9 33.3 33.3	tion formula is iill's work. ient x 10 <sup>3</sup> at 313.15 K 26.4 26.7 28.0 29.1 30.6 32.3
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063 0.097 0.120 0.162	r workers. The converse $D_t \propto \frac{T}{273.15} \propto 10^{-3}$ I values of L from Carge Ostwald coeffice 293.15 K 33.1 33.3 34.4 33.9 33.3 33.3 35.9	tion formula is iill's work. ient x 10 <sup>3</sup> at 313.15 K 26.4 26.7 28.0 29.1 30.6 32.3 37.8
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063 0.097 0.120 0.162 0.229	r workers. The converse $D_t = \frac{T}{273.15} \times 10^{-3}$ I values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3 34.4 33.9 33.3 33.3 35.9 45.6	<pre>tion formula is iill's work. ient x 10<sup>3</sup> at</pre>
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063 0.097 0.120 0.162 0.229 0.493	r workers. The converse $D_t = \frac{T}{273.15} \times 10^{-3}$ I values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3 34.4 33.9 33.3 34.4 33.9 33.3 35.9 45.6 104	<pre>tion formula is iill's work. ient x 10<sup>3</sup> at</pre>
	coefficient) used by the other $L = S_0 \times \rho$ The table below gives selected Mol fraction of ethanol $x_3$ 0 0.008 0.032 0.063 0.097 0.120 0.162 0.229	r workers. The converse $D_t = \frac{T}{273.15} \times 10^{-3}$ I values of L from Carg: Ostwald coeffic: 293.15 K 33.1 33.3 34.4 33.9 33.3 33.3 35.9 45.6	<pre>tion formula is iill's work. ient x 10<sup>3</sup> at</pre>

- (a) Shchukarev and Tolmacheva's results are 20-40% lower than those of the other workers, at the higher temperature of 323.15 K and where  $x_3 > 0.4$ , and should therefore be regarded as in error for that temperature only. This is confirmed by the unusual temperature effect which the authors themselves reported.
- (b) Tokunaga's results are generally 2-3% higher than those of Cargill and of Shchukarev and Tolmacheva over their common temperature range, but where  $x_3 < 0.15$ , his results are up to 20% higher and some data points show a scatter. It is felt that the work of these other authors is more reliable in that concentration range.

Thus data sheets have been prepared for each set of results, and these may be accepted tentatively, bearing in mind the criticisms in paragraphs (a) and (b) above. The units which the authors themselves used are employed in these data sheets, and this may be a help to different readers who have different uses for the data.

з. Oxygen + water + 1-propanol, and

4. Oxygen + water + 2-propanol

Tokunaga (9) has reported the solubility of oxygen in mixtures of water + 1-propanol, and water + 2-propanol, for mol fraction  $x_3$  0.00 to 1.00 and at temperatures of 273.15K, 293.15K, and 313.15K. A data sheet has been prepared for each system.

continued on following page

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COMPON	VENTS:	EVALUATOR:					
(1)	Oxygen; O <sub>2</sub> ; [7782-44-7]	R.W. Cargill					
(2)	Water; H <sub>2</sub> O;[7732-18-5]	Department of Molecular & Life Sciences Dundee College of Technology					
(3)	Polar organic compounds.	Bell Street, Dundee					
		December 1980					
CRITIC	CAL EVALUATION: cont	inued					
	5. Oxygen + water + 2-methyl-2-propano	1					
	Cargill's work (1) on this system covers it in detail over the whole concentration range and between 276 K and 335 K. See the data sheets.						
	6. Oxygen + water + methanol + potassi	um hydroxide					
	Pospisil and Luzny (6) measured the sol mixtures of water, methanol, and potass some uncertainty exists about the accur they are given as doubtful on a data sh	ium hydroxide at 293.15 K. Since acy of some of the data (see system 1 above)					
	mixtures are those by Schläpfer $et \ al.$ (solubility of oxygen was measured in mi 1-propanol, 2-propanol, 1-butanol, ethy range of solvent composition. These so	<ul> <li>the solubility of oxygen in aqueous alcohol</li> <li>7). At the temperature of 303.15 K the xtures of water with methanol, ethanol, lene glycol, and glycerol over the whole lubilities were given with an accuracy Therefore no data sheets were prepared</li> </ul>					
	REFERENCES						
	1. Cargill, R.W. J. Chem. Soc. Farada	у Trans. I <u>1976</u> , 72, 2296.					
	2. Enders, C.; Kleber, W.; Paukner, E.	Brawissenschaft <u>1956</u> ,2, 50.					
	3. Joslyn, M.A.; Supplee, H. Food Res	. <u>1949</u> , <i>14</i> , 209.					
	4. Kretschner, C.B.; Nowakowska, J.; W	iebe, R. Ind. Eng. Chem. <u>1946</u> , 38, 506.					
	5. Mejane, J.V.; Debailleul, M.; Lece	rf, J. Ind. Aliment Agr. <u>1974</u> , 90, 719.					
	6. Pospisil, J.; Luzny, Z. Czech. Cher	n. Comm. <u>1960</u> , 25, 589.					
	<ol> <li>Schläpfer, P.; Audykowski, T.; Buko <u>1949</u>, 15, 299.</li> </ol>	wiecki, A. Schweiz Arch. Angew. Wiss. Tech.					
	<ol> <li>Shchukarev, S.A.; Tolmacheva, T.A. (or J. Struct. Chem. <u>1968</u>, 9, 16)</li> </ol>	Zh. Strukt. Khim. <u>1968</u> , 9, 21					
	9. Tokunaga, J. J. Chem. Eng. Data. 1	975, 20, 41.					

COMPONENTS:			OPTOT	IAT MEACHDENENIMO	
		-		NAL MEASUREMENTS	
	; 0 <sub>2</sub> ; [7782-44-7		Tok	unaga, J.	
(2) Methan	ol; CH40; [67-	56-1]	J.	Chem. Eng. Da	ta, <u>1975</u> , 20,41-6.
(3) Water;	H <sub>2</sub> O; [7732-18	3-5]			
	-				
VARIABLES:	273-313		PREPA	RED BY:	
Composi				C.L.3	Coung, R.W. Cargill
EXPERIMENTAL	VALUES:				
T/K	Mole fraction	Ostwald		Henry's	Mole fraction
	of alcohol,	coefficien		Constant	of ovvgon in
	<sup><i>x</i></sup> Сн <sub>4</sub> О			/atm	liquid**,x <sub>O2</sub>
273.15	0.0000 0.0150	0.0490 0.0511		25400 24000	0.0000394 0.0000417
	0.0612	0.0535		21800	0.0000459
1	0.1051	0.0526		21300	0.0000469
	0.1423	0.0503		21600	0.0000463
	0.1978 0.3068	0.0488 0.0533		21200 17700	0.0000472 0.0000565
l.	0.3813	0.0606		14700	0.0000680
	0.5057	0.0777		10300	0.0000971
	0.6328	0.104		7030	0.000142
	0.8097 1.0000	0.154 0.237		4200 2390	0.000238 0.000418
293.15	0.0000	0.0347		38400	0.0000260
1	0.0188	0.0384		34000	0.0000294
	0.0492	0.0435		29100	0.0000344
ļ	0.0907	0.0472		25700	0.0000389
	0.1103 0.1564	0.0449 0.0411		26600 27800	0.0000376 0.0000360
	0.2066	0.0418		26100	0.0000383
	0.3054	0.0540		18500	0.0000541
	0.3976 0.4895	0.0689 0.0859		13400 9990	0.0000746 0.000100
	0.5927	0.112		7050	0.000143
	0,7046	0.144		5050	0.000198
		AUXILIARY	INFORM	IATION	
METHOD /APE	PARATUS/PROCEDUR	E :	SOURC	E AND PURITY OF	MATERIALS:
Volumetri	ic apparatus with	h multibulb	(1)	High purity	grade sample, purity
	d magnetic stirre			99.9 mole pe	r cent.
	ion and gas absound ad volumetrically		1/2 21	Guarantood r	eagent, further
pressure	determined from	total	(2,3)		distillation.
pressure	and vapor press	ure of			assed by boiling.
solvent s	olution. Detail	s in source.			
1			1		
			ESTIM	ATED ERROR:	
				\$m/v - +0 F-	۲۵۰ +1-20
1				01/K - 10.0;	$\delta x_{O_2} = \pm 1 - 2 \$.$
			REFEF	ENCES:	
}					
L			L		

COMPONENTS	:	ORIG	INAL MEASURI	EMENTS:		
1) Oxygen	; O <sub>2</sub> ; [7782-44-7]	Toku	Tokunaga, J.			
	ol; CH <sub>4</sub> O; [67-56-1] H <sub>2</sub> O; [7732-18-5]		hem. Eng. Do -6.	ata. <u>1975</u> , 20,		
EXPERIMENT	AL VALUES:					
T/K	Mole fraction of of alcohol, <sup>x</sup> CH <sub>4</sub> O	Ostwald coefficient*,L	Henry's Constant /atm	Mole fraction of oxygen in liquid**,x <sub>02</sub>		
293.15	0.8041 0.8923 0.9426 1.0000	0.173 0.205 0.221 0.246	3930 3120 2790 2400	0.000254 0.000321 0.000358 0.000417		
313.15	0.0000 0.0569 0.0972 0.2106 0.2974 0.4357 0.5052 0.5848 0.7009 0.8010 0.8905 1.0000	0.0272 0.0358 0.0328 0.0428 0.0577 0.0820 0.0962 0.116 0.148 0.182 0.213 0.255	50700 37200 39000 26800 18400 11500 9240 7170 5180 3900 3140 2440	0.0000197 0.0000269 0.0000373 0.0000543 0.0000870 0.000108 0.000139 0.000193 0.000193 0.000256 0.000318 0.000410		
* 8	at 1.01325 x 10 <sup>5</sup> Pa pa	artial pressure		<u></u>		
** ć	at 1.01325 x $10^5$ Pa pa	artial pressure				
	(calculated from the p	reciprocal of Heni	ry's Constan	ut)		

COMPONENTS :		ORIGINAL MEASURE	MENTS .			
		1		Junghowa	л л	
(1) Oxygen; $O_2$ ; [7782-44-7]		Shchukarev, S.A.; Tolmacheva, T.A. Zh. Strukt. Khim. 1968, 9, 21-8;				
(2) Ethanol; $C_2H_6O$ ; [64-17-		J. Struct. Chem. $1968$ , 9, 16-21.				
(3) Water; H <sub>2</sub> O; [7732-18-5]						
VARIABLES: T/K = 277 - 323		PREPARED BY:				
P/kPa = 101.325 Composition = 0 - 100%		R. Battino	; P. L. 1	Long; R.W.	. Cargill	
EXPERIMENTAL VALUES:	· ··· ·					
$T/K^a = 277.15$ $T/K = 28$	5.15	T/K ⊐ 298.	15	T/K = 32	3.15	
Mole Ostwald Mole Fraction Coeff. Fraction		ald Mole Fraction	Ostwald Coeff.	Yole Fraction	Ostwald	
Water <sup>b</sup> L Water	L	Water	L	Water	L	
1 0.0451 1	0.038	31 1	0.0310	1	0.0238	
0.978 0.0476 0.973	0.039	92 0.980	0.0326	0.969	0.0240	
0.956 0.0462 0.952 0.936 0.0441 0.923	0.04		0.0325 0.0325	0.890 0.864	0.0245	
0.928 0.0432 0.900	0.03		0.0323	0.860	0.0272	
0.891 0.0385 0.870	0.03		0.0322		0.0391	
0.854 0.0384 0.843 0.830 0.0379 0.700	0.030		0.0321 0.0338	0.750 0.616	0.044	
0.818 0.0386 0.539	0.094		0.0403	0.476	0.0935	
0.492 0.105 0.275	0.156		0.0629	0.262	0.131	
0.158 0.136 0.158	0.185		0.0980 0.152	0.140 0.141	0.154 0.154	
0.008 0.233 0.149 0.004	0.18			0.139	0.153	
0.002	0.232	0.120	0.193	0.002	0.180	
		0.049		0.002	0.180	
		0.049 0.029	0.208 0.221	0.001	0.182	
		0.002	0.283			
<pre>a Temperature reported to 1° 50°C. b Mole fraction ethanol = 1</pre>	- mole i			., 4, 12,	25,	
	UXILIARI	· · · · · · · · · · · · · · · · · · ·				
METHOD/APPARATUS/PROCEDURE:	3 4 -	SOURCE AND PURIT			<b>C</b>	
Degassed water is transferre an absorption vessel. The w		(1) Prepared		trolysis o ed by remo		
is sealed over mercury. Gas	is	hydrogen	traces,	and thore	oughly	
added and stirring accomplis			fore use	. No pur:	ity	
with a magnetic bob. Uptake of gas is read on buret syst		given. (2) Dried to	at leas	t 99.7% fo	or	
which is thermostatted along	with			re ethano		
the absorption vessel. Deta				hol was re		
of operation and a drawing a the original paper.	re in	distilled t		diluted w	with	
		(3) Distille				
		ESTIMATED ERROR				
		$\delta L/L = \pm 0.0$		ate by cor	mpiler.	
		$\delta x/x = \pm 0.0$				
		0x/x = 10.0	ur, colli	ale by C		
		REFERENCES :				

COMPONENTS :		ODICINAL MEASUREMENTS					
	4	ORIGINAL MEASUREMENTS:					
(1) Oxygen; O <sub>2</sub> ; [7782-44		Mejane, J. V.; Debailleul, M.; Lecerf, J. Ind. Aliment. Agr. <u>1974</u> , 90, 719-27.					
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64							
(3) Water; H <sub>2</sub> O; [7732-11	8-5]	Chem. Abstr. 1974, 80, 119192f.					
	<del></del>						
VARIABLES: T/K = 273 - 383		PREPARED BY:					
Composition		R. Battino					
EXPERIMENTAL VALUES:	,						
Degre alcoolique °G.L.	[02] <sup>a</sup> / mg dm <sup>-3</sup>	Degre alcoolique °G.L.	[02]/ mg dm-3				
0	9.17	60	13.3				
5	8.5	65	15.5				
10	8.8	70	18.3				
15	15 7.9		22.6				
20	20 7.8		27.6				
25	7.9	85	33.8				
30	7.8	90	41.0				
35	7.9	95	43.7				
40	8.4	96	52.0				
45	8.8	98	56.3				
50	10.0	100	61.9				
55	11.9						
a Oxygen solubility at a partial gas pressure of 158 mm Hg (21.1 kPa). continued on following page							
	AUXILIARY	INFORMATION	<u> </u>				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERI	ALS:				
The various alcohol solu saturated with air and t		(1) No details given					
solubility determined po	olarographi-	(2) "surfin"					
cally for $P_{0_2} = 158 \text{ mm}$ I	iy •	(3)					
		ESTIMATED ERROR:					
		$\delta^{\circ}$ G.L. = ± 0.1					
		$\delta T/K = \pm 0.1$ $\delta [O_2] = \pm 3\%$ , Compiler's estimate REFERENCES:					
	<u></u>	A					

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] Mejane, J. V.; D								1 м.		
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]					Mejane, J. V.; Debailleul, M.; Lecerf, J.					
(3) Water; $H_2O$ ; [7732-18-5]				Ind Ci	Ind. Aliment. Agr. <u>1974</u> , 90, 719-27. Chem. Abstr. <u>1974</u> , 80, 119192f.					
				<u></u>						
	continued									
°G.:	L.			-		-				
t/°c	10	20	30	40	50	60	70	80	90	100
0	12.6	11.7	11.1	11.9	14.2	17.6	21.4	30.1	44.8	65.0
5	11.3	10.6	10.1	10.8	12.6	16.0	20.8	29.7	44.2	64.6
10	10.1	9.6	9.2	9.7	11.2	14.6	20.1	29.3	43.5	64.1
15	9.2	8.9	8.6	9.0	10.5	13.9	19.3	28.8	42.8	63.0
20	8.3	8.1	8.0	8.4	10.0	13.3	18.5	27.9	40.9	61.2
25	7.7	7.5	7.4	7.8	9.4	12.4	17.4	25.9	38.1	56.1
30	7.2	7.1	7.0	7.3	8.9	11.5	16.4	23.9	35.0	51.8
35	6.9	6.8	6.7	7.0	8.3	10.3	14.6	21.2	30.5	44.2
40	6.6	6.6	6.4	6.8	7.7	9.3	12.8	18.6	26.5	39.0
45	6.1	6.1	6.1	6.5	7.5	9.3	12.8	18.1	25.5	37.6
50	5.5	5.6	5.8	6.2	7.3	9.3	13.0	17.9	25.0	36.6
55	5.1	5.2	5.2	5.5	6.8	9.0	12.4	16.7	23.1	34.4
60	4.7	4.7	4.7	4.9	6.4	8.7	11.6	15.1	20.6	29.8
65	4.3	4.3	4.2	4.3	5.8	7.9	10.6	13.7	18.4	26.1
70	3.8	3.7	3.5	3.6	5.1	7.1	9.2	11.8	15.4	22.2
75	3.0	2.8	2.4	2.5	3.3	4.2	5.0	6.1	7.6	9.9
80	2.2	1.7	1.2	1.2	1.2	0.9	0.6	0	0	0
85	1.3	0.7	0.1	0	0	0	0	0	0	0
90	0.4	0	0	0	0	0	0	0	0	0

 $^{\rm a}$  Smoothed values of oxygen solubility in mg dm  $^{-3}$  at a partial pressure of 158mm Hg (21.1 kPa).

COMPONENTS	•		ORICIN	AL MEACUDENEN		
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]			ORIGINAL MEASUREMENTS: Tokunaga, J.			
(2) Ethanol; $C_{2}H_{6}O;$ [64-17-5]			J. Ch	em.Eng. Dat	ta <u>1975</u> , 20, 41-6.	
(3) Water	; H <sub>2</sub> O; [7732-18-	-5]				
VARIABLES:			PREPAR			
T/K = Compos	273-313			С.Б.	Young; R.W. Cargill	
EXPERIMENT	AL VALUES:					
T/K	Mole fraction	Ostwal	đ	Henry's	Mole fraction	
	of alcohol,	coefficie		Constant	of oxygen in	
	<sup><i>x</i></sup> C <sub>2</sub> H <sub>6</sub> O			/atm	liquid,**x <sub>O2</sub>	
273.15	0.0000	0.0490		25400	0.0000394	
	0.0056	0.0485		25400	0.0000394 0.0000418	
1	0.0089 0.0176	0.0512 0.0487		23900 24700	0.0000418	
	0.0353	0.0489		23800	0.0000420	
[	0.0552	0.0467		24100	0.0000415	
	0.0715	0.0444		24700	0.0000405	
ł	0.1065 0.1376	0.0403 0.0372		25800 26600	0.0000388 0.0000376	
	0.1762	0.0364		25700	0.0000389	
ļ	0.2384	0.0437		19500	0.0000513	
	0.3646	0.0689		10500	0.0000952	
	0.4350	0.0912 0.111		7260 5290	0.000138 0.000189	
	0.5464 0.6676	0.142		3650	0.000274	
	0.8981	0.206		2060	0.000485	
	1.0000	0.238		1660	0.000602	
293.15	0.0000	0.0347		38400	0.000260	
	0.0810	0.0420		27400	0.000365	
	0.1058	0.0409		27000	0.0000370	
	0.2057 0.3085	0.0456 0.0663		20800 12400	0.0000481 0.0000806	
	0.4052	0.0890		8100	0.000123	
		AUXILIARY	INFORM	ATION		
METHOD /A	PPARATUS/PROCEDURE	5:	SOURCE	AND PURITY	OF MATERIALS:	
	· · · ·					
Volumet	ric apparatus with	multibulb		High purity	grade sample, purity	
	nd magnetic stirre		99.9 mole per cent.			
of solu	tion and gas absor	cbed				
determi	ned volumetrically	. Partial			reagent, further	
	e determined from			Solution de	v distillation. gassed by boiling.	
solvent	e and vapor pressu solution. Detail	s in source.	.  `	Solucion de	gassed by borring.	
			1			
1			1			
]						
			ESTIMATED ERROR:			
1			,	ለጠ/ዤ ≕ +0 ⊑	. δ <i>π</i> ≈ +1−28.	
			l `	71/17 - TO*O	$\delta; \ \delta x_{O_2} = \pm 1 - 2 $	
			DDDDD			
			KEFERI	ENCES:		
			}			
1						
1						
1						
L			L			

Components:			ORIGINAL MEASUREMENTS:				
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Tokunaga, J.				
	ol; C <sub>2</sub> H <sub>6</sub> O; [64-17 ; H <sub>2</sub> O; [7732-18-5		J. Chem.	. Eng. Data <u>1975</u> ,	20, 46-6.		
EXPERIMENT T/K	TAL VALUES: Mole fraction of alcohol, <sup>x</sup> C <sub>2</sub> H <sub>6</sub> O	Os	inued twald icient*,L	Constant	Mole fraction of oxygen in liquid,**x <sub>02</sub>		
293.15	0.5280 0.5978 0.7171 0.8065 0.9382 1.0000	0 0 0 0	.118 .137 .165 .189 .225 .244	5320 4260 3170 2550 1930 1690	0.000188 0.000235 0.000315 0.000392 0.000518 0.000592		
313.15	0.0000 0.0158 0.0465 0.1022 0.2014 0.3063 0.3924 0.4940 0.5817 0.6915 0.7984 0.8723 0.9317 1.0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.0272 .0430 .0383 .0366 .0483 .0675 .0885 .114 .137 .163 .193 .213 .230 .247	50700 31900 33800 32100 20700 12900 8700 5980 4540 3420 2630 2240 1980 1760	0.0000197 0.0000313 0.0000296 0.0000483 0.0000775 0.000115 0.000167 0.000292 0.000380 0.000380 0.000446 0.000505 0.000568		
<ul> <li>* at 1.01325 x 10<sup>5</sup> Pa partial pressure</li> <li>** at 1.01325 x 10<sup>5</sup> Pa partial pressure (calculated from the reciprocal of Henry's Constant).</li> </ul>							

	· •	•	······
COMPONENTS:		ORIGINAL MEASUREM	ENTS:
(1) Oxygen; O <sub>2</sub> ;[7782-44-7]			
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]		Cargill, R.W.	
(3) Water; H <sub>2</sub> O; [7732-18-5]		J. Chem. Soc., 12, 2296-2	Faraday Trans. I <u>1976</u> , 300
2		, 2290-2	500.
VARIABLES: T/K = 277.3 - 334.4		PREPARED BY:	
P/kPa = 101.325		R.W.Cargill	
Concentration			
EXPERIMENTAL VALUES:			
Mol Fraction	T/K	s_/cm <sup>3</sup> kg <sup>-1</sup>	$\log(S_{cm}^{3}kg^{-1})$
Ethanol		-0,	
0.78	277.7	194	2,287
0.78	294.3	194	2.296
0.78	314.2	200	2.301
0.78	331.9	202	2.306
0.99	278.9	269	2.430
0.99	294.8	274	2,437
0.99	313.3	274	2.438
0.99	330.8	275	2.439
		co	ntinued on following page
<u> </u>	ALIVELEADY		
		INFORMATION	
METHOD / APPARATUS / PROCEDURE :		SOURCE AND PURITY	
METHOD: Absorption of gas by liquid. The Morrison and Bil was modified by replacing val	lett (1) method		tish Oxygen Co. cent pure, stored over ine.
constant flow pump, and by me	asuring the mass	1.	solute Alcohol.
of the solvent leaving the ab (instead of the volume) on a		. ,	lled then deionized.
(instead of the volume) on a	cop-pan barance.	(J) water. Disti.	rreu then deronized.
APPARATUS/PROCEDURE: The solusing the vapor pump principl determination absorbs about 2 up to 500 $\text{cm}^3$ of solvent, whi The density of the solvent wa	e (1). Each 0 $cm^3$ of gas in ch was recycled.		
each run, so that the exact c	omposition of th	ESTIMATED ERROR:	ለመ/ጽ ቋ 0 1
solution could be determined	(2).		$\delta T/K = 0.1$ $\delta P/mmHg = 0.5$
		Solubility values per cent (author)	reproducible within 0.5
		REFERENCES:	
		1. Morrison, T. J	.; Billett, F. 48, 2033; <u>1952</u> , 3819
		<ol> <li>Morrison, T. J J.Chem.Soc. <u>19</u></li> </ol>	
		<ol> <li>Morrison, T. J J.Chem.Soc. 19</li> <li>International (</li> </ol>	<u>48</u> , 2033; <u>1952</u> , 3819 Critical Tables, Volume II

· · · · · · · · · · · · · · · · · · ·		- <u></u>	
(1) Oxygen; O <sub>2</sub> ; [778	2-44-7]	Cargill	. R.W.
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O;	[64-17-5]	-	
(3) Water; H <sub>2</sub> O; [77		J. Chem.	Soc., Faraday Trans. I 5, 72, 2296-2300.
(3) water, 120, 177	56 10 5,	1970	5, 72, 2290-2300.
EXPERIMENTAL VALUE	S:	continued	
Mol Fraction			
Ethanol	т/к	So/cm <sup>3</sup> kg <sup>-1</sup>	$\log(S_{o}/cm^{3}kg^{-1})$
0.00	277.0	43.7	1.640
0.00	279.4	41.0	1.613
0.00	283.1	37.4	1.573
0.00	285.7	36.4 <sup>a</sup>	1.561
0.00	286.2	35.2	1.547
0.00	286.5	35.6 <sup>a</sup>	1,551
0.00	290.4	32.6 <sup>a</sup>	1,513
0.00	293.2	30.8	1.489
0.00	294.7	30.1 <sup>a</sup>	1.479
0.00	303.1	26,5 <sup>a</sup>	1.423
0.00	312.5	23.3 <sup>a</sup>	1,368
0.00	322.4	21.1 <sup>a</sup>	1,324
0.00	331.6	19.8 <sup>a</sup>	1,296
0.00	338.4	19.1 <sup>a</sup>	1,279
0.00	345.6	18.3 <sup>a</sup>	1,263
0.00	348.0	18.2 <sup>a</sup>	1,260
0.008	277.8	43.5	1.638
0.008	285.5	36.1	1,558
0.008	294,9	30.2	1,480
0.008	304.1	26.2	1,419
0.008	313.3	23.1	1.364
0.008	324.2	21.2	1.326
0.008	333.5	20.0	1.301
0.021	277.7	44.5	1.648
0.021	285.1	38.0	1.580
0.021	294.9	31.4	1.497
0.021	305.2	26.9	1.430
0.021 0.021	314.3 332.4	23.9 21.1	1.379 1.325
0.032	279.3	43.2	1,635
0.032	286,0	37.3	1.572
0.032	295,9	31.2	1,494
0.032	304.9	27.5	1.439
0.032	313.8	24.8	1.395
0.032	324.3	22.5	1,353
0.032	334.4	21.3	1.329
0.063	277.3	43.0	1,633
0.063	285.4	37.1	1.569
0.063	295.3	31.5	1.498
0.063	306.2	27.2	1.435
0.063	313.3	26.2	1.418
0.063	330.3	24.5	1,389

<ol> <li>Oxygen; O<sub>2</sub>; [7782-44</li> <li>Ethanol; C<sub>2</sub>H<sub>6</sub>O</li> <li>Water · H<sub>2</sub>O; [7<sup>7</sup></li> </ol>	; [64-17-5]		R.W c., Faraday Trans. I <u>1976</u> 2296–2300.
EXPERIMENTAL VALUES	;	continued	
Mol Fraction Ethanol	T/K	S <sub>o</sub> /cm <sup>3</sup> kg <sup>-1</sup>	log(S <sub>0</sub> /cm <sup>3</sup> kg <sup>-1</sup> )
0.097	278.7	38.6	1,586
0.097	280.8	37.0	
0.097	286.2	34.8	1.542
0.097	293.3	31.8	1.502
0.097	304.2	29.4	1.468
0.097	313.4	27.8	1.444
0.097	324.7	26.7	1.427
0.097	333.9	26.4	1.422
0.12	277.7	37.0	1.568
0.12		34.3	1.535
0.12 0.12 0.12 0.12	297.3 319.5 332.9	31.3 29.4 29.5	1.496 1.469 1.470
0.16	277.6	36.6	1.564
0.16	288.6	35.5	1.550
0.16	308.8	34.7	1.540
0.16	331.9	37.0	1.568
0.23	277.7	45.7	1.660
	294.3	45.8	1.661
0.23	314.3	46.2	1.665
0.23	322.5	48.0	1.681
0.23	333.4	49.2	1.692
0.31	277.8	67.5	1.829
0.31	283.5	67.3	1.828
0.31	298.1	69.0	1.839
0.31	318.3	71.3	1.853
0.49	277.7	110	2.041
0.49	295.3	111	2.044
0.49	314.8	116	2.063
0.49	333.1	121	2.081

<sup>a</sup> Values from reference 3. The solubility, S<sub>o</sub>, calculated as cm<sup>3</sup> gas at 273.15 K and O<sub>2</sub> partial pressure of 101.325 kPa (1 atm) per kg of solvent. In the critical evaluation of this system some of these data have been converted to Ostwald coefficients.

Organic Solvents and Water

Olga	anic Solve	nts and Water	20
COMPONENTS :		ORIGINAL MEASUREM	ENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Tokunaga, J.	
(2) <b>1-</b> Propanol; C <sub>3</sub> H <sub>8</sub> O; [71-23	3-8]	J. Chem. Eng	. Data. <u>1975</u> , 20, 41-6.
(3) Water; H <sub>2</sub> O; [7732-18-5]			
VARIABLES: T/K = 273-313		PREPARED BY:	
Composition		c.	L. Young; R.W. Cargill
EXPERIMENTAL VALUES:			
	Ostwald fficient	Henry's t,* Constant	Mole fraction of oxygen in
<sup>x</sup> C <sub>3</sub> H <sub>8</sub> O	L	/atm	liquid,**x <sub>O2</sub>
			<u></u>
	.0490	25400 23000	0.0000394 0.0000435
	.0446	24700	0.0000405
	.0411	25400	0.0000394
	.0417 .0454	23400 20300	0.0000427 0.0000493
	.0647	12300	0.0000813
0.2852 0	.0840	8090	0.000124
	.106	5190	0.000193
	.154	2830 2130	0.000353 0.000469
	.187	1810	0.000552
	.209	1480	0.000676
	.0347	38400	0.0000260
	.0370 .0353	33800 33700	0.0000296 0.0000297
	.0353	26800	0.0000373
0.1057 0	.0446	22900	0.0000437
	.0703	11800 7060	0.0000847 0.000142
	.0970 .119	4910	0.000204
0.5103 0	.138	3760	0.000266
	.152 .169	3080 2500	0.000325 0.000400
		INFORMATION	
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY	OF MATERIALS:
Volumetric apparatus with mult	-ibulb	(1) High purit	y grade sample, purity
	Amount	99.9 mole	
of solution and gas absorbed		(2.2)	Franklik and
determined volumetrically. Paperssure determined from total	irtial	purified b	reagent, further y distillation.
pressure and vapor pressure of	f		egassed by boiling.
solvent solution. Details in			
source.			
		ESTIMATED ERROR:	
		δ፹/ዤ = +በ.	$5: \delta x = \pm 1 - 28$
		51/1 - 20.	$5; \delta x_{O_2} = \pm 1 - 2 $
		REFERENCES :	
		KUT DILINGEO;	

COMPONENT	'S :		ORIGINAL MEASUREM	ENTS :
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) 1-Propanol; C<sub>3</sub>H<sub>8</sub>O; [71-23-8]</pre>		-7]	Tokunaga, J.	
		J. Chem. Eng.	Data. <u>1975</u> ,20,41-6.	
3) Water	; H <sub>2</sub> O; [7732-	18-5]		
EXPERIMEN	TAL VALUES :			
т/к	Mole fraction of alcohol, <sup>x</sup> C <sub>3</sub> H <sub>8</sub> O	Ostwald coefficie: L		Mole fraction of oxygen in liquid,**x <sub>O2</sub>
293.15	0.7987 0.9085 1.0000	0.184 0.202 0.221	2080 1710 1450	0.000481 0.000585 0.000690
313.15	0.0000 0.0225 0.0428 0.0657 0.0834 0.1043 0.2044 0.3034 0.4033 0.5056 0.6063 0.6972 0.8010 0.8955 1.0000	0.0272 0.0305 0.0265 0.0294 0.0347 0.0393 0.0707 0.0983 0.122 0.142 0.159 0.173 0.188 0.205 0.226	50700 42300 46100 39200 27500 12000 7180 4990 3740 2950 2470 2060 1730 1440	0.0000197 0.0000236 0.0000217 0.0000255 0.0000306 0.0000364 0.0000833 0.000139 0.000200 0.000200 0.000267 0.000339 0.000405 0.000405 0.000485 0.000578 0.000694
	** at 1.0132	5 x 10 <sup>5</sup> Pa pa	artial pressure artial pressure (ca cy's Constant).	lculated from

Organic Solvents and Water

·					20
COMPONENTS :			ORIGINAL	MEASUREMENT	S:
(1) Oxygen;	: O <sub>2</sub> ; [7782-44-7]		Tokun	aga, J.	
(2) 2-Propa	no <b>1</b> ; C <sub>3</sub> H <sub>8</sub> O; [67-6	63-0]	J. Ch	em. Eng. D	ata, <u>1975</u> , 20,41-6.
(3) Water;	H <sub>2</sub> O; [7732-18-5]	]			
VARIABLES:		· · · · · · · · · · · · · · · · · · ·	DEDADED		
T/K = 2	73-313		PREPARED		Young; R.W. Cargill
Composi				с.п.	ioung, k.w. cargini
EXPERIMENTAL	VALUES:				
Т/К	Mole fraction	Ostwa	ald	Henry's	Mole fraction
	of alcohol,	coeffici		Constant	of ovygon in
	<sup>x</sup> C <sub>3</sub> H <sub>8</sub> O	L		/atm	liquid,**x <sub>O2</sub>
273.15	0.0000	0.0490		25400	0.0000394
l	0.0096	0.0495		24500	0.0000408
1	0.0168 0.0467	0.0493		24200 25600	0.0000413 0.0000391
	0.0467	0.0430		28700	0.0000348
	0.1116	0.0329		29000	0.0000345
	0.1602	0.0431		19900	0.0000503
	0.2779	0.0753	L	9130	0.000110
	0.3591 0.4838	0.102 0.126		5900 4000	0.000169 0.000250
	0.5417	0.142		3310	0.000302
	0.6902	0.173		2300	0.000435
	0.7936	0.197		1820	0.000549
	1.0000	0.231		1300	0.000769
293.15	0.0000	0.0347		38400	0.0000260
	0.0220 0.0408	0.0392 0.0346		32000 34600	0.0000313 0.0000289
	0.0733	0.0334		33100	0.0000302
	0.0943	0.0346		30400	0.0000329
	0.1994	0.0605		13800	0.0000725
	0.2985 0.3920	0.0917 0.115	/	7600 5220	0.000132 0.000192
	0.5950	0.162		2860	0.000350
		AUXILIARY	INFORMATI	ON	
METHOD /APPA	RATUS/PROCEDURE:		SOURCE A	ND PURITY OF	MATERIALS
,					
Volumetric	c apparatus with m	ultibulb	(l) Hi	gh puritv	grade sample, purity
	magnetic stirrer.			.9 mole pe	
	on and gas absorbed				
	l volumetrically. letermined from tot				eagent, further distillation.
	nd vapor pressure		So.	lution deg	assed by boiling.
solvent so	lution. Details i	in source.			
1			DOTTION-	D. EDDOD.	
			ESTIMATE	D ERKOR:	
l			δТ,	$/K = \pm 0.5;$	$\delta x_{O_2} = \pm 1 - 2 \%.$
			REFERENC	ES:	······································
Î					
		A			

Oxygen Solubilities up to 200 kPa

COMPONENT	COMPONENTS :		ORIGINAL MEASUREMENTS :		
1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Tokunaga, J.			
	opanol; C <sub>3</sub> H <sub>8</sub> O;		J. Chem. Eng. 1	Data. <u>1975</u> , 20,41-6.	
3) Wateı	с; H <sub>2</sub> O; [7732-]	L8-5]			
EXPERIMEN	ITAL VALUES:				
т/к	Mole fraction of alcohol, <sup>x</sup> C <sub>3</sub> H <sub>8</sub> O	Ostwald coefficien <i>L</i>	Henry's c,* Constant /atm	Mole fraction of oxygen in liquid,**x <sub>O2</sub>	
293.15	0.7836 1.0000	0.204 0.246	1860 1270	0.000538 0.000787	
313.15	0.0000 0.0791 0.0993 0.1496 0.1984 0.3003 0.3052 0.5000 0.5978	0.0272 0.0368 0.0390 0.0524 0.0690 0.105 0.131 0.156 0.179	50700 31200 28000 18500 12700 6960 4790 3500 2700	0.0000197 0.0000321 0.0000357 0.0000541 0.0000787 0.000144 0.000209 0.000286 0.000370	
	0.6995 0.7930 0.8950 1.0000	0.199 0.220 0.238 0.255	2170 1790 1510 1280	0.000461 0.000559 0.000662 0.000781	
- <u></u>	* at 1.01325	x 10 <sup>5</sup> Pa par	tial pressure		
	** at 1.01325 the recipro	x 10 <sup>5</sup> Pa part cal of Henry	ial pressure (cald's Constant).	culated from	
		-			

COMPONENTS:	ORIGINAL MEASUREMENTS:
(l) Oxygen; O <sub>2</sub> ; [7782-44-7]	Müller, C.
<pre>(2) 1,2,3-Propanetriol (Glycerol); C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>; [56-81-5]</pre>	Z. Physik. Chem. <u>1912</u> , 81, 483-503.
(3) Water; H <sub>2</sub> O; [7732-19-5]	
VARIABLES:	PREPARED BY:
T/K = 285 - 288 P/kPa = 101.325	R. Battino
·	L
EXPERIMENTAL VALUES:	
Weight Percentage <sup>b</sup> Ost T/K <sup>a</sup> Glycerol	wald Coeff. <sup>C</sup> Bunsen Coeff. <sup>d</sup> $10^{2}L$ $10^{2}\alpha$
295.35 20.5	3.034 2.904
285.65 25.	2.775 2.654
287.75 37.3	2.147 2.038
286.65 45.	1.889 1.300
285.55 52.	1.697 1.623
285.25 71.5	1.055 1.010
286.45 88.5	0.950 0.906
d Bunsen coefficient.	compiler.
d Bunsen coefficient.	Comparer
	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO <sub>4</sub> and washed in concentrated
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO <sub>4</sub> and washed in concentrated KOH solution.
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO <sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck.
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and a drawing of the apparatus.	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO<sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck. (3) No comment by author.</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO <sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck.
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and a drawing of the apparatus. Solubilities were also reported in aqueous solutions of sucrose,	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO<sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck. (3) No comment by author. ESTIMATED ERROR: δα/α = ± 0.01, estimated by compiler</pre>
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and a drawing of the apparatus. Solubilities were also reported in aqueous solutions of sucrose,	INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO <sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck. (3) No comment by author. ESTIMATED ERROR:
AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and a drawing of the apparatus. Solubilities were also reported in aqueous solutions of sucrose,	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO<sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck. (3) No comment by author. ESTIMATED ERROR: δα/α = ± 0.01, estimated by compiler</pre>
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AUXILIARY METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and a drawing of the apparatus. Solubilities were also reported in aqueous solutions of sucrose,	<pre>INFORMATION SOURCE AND PURITY OF MATERIALS: (1) From the heading of KMnO<sub>4</sub> and washed in concentrated KOH solution. (2) 1,2,3-Propanetriol from Merck. (3) No comment by author. ESTIMATED ERROR: δα/α = ± 0.01, estimated by compiler</pre>

COMPONENTS: (1) Oxygen; O <sub>2</sub> ;[7782-44			re .	
-	1-71	ORIGINAL MEASUREMENT	15:	
(2) 2-Hethyl-2-propanol (t-Butanol); C <sub>4</sub> H <sub>10</sub> O		Cargill, R.W.		
[(2) 2-metny1-2-propano [75-65-0]	$(\underline{t}-Butano1); C_4^{H}_{10}$	J. Chem. Soc. Farad	ay Trans. I 1976, 72,	
	10 53	2296-2300.	<i><u> <u></u>,,</u></i>	
(3) Water; H <sub>2</sub> O; [7732-	18-21			
		-		
1	277.5 - 333.9	PREPARED BY:		
p/kPa = 1 Concentrat		R.W. Cargill		
Uncentrat				
EXPERIMENTAL VALUES:		•		
Nol Russhien				
Mol Fraction Alcohol	T/K	s <sub>o</sub> /cm <sup>3</sup> kg <sup>-1</sup>	log(S <sub>c</sub> m <sup>3</sup> kg <sup>-1</sup> )	
0.60	278.4	214	2.331	
0.60	294.9	211 218	2.325 2.338	
0.60 0.60	312.5 331.4	226	2.356	
0.76	280.1	246	2.390	
0.76	303.1	243	2.386	
0.76 0.76	313.6 328.0	243 245	2.386 2.389	
0.78	528.0	245	2.309	
0.93	280.5	266	2.425	
0.93	297.8	261	2.417	
0.93	313.0	256	2,409	
		co	ntinued on following page	
	AUXILIARY		ntinued on following page	
	·	INFORMATION		
METHOD / APPARATUS / PROCE	DURE :	INFORMATION SOURCE AND PURITY O	F MATERIALS:	
METHOD: Absorption of	DURE: gas by a thin film of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis	F MATERIALS: h Oxygen Co.	
METHOD: Absorption of liquid. The Morrison was modified by repla	DURE: gas by a thin film of and Billett (1) method cing valve A with a	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine	F MATERIALS: h Oxygen Co. nt pure, stored over	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine	F MATERIALS: h Oxygen Co. nt pure, stored over	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop. (98 per cent bo	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop. (98 per cent bo	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C).	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distille	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C).	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube we) on a top-pan balance The solvent is degasse principle (1). Each	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distille	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C).	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distille	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C).	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube we) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distille	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C).	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distille	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C).	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distille	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. δT/K = 0.1	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-propy (98 per cent bo) (3) Water. Distillo ESTIMATED ERROR:	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. δT/K = 0.1 δP/mmHg = 0.5	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-propy (98 per cent bo) (3) Water. Distillo ESTIMATED ERROR: Solubility values re	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. δT/K = 0.1	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-propy (98 per cent bo) (3) Water. Distillo ESTIMATED ERROR:	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. δT/K = 0.1 δP/mmHg = 0.5	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-propy (98 per cent bo) (3) Water. Distillo ESTIMATED ERROR: Solubility values re	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. δT/K = 0.1 δP/mmHg = 0.5	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-propu- (98 per cent bo (3) Water. Distille (3) Water. Distille ESTIMATED ERROR: Solubility values r cent (author). REFERENCES: 1. Morrison, T. J.;	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. $\delta T/K = 0.1$ $\delta P/mmHg = 0.5$ eproducible within 0.5 per Billett, F.	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop. (98 per cent bo (3) Water. Distilled ESTIMATED ERROR: Solubility values recent (author). REFERENCES: 1. Morrison, T. J.; J.Chem.Soc. 1948	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. $\delta T/K = 0.1$ $\delta P/mmHg = 0.5$ eproducible within 0.5 per Billett, F. , 2033; <u>1952</u> , 3819	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorps up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop. (98 per cent bo (3) Water. Distilled ESTIMATED ERROR: Solubility values recent (author). REFERENCES: 1. Morrison, T. J.; J.Chem.Soc. 1948 2. International Cr.	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. $\delta T/K = 0.1$ $\delta P/mmHg = 0.5$ eproducible within 0.5 per Billett, F.	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop (98 per cent bo (3) Water. Distilled ESTIMATED ERROR: Solubility values r cent (author). REFERENCES: 1. Morrison, T. J.; J.Chem.Soc. 1948 2. International Cr. pp 112-118	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. $\delta T/K = 0.1$ $\delta P/mmHg = 0.5$ eproducible within 0.5 per Billett, F. , 2033; <u>1952</u> , 3819 itical Tables, Volume III,	
METHOD: Absorption of liquid. The Morrison was modified by repla constant flow pump, a of the solvent leavin (instead of the volum APPARATUS/PROCEDURE: using the vapor pump determination absorbs up to 500 cm <sup>3</sup> of solv The density of the so each run, so that the	DURE: gas by a thin film of and Billett (1) method cing valve A with a and by measuring the mas g the absorption tube he) on a top-pan balance The solvent is degasse principle (1). Each about 20 cm <sup>3</sup> of gas in rent, which was recycled lvent was checked after e exact composition of	INFORMATION SOURCE AND PURITY O (1) Oxygen. Britis Gas 99.5 per ce saturated brine (2) 2-Methyl-2-prop. (98 per cent bo (3) Water. Distilled ESTIMATED ERROR: Solubility values recent (author). REFERENCES: 1. Morrison, T. J.; J.Chem.Soc. 1948 2. International Cr.	F MATERIALS: h Oxygen Co. nt pure, stored over anol. Reagent-grade ils 82-83°C). ed then deionized. $\delta T/K = 0.1$ $\delta P/mmHg = 0.5$ eproducible within 0.5 per Billett, F. , 2033; <u>1952</u> , 3819 itical Tables, Volume III, Billet, F.	

2	20
21	Ja

<ul> <li>Oxygen; 0<sub>2</sub>; [7782-44</li> <li>2-Methyl-2-propanol [75-65-0]</li> <li>Water; H<sub>2</sub>O; [7732-1</li> </ul>	$(\underline{t}-Butanol); C_4H_{10}O;$	Cargill, R.W. J.Chem.Soc., Fara 2296-2300.	day Trans. I <u>1976</u> , 72,
XPERIMENTAL VALUES:	cont	inued	·····
Mol Fraction Alcohol	т/к	S <sub>o</sub> /cm <sup>3</sup> kg <sup>-1</sup>	log(S <sub>o</sub> cm <sup>3</sup> kg <sup>-1</sup> )
0.00	277.0	43.7	1.640
0.00	279.4	41.0	1.613
0.00	283.1	37.4	1.573
0.00	285.7	36.4 <sup>a</sup>	1.561
0.00	286.2	35.2	1.547
0.00	286.5	35.6ª	1.551
0.00	290.4	32.6 <sup>a</sup>	1.513
0.00	293.2	30.8	1.489
0.00	294.7	30.1 <sup>a</sup>	1.479
0.00	303.1	26,5ª	1.423
0.00	312.5	23.3 <sup>a</sup>	1.368
0.00	322.4	21 <b>.1<sup>a</sup></b>	1.324
0.00	331.6	19.8ª	1.296
0.00	338.4	19.1 <sup>a</sup>	1.279
0.00	345.6	18.3ª	1.263
0.00	348.0	18.2 <sup>a</sup>	1.260
0,006	277.7	42.8	1.631
0.006	285.5	35.8	1,554
0.006	292.8	31.3	1,495
0.006	296.5	28.8	1.459
0.006	304.2	26.2	1,419
0.006	318.5	22.1	1.344
0.006	332.9	19.8	1.296
0.014	278.0	43.5	1.638
0.014	278.7	42.6	1.629
0.014	285.5	36.6	1.563
0.014	297.0	29.4	1.469
0.014	304.2	26.1	1.417
0.014	308.3	24.7	1.392
0.014	314.4	23.2	1,366
0.014	325.2	21.7	1.336
0.014	333.0	20.5	1.312
0.014	333.4	20.5	1.312
0.022	277.6	42.7	1.630
0.022	285.5	35.3	1.548
0.022	295.9	29.2	1,466
0.022	304.7	26.2	1.418
0.022	314.4	23.4	1.370
0.022	324.7	21.8	1.338
0.022	334.4	20.6	1.313
0.000	270 4	39.0	1 500
0.032	278.4	38.9	1.590
0.032	285.5	32.9	1.517
0.032	294.3	29.4	1.469
0.032	305.1	26.1	1.416
0.032	314.3	24.3	1.386
0.032	324.2	23.6	1.373
0.032	333.9	22.4	1.351

<ol> <li>Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>2-Methyl-2-propanol (<u>t</u>-Butanol); C<sub>4</sub>H<sub>10</sub>O; [75-65-0]</li> </ol>		Cargill, R.W. J.Chem.Soc., Faraday Trans. I <u>1976</u> , 72 2296-2300.	
(3) Water; H <sub>2</sub> O; [773]	2-18-5]		
EXPERIMENTAL VALUES:		<u></u>	
Mol Fraction			· -·
Alochol	т/к	S <sub>o</sub> /cm <sup>3</sup> kg <sup>-1</sup>	log(S <sub>c</sub> m <sup>3</sup> kg <sup>-1</sup> )
0.044	277.8	35.1	1.545
0.044	285.5	31.9	1.504
0.044	294.8	27.9	1.446
0.044	304.7	26.6	1,424
0.044	314.9	24.7	1,393
0.044	324.7	25.0	1.398
0.044	335.1	25.1	1.399
0.062	283.5	29.5	1.470
0.062	296.9	28.8	1.460
0.062	310.8	29.3	1.467
0.062	327.5	30.4	1.483
0.093	277.8	37.6	1.575
0.093	287.9	38.7	1.588
0.093	310.4	41.1	1.588
0.093	321.7	42.7	1,630
0.093	333.5	43.5	1.638
0.15	285.8	62.4	1,795
0.15	298.0	63.8	1.805
0.15	313.0	65.8	1,818
0.15	332.7	70.3	1.847
0.18	277.7	70,8	1.850
0.18	288.1	72.4	1.860
0.18	299.6	73.1	1.864
0.18	310.6	76.2	1.882
0.18	321.4	76.2	1.882
0.18	333.6	80.2	1.904
0,25	284.4	96.8	1.986
0.25	303.6	101	2,006
0.25	323.7	107	2.029
0.31	277.8	122	2,087
0.31	295.3	129	2.111
0.31	313.8	130	2.113
0.31	333.4	133	2.124
0.44	279,2	167	2,222
0.44	287.6	169	2.229
0.44	297.6	169	2,227
0.44	308.0	172	2.236
0.44	319.5	173	2,237
0.44	331.1	177	2.247

 $^a$  Values from reference 3. The solubility,  $S_O,$  calculated as cm  $^3$  gas at 273.15 K and  $O_2$  partial pressure of 101.325 kPa (1 atm) per kg of solvent.

(1) (2)			ORIGINAL MEASUREMENTS:	
(2)	Oxygen; O <sub>2</sub> ;	[7782-44-7]	Müller, C.	
	2,2,2-Trichlo diol (Chlora [302-17-0]	oro-1,1-ethane- 1 hydrate);	Z. Physik. Chem. <u>191</u>	<u>2</u> , 81, 483-503.
(3)	Water; H <sub>2</sub> O;	[7732-18-5]		
VARIABI			PREPARED BY:	
,	K = 286 - 291 a = 101.325		R. Battino	
XPERIMEN	T/K <sup>a</sup>	Weight Percentag Chloral hydrate	e Ostwald Coeff. <sup>C</sup> b 10 <sup>2</sup> L	Bunsen Coeff. <sup>d</sup> $10^{2}\alpha$
	291.45	22.9	2.944	2.759
	290.05	23.	2.856	2.690
	288.55	36.6	2.736	2.590
	289.75	38.6	2.548	2.402
	285.95	51.3	2.553	2.439
	289.35	58.44	2.489	2.350
	289.05	70.	2.814	2.659
	290.35	80.85	3.402	3.200
	290.05	80.9	3.334	3.140
		AUXILIARY	INFORMATION	
Æ THOD /AP	PARATUS / PROCEDU	RE :	SOURCE AND PURITY OF MATER	IALS:
Water vacuu about therm measu conne tube tube the o flask were origi	r is degassed um. The absor- t 600 cm <sup>3</sup> and mostatted from uring system. ected by a cop . Gas uptake gas burets. T c volume and a c calibrated wi inal paper con awing of the a	by pumping under rption vessel is is separately m the buret gas Both are oper capillary is measured on The absorption all liquid volumes ith mercury. The ntains details and apparatus. also reported in of sucrose,		trated <sup>*</sup> 1,1-ethanediol- om Münster.

000			Ionza				
COMPONENT	'S: en; O <sub>2</sub> ; [7782-44-	71		ORIGINAL MEASUREMENTS:			
(I) OXYG	en; 02; [//82-44-	11	Mathes	Matheson, I. B. C.; King, A. D.			
(2) Sulfuric acid monododecyl ester sodium salt (Sodium dodecyl sulfate or SDS); C <sub>12</sub> H <sub>26</sub> O <sub>4</sub> S.Na; [151-21-3]				J. Coll. Interface Sci. <u>1978</u> , 66, 464-9.			
(3)Water	r; H <sub>2</sub> O; [7732-18-	5]					
VARIABLES	3:		PREPAREI	) BY:			
D (1 D	T/K = 298.15				<u>.</u>		
SDS/mol	340 - 841 kg <sup>-1</sup> H <sub>2</sub> O = 0 - 0	.300		н. т.	Clever		
	TAL VALUES:	·······					
T/K	Sulfuric acid monodecyl ester sodium salt mol kg <sup>-1</sup> H <sub>2</sub> O	pounds per	Volume gas evolved ml		Ambient Temperature °C	Henry's constant K x 10 <sup>3</sup> mol Ar kg <sup>-1</sup> H <sub>2</sub> O atm <sup>-1</sup>	
298.15	0	49.3	12.5	746.3	25.1		
		71.5 74.7	18.0 18.6	743.5 745.5	25.2 24.8		
		108.5	26.2	747.0	24.8		
		122.0	29.7	745.5	25.9	1.41±0.02	
	0.100	65.5	16.9	755.3	23.0		
		90.3 121.0	22.2 30.5	751.1 756.7	23.3 22.0	1.47±0.03	
	0.000	E0 0	14.9	741.7	22.6		
	0.200	52.2 69.0	19.4	741.0	23.1		
		91.0	25.0	743.2	22.9	1.61±0.02	
	0.300	56.6	16.5	754.0	22.4		
		66.9 86.5	19.4 25.2	743.8 752.4	22.0 21.9	1.70±0.01	
	· · · · ·						
		AUXILIARY	INFORMAT	ION			
METHOD/AP	PPARATUS/PROCEDURE:		SOURCE A	SOURCE AND PURITY OF MATERIALS:			
thermost brass bo speed ma to the k manifold	aratus consists o tated thick-walled omb which rests of agnetic stirrer. A bomb is connected 1, and an exit light	d cylindrical n a variable An inlet line to a gas ne is connec-	(2) Su	lly pure d l per cent lfuric act dium salt.	cce not given or equivalent purity or b d monodecvl Aldrich Ch	t of 99.5 Detter. ester Demical Co.	
	ted to a Warburg manometer. Bourden gauges are used to record the pres- sure.			c. Recryst d dried <u>ir</u>	allized from <u>vacuo</u> .	n ethanol	
water ar	ution, consisting nd the colloidal	electrolyte,	(3) Wa	(3) Water. Laboratory distilled.			
	ained in a glass bomb. The solution		ESTIMAT	ED ERROR:			
of the bomb. The solution is degassed by evacuation to just above water vapor pressure and then stirring for several hours. The gas is introduced over the solution at the desired pres- sure and the solution is stirred for a minimum of five hours.			-	δ <b>κ</b> /	′K = 0.02		
The gas solutior atmosphe ing vent	is vented to atmon is collected in eric pressure and ting and thermal of	manomete erature. and for	r and its Correcti water vap	volume measu ons for gas or pressure	red at lost dur- are made.		
gas mola	The solubility is reported as Henry's constant, K/mol gas kg <sup>-1</sup> water atm <sup>-1</sup> = gas molality/pressure, m/p.						

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kretschmer, C. B.; Nowakowaska, J.;
(2) 2,2,4-Trimethylpentane or iso-	Wiebe, R.
octane; C <sub>8</sub> H <sub>18</sub> ; [540-84-1]	Ind. Eng. Chem. 1946, 38, 506-9.
(3) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]	
VARIABLES: T/K = 273.15 - 323.15 P/kPa = 101.325	PREPARED BY:
F/KPa = 101.525 Ethanol/vol % = 50	P. L. Long; H.L. Clever; R.W. Cargill
· · · ·	<b>-</b>
EXPERIMENTAL VALUES:	
T/K Bunser Coeffici	n Ostwald Lent Coefficient
a	L
273.15 0.3119	0.3119
273.15 0.3119 298.15 0.2898	
323.15 0.2726	
The Ostwald coefficients were measured	
(1 atm). The compiler calculated the oxygen partial pressure of 101.325 kPa	Bunsen coefficient value for an
coefficient was independent of pressure	
The solvent is 2,2,4-trimethylpentane	in ethanol, 50 per cent by volume.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that of	(1) Oxygen. Source not given. Con-
Horiuti (1), it consisted of a gas	tained 0.4 per cent N <sub>2</sub> . Passed
buret, manometer, and absorption	through Drierite to dry.
pipet equipped with a magnetic stirrer. All volumes were calibrated	(2) 2,2,4-Trimethylpentane. "Certi-
by mercury displacement.	fied material," source not given.
The solvent was partly degassed by	Dried over CaSO <sub>4</sub> , distilled, b.p. (760 mmHg)/°C 99.24, density,
boiling under reflux. About 40 cm <sup>3</sup>	$\rho_4^{25}/g \text{ cm}^{-3}$ 0.68774.
of solvent was admitted into the	(3) Ethanol. Source not given. Dried
absorption pipet, and pumped on to complete the degassing. Dry gas,	with Mg. Density, $\rho/g \text{ cm}^{-3}$
measured in the buret, was admitted,	0.78508.
final equilibrium was established	ESTIMATED ERROR: Gas buret $\delta V/cm^3 = 0.005$
after 1 to 3 hours stirring. During the solution process the total pres-	Gas buret $\delta V/Cm = 0.005$ Average deviation from the mean 0.3%,
sure was kept at one atm by addi-	maximum deviation 0.9% (authors).
tions of dry gas.	
The solubility value was corrected	REFERENCES :
for the increase of solvent volume	l. Horiuti, J.
with gas absorption, and for the nitrogen impurity in the oxygen.	J. Sci Papers Inst. Phys. Chem.
niciogen impurity in the oxygen.	Res. (Tokyo) <u>1931</u> , 17, 125.

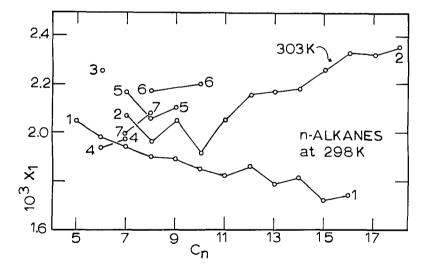
COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) n-Alkanes	Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 U.S.A.

CRITICAL EVALUATION:

The solubility of oxygen in the n-alkanes has been studied by some seven workers (1-7) with surprisingly poor agreement. This is most striking when examining the figure below. The work of Makranczy, et al. (1) shows a decreasing solubility with increasing carbon number while that of Blance and Batiste (2) shows an increasing solubility. The work of these two groups appears to be of comparable precision. However, a judgment on accuracy must depend on a definitive study of these systems. There does appear to be a general trend for solubilities in even-numbered n-alkanes to be higher than for those in the odd-numbered members.

The solubility of oxygen in 2,2,4-trimethylpentane (isooctane) was measured by four groups (7-10) and the four values at 298.15, respectively, by reference number are: 2.43, 2.814, 2.59 (at 293.15), and 2.529 x  $10^{-3}$  mole fraction solubility at 101.325 kPa partial pressure of gas. The average value is 2.58 x  $10^{-3} \pm 0.17$  ( $\sigma$ ).

The n-alkanes need to be re-studied.



COMP	ONENTS:	EVALUATOR:
(1) (2)		Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 U.S.A.
CRIT	ICAL EVALUATION: contin	ued
Ref	erences	
2.	Makranczy, J.; Megyery-Balog, K.; Ind. Chem. <u>1976</u> , 4, 269-80. Blanc, C.; Batiste, M. Bull. Cen Naumenko, N.K. Candidates thesis	t. Rech. Pan <u>1970</u> , 4, 235-41.

- 4.
- Guerry, D. Ph.D. thesis, 1944, Vanderbilt University. Thomsen, E.S.; Gjaldbaek, J. Chr. Acta Chem. Scand. 1963, 17, 127-33. Wilcock, R.J.; Battino, R.; Danforth, W.E. J. Chem. Thermodyn. 5. 6.

- Wilcock, R.J.; Battino, R.; Banforth, W.E. J. Chem. Inermolyn. 1978, 10, 817-22.
   Tjams, C.C. Ph.D. thesis, 1941, Vanderbilt University.
   Kobatake, Y.; Hildebrand, J.H. J. Phys. Chem. 1961, 65, 331-5.
   Baldwin, R.R.; Daniel, S.G. J. Appl. Chem. (London) 1952, 2, 161-5; J. Inst. Petrol. 1953, 39, 105-24.
   Kretschmer, C.G.; Nowakowska, J.; Wiebe, R. Ind. Eng. Chem. 1946, 38, 500 0
- 506-9.

COMPONENTS:		ORIGINAL MEASUR	EMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			J.; Megyery-Ba	log, K.;
(2) Pentane; C <sub>5</sub> H <sub>12</sub> ; [109-66-0	)]		Patyi, L.	
	Hung. J. In	d. Chem. <u>1976</u> ,	4,269-80.	
VARIABLES:		PREPARED BY:	<u> </u>	
T/K = 298.15 - 313.1 P/kPa = 101.325	15		. A. Johnson . L. Clever	
1/112 - 101.525				
EXPERIMENTAL VALUES:				
T/K Mol	Fraction	Bunsen	Ostwald	
x <sub>1</sub>	1 × 10 <sup>3</sup>	Coefficient a	Coefficient L	
		<u></u>		
	2.05 1.67	0.396 0.317	0.432 0.362	
		0.317	0.362	
The mole fraction solubiliti	les and th	e Bunsen coef	ficients were	calculated
by the compiler.				
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1}$	= - RT ln	$x_1 = -10,610$	+ 87.050 T	
The data and the equation ar	ce classed	as tentative	•	
		INFORMATION		
	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	AUXILIARY		TY OF MATERIALS:	
Volumetric method. The appar	catus of	SOURCE AND PURI Both the ga	s and liquid w	ere analyti-
	catus of	SOURCE AND PURI Both the ga cal grade ro of foreign o		garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade r	s and liquid we eagents of Hun	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ro of foreign o	s and liquid we eagents of Hun	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ro of foreign o	s and liquid we eagents of Hun	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ro of foreign o	s and liquid we eagents of Hun	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ro of foreign mation.	s and liquid w eagents of Hun origin. No fur	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ru of foreign mation.	s and liquid w eagents of Hun origin. No fur	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ru of foreign mation.	s and liquid w eagents of Hun origin. No fur	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ru of foreign mation.	s and liquid w eagents of Hun origin. No fur	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ru of foreign mation.	s and liquid w eagents of Hun origin. No fur	garian or
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the ga cal grade ro of foreign mation. ESTIMATED ERROF $\delta X_1/X$ REFERENCES: 1. Bodor, E.	s and liquid w eagents of Hum origin. No fur :: 1 = 0.03 ; Bor, Gy.; Mo	garian or ther infor-
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the gat cal grade ro of foreign mation. ESTIMATED ERROF δX1/X REFERENCES: 1. Bodor, E. Sipos, G Veszpremi	s and liquid w eagents of Hum brigin. No fur 1 = 0.03 ; Bor, Gy.; Mol G. Vegyip. Egy.	garian or ther infor- hai, B.;
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the gal cal grade r of foreign mation. ESTIMATED ERROR $\delta X_1/X$ REFERENCES: 1. Bodor, E. Sipos, Vespremi 1957, 1,	s and liquid w. eagents of Hum origin. No fur 1 = 0.03 ; Bor, Gy.; Mol G. Vegyip. Egy.	garian or ther infor- hai, B.; Kozl.
Volumetric method. The appar Bodor, Bor, Mohai and Sipos	catus of	SOURCE AND PURI Both the gal cal grade r of foreign mation. ESTIMATED ERROR $\delta X_1/X$ REFERENCES: 1. Bodor, E. Sipos, Vespremi 1957, 1,	s and liquid w eagents of Hum brigin. No fur 1 = 0.03 ; Bor, Gy.; Mol G. Vegyip. Egy.	garian or ther infor- hai, B.; Kozl.

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Naumenko, N. K.		
(2) Hexane; C <sub>6</sub> H <sub>14</sub> ;[110-54-3]	Candidates thesis, <u>1970</u> , Leningrad.		
VARIABLES:	PREPARED BY:		
T/K = 298.15	H. L. Clever		
P/kPa = 101.325			
EXPERIMENTAL VALUES:			
T/K Mol Fraction $x_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient L		
298.15 2.258	0.385 0.421		
The mole fraction solub	ility value is quoted in (1).		
The Bunsen and Ostwald by the compiler.	coefficients were calculated		
	•		
AUXILIA	RY INFORMATION		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Probably used volumetric method described by Naumenko $et \ al$ . (2).	No information.		
	ESTIMATED ERROR:		
	REFERENCES :		
	<ol> <li>Chaenko, N. V.; Sukhova, G. I.; Naumenko, N. K.; Kedrinskii, I.A. Zh. Fiz. Khim. <u>1979</u>, 53, 1989.</li> </ol>		
	<ol> <li>Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. Zh. Prikl. Khim. 1969, 42, 2090.</li> </ol>		

COMPONENTS :			ORIGINAL MEASURE	EMENTS:	
(1) Oxygen; O <sub>2</sub>	[7782-44-	.7]	Makranczy, J. Rusz, L.; P	; Megyery-Balog, K.; atyi, L.	
(2) Hexane; C <sub>6</sub> H <sub>14</sub> ; [110-54-3]			Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.		
VARIABLES: T/K = 2 P/kPa = 1	98.15 - 3 01.325	313.15		A. Johnson L. Clever	
EXPERIMENTAL VALUES	3:				
_	T/K	Mol Fraction $\frac{x_1 \times 10^3}{1000}$	Coefficient a	L ,	
	298.15 313.15	1.98 1.52	0.337 0.254	0.368 0.291	
The mole fraction by the compiler.		lities and the	e Bunsen coeff	icients were calculated	
Smoothed Data:	∆G°/J mo	$1^{-1} = - RT ln$	$x_1 = -13,682$	+ 97.645 T	
				· · · · · · · · · · · · · · · · · · ·	
		AUXILIARY	INFORMATION		
METHOD/APPARATUS/PI	ROCEDURE:		· · · · · · · · · · · · · · · · · · ·	TY OF MATERIALS:	
Volumetric metho Bodor, Bor, Moha used.			cal grade r	s and liquid were analyti- eagents of Hungarian or origin. No further infor-	
			estimated error $\delta x_1/2$	: x <sub>1</sub> = 0.03	
			Sipos, ( Veszpremi 1957, 1, 1	Vegyip. Egy. Kozl.	

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [	7782-44-71	ORIGINAL MEA Guerry, I		
(2) Alkanes; C <sub>6</sub> H <sub>1</sub>		Ph.D. the	esis, <u>1944</u> , Vander 7, Nashville, TN.	bilt Univ-
VARIABLES:		PREPARED BY	:	
	.15, 298.15 .325 (1 atm)		H. L. Clever	
EXPERIMENTAL VALUES:			·····	
Т	/K Mol Fraction $x_1 \times 10^4$	Bunsen Coefficient α	Ostwald Coefficient L	
	Hexane; C <sub>6</sub> H <sub>14</sub> ; [1	10-54-3]		
	.15 19.6 .15 19.3	0.337 0.329	0.362 0.359	
	Heptane; C7 <sup>H</sup> 16; []	42-82-5]		
293 298	.15 19.8	0.304 0.300	0.326 0.327	
	Ň			
	AUXILIAR	' INFORMATION		
METHOD/APPARATUS/PROC A Van Slyke-Neill tus manufactured h Amend Co. was used The procedure of V pure liquids was n that small solvent could be used with recovery of the sa An improved temper system was used.	EDURE: Manometric Appara- by the Eimer and d. Van Slyke (1) for modified (2) so t samples (2 cm <sup>3</sup> ) h almost complete ample.	SOURCE AND F Hexane. B.p. (760 Heptane.	PURITY OF MATERIALS: Eastman Kodak Co. .3 mmHg) t/°C 68.8 B.p. (753.9 mmHg) 8.28 (corr.).	
A Van Slyke-Neill tus manufactured H Amend Co. was used The procedure of V pure liquids was n that small solvent could be used with recovery of the sa An improved temper	EDURE: Manometric Appara- by the Eimer and d. Van Slyke (1) for modified (2) so t samples (2 cm <sup>3</sup> ) h almost complete ample. rature control	SOURCE AND F Hexane. B.p. (760 Heptane.	Eastman Kodak Co. .3 mmHg) t/°C 68.8 B.p. (753.9 mmHg) 8.28 (corr.).	
A Van Slyke-Neill tus manufactured H Amend Co. was used The procedure of V pure liquids was n that small solvent could be used with recovery of the sa An improved temper system was used.	EDURE: Manometric Appara- by the Eimer and d. Van Slyke (1) for modified (2) so t samples (2 cm <sup>3</sup> ) h almost complete ample. rature control OF MATERIALS: reduction Co.	SOURCE AND F Hexane. B.p. (760 Heptane. 98.27 - 9	Eastman Kodak Co. .3 mmHg) t/°C 68.8 B.p. (753.9 mmHg) 8.28 (corr.).	

COMPONENTS :		ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ;	[7782-44-7]	Thomsen, E. S.; Gjaldbaek, J. C.
-		
(2) Heptane; C <sub>7</sub> H	16' [142-82-5]	Acta Chem. Scand. <u>1963</u> , 17, 127-33.
VARIABLES:		PREPARED BY:
	98.15 - 307.95	E. S. Thomsen
Total P/kPa = 1	01.325	
EXPERIMENTAL VALUES	<u>.</u>	
	T/K Mol Fraction	Bunsen Ostwald
	x <sub>1</sub> x 10 <sup>3</sup>	Coefficient Coefficient
	298.15 2.17	0.330 0.360
	298.25 2.15 307.95 2.18	0.327 0.357 0.328 0.370
The mole fracti	on and Ostwald solubili	ty values were calculated by the
compiler.	on and Ostward Solubili	ity varues were carcurated by the
Smoothed Data:	$\Delta G^{O}/J \text{ mol}^{-1} = -RT \ln X$	с, = 705.6 + 48.663 т
		$s^{0}/J \kappa^{-1} mol^{-1} = -48.663$
		tion $\Delta G^{O}/J \text{ mol}^{-1}$
	X <sub>1</sub> × 1	
	298.15 2.16 303.15 2.17	•
	308.15 2.18	
		,
		INFORMATION
METHOD/APPARATUS/P	ROCEDURE: 1-glass combined man-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Contained 0.2 percent
ometer and bulb	was enclosed in an air	
	shaken until equilib- was used for calibra-	(2) Heptane. Merck Co. Distillation
tion and as the	confining liquid.	range of 0.09 degree.
	re degassed in the ails are in references	
1 and 2.	und and in references	
	lume of gas was cal-	
	e initial and final aturated with solvent	
vapor. The amo	unt of solvent was	
determined by the mercury.	he weight of displaced	ESTIMATED ERROR:
1 -	of the liquid with the	$\delta T/K = 0.05$ $\delta X_1/X_1 = 0.015$
gas was carried	out close to atmos-	
	. The solubility orted for one atmos-	REFERENCES :
phere gas press	ure assuming Henry's	1. Lannung, A.
law is obeyed.		J. Am. Chem. Soc. <u>1930</u> , 52, 68.
		2. Gjaldbaek, J. C. Acta Chem. Scand. 1952, 6, 623.
		Acta them. Scana. <u>1952</u> , 0, 025.
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ORIGINAL MEASUREMENTS: Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
Rusz, L.; Patyi, L.
Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
PREPARED BY:
S. A. Johnson H. L. Clever
Bunsen Ostwald
Coefficient Coefficient $\alpha$ L 
0.295 0.322 0.230 0.264
ne Bunsen coefficients were calculated
n X₁ = −11,950 + 92.003 T
eptane system for the recommended equa-
( INFORMATION
SOURCE AND PURITY OF MATERIALS:
Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No futhrer infor- mation.
ESTIMATED ERROR:
$\delta x_{1}/x_{1} = 0.03$
REFERENCES :

COMPONENTS:	19300 4		ORIGINAL MEASUREMENTS:	
(1) Oxygen; 0 <sub>2</sub> ;			Thomsen, E. S.; Gjaldbaek, J. C.	
2) Octane; C <sub>8</sub> H <sub>18</sub> ; [111-65-9]			Acta Chem. Scand. 1963, 17,127-33.	
VARIABLES:			PREPARED BY:	
	298.15 -	308.15	E. S. Thomsen	
Total P/kPa = 1	.01.325			
EXPERIMENTAL VALUE	S:			
	т/к	Mol Fraction	Bunsen Ostwald	
		$x_{1} \times 10^{3}$	Coefficient Coefficient	
	298.15	2.06	0.283 0.309	
	298.25 308.15	2.11 2.08	0.290 0.317 0.282 0.318	
The wells freeting		Daturald colubil	ity values were calculated by the	
compiler.	ton and t	Stward Solusii.	ity values were calculated by the	
	∆G <sup>O</sup> /J ⊓	$nol^{-1} = -RT \ln 2$	х <sub>1</sub> = -198.2 + 51.989 т	
			$\Delta s^{\circ}/J \kappa^{-1} mol^{-1} = -51.989$	
	Δн /Ј п -			
			ction $\Delta G^{\circ}/J \text{ mol}^{-1}$	
	-	X		
		298.15         2.01           303.15         2.01	8 15,302 8 15,562	
		308.15 2.0	8 15,822	
			INFORMATION	
	BOASDUDS		· · · · · · · · · · · · · · · · · · ·	
METHOD/APPARATUS/P A calibrated al		combined man-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Contained 0.2 percent	
ometer and bulk	o was end	closed in an	N <sub>2</sub> .	
air thermostat equilibrium. M			(2) Octane. British Drug House.	
calibration and liquid. The so		confining vere degassed	Fractionated, distillation range 0.02 K, (a) treated with	
in the apparatu	ıs. Deta		$H_2SO_4 + HNO_3$ , (b) no treatment	
references 1 ar			with acids, (ca. 1 percent	
The absorped vo culated from th			impurity).	
amounts, both s vapor. The amo	saturated	d with solvent		
determined by t	the weigh	nt of displaced	ESTIMATED ERROR:	
mercury.			$\delta T/K = 0.05$	
The saturation gas was carried	of the 1 l out clo	liquid with the ose to atmos-	$\delta x_1 / x_1 = 0.015$	
pheric pressure	e. The s	solubility	REFERENCES :	
values were rep phere gas press law is obeyed.			L. Lannung, A. J. Am. Chem. Soc. 1930, 52, 68.	
			2. Gjaldbaek, J. C.	
			Acta Chem. Scand. <u>1952</u> , 6, 623.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
(2) Octane; C <sub>8</sub> H <sub>18</sub> ; [111-65-9]	Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
VARIABLES: T/K = 298.15 - 313.15 P/kPa = 101.325	PREPARED BY: S. A. Johnson H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $X_1 \times 10^3$	Bunsen Ostwald Defficient Coefficient $\alpha$ L
298.15 1.90 313.15 1.48	0.260 0.284 0.200 0.229
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = - RT \ln$ See the evaluation of the oxygen + oction.	-
	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was used.	Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.
Bodor, Bor, Mohai and Sipos (1) was	Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor-
Bodor, Bor, Mohai and Sipos (1) was	Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.
Bodor, Bor, Mohai and Sipos (1) was	Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wilcock, R. J.; Battino, R.;
-	Danforth, W. F.; Wilhelm, E.
(2) Octane; C <sub>8</sub> H <sub>18</sub> ; [111-65-9]	J. Chem. Thermodyn. <u>1978</u> , 10, <b>8</b> 17-22.
VARIABLES:	PREPARED BY:
T/K = 283.31 - 313.15 P/kPa = 101.325	A. L. Cramer
F/KFA - 101.323	
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald
$X_1 \times 10^3$	Coefficient Coefficient
283.31 2.159	0.3015 0.3127
298.21 2.177 313.15 2.170	0.2990 0.3264 0.2927 0.3356
The Bunsen coefficients were calculat	
The solubility values were adjusted t 101.325 kPa (1 atm) by Henry's law.	o an oxygen partial pressure of
	х <sub>1</sub> = 120.84 + 50.591 т
Std. Dev. $\Delta G^{\circ} = 8.1$ ,	Coef. Corr. = 0.9999
$\Delta H^{O}/J \text{ mol}^{-1} = 120.84,$	$\Delta s^{\circ}/J K^{-1} mol^{-1} = -50.591$
T/K Mol Fra	ction $\Delta G^{O}/J \text{ mol}^{-1}$
X, X	
283.15 2.1 293.15 2.1	
303.15 2.1	7 15,457
313.15 2.1	7 15,963
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus is based on	(1)Oxygen. Air Products and
the design of Morrison and Billett (1) and the version used is	Chemicals Co. 99.6 per cent.
described by Battino, Evans, and	(2)Octane. Phillips Petroleum Co. 99 mol %, distilled, density
Danforth (2). The degassing appara- tus is that described by Battino,	$\rho_{298.15}^{\rho} = 0.6988.$
Banzhof, Bogan, and Wilhelm (3).	
Degassing. Up to 500 cm <sup>3</sup> of solvent	ESTIMATED ERROR: $\delta T/K = 0.02$
is placed in a flask of such size that the liquid is about 4 cm deep.	$\begin{array}{l} \delta P/mmHg = 0.5\\ \delta X_1/X_1 = 0.01 \end{array}$
The liquid is rapidly stirred, and	
vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the	REFERENCES :
permanent gas residual pressure drops to 5 microns.	1. Morrison, T. J.; Billett, F.
Solubility Determination. The de-	J. Chem. Soc. 1948, 2033.
gassed solvent is passed in a thin	2. Battino, R.; Evans, F. D.;
film down a glass helical tube con- taining solute gas plus the solvent	Danforth, W. F. J. Am. Oil Chem. Soc. 1968,
vapor at a total pressure of one atm.	45, 830.
The volume of gas absorbed is found by difference between the initial	3. Battino, R.; Banzhof, M.;
and final volumes in the buret	Bogan, M.; Wilhelm, E. Anal. Chem. 1971, 43, 806.
system. The solvent is collected in a tared flask and weighed.	,,,,
In a curba statut and notynout	

COMPONENTS:	
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kretschmer, C. B.; Nowakowska, J.; Wiebe, R.
<pre>(2) 2,2,4-Trimethylpentane or isooctane; C<sub>8</sub>H<sub>18</sub>; [540-84-1]</pre>	Ind. Eng. Chem. <u>1946</u> , 38, 506 <b>-</b> 9.
VARIABLES: T/K ≈ 248.15 - 323.15 P/kPa ≈ 101.325	PREPARED BY: P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^3$	Bunsen Ostwald oefficient Coefficient $\alpha$ L
248.15 2.983 273.15 2.664 298.15 2.529 323.15 2.494	0.4264 0.3874 0.3701 0.3701 0.3413 0.3725 0.3266 0.3864
The Ostwald coefficients were measured (1 atm). The compiler calculated the values for an oxygen partial pressure Ostwald coefficient was independent o Smoothed Data: $\ln x_1 = -6.6138 + 1.4$	Bunsen coefficient and mole fraction of 101.325 kPa (1 atm) assuming the f pressure. 9369/(T/100 K)
Standard error about the p	regression line = $7.44 \times 10^{-5}$
T/K Mo	$x_1 \times 10^3$
253.15 263.15 273.15 283.15 293.15 298.15 303.15 313.15 323.15	2.884 2.801 2.727 2.659 2.598 2.569 2.542 2.490 2.443
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus was similar to that of Horiuti (1), it consisted of a gas buret, manometer, and absorption pipet equiped with a magnetic stirrer All volumes were calibrated by mercury displacement. The solvent was partly degassed by boiling under reflux. About 40 cm <sup>3</sup> of solvent was admitted into the absorp- tion pipet, and pumped on to complete the degassing. Dry gas, measured in the buret, was admitted, final eq- uilibrium was established after 1 to 3 hours stirring. During the solution process the total pressure was kept at one atm by additions of dry gas. The solubility value was corrected for the increase of solvent volume with gas absorption, and for the	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given. Contained 0.4 per cent N<sub>2</sub>. Gas dried by passing through Drierite (2) 2,2,4-Trimethylpentane. "Certi- fied material", source not given. Dried over CaSO<sub>4</sub>, distilled, b.p. (760 mmHg) 99.24, density ρ<sup>25</sup>/ g cm<sup>-3</sup> 0.68774. ESTIMATED ERROR: Gas buret</pre>
nitrogen impurity in the oxygen.	J. Sci Papers Inst. Phys. Chem. Res. (Tokyo) <u>1931</u> , 17, 125.

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Baldwin, R. R.; Daniel, S. G.;	
<pre>(2) 2,2,4-Trimethylpentane     (Isooctane); C<sub>8</sub>H<sub>18</sub>;     [540-84-1]</pre>	J. Appl. Chem., <u>1952</u> , 2(Apr.), 161-5. J. Inst. Petrol., London, <u>1953</u> , 39,	
	105-24.	
VARIABLES:	PREPARED BY:	
T/K = 293.15	P. L. Long	
$O_2 P/kPa = 101.325$	H. L. Clever	
EXPERIMENTAL VALUES:		
T/K Mol Fraction	Bunsen Ostwald	
$x_1 \times 10^3$	$\begin{array}{ccc} \text{Coefficient} & \text{Coefficient} \\ \hline \alpha & \text{L} \\ \hline \end{array}$	
293.15 2.59	0.351 0.377	
AUXILIAF	RY INFORMATION	
METHOD/APPARATUS/PROCEDURE: The method consists of two opera-	SOURCE AND PURITY OF MATERIALS:	
tions: Saturation of the liquid with the gas under consideration; and determination of the amount of dissolved gas in the liquid saturate with the gas. All gases were passed through a liquid air trap to remove water and CO <sub>2</sub> vapors before passage through the liquid. All gases were passed through a long coil, thermo- stated, before the saturation pro- cess.	d (2) 2,2,3-Trimethylpentane. No	

i i yui	ocarbons 22
COMPONENTS :	ORIGINAL MEASUREMENTS:
(1)Oxygen, O <sub>2</sub> ; [7782-44-7]	Kobatake, Y.; Hildebrand, J. H.
(2) 2,2,4-Trimethylpentane or Isooctane; C <sub>8</sub> H <sub>18</sub> ; [540-84-1]	J. Phys. Chem. <u>1961</u> , 65, 331-5.
VARIABLES: T/K = 282.87 - 303.36	PREPARED BY: M. E. Derrick
P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $X_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient aL
282.87 2.912	0.401 0.415
292.00 2.853 298.15 2.814	0.389 0.416 0.381 0.416
303.36 2.783	0.374 0.415
The Bunsen and Ostwald coefficients	were calculated by the compiler.
Smoothed Data: $\Delta G^{O}/J \text{ mol}^{-1} = -RT$ in	
	—
	3, Coef. Corr. = 1.000
$\Delta H^{O}/J \text{ mol}^{-1} = -1579.$	9, $\Delta S^{\circ}/J K^{-1} mol^{-1} = -54.130$
T/K Mol Fr	$\Delta G^{O}/J \text{ mol}^{-1}$
	x 10 <sup>3</sup>
	·····
	911 13,747 877 14,018
293.15 2.	845 14,288
	814 14,559 785 14,830
AUXILIA	RY INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas- measuring buret, an absorption pipet	(1) Oxygen. Linde Oxygen Co. Standard grade, 99.7% oxygen.
and reservoir for solvent. The bure	et
is thermostated at $25^{\circ}$ C, the pipet a any temperature from 5 to $30^{\circ}$ C.	
The solvent is degassed by freezing	dried, fractionated b.p. 99.1 <sup>o</sup> C.
with liquid nitrogen, evacuating,	
then boiling with a heat lamp. The solvent never comes into contact wit	h l
stopcock grease.	
The amount of gas is determined by	
P-V measurements in the gas buret before and after admission of the	ESTIMATED ERROR:
gas into the pipet. No solvent vapo	$\delta x_1 / x_1 = 0.003$
is allowed into the buret system. The solvent is magnetically stirred	
for up to 24 hours until equilibrium	
is reached.	REFERENCES :
Ideal gas behavior and Henry's law are assumed to calculate the mole	
fraction solubility at a gas partial	
pressure of one atm.	
	1

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Thomsen, E. S.; Gjaldbaek, J. C.
(2) Nonane; C <sub>9</sub> H <sub>20</sub> ; [111-84-2]	Acta Chem. Scand. 1963, 17,127-33.
9 20	
VARIABLES: T/K = 298.05 - 298.15	PREPARED BY:
Total $P/kPa = 101.325$	E. S. Thomsen
EXPERIMENTAL VALUES: T/K Mol Fraction	Bunsen Ostwald
$x_1 \times 10^3$	Coefficient Coefficient
$\frac{1}{298.05}$ 2.13	$\frac{\alpha}{0.266}$ L 0.290
298.15 2.09	0.261 0.285
The mole fraction and Ostwald solubili	ty values were calculated by the
compiler.	
	· · · · · ·
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A calibrated all-glass combined man-	(1) Oxygen. Contained 0.2 percent
ometer and bulb was enclosed in an air thermostat and shaken until	<sup>N</sup> 2·
equilibrium. Mercury was used for	(2) Nonane, Fluka "purum." Frac-
calibration and as the confining liquid. The solvents were degassed	tionated, distillation range 0.08 K.
liquid. The solvents were degassed in the apparatus. Details are in	0.08 K.
references 1 and 2.	
The absorped volume of gas was cal-	
culated from the initial and final amounts, both saturated with solvent	
vapor. The amount of solvent was	
determined by the weight of displaced mercury.	ESTIMATED ERROR:
The saturation of the liquid with the	$\delta T/K = 0.05$ $\delta X_1/X_1 = 0.015$
gas was carried out close to atmos-	
pheric pressure. The solubility values were reported for one atmos-	REFERENCES :
phere gas pressure assuming Henry's	1. Lannung, A.
law is obeyed.	J. Am. Chem. Soc. <u>1930</u> , 52, 68.
	2. Gjaldbaek, J. C.
	Acta Chem. Scand. <u>1952</u> , 6, 623.

COMPONENTS:	
	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
(2) Nonane; C <sub>9</sub> H <sub>20</sub> ; [111-84-2]	Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
VARIABLES: T/K = 298.15 - 313.15 P/kPa = 101.325	PREPARED BY: S. A. Johnson H. L. Clever
EXPERIMENTAL VALUES:	L
T/K Mol Fraction	Bunsen Ostwald
	pefficient Coefficient
298.15 1.89 313.15 1.42	0.236 0.258 0.174 0.200
The mole fraction solubilities and the by the compiler.	Bunsen coefficients were calculated
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = - RT \ln$	$X_3 = -14,797 + 101.769 T$
See the evaluation of the oxygen + nor	-
AUXILIARY	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analy- tical grade reagents of Hungarian or of foreign origin. No further infor- mation.
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analy- tical grade reagents of Hungarian or of foreign origin. No further infor-

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
(2) Decane; C <sub>10</sub> H <sub>22</sub> ; [124-18-5]	Inst. J. Ind. Chem. <u>1976</u> , 4, 269-80.
VARIABLES: T/K = 298.15 - 313.15 P/kPa = 101.325	PREPARED BY: S. A. Johnson H. L. Clever
EXPERIMENTAL VALUES:	
	Bunsen Ostwald pefficient Coefficient α L
298.15 1.85 313.15 1.42	0.212 0.231 0.159 0.183
The mole fraction solubilities and the by the compiler.	Bunsen coefficients were calculated
	Х <sub>1</sub> = -13,690 + 98,234 т
See the evaluation of the oxygen + dec	ane system for the recommended equa-
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was used.	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.
	ESTIMATED ERROR: $\delta x_1/x_1 = 0.03$

				23
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; (2) Decane; C <sub>10</sub> H			Danforth,	REMENTS: J.; Battino, R.; W. F.; Wilhelm, E. ermodyn. <u>1978</u> , 10,817-22.
VARIABLES: T/K = 2 P/kPa = 1	283.15 - 31 .01.325	3.48	PREPARED BY:	H. L. Clever
EXPERIMENTAL VALUE	:S:		l	
		ol Fraction X <sub>1</sub> × 10 <sup>3</sup>	Bunsen Coefficient a	Ostwald Coefficient L
	283.15 298.11 313.48	2.204 2.200 2.181	0.2564 0.2522 0.2460	0.2658 0.2752 0.2823
The Bunsen coef The solubility Henry's law.				piler. (l atm) assuming
Smoothed Data:	Std. Dev. ∆H <sup>O</sup> /J mol               	$\Delta G^{\circ} = 5.9, C$ $^{-1} = -281.9,$	tion $\Delta G^{\circ}/J$ r 0 <sup>3</sup> 14,12 14,62 15,12 15,69	$0.99999$ $L^{-1} = -51.846$ $no1^{-1}$ $39$ $58$ $76$ $95$
<u></u>		AUXILIARY	INFORMATION	
METHOD/APPARATUS/P The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a that the liquid The liquid is ra vacuum is inter through a liquid permanent gas ra to 5 microns. Solubility Dete gassed solvent film down a glas taining solute of vapor at a tota The volume of ga by difference bo final volumes in The solvent is of flask and weight	apparatus orrison and sion used ns, and Da pparatus i ttino, Ban to 500 cm <sup>3</sup> flask of s is about apidly stim mittently a d N <sub>2</sub> trap esidual pro- rmination. is passed s helical gas plus th pressure as absorbed etween the buref collected	d Billett is described nforth (2). s that zhof, Bogan, of solvent uch size 4 cm deep. rred, and applied until the essure drops The de- in a thin tube con- ne solvent of one atm. d is found initial and t system.	<pre>(1) Oxygen. Chemicals (2) Decane. 99 mol % <sup>0</sup>298.15<sup>=</sup> ESTIMATED EN REFERENCES: 1. Morrison, J. Chem. 2. Battino, Danforth, J. Am. Oi 45, 830. 3. Battino, Bogan, M.</pre>	distilled, density, = 0.7264. RROR: $\delta T/K = 0.02$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.01$ T. J.; Billett, F. Soc. <u>1948</u> , 2033. R.; Evans, F. D.;

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Megyery-Balog, K.;	
-	Rusz, L.; Patyi, L.	
(2) Undecane; C <sub>11</sub> H <sub>24</sub> ; [1120-21-4]	Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.	
VARIABLES:	PREPARED BY:	
T/K =298.15 - 313.15 P/kPa =101.325	H. L. Clever S. A. Johnson	
EXPERIMENTAL VALUES:		
T/K Mol Fraction $X_1 \times 10^3$	Bunsen Ostwald Defficient Coefficient α L	
298.15 1.82 313.15 1.38	0.193 0.211 0.144 0.165	
The mole fraction solubilities and the by the compiler. Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = - RT \ln$		
	·	
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was used.	Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.	
	ESTIMATED ERROR: $\delta X_1 / X_1 = 0.03$ REFERENCES:	

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Dodecane; C <sub>12</sub> H <sub>26</sub> ; [112-40-3]	ODICINAL MELCHERING
-	ORIGINAL MEASUREMENTS:
(2) Dodecane: $C_{-0}H_{-1}$ , [112-40-3]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
$(2, 5)$ boundary, $(12n_{26}, (112-40-5))$	Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
VARIABLES:	PREPARED BY:
T/K = 298.15 - 313.15 P/kPa = 101.325	S. A. Johnson H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald
Ċ	oefficient Coefficient
$x_1 \times 10^3$	α L
298.15 1.86 313.15 1.38	0.182 0.199 0.133 0.153
The mole fraction solubilities and th by the compiler. Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = - RT \ln$	e Bunsen coefficients were calculated $x_1 = -15.447 + 104.08 \text{ T}$
The data and the equation are classes	-
AUXILIARY	INFORMATION
	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further infor-
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further infor-
	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further infor- mation.
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further infor- mation.

COMPONENTS:	
	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
(2) Tridecane; C <sub>13</sub> H <sub>28</sub> ; [629-50-5]	Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
VARIABLES:	PREPARED BY:
<pre>\mathcal{T} = 298.15 - 313.15 P/kPa = 101.325</pre>	S. A. Johnson H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction Co $X_1 \times 10^3$	Bunsen Ostwald efficient Coefficient a L
298.15 1.79 313.15 1.39	0.164 0.179 0.126 0.144
The mole fraction solubilities and the by the compiler.	Bunsen coefficients were calculated
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = -RT \ln$	X <sub>1</sub> = −13,089 + 96.49 T
The data and the equation are classes	na tantativa
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	
1	SOURCE AND PURITY OF MATERIALS:
Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was used.	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analy- tical grade reagents of Hungarian or of foreign origin. No further in- formation.
Bodor, Bor, Mohai and Sipos (1) was	Both the gas and liquid were analy- tical grade reagents of Hungarian or of foreign origin. No further in- formation.
Bodor, Bor, Mohai and Sipos (1) was	Both the gas and liquid were analy- tical grade reagents of Hungarian or of foreign origin. No further in-
Bodor, Bor, Mohai and Sipos (1) was	Both the gas and liquid were analy- tical grade reagents of Hungarian or of foreign origin. No further in- formation.

COMPONENTS:	
	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Tetradecane; C <sub>14</sub> H <sub>30</sub> ; [629-59-4]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.
VARIABLES: T/K = 298.15 - 313.15	PREPARED BY: S. A. Johnson
P/kPa = 101.325 EXPERIMENTAL VALUES:	H. L. Clever
EAFERIMENTAL VALUES:	
$     \begin{array}{r}         T/K  Mol \ Fraction \\                                    $	BunsenOstwaldDefficientCoefficient $\alpha$ L0.1560.1700.1140.131
The mole fraction solubilities and the by the compiler. Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = - RT \ln$ The data and the equation are classed	Х <sub>1</sub> = -15.175 + 103.40 т
	INFORMATION
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai and Sipos (1) was used.	INFORMATION SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.

COVER ON THE OWNER OF THE OWNER OWNE		
COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.	
(2) Pentadecane; C <sub>15</sub> H <sub>32</sub> ; [629-62-9]	Rusz, L.; Patyi, L.	
10 52	Hung. J. Ind. Chem. <u>1976</u> , 4, 269-80.	
VARIABLES:	PREPARED BY:	
T/K = 298.15 - 313.15	S. A. Johnson H. L. Clever	
P/kPa = 101.325		
EXPERIMENTAL VALUES:		
T/K Mol Fraction	Bunsen Ostwald Defficient Coefficient	
$x_{1} \times 10^{3}$	a L	
298.15 1.72	0.139 0.152	
313.15 1.38	0.110 0.126	
The mole fraction solubilities and the	Bunsen coefficients were calculated	
by the compiler.		
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = - RT \ln$	$X_1 = -11,398 + 91.15 \text{ T}.$	
The data and the equation are classed	as tentative.	
AUXILIARY	INFORMATION	
AUXILIARY METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor-	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor-	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor-	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor-	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor-	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further information. ESTIMATED ERROR: $\delta X_1/X_1 = 0.03$	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analyti- cal grade reagents of Hungarian or of foreign origin. No further infor- mation.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further information. ESTIMATED ERROR: $\delta X_1/X_1 = 0.03$ REFERENCES:	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further information. ESTIMATED ERROR: $\delta X_1/X_1 = 0.03$ REFERENCES: 1. Bodor, E.; Bor, Gy., Mohai, B.; Sipos, G.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further information. ESTIMATED ERROR: $\delta X_1/X_1 = 0.03$ REFERENCES: 1. Bodor, E.; Bor, Gy., Mohai, B.; Sipos, G. Veszpremi Vegyip. Egy. Kozl.	
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Moahi and Sipos (1) was	SOURCE AND PURITY OF MATERIALS: Both the gas and liquid were analytical grade reagents of Hungarian or of foreign origin. No further information. ESTIMATED ERROR: $\delta X_1/X_1 = 0.03$ REFERENCES: 1. Bodor, E.; Bor, Gy., Mohai, B.; Sipos, G.	

		•	rocarbons		237
COMPONENTS:			ORIGINAL ME	ASUREMENTS:	
(1) Oxygen; (	-			, J.; Megyery- Balog, K.; .; Patyi, L.	
(2) Hexadecar	ne; C <sub>16</sub> H <sub>34</sub>	; [544-76-3]		Ind. Chem. <u>1976</u> , 4, 269-80	•
VARIABLES:		<u> </u>	PREPARED BY	:	
Т/К = 298.15 - 313.15 P/kPa = 101.325			A. Johnson L. Clever		
EXPERIMENTAL VA	LUES:		<b>-</b>		
		Mol Fraction	Bunsen	Ostwald	
	-,		Coefficient α	Coefficient L	
	298.15 313.15	1.74 1.38	0.133 0.104	0.145 0.119	
			n X <sub>l</sub> = -11,9 s as tentati		
		mol <sup>-</sup> = - RT I	-		
		ion are classe	s as tentati		
The data and	the equat	ion are classe	s as tentati	ve.	
The data and METHOD/APPARATU Volumetric me	the equat	ion are classe	s as tentati RY INFORMATION SOURCE AND Both the cal grade		

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Ijams, C. C.
(2) Alkanes; C7H <sub>16</sub> , C <sub>8</sub> H <sub>18</sub> , C <sub>10</sub> H <sub>22</sub>	Ph. D. thesis,1941, Vanderbilt University, Nashville, TN
VARIABLES: T/K= 298.15 P/kPa= 101.325	PREPARED BY: H.L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient
Heptane; C7H16; [	142-82-5]
298.15 1.99	0.303 0.331
Octane; C <sub>8</sub> H <sub>18</sub> ; []	.11-65-9]
298.15 2.08	0.286 0.312
2,2,4-Trimethylpe C <sub>8</sub> H <sub>18</sub> ; [540-84-1]	entane or isooctane;
298.15 2.43	0.329 0.359
Decane; C <sub>10</sub> H <sub>22</sub> ; [	124-18-5]
298.15 2.13	0.244 0.266
The mole fraction and Ostw were calculated by the com	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified so that small solvent sample (2 cm <sup>3</sup> ) could be used with almost 100 per cent recovery of the solvent.	<ol> <li>Oxygen. Air Reduction Co. Purity 99.5 per cent.</li> <li>Alkanes. Purified. Vapor pressure and boiling point also reported in the thesis.</li> </ol>
An improved temperature control system was used.	ESTIMATED ERROR:
-	$\delta T/K = 0.05$
1	
	REFERENCES: 1. Van Slyke, D. D. <i>J. Biol. Chem.</i> <u>1939</u> , <i>130</i> , 545.

COMPONENTS :		ORIGINAL M	EASUREMENTS:
<pre>(1) Oxygen; 0<sub>2</sub>;</pre>	[7782-44-7]	Blanc, C	C; Batiste, M.
(2) n-Alkanes (	(C <sub>7</sub> -C <sub>18</sub> )	Bull. Ce 41.	entr. Rech. Pan. <u>1970</u> ,4, 235
		Chem. Ab	str. <u>1973</u> , 79, 108564g.
ARIABLES:		PREPARED B	Y:
T/K = 303 P/kPa = 101		R. Batti	no
XPERIMENTAL VALUE	S:		
Solvent	10 <sup>5</sup> Cp <sup>a</sup> /g cm <sup>-3</sup>	10 <sup>2</sup> L <sup>b</sup>	$10^{2} \beta^{9} \text{cm}^{3} (\text{STP}) \text{cm}^{-3} \text{atm}^{-1}$
	t/°C =	30	
<sup>n-C</sup> 7 <sup>H</sup> 16	44.64	34.67	31.24
n-C <sub>8</sub> H <sub>18</sub>	38.15	29.63	26.70
n-C <sub>9</sub> H <sub>20</sub>	36.45	28.31	25.51
n-C <sub>10</sub> <sup>H</sup> 22	31.15	24.19	21.80
n-C H 11 24	30.87	23.97	21.60
n-C <sub>12</sub> H <sub>26</sub>	30.10	23.38	21.07
<sup>n-C</sup> 13 <sup>H</sup> 28	28.27	21.95	19.78
<sup>n-C</sup> 14 <sup>H</sup> 30	26.66	20.71	19.66
<sup>b</sup> Ostwald coeff <sup>c</sup> Bunsen coeffi	icient.	t 101.325 KPa	partial pressure of gas.
	AUXIL	IARY INFORMATION	N
	is described in the a manometric-		PURITY OF MATERIALS: tails given.
		ESTIMATED $\delta L/L =$ REFERENCES	±0.01, authors' estimate.

COMPONENTS:	NENTS:		EASUREMENTS:
(1) Oxygen;	(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]		Batiste, M.
(2) n-Alkane	(2) n-Alkanes $(C_7 - C_{18})$		Rech. Pan. 1970, 4, 235-41
			1973 , 79, 108564g
EXPERIMENTAL	VALUES:	J	
	co	ontinued	
Solvent	10 <sup>5</sup> Cp <sup>a</sup> /g cm <sup>-3</sup>	10 <sup>2</sup> L <sup>b</sup>	$10^{2}\beta^{c}/cm^{3}$ (STP) cm <sup>-3</sup> atm <sup>-1</sup>
	t/°C =	: 30	
<sup>n-C</sup> 15 <sup>H</sup> 32	26.00	20.20	18.20
$n-C_{16}^{H}_{34}$	25.28	19.63	17.69
n-C <sub>17</sub> H <sub>36</sub>	23.88	18.54	16.71
<sup>n-C</sup> 18 <sup>H</sup> 38	23.00	17.87	16.10

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Guerry, D. Jr.
<pre>(1) Oxygen; O<sub>2</sub>; (7)O2 44 7] (2) Cyclic hydrocarbons; C<sub>6</sub>H<sub>10</sub> and C<sub>6</sub>H<sub>12</sub></pre>	Ph.D. thesis, <u>1944</u> , Vanderbilt University, Nashville, TN.
VARIABLES: T/K = 293.15, 298.15 P/kPa = 101.325 (1 atm)	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	L
T/K Mol Fraction $x_1 \times 10^4$ C	Bunsen Ostwald oefficient Coefficient αL
Cyclohexene; C <sub>6</sub> H <sub>10</sub>	; [110-83-8]
293.15 10.4 298.15 10.4	0.231 0.248 0.229 0.250
Cyclohexane; C <sub>6</sub> H <sub>12</sub>	; [110-82-7]
293.15 12.1 298.15 12.3	0.252 0.270 0.255 0.278
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A Van Slyke-Neill Manometric Appara- tus manufactured by the Eimer and Amend Co. was used.	Cyclohexene. B.p. (756.6 mmHg) t/°C 82.35 - 82.50 (corr.).
The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample.	Cyclohexane. B.p. (760.7 mmHg) t/°C 80.90 (corr.). Data on density, refractive index and vapor pressure are in the thesis.
An improved temperature control system was used.	
SOURCE AND PURITY OF MATERIALS:	ESTIMATED ERROR:
(1) Oxygen. Air reduction Co. Purity 99.5 per cent.	δT/K = 0.05
(2) Hydrocarbons. Both were Eastman Kodak Co. products. They were purified by standard methods, and distilled from Na in a nitrogen atm.	<pre>REFERENCES: 1. Van Slyke, D. D. J. Biol. Chem. 1939, 130, 545. 2. Ijams, C. C. Ph.D. thesis, 1941 Vanderbilt University</pre>

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wilhelm, E.; Battino, R.
-	
(2) Cyclohexane; C <sub>6</sub> H <sub>12</sub> ; [110-82-7]	J. Chem. Thermodyn. <u>1973</u> , 5, 117-20.
VARIABLES:	PREPARED BY:
T/K = 283.47 - 313.06	
P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	l
	unsen Ostwald
-/	fficient Coefficient
	0.262 0.272 0.260 0.270
283.64 1.243	0.261 0.271
	0.257 0.280 0.255 0.280
	0.255 0.280 0.255 0.289
310.38 1.234	0.251 0.285
313.06 1.274	0.258 0.296
The solubility values were adjusted to 101.325 kPa (1 atm) by Henry's law.	o an oxygen partial pressure of
Smoothed Data: $\Delta G^{\circ}/J \text{ mol}^{-1} = -RT \ln 2$	$x_{-} = 236.7 + 54.798 \text{ T}$
	-
Std. Dev. $\Delta G^{\circ} = 22.3$ ,	
$\Delta H^{O}/J \text{ mol}^{-1} = 236.7, 4$	$\Delta s^{\circ}/J K^{-1} mol^{-1} = -54.798$
T/K Mol Frad	ction $\Delta G^{\circ}/J \text{ mol}^{-1}$
x <sub>1</sub> × 1	10 <sup>3</sup>
283.15 1.24 293.15 1.24	
303.15 1.25	50 16,849
313.15 1.29	54 17,397
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus is based on	(1) Oxygen. Air Products & Chemicals
the design of Morrison and Billett (1) and the version used is described	Co. Minimum purity 99.6 mole per cent.
by Battino, Evans, and Danforth (2).	
The degassing apparatus is that	(2) Cyclohexane. Phillips Petroleum Co. Pure Grade. Distilled.
described by Battino, Banzhof, Bogan, and Wilhelm (3).	Co. Pure Grade. Distilled.
Degassing. Up to 500 cm <sup>3</sup> of solvent	
is placed in a flask of such size	
that the liquid is about 4 cm deep. The liquid is rapidly stirred, and	
vacuum is intermittently	
applied through a liquid N <sub>2</sub> trap	ESTIMATED ERROR:
until the permanent gas residual pressure drops to 5 microns.	$\delta T/K = 0.03$ $\delta P/mmHg = 0.5$
Solubility Determination. The de-	$\delta x_1 / x_1 = 0.005$
gassed solvent is passed in a thin	
film down a glass spiral tube con-	REFERENCES: 1. Morrison, T. J.; Billett, F.
taining solute gas plus the solvent vapor at a total pressure of one atm.	J. Chem. Soc. 1948, 2033.
The volume of gas absorbed is found	2. Battino, R.; Evans, F. D.;
by difference between the initial and final volumes in the buret system.	Danforth, W. F. J. Am. Oil Chem. Soc. 1968, 45, 830.
The solvent is collected in a tared	3. Battino, R.; Banzhof, M.;
flask and weighed.	Bogan, M.; Wilhelm, E.
	Anal. Chem. 1971, 43, 806.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> [7782-44-7]	Wild, J. D.; Sridhar, T.; Potter,
(2) Cyclohexane; C <sub>6</sub> H <sub>12</sub> ; [110-82-7	0.E.
	Chem. Eng. J. <u>1978</u> , 15, 209-14.
VARIABLES:	PREPARED BY:
T/K = 293 - 371	
P/kPa = 0-1206	R. Battino
EXPERIMENTAL VALUES:	
T/°C T <sup>a</sup> /K P <sup>b</sup> /	$1b in^{-2}$ $10^{3}x_{1}^{c}$ $H^{a,d}$
39 312.2	175 1.217 822
39 312.2 59 332.2	156         1.205         930           150         1.231         912
71 344.2	135 1.25 800
	112         1.263         792           165         1.263         792
98 371.2	150 1.277 793
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
47 320.2	0 <sup>e</sup> 1.2 833
58 331.2	0 <sup>e</sup> 1.26 794
<sup>C</sup> Mole fraction solubility at <sup>d</sup> Henry's law coefficient; x <sub>1</sub> <sup>e</sup> Determined by a gas chromato	= H(P/atm).
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K)</pre>	= H(P/atm).
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and</pre>	= H(P/atm). graphic method. -3.8385; authors' smoothing equation.
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>.</pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILI. METHOD/APPARATUS/PROCEDURE:</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION SOURCE AND PURITY OF MATERIALS:</pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i reference (1). Air was</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION SOURCE AND PURITY OF MATERIALS: (1) "High purity medical grade."</pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION SOURCE AND PURITY OF MATERIALS: n (1) "High purity medical grade." (2) Distilled to a final boiling poing of 80.7°C and refractive index of 1.4261. e</pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i reference (1). Air was introduced into a reactor contain ing one gallon of cyclohexane and brought to the desired pressure. Equilibrium was approached from above and below the pressure. Th oxygen in the solution was analyz using the pyrogallol absorption method. A gas chromatographic</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION SOURCE AND PURITY OF MATERIALS: n (1) "High purity medical grade." (2) Distilled to a final boiling poing of 80.7°C and refractive index of 1.4261. e</pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i reference (1). Air was introduced into a reactor contain ing one gallon of cyclohexane and brought to the desired pressure. Equilibrium was approached from above and below the pressure. Th oxygen in the solution was analyz using the pyrogallol absorption method. A gas chromatographic</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION SOURCE AND PURITY OF MATERIALS: n (1) "High purity medical grade." (2) Distilled to a final boiling poing of 80.7°C and refractive index of 1.4261. e ed </pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i reference (1). Air was introduced into a reactor contain ing one gallon of cyclohexane and brought to the desired pressure. Equilibrium was approached from above and below the pressure. Th oxygen in the solution was analyz using the pyrogallol absorption method. A gas chromatographic</pre>	<pre>= H(P/atm). graphic method3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION SOURCE AND PURITY OF MATERIALS: n (1) "High purity medical grade." (2) Distilled to a final boiling poing of 80.7°C and refractive index of 1.4261. e ed ESTIMATED ERROR:</pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i reference (1). Air was introduced into a reactor contain ing one gallon of cyclohexane and brought to the desired pressure. Equilibrium was approached from above and below the pressure. Th oxygen in the solution was analyz using the pyrogallol absorption method. A gas chromatographic</pre>	<pre>= H(P/atm). graphic method. -3.8385; authors' smoothing equation. equation mistakenly have H for x<sub>1</sub>. ARY INFORMATION ARY INFORMATION SOURCE AND PURITY OF MATERIALS: (1) "High purity medical grade." (2) Distilled to a final boiling poing of 80.7°C and refractive index of 1.4261. e ed ESTIMATED ERROR: <math>\delta x_1 / x_1 = \pm 0.02</math>, compiler's estimate <math>\delta T/K = \pm 0.5</math></pre>
<pre>d Henry's law coefficient; x<sub>1</sub> e Determined by a gas chromato f log<sub>10</sub> x<sub>1</sub> = 0.366 log<sub>10</sub> (T/K) g In original paper table and AUXILL METHOD/APPARATUS/PROCEDURE: Details of the method are given i reference (1). Air was introduced into a reactor contain ing one gallon of cyclohexane and brought to the desired pressure. Equilibrium was approached from above and below the pressure. Th oxygen in the solution was analyz using the pyrogallol absorption method. A gas chromatographic</pre>	= $H(P/atm)$ . graphic method. -3.8385; authors' smoothing equation. equation mistakenly have H for $x_1$ . ARY INFORMATION SOURCE AND PURITY OF MATERIALS: (1) "High purity medical grade." (2) Distilled to a final boiling poing of 80.7°C and refractive index of 1.4261. e ed ESTIMATED ERROR: $\delta x_1 / x_1 = \pm 0.02$ , compiler's estimate

COMPONENTS:	ORIGINAL MEASUREMENTS: Field, L. R.; Wilhelm, E.;
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Battino, R.
<pre>(2) Methylcyclohexane; C<sub>7</sub>H<sub>14</sub>; [108-87-2]</pre>	J. Chem. Thermodyn. <u>1974</u> , 6, 237-43.
VARIABLES :	PREPARED BY:
T/K = 284.15 - 313.26 P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	l <u>anda andara andara ang sana ang sana</u>
T/K Mol Fraction	Bunsen Ostwald
$\qquad \qquad $	coefficient Coefficient αL
284.15 1.543	0.2743 0.2853
298.24 1.599 313.26 1.603	0.2795 0.3052 0.2755 0.3159
	0.2755 0.3159
The gas solubility values were adjuste 101.325 kPa (1 atm) by Henry's law.	d to an oxygen partial pressure of
The Bunsen coefficients were calculate	d by the compiler.
Smoothed Data: $\Delta G^{O}/J \text{ mol}^{-1} = -RT \ln X$	1 = 943.0 + 50.459 T
Std. Dev. $\Delta G^{O} = 23.4$ ,	Coef. Corr. = 0.9996
$\Delta H^{O}/J \text{ mol}^{-1} = 943.0, \Delta$	$s^{o}/J K^{-1} mol^{-1} = -50.459$
	tion $\Delta G^{O}/J \text{ mol}^{-1}$
X <sub>1</sub> x 1	0 <sup>3</sup>
283.15 1.55	
293.15 1.57 303.15 1.59	==;;==
313.15 1.61	16,744
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus is based on	(1) Oxygen. Air Products &
the design of Morrison and Billett (1) and the version used is described	Chemicals Co. Minimum purity
by Battino, Evans, and Danforth (2).	99.6 mole per cent.
The degassing apparatus is that described by Battino, Banzhof, Bogan,	(2) Methylcyclohexane. Phillips
and Wilhelm (3).	Petroleum Co. Pure Grade. Distilled.
Degassing. Up to 500 cm <sup>3</sup> of solvent	
is placed in a flask of such size that the liquid is about 4 cm deep.	
The liquid is rapidly stirred, and	
vacuum is intermittently applied through a liquid N <sub>2</sub> trap until	ESTIMATED ERROR:
the permanent gas residual pressure	817K = 0.03
drops to 5 microns.	$\delta P/mmHg = 0.5$ $\delta X_{-}/X_{-} = 0.005$
Solubility Determination. The de-	$\delta x_1 / x_1 = 0.005$
gassed solvent is passed in a thin film down a glass spiral tube con-	REFERENCES :
taining solute gas plus the solvent	1. Morrison, T. J.; Billett, F.
vapor at a total pressure of one atm.	J. Chem. Soc. 1948, 2033. 2. Battino, R.; Evans, F. D.;
The volume of gas absorbed is found by difference between the initial and	Danforth, W. F. J. Am. Oil
final volumes in the buret system.	Chem. Soc. 1968, 45, 830.
inter of an of a buret system.	13 Battino D. Donahof M.
The solvent is collected in a tared flask and weighed.	3. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) <i>cis</i> -1,2-Dimethylcyclohexane; C <sub>8</sub> H <sub>16</sub> ; [2207-01-4]	<pre>ORIGINAL MEASUREMENTS: Geller, E. B.; Battino, R.; Wilhelm, E. J. Chem. Thermodyn. <u>1976</u>, 8, 197-202.</pre>
VARIABLES: T/K = 297.96 - 312.99 P/kPa = 101.325	PREPARED BY: H. L. Clever A. L. Cramer
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald Coefficient Coefficient α L
297.96 1.543 312.99 1.534	0.2446 0.2669 0.2394 0.2744
The Bunsen coefficients were calculate The solubility values were adjusted to 101.325 kPa (1 atm) by Henry's law.	
	$\frac{\Delta S^{0}/J \ K^{-1} \ mol^{-1}}{\Delta S^{0}/J \ mol^{-1}} = -54.836$ $\frac{\Delta S^{0}/J \ K^{-1} \ mol^{-1}}{\Delta G^{0}/J \ mol^{-1}}$ $\frac{\Delta G^{0}/J \ mol^{-1}}{16,049}$
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is applied intermittently through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass spiral tube con- taining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and final volumes in the buret system.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Either Air Products & Chemicals, Inc. or Matheson Co., Inc. 99 mol per cent or better. (2) $cis-1,2$ -Dimethylcyclohexane. Chemical Samples Co. Fractionally distilled and stored in dark. Refractive index (NaD, 298.15 K) 1.4337. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil Chem. Soc. <u>1968</u> , 45, 830. 3. Battino, R.; Banzhof, M.;
The solvent is collected in a tared flask and weighed.	Bogan, M.; Wilhelm, E. Anal. Chem. <u>1971</u> , 43, 806.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) <i>sis</i> -1,3-Dimethylcyclohexane, 59 mol %; C <sub>8</sub> H <sub>16</sub> ; [638-04-0] (3) <i>trans</i> -1,3-Dimethylcyclohexane, 41 mol %; C <sub>8</sub> H <sub>16</sub> ; [2207-03-6] VARIABLES: T/K = 298.03 - 313.05 P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction $\frac{X_1 \times 10^3}{298.03} = \frac{X_1 \times 10^3}{1.722}$	ORIGINAL MEASUREMENTS: Geller, E. B.; Battino, R.; Wilhelm, E. J. Chem. Thermodyn. <u>1976</u> , 8, 197-202. PREPARED BY: H. L. Clever A. L. Cramer Bunsen Ostwald Coefficient Coefficient $\alpha$ L 0.2651 0.2893 0.2574 0.2950
experimental values. $\Delta G^{O}/J \text{ mol}^{-1} = -RT \ln Z$	-
	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass helical tube con- taining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and final volumes in the buret system. The solvent is col- lected in a tared flask and weighed.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Either Air Products & Chemicals, Inc., or Matheson Co., Inc. 99 mol per cent or better. (2) $cis-1,4$ -Dimethylcyclohexane. (3) $trans-1,4$ -Dimethylcyclohexane. Chemical Samples Co. Binary mixture used as received. Authors analyzed mixture by refractive index. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil Chem. Soc. 1968, 45, 830. 3. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E. Anal. Chem. 1971, 43, 806.

COMPONENTS :	· · · · · · · · · · · · · · · · · · ·
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) trans-1,2-Dimethylcyclohexane;</pre>	ORIGINAL MEASUREMENTS: Geller, E. B.; Battino, R.; Wilhelm, E. J. Chem. Thermodyn. <u>1976</u> , 8,197-202.
VARIABLES: T/K = 298.11 - 313.05 P/kPa = 101.325	PREPARED BY: H. L. Clever A. L. Cramer
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald Coefficient Coefficient α L
298.11         1.734           313.05         1.705	0.2678 0.2923 0.2594 0.2973
The Bunsen coefficients were calculate The solubility values were adjusted to 101.325 kPa (1 atm) by Henry's law. Smoothed Data: The Gibbs energy equat points and should be u	o an oxygen partial pressure of tion is based on only two pair of
	$K_1 = -878.35 + 55.803 \text{ T}$
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus is based on the design of Morrison and Billett	(1) Oxygen. Either Air Products &
(1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep.	<pre>Chemicals Inc., or Matheson Co., Inc. 99 mol per cent or better. (2) trans-1,2-Dimethylcyclohexane. Chemical samples Co. Fraction- ally distilled and stored in dark. Refractive index (NaD, 298.15 K) 1.4248. ESTIMATED ERROR:</pre>

			ORIGINAL MEASUE	FMENTS .		
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]			ORIGINAL MEASUREMENTS: Geller, E. B.; Battino, R.;			
(2) cis-1,4-Dimethylcyclohexane,			Wilhelm,			
70 mol %; C <sub>8</sub> H <sub>16</sub> ; [624-29-3]			J. Chem. Th	ermodyn. <u>1976</u> , 8, 197-2	02.	
(3) <i>trans</i> -1,4-Dimethylcyclohexane, 30 mol %; C <sub>8</sub> H <sub>16</sub> ; [2207-04-7]						
8	3 IO, -					
VARIABLES:			PREPARED BY:			
	298.10 - 3 101 325	313.15		. L. Clever . L. Cramer		
P/kPa =101.325						
EXPERIMENTAL VALUE	S:	· · · · · · · · · · · · · · · · · · ·		<u> </u>		
	T/K	Mol Fraction	Bunsen Coefficient	Ostwald		
		$x_{1} \times 10^{3}$				
	298.10	1.737	0.2685	0.2930		
	313.15	1.724	0.2623	0.3007		
The Bunsen coef	ficients	were calculate	ed by the com	piler.		
			_			
101.325 kPa (1			b a nitrogen	partial pressure of		
Smoothed Data.	The Cibb	s energy equat	ion is based	on only two pair of		
Smoothed Data.	experime	ental values.	It should be	used with caution.		
	∆G <sup>O</sup> /J mo	$pl^{-1} = -RT \ln x$	$x_{1} = -370.1 +$	54.086 T		
		-1 = -370.1,	-			
	AH /J MC	= -3/0.1,		1 J4.088		
		AUXTLIARY	INFORMATION			
		AUXILIARY	INFORMATION			
METHOD/APPARATUS/P			SOURCE AND PUR	TY OF MATERIALS:		
METHOD/APPARATUS/P The solubility the design of M	apparatus	s is based on	SOURCE AND PUR (1) Oxygen. Chemical	Either Air Products & s, Inc., or Matheson Co		
The solubility the design of M (1) and the ver	apparatus Morrison a sion used	s is based on and Billett I is described	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 p	Either Air Products & s, Inc., or Matheson Co mol per cent or better.		
The solubility the design of M (1) and the ver by Battino, Eva The degassing a	apparatus Aorrison a sion used ans, and I apparatus	s is based on and Billett l is described Danforth (2). is that	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 1 (2) cis-1,4-1	Either Air Products & s, Inc., or Matheson Co mol per cent or better. Dimethylcyclohexane.		
The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba	apparatus Aorrison a ssion used ins, and I apparatus attino, Ba	s is based on and Billett l is described Danforth (2). is that	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4-1 (3) trans-1,	Either Air Products & s, Inc., or Matheson Co mol per cent or better. Dimethylcyclohexane. 4-Dimethylcyclohexane.		
The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3)	apparatus Aorrison a rsion used ans, and E apparatus attino, Ba	s is based on and Billett l is described Danforth (2). is that anzhof, Bogan,	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4-1 (3) trans-1, Chemical mixture	Either Air Products & s, Inc., or Matheson Co mol per cent or better. Dimethylcyclohexane. 4-Dimethylcyclohexane. Samples Co. The binar used as received.	тy	
The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a	apparatus Morrison a rsion used ans, and I apparatus attino, Ba to 500 cm flask of	s is based on and Billett l is described Danforth (2). is that anzhof, Bogan, a <sup>3</sup> of solvent such size	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4-1 (3) trans-1, Chemical mixture Composit	Either Air Products & s, Inc., or Matheson Co nol per cent or better. Dimethylcyclohexane. 4-Dimethylcyclohexane. Samples Co. The binar used as received. ion determined by refra	чy	
The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a that the liquid	apparatus Morrison a ssion used ans, and I apparatus attino, Ba to 500 cm flask of d is about	s is based on and Billett l is described Danforth (2). is that anzhof, Bogan, a <sup>3</sup> of solvent such size t 4 cm deep.	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4- (3) trans-1, Chemical mixture Composit tive ind	Either Air Products & s, Inc., or Matheson Co mol per cent or better. Dimethylcyclohexane. 4-Dimethylcyclohexane. Samples Co. The binar used as received. ion determined by refra ex by authors.	чy	
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The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a that the liquid The liquid is r vacuum is applied through	apparatus Morrison a ssion used apparatus ttino, Ba to 500 cm flask of d is about capidly st interm a liquid	s is based on and Billett l is described Danforth (2). is that anzhof, Bogan, a <sup>3</sup> of solvent such size t 4 cm deep. tirred, and bittently N <sub>2</sub> trap	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4- (3) trans-1, Chemical mixture Composit tive ind	Either Air Products & s, Inc., or Matheson Co mol per cent or better. Dimethylcyclohexane. 4-Dimethylcyclohexane. Samples Co. The binar used as received. ion determined by refra ex by authors. RROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$	чy	
The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a that the liquid The liquid is r vacuum is	apparatus Morrison a ssion used apparatus attino, Ba to 500 cm flask of d is about capidly st interm a liquid anent gas	s is based on and Billett l is described Danforth (2). is that anzhof, Bogan, a <sup>3</sup> of solvent such size a 4 cm deep. cirred, and hittently l N <sub>2</sub> trap residual	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4-1 (3) trans-1, Chemical mixture Composit tive ind ESTIMATED E	Either Air Products & s, Inc., or Matheson Co mol per cent or better. Dimethylcyclohexane. 4-Dimethylcyclohexane. Samples Co. The binar used as received. ion determined by refra ex by authors. RROR:	чy	
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The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a that the liquid The liquid is r vacuum is applied through until the perma pressure drops Solubility Dete gassed solvent film down a gla taining solute vapor at a tota	apparatus Morrison a rsion used ans, and I apparatus attino, Ba to 500 cm flask of l is about rapidly st interm a liquid anent gas to 5 micr ermination is passed ass spiral gas plus al pressur	a is based on and Billett l is described Danforth (2). is that anzhof, Bogan, a of solvent such size a 4 cm deep. tirred, and hittently l N <sub>2</sub> trap residual cons. I. The de- l in a thin tube con- the solvent re of one atm.	SOURCE AND PUR (1) Oxygen. Chemical Inc. 99 (2) cis-1,4-1 (3) trans-1, Chemical mixture Composit tive ind ESTIMATED E REFERENCES: 1. Morrison J. Chem. 2. Battino, Danforth	Either Air Products & s, Inc., or Matheson Comol per cent or better. Dimethylcyclohexane. A-Dimethylcyclohexane. Samples Co. The binar used as received. ion determined by refrate the by authors. RROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ , T. J.; Billett, F. Soc. <u>1948</u> , 2033. R.; Evans, F. D.; , W. F.	чy	
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The solubility the design of M (1) and the ver by Battino, Eva The degassing a described by Ba and Wilhelm (3) Degassing. Up is placed in a that the liquid The liquid is r vacuum is applied through until the perma pressure drops Solubility Dete gassed solvent film down a gla taining solute vapor at a tota The volume of g by difference b and final volum	apparatus Morrison a ssion used ans, and I apparatus ttino, Ba to 500 cm flask of d is about capidly st interm h a liquid anent gas to 5 micr ermination gas plus as spiral gas plus persour pas absorb between the nes in the ent is col	a is based on and Billett l is described Danforth (2). is that anzhof, Bogan, a <sup>3</sup> of solvent such size t 4 cm deep. tirred, and bittently l N <sub>2</sub> trap residual cons. b. The de- l in a thin tube con- the solvent the solvent sys-	<pre>SOURCE AND PUR: (1) Oxygen. Chemical Inc. 99 (2) cis-1,4-1 (3) trans-1, Chemical mixture Composit tive ind ESTIMATED E REFERENCES: 1. Morrison J. Chem. 2. Battino, Danforth J. Am. O 45, 830. 3. Battino, Bogan, M</pre>	Either Air Products & s, Inc., or Matheson Comol per cent or better. Dimethylcyclohexane. A-Dimethylcyclohexane. Samples Co. The binar used as received. ion determined by refra- ex by authors. RROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ , T. J.; Billett, F. Soc. 1948, 2033. R.; Evans, F. D.; , W. F. il Chem. Soc. 1968,	чy	

OMPONENTS:	ORIGINAL MEASUREMENTS:	
1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wilcock, R. J.; Battino, R.;	
2) Cyclooctane; C <sub>8</sub> H <sub>16</sub> ; [292-64-8]	Wilhelm, E.	
- 8 10	J. Chem. Thermodyn. <u>1977</u> , 9,111-5.	
ARIABLES:	PREPARED BY:	
T/K = 289.18 - 313.53	H. L. Clever	
P/kPa = 101.325	A. L. Cramer	
XPERIMENTAL VALUES: T/K Mol Fraction	Bunsen Ostwald	
	Coefficient Coefficient	
	<u>α L</u>	
289.18 1.105 298.26 1.072	0.1852 0.1961 0.1782 0.1946	
313.53 1.088	0.1782 0.2046	
he Bunsen coefficients were calculat		
he solubility values were adjusted t .01.325 kPa (1 atm) by Henry's law.	o an oxygen partial pressure of	
	х <sub>1</sub> = -15.78 + 56.783 т	
	$x_1 = -15.78 + 56.785 + 1$ , Coef. Corr. = 0.9993	
$Au^{O}/T = -15.78$	$\Delta s^{\circ}/J \kappa^{-1} mol^{-1} = -56.783$	
	ction $\Delta G^{O}/J \text{ mol}^{-1}$	
X <sub>1</sub> x	10 <sup>3</sup>	
288.15 1.0		
293.15 1.0	88 16,630	
298.15 1.0 303.15 1.0	•	
308.15 1.0		
313.15 1.0	88 17,766	
AUXILIARY	INFORMATION	
ETHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
he solubility apparatus is based on	(1) Oxygen. Air Products and	
he design of Morrison and Billett 1) and the version used is described	Chemicals Co. Minimum purity 99.6 mol per cent.	
y Battino, Evans, and Danforth (2).	-	
he degassing apparatus is that	(2) Cyclooctane. Chemical Samples Co. 99 mol percent, distilled,	
escribed by Battino, Banzhof, Bogan, nd Wilhelm (3).	refractive index (NaD, 298.15 K)	
egassing. Up to 500 cm <sup>3</sup> of solvent	1.4562.	
s placed in a flask of such size	ESTIMATED ERROR: $\delta T/K = 0.03$	
hat the liquid is about 4 cm deep.	$\delta P/mmHg = 0.3$	
he liquid is rapidly stirred, and acuum is intermittently	$\delta x_1 / x_1 = 0.005$	
pplied through a liquid N2 trap	REFERENCES:	
ntil the permanent gas residual	1. Morrison, T. J.; Billett, F.	
· · · · · · · · · · · · · · · · · · ·	J. Chem. Soc. <u>1948</u> , 2033.	
	2. Battino, R.; Evans, F. D.;	
ilm down a glass spiral tube con-	Danforth, W. F.	
aining solute gas plus the solvent		
he volume of gas absorbed is found		
y difference between the initial and		
inal volumes in the buret system.		
he solvent is collected in a tared	Bogan, M.; Wilhelm, E. Anal. Chem. <u>1971</u> , 43, 806.	
aining solute gas plus the solvent apor at a total pressure of one atm. he volume of gas absorbed is found y difference between the initial and	J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil Chem. Soc. <u>1968</u> , 45, 830.	

COMPONENTS:	EVALUATOR:
<ol> <li>Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>Benzene; C<sub>6</sub>H<sub>6</sub>; [71-43-2]</li> </ol>	Rubin Battino Department of Chemistry Wright State University Dayton, OH 45435 U.S.A.

CRITICAL EVALUATION:

The solubility of oxygen in benzene was determined by five workers (1-5). Only three of these were of sufficient consistency to smooth. We used 16 data points for the smoothing and they were obtained as follows (reference-number of data points used from that reference): 1-3, 2-6, 5-7. The fitting equation used was:

$$\ln x_1 = A + B/(T/100K) + C \ln (T/100K)$$
(1)

The least squares fit for the 16 points gave

 $\ln x_1 = -13.90754 + 8.741567/(T/100K) + 3.530241 \ln (T/100K)$  (2)

where  $x_1$  is the mole fraction solubility at 101.325 kPa partial pressure of gas. The fit in the mole fraction was to  $\pm 0.60 \times 10^{-5}$  or  $\pm 0.71$  per cent at the middle of the temperature range. Table 1 gives smoothed values of the mole fraction at 101.325 kPa partial pressure of the gas and the Ostwald coefficients at 5K intervals.

Table 1 also gives the thermodynamic functions  $\Delta \overline{G}_{1}^{\circ}$ ,  $\Delta \overline{H}_{1}^{\circ}$ , and  $\Delta \overline{S}_{1}^{\circ}$  for the transfer of gas from the vapor phase at 101.325 kPa partial pressure to the (hypothetical) solution phase of unit mole fraction. These thermodynamic properties were calculated from the smoothing equation according to the following equations:

 $\Delta \overline{G}_{1}^{\circ} = -RAT - 100RB - RCT \ln (T/100)$ (3)  $\Delta \overline{S}_{1}^{\circ} = RA + RC \ln (T/100) + RC$ (4)  $\Delta \overline{H}_{1}^{\circ} = -100RB + RCT$ (5)  $\Delta \overline{C}p_{1}^{\circ} = RC$ (6)

The  $\Delta \overline{C} p_1^{\circ}$  value was constant at 29.4 J mol<sup>-1</sup> K<sup>-1</sup>.

Morgan and Pyne's (3) single value and Naumenko, et al.'s (4), single value were not used since they deviated by about three standard deviations from the smoothed line. There is no apparent reason for this.

TABLE 1. Smoothed values of the solubility of oxygen in benzene, and thermodynamic functions at 5K intervals using equation 2 at 101.325 kPa partial pressure of gas.

т/к	10 <sup>4</sup> x <sub>1</sub> <sup>a</sup>	rp	$\Delta \overline{G}_{1}^{\prime}/kJ mol^{-1}$	$\lambda \overline{H}_{1}^{\circ}/$ kj mol-1	∆ <sup>3</sup> °∕ J mol <sup>-1</sup>
283.15	7.88	0.209	16.82	1.04	-55.7
288.15	7.95	0.213	17.10	1.19	-55.2
293.15	8.02	0.217	17.38	1.34	-54.7
298.15	8.10	0.222	17.65	1.48	-54.2
303.15	8.18	0.226	17.92	1.63	-53.7
308.15	8.27	0.231	18.18	1.78	-53.2
313.15	8.37	0.236	18.45	1.92	-52.8
318.15	8.47	0.241	18.71	2.07	-52.3
323.15	8.57	0.247	18.97	2.22	-51.9
328.15	8.69	9.252	19.23	2.36	-51.4
333.15	8.80	0.258	19.49	2.51	-51.0
338.15	8.93	0.264	19.74	2.66	-50.5
343.15	9.05	0.269	19.99	2.80	-50.1
•	raction solu		101.325 kPa pa	artial pressu	re of gas.
US CWUIC	, cocreterer				- · ·
				continued of	n following page

- Oxygen; 0<sub>2</sub>; [7782-44-7] (1)
- Benzene; C<sub>6</sub>H<sub>6</sub>; [71-43-2] (2)

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EVALUATOR:
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Rubin Battino
Department of Chemistry
Wright State University
Dayton, OH 45435 U.S.A.
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CRITICAL EVALUATION:

continued

References

- 1. Byrne, J.E.; Battino, R.; Danforth, W.F. J. Chem. Thermodyn. 1974, 6, 245-50.
- Sci. Papers Inst. Phys. Chem. Research (Tokyo) 1931, 2. Horiuchi, J. 17, 125-256.
- Morgan, J.L.R.; Pyne, H.R. J. Phys. Chem. <u>1930</u>, 34, 2045-8.
   Naumenko, N.K.; Mukhin, N.N.; Aleskovskii, V.B. Zh. Prikl. Khim.
- (Leningrad) 1969, 42, 2522-8.
  5. Schläpfer, P.; Audykowski, T.; Bukowiecki, A. Schweiz. Arch. Angew. Wiss. Tech. 1949, 15, 299-307.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; $0_2$ ; [7782-44-7]	Morgan, J.L.R.; Pyne, H.R.
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]	J. Phys. Chem. <u>1930</u> , 34, 2045-8.
VARIABLES :	PREPARED BY:
T/K = 298	R. Battino
EXPERIMENTAL VALUES:	h 4 a a
t/°C T/K <sup>a</sup>	$L^{b}$ $10^{4} x_{1}^{a,c}$
25 298.15	0.2076 7.581 0.2079 0.2146 0.2077 0.2051 0.2037 0.2030 0.2100 0.2062
<sup>a</sup> Calculated by compiler.	
<sup>b</sup> Ostwald coefficient.	
<sup>C</sup> Mole fraction solubilit	
L of 0.2079 with a sta	lated from average value of ndard deviation of <u>+</u> 0.0031.
AUXILIARY	INFORMATION
ME THOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;
Used the apparatus of Morgan and Pyne (1). A method is used whereby a rocking beam connected to mercury reservoirs and oumping bulbs oumos gas through previously degassed liquid. After equilibration the gas uptake is read on attached burets. The apparatus is all glass.	<ol> <li>From an electrolytically pre- pared supply and passed over a heated spiral of copper oxide before use.</li> <li>Merck. Distilled to a boiling point of 80.4°C.</li> </ol>
	ESTIMATED ERROR: $\delta L/L = \pm 0.02$ , compiler's estimate REFERENCES: 1. Morgan, J.L.R.; Pyne, H.R. J. Phys. Chem., <u>1930</u> , 34, 1573-82.

COMPONENTS :	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Horiuti, J.	
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]	Sci. Papers Inst. Phys. Chem. Res. (Tokyo)(Jpn) 1931/32, 17, 125-256.	
	( <i>ive kyey</i> , <i>ispla</i> , <u>1991, 92</u> , <i>ive</i> , 129, 290.	
VARIABLES:	PREPARED BY:	
T/K = 283.15 - 333.15	M. E. Derrick H. L. Clever	
Total P/kPa = 101.325	H. L. Clever	
	L	
EXPERIMENTAL VALUES: T/K Mol Fraction	Bunsen Ostwald	
· · · · · · · · · · · · · · · · · · ·	Coefficient Coefficient	
x <sub>1</sub> x 10 <sup>3</sup>	<u>α L</u>	
283.15 0.7897	0.2017 0.2091	
293.15 0.8070 303.15 0.8241	0.2037 0.2186 0.2055 0.2281	
313.15 0.8394	0.2068 0.2371	
323.15 0.8626	0.2099 0.2483	
333.15 0.8788	0.2112 0.2576	
Smoothed Data: $\ln X_1 = -9.95246 + 3.$	0634/(T/100) + 1.6593 ln (T/100)	
Standard error about the regression 1	line = $1.96 \times 10^{-6}$	
T/K Mol Fraction	T/K Mol Fraction	
$x_1 \times 10^3$	$x_1 \times 10^3$	
283.15 0.7899	313.15 0.8417	
293.15 0.8065 303.15 0.8237	323.15 0.8603 333.15 0.8796	
If the gas and solution are assumed t		
the following thermodynamic values.	o be ideal the littled equation gives	
	1 0 -1 -1 0 -1 -1	
	$^{1}$ $\Delta S^{\circ}/J K^{-1} mol^{-1} \Delta C_{p}^{\circ}/J K^{-1} mol^{-1}$	
273.15 16.817 1359	-54.59 13.80	
<u>298.15 17.631 1566</u>	-53.88 13.80	
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
The apparatus consists of a gas	(1)Oxygen. Prepared in the labora-	
buret, a solvent reservoir, and an	tory by heating potassium perman-	
absorption pipet. The volume of the pipet was determined at various	ganate (Kahlbaum). Gas frac-	
miniscus heights by weighing a quan-	tionated in liquid air.	
tity of water. The miniscus height	(2) Benzene. Merck. Extra pure,	
was read with a cathetometer.	free from sulfur sample refluxed with sodium amalgam. Normal	
The dry gas introduced into the de-		
gassed solvent. The gas and solvent	boiling point 80.18 <sup>0</sup> C.	
are mixed with a magnetic stirrer		
until saturation. Care taken to prevent solvent vapor from mixing		
with the solute gas in the gas buret.	ESTIMATED ERROR:	
The volume of gas was determined from		
a gas buret reading, the volume of	$\delta T/K = 0.05$	
the solvent was determined from the miniscus height in the absorption		
pipet.		
	at a total processre of one atm mba	
The Ostwald coefficient was measured a Bunsen coefficient and the mole fract.	at a total pressure of one atm. The ion solubility values were calculated	
by the compiler for a gas pressure of	one atm assuming the gas to behave	
ideally and the Ostwald coefficient to be independent of pressure.		

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Schläpfer, P.; Audykowski, T.;		
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]	Bukowiecki, A.		
(-,, 6-6, 1, ,	Schwe iz. Arch. Argew. Wiss. Tech. 1949, 15, 299-307.		
	<u>1949</u> , 19, 299-307.		
VARIABLES: T/K = 283 - 343	PREPARED BY: R. Battino		
1/K - 205 - 545	R. Battino		
EXPERIMENTAL VALUES:			
	a/K L <sup>b</sup>		
t/°C T			
10 2	83 0.206		
	93 0.219 03 0.226		
40 3	13 0.234		
	23 0.245 33 0.256		
70 3	43 0.271		
a coloriat			
	ed by compiler.		
b Ostwald	coefficient.		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;		
The solvent was saturated with air	(1) From air.		
and the dissolved oxygen determined iodimetrically.	(2) Specific gravity of 0.879 g cm <sup>-3</sup> at 20°C.		
	ESTIMATED ERROR:		
	$\delta L/L = \pm 0.025$ , authors' estimate.		
	DEFEDENCIE.		
	REFERENCES :		
	]		

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Byrne, J. E.; Battino, R.;		
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]	Danforth, W. F.		
(2)(1, 1, 1, 2)	J. Chem. Thermodyn. <u>1974</u> , 6, 245-	50.	
VARIABLES:	PREPARED BY:		
T/K = 310.59 - 310.66 P/kPa = 101.325	H. L. Clever		
-,			
EXPERIMENTAL VALUES:			
-	unsen Ostwald fficient Coefficient		
$\qquad \qquad $			
310.59 0.847	0.2092 0.2379		
310.61 0.836 310.64 0.828	0.2066 0.2349 0.2045 0.2326		
310.66 0.825	0.2038 0.2318		
······································			
The Bunsen coefficients and mol fract the compiler.	ion solubilities were calculated by	Y	
the compiler.			
AUXILIARY	INFORMATION		
ÆTHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
ÆTHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica	1s	
ÆTHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described	SOURCE AND PURITY OF MATERIALS:	ls	
ÆTHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2).	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent.		
ETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen</li> </ul>	t	
ETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan,	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent.	t	
ETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3).	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo</li> </ul>	t	
ETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo</li> </ul>	t	
ETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep.	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo</li> </ul>	t	
ETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo</li> </ul>	t	
ÆTHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent.</li> </ul>	t	
ÆTHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent.</li> <li>(2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent.</li> </ul>	t	
ÆTHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent.  ESTIMATED ERROR:</pre>	t	
AETHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns.	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR:</pre>	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de-	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products &amp; Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent.  ESTIMATED ERROR:</pre>	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES:	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass spiral tube con-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F.	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass spiral tube con- taining solute gas plus the solvent	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033.	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass spiral tube con- caining solute gas plus the solvent	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta x_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.;	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass spiral tube con- caining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin Film down a glass spiral tube con- caining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and final volumes in the buret system.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil Chem. Soc. <u>1968</u> , 45, 830.	t	
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass spiral tube con- caining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and binal volumes in the buret system.	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products & Chemica Co. Minimum purity 99.6 mole per cent. (2) Benzene. Baker Analyzed Reagen Grade. Thiophene free, 99.9 mo per cent. ESTIMATED ERROR: $\delta T/K = 0.03$ $\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil	t	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B.
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]	Zh. Prikl. Khim. (Leningrad) 1969,
Methylbenzene or toluene; C7H8; [108-88-3]	42, 2522-8. J. Appl. Chem. USSR <u>1969</u> , 42, 2376-81.
VARIABLES: $T/K = 298.15$	PREPARED BY:
$O_2 P/kPa = 101.325$	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^4$	Bunsen     Ostwald       Coefficient     Coefficient $\alpha$ L
Benzene; C <sub>6</sub> H <sub>6</sub> ; [	71-43-2]
298.15 8.77	0.220±0.0041 0.240
Methylbenzene or	toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3]
298.15 10.67	0.222±0.006 0.242
The Ostwald coefficent the compiler.	values were calculated by
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	
The oxygen solubility was determined	SOURCE AND PURITY OF MATERIALS:
by a volumetric gas method. The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum gage.	
The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum	The source and purity of the

	·		
COMPONENTS :		ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ;	[7782-44-7]	Field, L. R.; Wilhelm, E.;	
(2) Mothylbonzo	ne or Toluene; C <sub>7</sub> H <sub>8</sub> ;	Battino, R.	
	ne or fordene, c <sub>7</sub> .8,	J. Chem. Thermodyn. 1974, 6, 237-43.	
[108-88-3]			
VARIABLES:		PREPARED BY:	
	293.71 - 313.20	H. L. Clever	
P/kPa = 1	101.325		
EXPERIMENTAL VALUE	T/K Mol Fraction	Bunsen Ostwald	
	$X_{1} \times 10^{3}$	Bunsen Ostwald Coefficient Coefficient	
	X1 × 10 <sup>-</sup>	L	
	293.71 0.922	0.1898 0.2041	
	309.69 0.909	0.1841 0.2087	
	313.20 0.960	0.1991 0.2283	
mh			
The gas solubil	ity values were adjuste atm) by Henry's law.	ed to an oxygen partial pressure of	
		ad by the compiler	
The Bunsen Coer	ficients were calculate	ed by the compiler.	
Smoothed Data:	$\Delta G^{O}/J \text{ mol}^{-1} = -RT \ln 3$	к <sub>1</sub> = 894.6 + 55.105 т	
	Std. Dev. $\Delta G^{O} = 66.5$ ,	= 0.0000	
	$\Delta H^{O}/J \text{ mol}^{-1} = 894.6, \Delta H^{O}/J \text{ mol}^{-1}$	$s^{\circ}/J K^{-1} mol^{-1} = -55.105$	
		tion $\Delta G^{O}/J \text{ mol}^{-1}$	
	x <sub>1</sub> x 1	103	
	293.15 0.91	.7 17,049	
	303.15 0.92		
	313.15 0.93	18,151	
	AUXILIARY	INFORMATION	
		COURCE AND DURYTH OR MATTRACK	
METHOD/APPARATUS/P		SOURCE AND PURITY OF MATERIALS:	
the design of M	apparatus is based on orrison and Billett	(1) Oxygen. Air Products & Chemicals Co. Minimum purity 99.6 mole	
(1) and the vers	sion used is described	per cent.	
by Battino, Evan	ns, and Danforth (2).		
	pparatus is that ttino, Banzhof, Bogan,	(2) Methylbenzene. Phillips Petroleum. Pure Grade.	
and Wilhlem (3)		Distilled.	
	to 500 cm <sup>3</sup> of solvent		
is placed in a f	Elask of such size that		
he liquid is al	oout 4 cm deep. The		
iquid is rapid	ly stirred, and vacuum		
is applied intermittently through a liquid N2 trap until the		ESTIMATED ERROR:	
	esidual pressure drops	$\delta T/K = 0.03$	
to 5 microns.		$\delta P/mmHg = 0.5$	
	mination. The de-	$\delta x_1 / x_1 = 0.005$	
assed solvent i	s passed in a thin		
ilm down a glas	s spiral tube con-	REFERENCES:	
	as plus the solvent	1. Morrison, T. J.; Billett, F.	
apor at a total	pressure of one atm.	J. Chem. Soc. 1948, 2033.	
$n \alpha$ $n \alpha$ $n \alpha$		IZ, BATTINO, R., EVANS, F. D	
	is absorbed is found	2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil	
y difference be		Danforth, W. F. J. Am. Oil Chem. Soc. 1968, 45, 830.	
by difference be inal volumes in The solvent is c	as absorbed is found etween the initial and the buret system. collected in a tared	Danforth, W. F. J. Am. Oil Chem. Soc. 1968, 45, 830. 3. Battino, R.; Banzhof, M.;	
y difference be inal volumes in	as absorbed is found etween the initial and the buret system. collected in a tared	Danforth, W. F. J. Am. Oil Chem. Soc. 1968, 45, 830.	

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B.
(2) Aromatic hydrocarbons; C <sub>8</sub> H <sub>10</sub>	Zh. Prikl. Khim. (Leningrad) <u>1969</u> , 42. 2522-8.
	J. Appl. Chem. <u>1969</u> , 42, 2376-81.
VARIABLES:	PREPARED BY:
T/K = 298.15 O <sub>2</sub> P/kPa = 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction H	Bunsen Ostwald
	efficient Coefficient
1,2-Dimethylbenzene; C <sub>8</sub> H <sub>10</sub> ;	[95-47-6]
298.15 11.18 0.206	5 <u>+</u> 0.0043 0.225
1,3-Dimethylbenzene; C <sub>8</sub> H <sub>10</sub>	[108-38-3]
298.15 11.96 0.216	5 <u>+</u> 0.0043 0.236
1,4-Dimethylbenzene; C <sub>8</sub> H <sub>10</sub> ;	[106-42-3]
298.15 12.44 0.225	$5 \pm 0.0070$ 0.246
Ethylbenzene; C <sub>8</sub> H <sub>10</sub> ; [100-4	1-4]
298.15 12.20 0.222	2 + 0.0070 0.242
The absolute errors are calcu of three or four determination	
AUXILIARY	INFORMATION
	COURCE AND DUDITY OF MATERIALS.
METHOD/APPARATUS/PROCEDURE: The oxygen solubility was determined by a volumetric gas method.	SOURCE AND PURITY OF MATERIALS: The source and purity of the
The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum gage.	materials were not given.
The liquids were saturated with oxygen under an oxygen partial pressure of about 760 mmHg at 25°C for 2 hours. The amount of gas absorbed was then determined.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha / \alpha = 0.023$
Details of the method are given in an earlier paper (1).	(relative) REFERENCES: 1. Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. Zh. Prikl. Khim. <u>1969</u> , 42, 2090.

COMPONENTS:	
	ORIGINAL MEASUREMENTS:
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Fisher, G.T.
(2) p-Xylene; C <sub>8</sub> H <sub>10</sub> ; [106-42-3]	J. Chem. Eng. Data <u>1963</u> , 8, 206; also see correction, ibid. <u>1963</u> , 8, 571.
VARIABLES:	PREPARED BY:
T/K = 303.2 - 353.2	R. Battino
EXPERIMENTAL VALUES:	
t/°C T/X <sup>a</sup> 10 <sup>-2</sup> Henry's	Constant <sup>b</sup> L <sup>C</sup> 10 <sup>3</sup> x <sub>1</sub> <sup>a</sup>
30.0 303.2 8.3	9 0.220 1.13
40.0 313.2 <u>P</u> .0	0 0.214 1.11
50.0 323.2 3.8 60.0 333.2 3.4	
60.0 333.2 3.4 70.0 343.2 8.4	
30.0 353.2 8.7	0 0.193 1.15
<sup>C</sup> "Ostwald Constant" using 25°C volum standard Ostwald coefficient.	2
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The p-xylene is degassed by boiling	(1) No details given.
and passed while hot into a 250 ml	(1) NO details given.
Erlenmever flask which contains p-xylene saturated oxvgen. After equilibrium volume changes are recorded on a buret and the amount of p-xylene in a graduated cvlinder. Measurements were carried out at 750 ±2 mm Hg. Henry's Law Constants were calculated from the measure- ments.	(2) Enjay 99% pure with impurities being the o- and m-isomers.
	ESTIMATED ERROR:
	$\delta \mathbf{T}/\mathbf{T} = \pm 0.1$
	$\delta$ (Henry's Constant) = ±3% (compiler)
	REFERENCES :

\_\_\_\_\_

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B.
(2) Aromatic hydrocarbons;	
$C_{9}H_{12}$ and $C_{10}H_{14}$	Zh. Prikl. Khim. (Leningrad) <u>1969</u> , 42, 2522-8.
	J. Appl. Chem. <u>1969</u> , 42, 2376-81.
VARIABLES:	PREPARED BY:
T/K = 298.15 O <sub>2</sub> P/kPa = 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	А <sub>лан</sub> , страница и страница страница и страниц На постати и страница и с
T/K Mol Fraction	Bunsen Ostwald
$x_1 \times 10^4$ Co	oefficient Coefficient α L
Propylbenzene; C <sub>9</sub> H <sub>12</sub> ; [103	3-65-1]
	L5 <u>+</u> 0.0065 0.235
(1-methylethyl)benzene or cumene; C <sub>9</sub> H <sub>12</sub> ; [98-82-8]	isopropylbenzene or
ş <b>_</b>	22 + 0.0070 0.242
1-methy1-4-propy1benzene; 298.15 14.29 0.20	$(10^{-1}14^{-7}, [1074-35-1])$ 03 + 0.0030 0.222
	-
Butylbenzene; $C_{10}H_{14}$ ; [104	
298.15 14.40 0.18	$33 \pm 0.0055$ 0.200
(1-methylpropyl)benzene or [135-98-8]	s-butylbenzene; C <sub>10</sub> H <sub>14</sub> ;
298.15 15.69 0.20	0.0026 0.227
The Ostwald coefficient valu the compiler. The absolute errors are calc of three or four determinati	culated from the results
AIIXTLIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The oxygen solubility was determined	SOURCE AND PURITY OF MATERIALS:
by a volumetric gas method.	The source and purity of the
The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum gage.	materials were not given.
The liquids were saturated with oxygen under an oxygen partial pressure of about 760 mmHg at 25°C for 2 hours. The amount of gas	ESTIMATED ERROR:
absorbed was then determined. Details of the method are given in	$\delta T/K = 0.1$ $\delta \alpha / \alpha = 0.023$ (relative)
an earlier paper (1).	REFERENCES :
	<pre>1. Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. 2h. Prikl. Khim. 1969, 42, 2090.</pre>

COMPONENTS:	EVALUATOR:
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) Alcohols</pre>	H. L. Clever Department of Chemistry Emory University Atlanta, GA 30322 USA 1981, March

CRITICAL EVALUATION:

An Evaluation of the Mole Fraction Solubility of Oxygen in Alcohols at an Oxygen Partial Pressure of 101.325 kPa (l atm).

The solubility measurements evaluated in this section were carried out at an oxygen partial pressure of 200 kPa or less. Most of the measurements were made at a total pressure near 101.325 kPa (l atm). The mole fraction solubility values are calculated for an oxygen partial pressure of 101.325 kPa assuming the gas is ideal, Henry's constant is obeyed, and the Ostwald coefficient is independent of pressure. The assumptions probably introduce a total error that is smaller than the experimental error of the solubility measurement.

Most of the oxygen solubility measurements were made with pure oxygen, but some were made with air at a pressure near 101.325 kPa, which has an oxygen partial pressure of about 21.3 kPa (0.21 atm). Both volumetric methods and chemical methods were used to determine the oxygen dissolved in the saturated solution.

Oxygen solubility values from twelve papers are evaluated. Only the results of Carius (1) are rejected. All other solubility values are classed as tentative. The results of Kretschmer, Nowakowska, and Wiebe (6) and Battino *et al.* (10, 11) are preferred wherever there is a choice.

The experimental methods used by the authors of the twelve papers are varied. Carius (1) used the original Bunsen technique. His results are high and should be rejected. Timofeev (2) used the original Ostwald technique. His results compare well with modern values. Metschl (3) saturated the solvent at oxygen pressures up to 456 kPa (4.5 atm). The solubility value he reports is essentially the volume of oxygen "shaken out" of the supersaturated solution as the pressure drops from 202 to 101 kPa (2 to 1 atm). His results appear to have a higher uncertainty than the others. Cauquil (4) used an Ostwald-like technique. Some of her results are doubtful. Ijams (5) used a modified van Slyke method. He carefully applied all corrections but he used a small sample volume which in some cases appears to result in a greater than average uncertainty.

Kretschmer, Nowakowska, and Wiebe (6) used the method of Horiuti. Their solvents were well characterized, and the experimental details of the measurement appear to have been carried out carefully. Schläpfer, Audykowski, and Bukowiecki (7) saturated the solvent with air and deter-mined the dissolved oxygen iodimetrically. When their Ostwald coefficients are recalculated as mole fractions at 101.325 kPa oxygen pressure they compare well with other data at temperatures below 313 K. At higher temperatures their results appear to scatter. Shchukarev and Tolmacheva (8) use a volumetric method. Their results at a temperature of 288 K and below appear more reliable than their results at 298 K and above. Naumen Naumenko (9) uses a volumetric method. Battino et al. (10, 11) use a modified Morrison and Billett method. Their solvents are well characterized and the solubility measurement is carried out with care. Makranczy, Rusz, and Balog-Megyery (12) use a volumetric method to measure directly an Ostwald coefficient. In general their results at 298.15 K have appeared to be reliable while results at higher temperatures are not as reliable. (See evaluations in noble gas volumes of the Solubility Series). However, their results for many of the oxygen + alcohol systems they studied tend to be below average values when compared with other workers 'results.

Oxygen + Methanol [67-56-1]

Kretschmer  $et \ al$ . (6) report solubility values at temperatures of 248.15, 273.15, 298.15, and 323.15 K. Makranczy  $et \ al$ . (12) report one value at 298.15 K which is 7.5 per cent lower than the Kretschmer  $et \ al$ . value. Although both sets of data are classed as tentative, the thermodynamic change and solubility values below are based on a linear regression of the Kretschmer  $et \ al$ . data.

The equation for use between 248.15 and 323.15 K is

 $\ln x_{1} = -8.2471 + 1.3742/(T/100 \text{ K})$ 

with a standard error about the regression line of 3.67 x  $10^{-6}$ .

The temperature independent thermodynamic changes for the transfer of one mole of oxygen from the gas at a partial pressure of 101.325 kPa to the infinitely dilute solution are

 $\Delta \overline{H}_1^{\circ}/kJ \mod^{-1} -1.142$  and  $\Delta \overline{S}_1^{\circ}/J K^{-1} \mod^{-1} -68.6$ 

The smoothed solubility values and the Gibbs energy of solution are given in Table 1.

Table l.	Solubility of oxygen in methanol at an oxygen
	partial pressure of 101.325 kPa. Tentative
	values of mole fraction solubility and partial
	molar Gibbs energy of solution as a function
	of temperature.

Т/К	Mol Fraction 10 <sup>4</sup> x <sub>1</sub>	$\Delta \overline{G}_{1}^{\circ}/kJ \text{ mol}^{-1}$
253.15	4.51	16.215
263.15	4.42	16.900
273.15	4.33	17.589
283.15	4.26	18.271
293.15	4.19	18.958
298.15	4.15	19.301
303.15	4.12	19.644
313.15	4.06	20.330
323.15	4.01	21.014

Oxygen + Ethanol [64-17-5]

The solubility of oxygen in ethanol is reported in at least eight papers. The results of Carius (1), a student of R. W. Bunsen, range from 18 per cent at 274 K to 28 per cent at 296 K greater than presently accepted values. The data are rejected.

The mole fraction solubility values at 298.15 K and an oxygen partial pressure of 101.325 kPa from the other papers are given below.

		10 <sup>4</sup> x <sub>1</sub>	Reference
		4.39	McKranczy <i>et al.</i> (12)
		5.10	Metschl (3)
		(5.53) <sup>1</sup>	Shchukarev and Tolmacheva (8)
		(5.68) <sup>2</sup>	Timofeev (2)
		5.74	Naumenko (9)
		5.798	Kretschmer <i>et al</i> . (6)
		(5.88) <sup>3</sup>	Schläpfer <i>et al</i> . (7)
1	Extrapolated experimental	from the value at	two measurements made at 277.15 and 285.15 K. The 298.15 K is 6.78 x $10^{-4}$ .
2	Extrapolated	from the	seven measurements made between 273.15 and 296.55 K.
3	Interpolated	from the	eight measurements made between 273.15 and 343.15 K.

The mole fraction solubility values from the seven papers were compared. In general the higher values were favored if there were no other good reasons for a decision. A linear regression was carried out using the Kretschmer *et al.* data weighted two times; and at a weight of one, the Timofeev data, except the 296.55 K value; the Schläpfer *et al.* data; the Shchukarev and Tolmacheva value at 277.15 K and the Naumenko value. The linear regression of the 24 temperature/solubility pairs gives the equation for use between 248.15 and 343.15 K

 $\ln x_{1} = -7.8738 + 1.2693/(T/100 \text{ K})$ 

with a standard deviation about the regression line of 1.13 x  $10^{-5}$ .

The temperature independent thermodynamic changes in enthalpy and entropy for the transfer of one mole of oxygen from the gas at a partial pressure of 101.325 kPa to the infinitely dilute solution are

 $\Delta \overline{H}_1^\circ/kJ \mod^{-1} -1.055$  and  $\Delta \overline{S}_1^\circ/J K^{-1} \mod^{-1} -65.5$ 

The smoothed solubility values and the Gibbs energy of solution are given in Table 2.

Table 2. Solubility of oxygen in ethanol at an oxygen partial pressure of 101.325 kPa. Tentative values of the mole fraction solubility and partial Gibbs energy of solution as a function of temperature.

T/K	Mol Fraction <sup>1</sup> 10 <sup>4</sup> x <sub>1</sub>	$\Delta \overline{G}_{1}^{\circ}/kJ \text{ mol}^{-1}$
253.15	6.285	15.517
263.15	6.165	16.172
273.15	6.055	16.827
283.15	5.960	17.481
293.15	5.870	18.136
298.15	5.825	18.463
303.15	5.785	18.790
313.15	5.700	19.445
323.15	5.635	20.100
333.15	5.570	20.754
343.15	5.510	21.409

 $^1$  Mole fraction values rounded to the nearest 0.005 x  $10^{-4}\,.$ 

A definitive study of the oxygen + ethanol system is yet to be carried out. Thus, the data of Table 2 are classed as tentative.

The equation and smoothed data based on the data of Kretschmer *et al*. (see their data sheet) may be an equally satisfactory representation of the system. From the equation based on their data  $\Delta \overline{H}_1^\circ/kJ \text{ mol}^{-1}$  is -1.32 and  $\Delta \overline{S}_1^\circ/J \text{ K}^{-1} \text{ mol}^{-1}$  is -66.3.

Oxygen + 1-Propanol [71-23-8]

Makranczy et al. (12) report one solubility value at 298.15 K which is a mole fraction of  $5.03 \times 10^{-4}$ . It is classed as tentative.

Oxygen + 2-Propanol [67-63-0]

Only Kretschmer  $et \ al$ . (6) have reported solubility measurements on the oxygen + 2-propanol system. A linear regression of their three measurements over the temperature interval of 273.15 to 323.15 K gives the equation

 $\ln x_{7} = -7.5774 + 1.2638/(T/100 \text{ K})$ 

with a standard error about the regression line of 9.35 x  $10^{-6}$ .

The temperature independent thermodynamic changes in enthalpy and entropy for the transfer of one mole of oxygen from the gas at a partial pressure of 101.325 kPa to the infinitely dilute solution are

 $\Delta \overline{H}_{1}^{\circ}/kJ \mod^{-1} -1.051$  and  $\Delta \overline{S}_{1}^{\circ}/J K^{-1} \mod^{-1} -63.0$ .

The smoothed values of the mole fraction solubility and the Gibbs energy are in Table 3.

Table 3. The solubility of oxygen in 2-propanol at an oxygen partial pressure of 101.325 kPa. Tentative values of the mole fraction solubility and partial molar Gibbs energy of solution as a function of temperature.

T/K	Mol Fraction $10^4 x_1$	∆G̃°∕kJ mol-1
273.15	8.13	16.158
283.15	8.00	16.788
293.15	7.88	17.418
298.15	7.82	17.733
303.15	7.77	18.048
313.15	7.66	18.678
323.15	7.57	19.308

Oxygen + 1-Butanol [71-36-3]

Kretschmer *et al.* (6) report three solubility values at the temperatures 273.15, 298.15 and 323.15 K. Makranczy *et al.* (12) report one value at 298.15 K which is 27 per cent smaller than the Kretschmer *et al.* (6) value. Although both sets of data are classed as tentative, the values of the thermodynamic changes and the solubility values below are based on a linear regression of the Kretschmer *et al.* data.

The equation for use between 273.15 and 323.15 K is

 $\ln x_{\tau} = -7.6234 + 1.4553/(T/100 \text{ K})$ 

with a standard error about the regression line of  $8.71 \times 10^{-6}$ .

The temperature independent thermodynamic changes in enthalpy and entropy for the transfer of one mole of oxygen from the gas at a partial pressure of 101.325 kPa to the infinitely dilute solution are

 $\Delta \overline{H}_{1}^{\circ}/kJ \mod^{-1}$  -1.210 and  $\Delta \overline{S}_{1}^{\circ}/J K^{-1} \mod^{-1}$  -63.4

The smoothed values of mole fraction solubility and Gibbs energy of solution are in Table 4.

Table 4. The solubility of oxygen in 1-butanol at an oxygen partial pressure of 101.325 kPa. Tentative values of the mole fraction solubility and partial molar Gibbs energy of solution as a function of temperature.

T/K	Mol Fraction $10^4 x_1$	$\Delta \overline{G}_{1}^{\circ}/kJ \text{ mol}^{-1}$
273.15	8.33	16.103
283.15	8.17	16.737
293.15	8.03	17.371
298.15	7.96	17.688
303.15	7.90	18.005
313.15	7.78	18.322
323.15	7.67	19.292

Oxygen + 2-methyl-1-propanol [78-83-1]

Only Battino et al. (10) have reported data on this system. A linear regression of their eight measurements between 274.09 and 327.96 K gives the equation

 $\ln x_{\tau} = -7.9459 + 2.5735/(T/100 \text{ K})$ 

with a standard error about the regression line of 9.40 x  $10^{-6}$ .

The temperature independent thermodynamic changes in enthalpy and entropy for the transfer of one mole of oxygen from the gas at a partial pressure of 101.325 kPa to the infinitely dilute solution are

 $\Delta \overline{H}_1^o/kJ \text{ mol}^{-1}$  -2.140 and  $\Delta \overline{S}_1^o/J \text{ K}^{-1} \text{ mol}^{-1}$  -66.1

The smoothed values of the mole fraction solubility and the Gibbs energy are in Table 5.

Table 5. The solubility of oxygen in 2-methyl-1-propanol at an oxygen partial pressure of 101.325 kPa. Tentative values of the mole fraction solubility and partial molar Gibbs energy of solution as a function of temperature.

Т/К	Mol Fraction $10^4 x_1$	$\Delta \overline{G}_{1}^{\circ}/kJ \text{ mol}^{-1}$
273.15	9.08	15.906
283.15	8.79	16.567
293.15	8.52	17.227
298.15	8.395	17.558
303.15	8.28	17.888
313.15	8.05	18.548
323.15	7.85	19.209

Oxygen + 1-Pentanol [71-41-0] Oxygen + 1-Hexanol [111-27-3]

Makranczy *et al.* (12) report one solubility value on each of these systems at 298.15 K. The values are classed as tentative. However, when the values are compared with the solubility values for the other normal alcohols there is reason to suspect these values may be low.

T/K	Alcohol	Mol Fraction $10^4 x_1$
	1-Pentanol 1-Hexanol	6.30 7.06

Oxygen + 1-Heptanol [111-70-6]

Both Makranczy *et al.* (12) and Ijams (5) report a single solubility value at 298.15 K. The mole fraction solubility values at 101.325 kPa oxygen partial pressure are

Ijams 10.8 x 10<sup>-4</sup> Makranczy *et al.* 7.59 x 10<sup>-7</sup>

Although the two values differ by 30 per cent both are classed as tentative. However, in view of the trends in solubility with alcohol carbon number, the Ijams value is preferred. Oxygen + 1-Octanol [111-87-5]

The following mole fraction solubility values are reported at 298.15 K and 101.325 kPa oxygen partial pressure

Ijams (5) $11.5 \times 10^{-4}$ Wilcock et al. (11) $11.3 \times 10^{-4}$ Makranczy et al. (12) $11.8 \times 10^{-4}$ 

The agreement is satisfactory.

Wilcock et al. report a second value at 283.35 K.

The tentative values for the system are based on the two determinations by Wilcock  $et \ al$ . The equation, based on only two experiments, should be used with caution.

 $\ln x_{1} = -7.2357 + 1.3472/(T/100 \text{ K})$ 

The temperature independent changes in enthalpy and entropy for the transfer of one mole of oxygen from the gas phase at a partial pressure of 101.325 kPa to the infinitely dilute solution are

```
\Delta \overline{H}^{\circ}_{\gamma}/kJ \mod^{-1} -1.120 and \Delta \overline{S}^{\circ}_{\gamma}/J K^{-1} \mod^{-1} -60.2
```

The smoothed values of the mole fraction solubility and the Gibbs energy are in Table 6.

Table 6. The solubility of oxygen in 1-octanol at an oxygen partial pressure of 101.325 kPa. Tentative values of the mole fraction solubility and partial molar Gibbs energy of solution as a function of temperature.

T/K	Mol Fraction $10^{7}x_{1}$	$\Delta \overline{G}_1^{\circ}/kJ \text{ mol}^{-1}$
283.15	11.6	15.914
288.15	11.5	16.215
293.15	11.4	16.516
298.15	11.3	16.817

Oxygen + 1-Nonanol [143-08-8]

Makranczy *et al.* (12) report one measurement at 298.15 K which is classed as tentative. It is equivalent to a mole fraction solubility at 101.325 kPa oxygen of 8.86 x  $10^{-4}$ .

Oxygen + 1-Decanol [112-30-1]

Wilcock *et al.* (11) report solubility values at 282.74, 298.10 and 313.56. Makranczy *et al.* (12) report one value at 298.15. Both sets of solubility values are classed as tentative, but the values given below are based on a linear regression of the Wilcock *et al.* data only.

 $\ln x_{1} = -6.9009 + 0.6185/(T/100 \text{ K})$ 

with a standard error about the regression line of 2.48 x  $10^{-5}$ .

The temperature independent changes in enthalpy and entropy for the transfer of one mole of oxygen from the gas phase at a partial pressure of 101.325 kPa to the infinitely dilute solution are

```
\Delta \overline{H}_1^{\circ}/kJ \mod^{-1} -0.514 and \Delta \overline{S}_1^{\circ}/J K^{-1} \mod^{-1} -57.4
```

The smoothed values of the mole fraction solubility and the Gibbs energy are in Table 7.

Table 7. The solubility of oxygen in 1-decanol at an oxygen partial pressure of 101.325 kPa. Tentative values of the mole fraction solubility and partial molar Gibbs energy of solution as a function of temperature.  $T/K \quad Mol \; Fraction \; \Delta \overline{G}_{2}^{\circ}/kJ \; mol^{-1}$ 

T/K	Mol Fraction $10^4 x_1$	∆G°∕kJ mol-'
283.15	12.53	15.732
293.15	12.43	16.306
298.15	12.39	16.592
303.15	12.35	16.879
313.15	12.27	17.453

Oxygen + 1-Undecanol [112-42-5] Oxygen + 1-Dodecanol [112-53-8]

Makranczy  $et \ all$ . (12) report one solubility value on each system at 298.15 K. The values are classed as tentative.

T/K	Alcohol	Mol Fraction $10^{4}x_{1}$
	1-Undecanol 1-Dodecanol	10.3 10.8

Oxygen + Cyclohexanol [108-93-0]

Cauquil (4) reports one value at 299.15 K. The mole fraction of  $8.55 \times 10^{-4}$  is classed as tentative.

## References:

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- 11. Wilcock, R. J.; Battino, R.; Danforth, W. F.; Wilhelm, E. J. Chem. Thermodyn. <u>1978</u>, 10, 317.
- Makranczy, J.; Rusz, L.; Balog-Megyery, K. Hung. J. Ind. Chem. <u>1979</u>, 7, 41.

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COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kretschmer, C. B.; Nowakowska, J.; Wiebe, R.
(2) Methanol; CH <sub>4</sub> O; [67-56-1]	Ind. Eng. Chem. <u>1946</u> , 38, 506-9.
	1,44. 2,49. 0,10m. <u>= 10,</u> 00, 000 9.
WARTART DO .	
VARIABLES: T/K = 248.15 - 323.15	PREPARED BY: P. L. Long
P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald Defficient Coefficient
$x_1 \times 10$	α
248.15 0.4580 273.15 0.4315	0.2672 0.2427 0.2446 0.2446
298.15 0.4122	0.2268 0.2476
323.15 0.4038	0.2155 0.2550
values for an oxygen partial pressure Ostwald coefficient was independent of	Bunsen coefficient and mole fraction of 101.325 kPa (1 atm) assuming the f pressure.
Smoothed Data: $\ln x_1 = -8.2471 + 1.37$	
	the regression line = $3.67 \times 10^{-6}$
T/K M	IOL Fraction
	$x_1 \times 10^3$
253.15 263.15	0.4509 0.4417
273.15	0.4333
283.15	0.4257
293.15 298.15	0.4187
202.15	0.4100
303.15 313.15	0.4123 0.4064
323.15	0.4009
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that of	(1) Oxygen. Source not given.
Horiuti (1), it consisted of a gas	Contained 0.4 per cent N2.
buret, manometer, and absorption pipet equipped with a magnetic	Passed through Drierite to dry.
stirrer. All volumes were calibrated by mercury displacement.	(2) Methanol. Source not given. Distilled, dried with metallic Al,
The solvent was partly degassed by	b.p. (760 mmHg)/ <sup>O</sup> C 64.50,
boiling under reflux. About 40 cm <sup>3</sup>	density, $\rho_{4}^{25}/g \text{ cm}^{-3}$ 0.78650.
of solvent was admitted into the absorption pipet, and pumped on to	
complete the degassing. Dry gas,	
measured in the buret, was admitted, final equilibrium was established	ESTIMATED ERROR: 3
after 1 to 3 hours stirring. During	Gas buret $\delta V/cm^3 = 0.005$ Average deviation from the mean 0.3%,
the solution process the total pres- sure was kept at one atm by addi-	maximum deviation 0.9% (authors).
tions of dry gas.	
The solubility value was corrected	REFERENCES :
for the increase of solvent volume with gas absorption, and for the	1. Horiuti, J. J. Sci Papers Inst. Phys. Chem.
nitrogen impurity in the oxygen.	<i>J. Sci Papers Inst. Phys. chem.</i> <i>Res. (Tokyo)</i> <u>1931</u> , 17, 125.

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; $O_2$ ; [7782-44-7]	Makranczy, J.; Rusz, L.;		
	Balog-Megyery, K.		
(2) Methanol; CH40; [67-56-1]	Hung. J. Ind. Chem. 1979 7, 41-6.		
	nung. 0. 1nu. onem. <u>1979</u> 7, 41 0.		
VARIABLES:	PREPARED BY:		
T/K = 298	C.L. Young		
EXPERIMENTAL VALUES:			
T/K P/kPa Ostwa	ld Mole fraction		
coeff	icient, of oxygen*, x <sub>O2</sub>		
} 			
298.15 101.3 0.22	0.000381		
* calculated by compiler			
+ partial pressure of oxygen			
·			
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Volumetric method. The apparatus			
of Bodor, Bor, Mohai, and Sipos (1)			
was used.	No details given		
	ESTIMATED ERROR:		
	$\delta x_{O_2} = \pm 3\%$		
	DE EE DENCUE.		
	REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.;		
	Sipos, G.		
	Veszpremi Vegyip. Egy. Kozl.		
	$\frac{1957}{(hom}$ , 1, 55.		
	<i>Chem. Abstr.</i> <u>1961</u> , 55, 3175h.		

COMPONENTS :			ORIGINAL MEASUR	REMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Timofeev, W.		
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]		Z. Physik. Chem. <u>1890</u> , 6, 141-52.		
VARIABLES:	<u></u>		PREPARED BY:	
T/K = 273 - 297		FREFARED BI:		
P/kPa = 101.325		R. Battino, H. L. Clever		
EXPERIMENTAL VAL	UES:			
t/°C	т <sup>а</sup> /К	10 <sup>4</sup> x1 <sup>a,b</sup>	L <sup>a,c</sup>	$\alpha^d/cm^3$ (STP) $cm^{-3}atm^{-1}$
First serie				
0 6.35	273.15 279.65	5.946 5.885	0.23344 0.23493	0.23344(3) 0.22947(4)
11.3	279.05	5.810		
17.1	290.25	5.810 5.750	0.23467 0.23552	0.22164(4)
11.3 17.1 23.4	296.55	5.704	0.23707	0.21836(2)
Second seri	.es	F 013	0 00410	0,00100(0)
3.5 15.1		5.911 5.774	0.23419 0.23539	0.23123(2) 0.22306(1)
_	efficient.	Number in par 99.7 wt % etha		he number of observations.
		AUXILIARY	INFORMATION	
METHOD/APPARATUS Used a Bunse as modified a manometric Details and the paper.	n absorptic by Ostwald volumetric	. Basically, c apparatus.		ITY OF MATERIALS:
			ESTIMATED ERRO	R:
			$\delta \alpha / \alpha = \pm 0.0$	l, compiler's estimate.
			REFERENCES :	

COMPONENTS:			ORIGINAL MEASUR	EMENTS :	
(1) Overgon, $0$ , $[$	7782_44_7]		Metschl, J.		
(1) Oxygen; $O_2$ ; [7782-44-7]				417-27	
(2) Ethanol; C <sub>2</sub> H <sub>6</sub>	0; [64-17-5	;]	J. Phys. Ch	eem. <u>1924</u> , 28, 4	41/-3/.
VARIABLES:			PREPARED BY:	-4,4	· · · · · · · · · · · · · · · · · · ·
T/K = 29 P/kPa = 10				M. E. Derrick H. L. Clever	
EXPERIMENTAL VALUES:					
-	-,	Fraction x 10 <sup>4</sup>	Bunsen Coefficient α	Ostwald Coefficient L	
2	98.15 5	5.10	0.195	0.213	
	compiler ca ald coeffic		the mole fraces.	tion and	
<u> </u>					
		AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCI	EDURE :	AUXILIARY		TY OF MATERIALS:	
METHOD/APPARATUS/PROCH The degassed solv with oxygen at 6 pressures between	ent is satu to 10 diffe	arated erent	SOURCE AND PURN (1) Oxygen. Prepare	TY OF MATERIALS; Commercial cyl d by Linde prod t pure.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	<pre>Kretschmer, C. B.; Nowakowska, J.; Wiebe, R.</pre>
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]	WIEDE, K.
2-6-7	Ind. Eng. Chem. <u>1946</u> , 38, 506-9.
VARIABLES:	
	PREPARED BY:
T/K = 248.15 - 323.15 P/kPa = 101.325	P. L. Long H. L. Clever
17 XI 4 101. 525	n. L. Clevel
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald
$x_1 \times 10^3$ Co	oefficient Coefficient α L
248.15 0.6523	$\begin{array}{c} \alpha & L \\ \hline 0.2627 & 0.2387 \end{array}$
273.15 0.6140	0.2409 0.2409
298.15 0.5798	0.2214 0.2417
323.15 0.5646	0.2097 0.2481
The Ostwald coefficients were measured	l at a total pressure of 101.325 kPa
(1 atm). The compiler calculated the	Bunsen coefficient and mole fraction
values for an oxygen partial pressure	of 101.325 kPa (1 atm) assuming the
Ostwald coefficient was independent of	pressure.
Smoothed Data: $\ln x_1 = -7.9758 + 1.58$	346/(T/100K)
-	-
Standard error about t	the regression line = $4.37 \times 10^{-6}$
	101 Fraction
-7 -	$x_1 \times 10^3$
253.15	0.6427
263.15 273.15	0.6276 0.6139
283.15	0.6014
293.15	0.5901
298.15	0.5848
303.15 313.15	0.5796 0.5701
323.15	0.5612
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that of	(1) Oxygen. Source not given.
Horiuti (1), it consisted of a gas	Contained 0.4 per cent N <sub>2</sub> .
buret, manometer, and absorption	Passed through Drierite to dry.
pipet equipped with a magnetic stirrer. All volumes were calibrated	(2) Ethanol. Source not given.
by mercury displacement.	Dried with Mg. Density,
	$p/g \text{ cm}^{-3} 0.78508.$
The solvent was partly degassed by boiling under reflux. About 40 cm <sup>3</sup>	p/g cm 0.78508.
of solvent was admitted into the	1
absorption pipet, and pumped on to	
complete the degassing. Dry gas,	
measured in the buret, was admitted,	ESTIMATED ERROR:
final equilibrium was established after 1 to 3 hours stirring. During	Gas buret $\delta V/cm^3 = 0.005$
the solution process the total pres-	Average deviation from the mean 0.3%,
sure was kept at one atm by additions	maximum deviation 0.9% (authors).
of dry gas.	
The solubility value was corrected	REFERENCES:
for the increase of solvent volume	l. Horiuti, J.
with gas absorption, and for the	J. Sci Papers Inst. Phys. Chem.
nitrogen impurity in the oxygen.	Res. (Tokyo) <u>1931</u> , 17, 125.

COMPONENTS:		ORIGIN	AL MEASUREMEN	ITS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		1		Audykowski, T.;
_		Bu	kowiecki,	A.
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> 0; [64-17-5]		Schu	æiz. Arch.	Angew. Wiss. Tech.
		19	<u>49</u> , 15, 29	9-307.
VARIABLES:		PREPAR	ED BY:	
T/K = 273 - 343			R. B	attino
EXPERIMENTAL VALUES:		<u> </u>		
	t/°C 1	г <sup>а</sup> /к	$^{r_{p}}$	
		273 283	0.242 0.243	
	20 2	293 303	0.244	
	40 3	313	0.244	
		323 333	0.250 0.253	
	70 3	343	0.262	
	a coloulot		<u>_</u>	
	Calculate	ed by o	compiler.	
	b Ostwald o	coeffic	cient.	
	AUXILIARY	INFORMA	m 7 0.11	
METHOD/APPARATUS/PROCEDURE:			TION	
	The solvent was saturated with air	SOURCE		DF MATERIALS:
iodimetrically.				DF MATERIALS:
-	ated with air gen determined		AND PURITY ( From air. Specific	gravity of 0.789 g
-		(1)	AND PURITY ( From air.	gravity of 0.789 g
-		(1)	AND PURITY ( From air. Specific	gravity of 0.789 g
		(1)	AND PURITY ( From air. Specific	gravity of 0.789 g
-		(1)	AND PURITY ( From air. Specific	gravity of 0.789 g
		(1) (2)	AND PURITY ( From air. Specific cm <sup>-3</sup> at	gravity of 0.789 g
Ţ		(1) (2) ESTIMA	AND PURITY ( From air. Specific cm <sup>-3</sup> at	gravity of 0.789 g 20°C.
		(1) (2) ESTIMA	AND PURITY ( From air. Specific cm <sup>-3</sup> at	gravity of 0.789 g
_		(1) (2) ESTIMA	AND PURITY ( From air. Specific cm <sup>-3</sup> at	gravity of 0.789 g 20°C.
_		(1) (2) ESTIMA	AND PURITY ( From air. Specific cm <sup>-3</sup> at TED ERROR: L = ±0.025	gravity of 0.789 g 20°C.
		(1) (2) ESTIMA $\delta L/$	AND PURITY ( From air. Specific cm <sup>-3</sup> at TED ERROR: L = ±0.025	gravity of 0.789 g 20°C.
		(1) (2) ESTIMA $\delta L/$	AND PURITY ( From air. Specific cm <sup>-3</sup> at TED ERROR: L = ±0.025	gravity of 0.789 g 20°C.
_		(1) (2) ESTIMA $\delta L/$	AND PURITY ( From air. Specific cm <sup>-3</sup> at TED ERROR: L = ±0.025	gravity of 0.789 g 20°C.
-		(1) (2) ESTIMA $\delta L/$	AND PURITY ( From air. Specific cm <sup>-3</sup> at TED ERROR: L = ±0.025	gravity of 0.789 g 20°C.

COMPONENTS :		ORIGINAL MEASUREMENTS:	<u></u>
(1) Oxygen; O <sub>2</sub> ; [7782-	-44-7]	Shchukarev, S.A.; Tolma	
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [0	54-17-5]	Zh. Strukt. Khim. <u>1968</u> J.Struct. Chem. <u>1968</u> ,9	,9,21-8; ,16-21.
VARIABLES:	<u> </u>	PREPARED BY:	<u> </u>
T/K = 277-323 P/kPa = 101.325		R. Battino	
EXPERIMENTAL VALUES:			
T/K <sup>a</sup>	Mole Fraction <sup>b</sup>	Ostwald Coeff. <sup>C</sup> L	Mole d Percent
277.15	5.875	0.233	99.2
285.15	5.734	0.232	99.8
298.15	6.784	0.283	99.8
323.15	4.141	0.182	99.9
50°C. <sup>b</sup> Mole fraction solucial calculated by comp <sup>c</sup> Ostwald coefficier	ubility at 101. Diler. nt.	as integer values, i.e. 325 kPa (latm) partial m Remainder is water.	
	AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :		SOURCE AND PURITY OF MATERI	ALS:
Degassed solvent is tra absorption vessel. The sealed over mercury. G and stirring accomplish magnetic bob. Uptake c on a gas buret system w thermostatted along wit absorption vessel. Det operation and a drawing original paper. The pa reports the solubility water/ethanol mixtures,	e solvent is as is added hed with a of gas is read which is th the cails of f are in the sper also of oxygen in	<ol> <li>Prepared by electrony solution, followed hydrogen traces, and dried before use. given.</li> <li>Dried to at least 9</li> </ol>	by removal of nd thoroughly No purity
1		ESTIMATED ERROR:	<u> </u>
		ESTIMATED ERROR: $\delta L/L = \pm 0.01$ , estimate REFERENCES:	

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Naumenko, N. K.
(2) Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]	Candidates thesis, <u>1970</u> , Leningrad.
VARIABLES: T/K = 298.15 P/kPa = 101.325	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^4$	Bunsen Ostwald Coefficient Coefficient $\alpha$ L
298.15 5.74	0.219 0.239
	ility value is quoted in (1)
The Bunsen and Ostwald by the compiler.	coefficients were calculated
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Probably used volumetric method described by Naumenko <i>et al</i> . (2).	No information.
8	ESTIMATED ERROR:

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COMPONENTS :	ORIGINAL MEASUREMENTS:
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) Ethanol; C<sub>2</sub>H<sub>6</sub>O; [64-17-5]</li> </ul>	Makranczy, J.; Rusz, L.; Balog-Megyery, K. Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES:	PREPARED BY:
T/K = 298	C.L. Young
EXPERIMENTAL VALUES:	
T/K P <sup>+</sup> kPa Ostwal coeffi	d Mole fraction of cient oxygen*, x <sub>O2</sub>
298.15 101.3 0.186	5 0.000439
* Calculated by compiler	
+ Partial pressure of oxygen	
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1) was used.	SOURCE AND PURITY OF MATERIALS: No details given.
	<pre>ESTIMATED ERROR:</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Rusz, L.;
	Balog - Megyery, K.
(2) 1-Propanol; $C_{3}H_{\theta}O$ ; [71-23-8]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES:	PREPARED BY:
T/K = 298	C.L. Young.
EXPERIMENTAL VALUES:	L
	vald Mole fraction
coel	fficient of oxygen*, x <sub>O2</sub>
298.15 101.3 0.3	164 0.000503
* calculated by compiler	
+ partial pressure of oxygen	
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Volumetric method. The apparatus	Na dataila aiwaa
of Bodor, Bor, Mohai, and Sipos (1) was used.	No details given.
(-)	
	ESTIMATED ERROR:
	$\delta x_{O_2} = \pm 3\%$
	0 <sub>2</sub>
	REFERENCES:
	<pre>1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G.</pre>
	Veszpremi Vegyip. Egy. Kozl.
	<u>1957, 1, 55.</u> Chem. Abstr. <u>1961</u> , 55, 3175h.
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COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kretschmer, C. B.; Nowakowska, J.; Wiebe, R.	
<pre>(2) 2-Propanol or isopropyl alcohol; C<sub>3</sub>H<sub>8</sub>O; [67-63-0]</pre>	Ind. Eng. Chem. <u>1946</u> , 38, 506-9.	
VARIABLES:	PREPARED BY:	
T/K = 273.15 - 323.15 P/kPa = 101.325	P. L. Long H. L. Clever	
EXPERIMENTAL VALUES:		
T/K Mol Fraction	Bunsen Ostwald	
$x_1 \times 10^3$ C	oefficient Coefficient α L	
273.15         0.8167           298.15         0.7745           323.15         0.7609	0.2443         0.2443           0.2256         0.2463           0.2157         0.2552	
The Ostwald coefficients were measured at a total pressure of 101.325 kPa (1 atm). The compiler calculated the Bunsen coefficient and mole fraction values for an oxygen partial pressure of 101.325 kPa (1 atm) assuming the Ostwald coefficient was independent of pressure. Smoothed Data: $\ln x_1 = -7.5774 + 1.2638/(T/100K)$		
	the regression line = $9.35 \times 10^{-6}$	
	Mol Fraction	
	$x_1 \times 10^3$	
273.15	0.813	
283.15 293.15	0.800 0.788	
295.15	0.782	
303.15	0.777	
313.15 323.15	0.766 0.757	
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
The apparatus was similar to that of Horiuti (1), it consisted of a gas	(1) Oxygen. Source not given. Contained 0.4 per cent N <sub>2</sub> .	
buret, manometer, and absorption pipet equipped with a magnetic	Passed through Drierite to dry.	
stirrer. All volumes were calibrated by mercury displacement.	Distilled, dried with metallic Al,	
The solvent was partly degassed by boiling under reflux. About 40 cm <sup>3</sup> of solvent was admitted into the absorption pipet, and pumped on to complete the degassing. Dry gas,	b.p. $(760 \text{ mmHg})/^{\circ}C 82.24$ , density, $\rho_{4}^{25}/g \text{ cm}^{-3} 0.78081$ .	
measured in the buret, was admitted, final equilibrium was established after 1 to 3 hours stirring. During the solution process the total pressure was kept at one atm by addi- tions of dry gas.	ESTIMATED ERROR: Gas buret $\delta V/cm^3 = 0.005$ Average deviation from the mean 0.3%, maximum deviation 0.9% (authors).	
The solubility value was corrected for the increase of solvent volume with gas absorption, and for the nitrogen impurity in the oxygen.	REFERENCES: 1. Horiuti, J. J. Sci Papers Inst. Phys. Chem. Res. (Tokyo) <u>1931</u> , 17, 125.	

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kretschmer, C. B.; Nowakowska, J.; Wiebe, R.
(2) 1-Butanol or n-butyl alcohol; $C_4H_{10}O;$ [71-36-3]	Ind. Eng. Chem. <u>1946</u> , 38, 506-9.
VARIABLES:	PREPARED BY:
T/K = 273.15 - 323.15 P/kPa = 101.325	P. L. Long H. L. Clever
	l
EXPERIMENTAL VALUES:	Puppop Octors 1.1
T/K Mol Fraction $x_1 \times 10^3$ C	Bunsen Ostwald oefficient Coefficient
273.15 0.8363 298.15 0.7894 323.15 0.7707	0.2085 0.1924 0.2100 0.1835 0.2171
values for an oxygen partial pressure Ostwald coefficient was independent o	Bunsen coefficient and mole fraction of 101.325 kPa (1 atm) assuming the f pressure.
Smoothed Data: $\ln x_1 = -7.6234 + 1.4$	
Standard error about	the regression line = $8.71 \times 10^{-6}$
4 T/K	Mol Fraction
	$x_1 \times 10^3$
273.15	0.833
283.15	0.817
293.15	0.803
298.15	0.796
303.15 313.15	0.790 0.778
323.15	0.767
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that of	(1) Oxygen. Source not given.
Horiuti (1), it consisted of a gas	Contained 0.4 per cent N <sub>2</sub> .
buret, manometer, and absorption	Passed through Drierite to dry.
pipet equipped with a magnetic stirrer. All volumes were calibrated by mercury displacement.	_
The solvent was partly degassed by	b.p. (760 mmHg)/ <sup>O</sup> C 117.67,
boiling under reflux. About $40 \text{ cm}^3$ of solvent was admitted into the absorption pipet, and pumped on to	density, $\rho_{4}^{25}/g \text{ cm}^{-3}$ 0.80573.
complete the degassing. Dry gas, measured in the buret, was admitted,	
final equilibrium was established	ESTIMATED ERROR: Gas buret $\delta V/cm^3 = 0.005$
after 1 to 3 hours stirring. During the solution process the total pres-	Average deviation from the mean 0.3%,
sure was kept at one atm by additions of dry gas.	maximum deviation 0.9% (authors).
The solubility value was corrected	REFERENCES:
for the increase of solvent volume with gas absorption, and for the nitrogen impurity in the oxygen.	<ol> <li>Horiuti, J.</li> <li>J. Sci Papers Inst. Phys. Chem.</li> <li>Res. (Tokyo) <u>1931</u>, 17, 125.</li> </ol>
for the increase of solvent volume with gas absorption, and for the	J. Sci Papers Inst. Phys. Chem.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Rusz, L.;
(2) 1-Butanol; C <sub>4</sub> H <sub>12</sub> O; [71-36-3]	Balog - Megyery, K. Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES:	DEEDADED DV.
T/K = 298	PREPARED BY: C.L. Young
EXPERIMENTAL VALUES:	
T/K P <sup>+</sup> /kPa Ostw coef	vald Mole fraction ficient, of oxygen*,x <sub>O2</sub>
298.15 101.3 0.1	.53 0.000575
* calculated by compiler	
+ partial pressure of oxygen	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1) was used.	SOURCE AND PURITY OF MATERIALS: No details given
	ESTIMATED ERROR: $\delta x_{O_2} = \pm 3\%$
	<pre>REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszpremi Vegyip. Egy. Kozl. <u>1957</u>, 1, 55. Chem. Abstr. <u>1961</u>, 55, 3175h.</pre>

$\begin{array}{c} \hline \text{COMPONENTS:} \\ (1) & \text{Oxygen; } 0_2; & [7782-44-7] \\ (2) & 2-\text{Methyl-1-propanol or Isobutanol;} \\ \hline \text{C}_{4}^{H_9}\text{OH; } [78-83-1] \\ \hline \text{VARIABLES:} \\ \hline \text{T/K} & = 274.09 - 327.96 \\ \hline \text{P/kPa} & = 101.325 \\ \hline \text{VARIABLES:} \\ \hline \text{T/K} & = 274.09 - 327.96 \\ \hline \text{P/kPa} & = 101.325 \\ \hline \text{VARIABLES:} \\ \hline \text{T/K} & 0 & \text{Fraction} \\ \hline \text{Z74.09} & 0.897 \\ 282.85 \\ 297.63 \\ 0.847 \\ 0.221 \\ 297.63 \\ 0.847 \\ 0.221 \\ 298.25 \\ 0.854 \\ 0.206 \\ 0.222 \\ 297.63 \\ 0.847 \\ 0.220 \\ 0.196 \\ 0.222 \\ 0.196 \\ 0.222 \\ 0.196 \\ 0.222 \\ 0.196 \\ 0.221 \\ \hline \text{D}_{222} \\ 222 \\ 228.25 \\ 0.854 \\ 0.206 \\ 0.225 \\ 0.190 \\ 0.221 \\ 0.222 \\ 0.223 \\ 298.25 \\ 0.190 \\ 0.221 \\ 0.222 \\ 0.223 \\ 298.25 \\ 0.190 \\ 0.221 \\ \hline \text{D}_{222} \\ 0.222 \\ 0.223 \\ 0.223 \\ 0.223 \\ 0.221 \\ 0.222 \\ 0.223 \\ 0.233 \\ 0.233 \\ 0.233 \\ 0.233 \\ 0.233 \\ 0.233 \\ 0.233 \\ 0.233 \\ 0.233 $		
$\begin{array}{c} (2) 2-Methyl-1-propanol or Isobutanol;\\ C_{4}H_{9}OH; [78-83-1] \\ \hline \\ \\ \\ VARIABLES: \\ T/K = 274.09 - 327.96 \\ P/kPa = 101.325 \\ \hline \\ \\ \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \\ \hline \\ \\ \\ \hline \\ \\ \\ \hline \\ \\ \\ \\ \\ \hline \\ \\ \\ \\ \hline \\$		
(2) 2-Methyl-1-propanol or Isobutanol; C <sub>4</sub> H <sub>9</sub> OH; [78-83-1] VARIABLES: T/K = 274.09 - 327.96 P/kPa = 101.325 EXPERIMENTAL VALUES: T/K MOI Fraction 2774.09 282.85 298.25 299.25 308.37 298.25 312.78 Mol Fraction 298.25 312.78 Mol Fraction 298.25 312.78 312.78 Mol Fraction Mol Fraction M		
$\begin{array}{c} \mbox{C}_{4}\mbox{H}_{9}\mbox{OH}; \ [78-83-1] \\ \hline \mbox{VARIABLES:} \\ \mbox{T/K} = 274.09 - 327.96 \\ \mbox{P/kPa} = 101.325 \\ \hline \mbox{T/K} = 274.09 - 327.96 \\ \mbox{P/kPa} = 101.325 \\ \hline \mbox{T/K} & \mbox{Mol Fraction} & \mbox{Bunsen} & \mbox{Ostwald} \\ \hline \mbox{Coefficient} & \mbox{Coefficient}$		
$\begin{array}{r c c c c c c c c c c c c c c c c c c c$		
T/K = 274.09 - 327.96 P/KPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction Bunsen Ostwald Coefficient Coefficient $\frac{x_1 \times 10^3}{274.09}$ 282.85 0.897 0.221 0.222 282.85 0.874 0.214 0.222 298.25 0.854 0.206 0.223 308.37 0.822 0.196 0.222 312.78 0.807 0.192 0.220 314.14 0.801 0.190 0.219 327.96 0.765 0.179 0.215 The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln X_1 = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4, \Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{O}/J \mod^{-1}$ $\frac{x_1 \times 10^3}{278.15 0.895 16,233}$ 288.15 0.839 17,558 308.15 0.816 18,220 318.15 0.794 18,883		
T/K = 274.09 - 327.96 P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction Bunsen Ostwald Coefficient Coefficient $\frac{x_1 \times 10^3}{274.09}$ 282.85 0.897 0.221 0.222 282.85 0.874 0.214 0.222 297.63 0.847 0.205 0.223 308.37 0.822 0.196 0.222 312.78 0.807 0.192 0.220 314.14 0.801 0.190 0.219 327.96 0.765 0.179 0.215 The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln x_1 = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4, \Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{O}/J \mod^{-1}$ $\frac{x_1 \times 10^3}{278.15 0.895 16,233}$ 288.15 0.839 17,558 308.15 0.816 18,220 318.15 0.794 18,883		
T/K = 274.09 - 327.96 P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction Bunsen Ostwald Coefficient Coefficient $\frac{x_1 \times 10^3}{274.09}$ 282.85 0.897 0.221 0.222 282.85 0.874 0.214 0.222 297.63 0.847 0.205 0.223 308.37 0.822 0.196 0.222 312.78 0.807 0.192 0.220 314.14 0.801 0.190 0.219 327.96 0.765 0.179 0.215 The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln x_1 = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4, \Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{O}/J \mod^{-1}$ $\frac{x_1 \times 10^3}{278.15 0.895 16,233}$ 288.15 0.839 17,558 308.15 0.816 18,220 318.15 0.794 18,883		
T/K = 274.09 - 327.96 P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction Bunsen Ostwald Coefficient Coefficient $\frac{x_1 \times 10^3}{274.09}$ 282.85 0.897 0.221 0.222 282.85 0.874 0.214 0.222 297.63 0.847 0.205 0.223 308.37 0.822 0.196 0.222 312.78 0.807 0.192 0.220 314.14 0.801 0.190 0.219 327.96 0.765 0.179 0.215 The Bunsen coefficients were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln x_1 = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4, \Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{O}/J \mod^{-1}$ $\frac{x_1 \times 10^3}{278.15 0.895 16,233}$ 288.15 0.866 16,895 298.15 0.816 18,220 318.15 0.794 18,883		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		
$\frac{X_1 \times 10^3}{274.09} \frac{X_1 \times 10^3}{0.897} \frac{\text{Coefficient}}{0.221} \frac{\text{Coefficient}}{0.222}$ $\frac{282.85}{282.85} \frac{0.874}{0.847} \frac{0.214}{0.222} \frac{1}{0.222}$ $\frac{297.63}{298.25} \frac{0.854}{0.8847} \frac{0.206}{0.205} \frac{0.223}{0.223}$ $\frac{398.25}{308.37} \frac{0.822}{0.196} \frac{0.192}{0.220}$ $\frac{312.78}{312.78} \frac{0.807}{0.807} \frac{0.192}{0.219} \frac{0.225}{0.223}$ $\frac{327.96}{0.765} \frac{0.179}{0.179} \frac{0.215}{0.215}$ The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \text{ mol}^{-1} = -\text{RT ln } X_1 = -2196.4 + 66.256 \text{ T}$ $\frac{X_1 \times 10^3}{278.15} \frac{X_1 \times 10^3}{0.895} \frac{X_1 \times 10^3}{16,233}$ $\frac{X_1 \times 10^3}{278.15} \frac{X_1 \times 10^3}{0.839} \frac{17,558}{308.15} \frac{0.816}{0.816} \frac{18,220}{318.15} \frac{18,883}{0.794}$		
$\frac{X_1 \times 10^3}{274.09} \frac{X_1 \times 10^3}{0.897} \frac{\text{Coefficient}}{0.221} \frac{\text{Coefficient}}{0.222}$ $\frac{282.85}{282.85} \frac{0.874}{0.847} \frac{0.214}{0.222} \frac{1}{0.222}$ $\frac{297.63}{298.25} \frac{0.854}{0.8847} \frac{0.205}{0.205} \frac{0.223}{0.223}$ $\frac{398.25}{308.37} \frac{0.822}{0.892} \frac{0.196}{0.190} \frac{0.222}{0.220}$ $\frac{312.78}{314.14} \frac{0.801}{0.801} \frac{0.190}{0.190} \frac{0.219}{0.215}$ The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \text{ mol}^{-1} = -\text{RT ln } X_1 = -2196.4 + 66.256 \text{ T}$ $\frac{X_1 \times 10^3}{278.15} \frac{X_1 \times 10^3}{0.895} \frac{16,233}{16,233}$ $\frac{X_1 \times 10^3}{278.15} \frac{X_1 \times 10^3}{0.895} \frac{16,233}{16,233}$ $\frac{X_1 \times 10^3}{308.15} \frac{16,233}{0.816} \frac{18,220}{318.15} \frac{0.794}{0.816} \frac{18,283}{18,883}$		
$\frac{X_1 \times 10^3}{274.09} \frac{X_1 \times 10^3}{0.897} \frac{\text{Coefficient}}{0.221} \frac{\text{Coefficient}}{0.222}$ $\frac{282.85}{282.85} \frac{0.874}{0.847} \frac{0.214}{0.222} \frac{1}{0.222}$ $\frac{297.63}{298.25} \frac{0.854}{0.8847} \frac{0.205}{0.205} \frac{0.223}{0.223}$ $\frac{398.25}{308.37} \frac{0.822}{0.892} \frac{0.196}{0.190} \frac{0.222}{0.220}$ $\frac{312.78}{314.14} \frac{0.801}{0.801} \frac{0.190}{0.190} \frac{0.219}{0.215}$ The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \text{ mol}^{-1} = -\text{RT ln } X_1 = -2196.4 + 66.256 \text{ T}$ $\frac{X_1 \times 10^3}{278.15} \frac{X_1 \times 10^3}{0.895} \frac{16,233}{16,233}$ $\frac{X_1 \times 10^3}{278.15} \frac{X_1 \times 10^3}{0.895} \frac{16,233}{16,233}$ $\frac{X_1 \times 10^3}{308.15} \frac{16,233}{0.816} \frac{18,220}{318.15} \frac{0.794}{0.816} \frac{18,283}{18,883}$		
$\frac{x_1 \times 10}{274.09} - \frac{\alpha}{0.897} - \frac{L}{0.221} - \frac{L}{0.222}$ $\frac{282.85}{282.85} - \frac{1}{0.874} - \frac{1}{0.214} - \frac{1}{0.222}$ $\frac{297.63}{298.25} - \frac{1}{0.847} - \frac{1}{0.205} - \frac{1}{0.223}$ $\frac{298.25}{298.25} - \frac{1}{0.854} - \frac{1}{0.206} - \frac{1}{0.223}$ $\frac{312.78}{312.78} - \frac{1}{0.807} - \frac{1}{0.192} - \frac{1}{0.220}$ $\frac{314.14}{314.14} - \frac{1}{0.801} - \frac{1}{0.190} - \frac{1}{0.219}$ $\frac{327.96}{327.96} - \frac{1}{0.765} - \frac{1}{0.179} - \frac{1}{0.219}$ The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln X_1 = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4$ , $\Delta S^{O}/J \operatorname{K}^{-1} \mod^{-1} = -66.256$ $\frac{X_1 \times 10^3}{278.15} - \frac{X_1 \times 10^3}{298.15} - \frac{16,233}{288.15} - \frac{16,233}{318.15} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{318.15} - \frac{16,233}{318.83} - \frac{16,233}{318.15} - \frac{16,233}{$		
$\frac{274.09}{282.85} = 0.897 \qquad 0.221 \qquad 0.222 \\ 282.85 \qquad 0.874 \qquad 0.214 \qquad 0.222 \\ 297.63 \qquad 0.847 \qquad 0.205 \qquad 0.223 \\ 298.25 \qquad 0.854 \qquad 0.206 \qquad 0.225 \\ 308.37 \qquad 0.822 \qquad 0.196 \qquad 0.222 \\ 312.78 \qquad 0.807 \qquad 0.192 \qquad 0.220 \\ 314.14 \qquad 0.801 \qquad 0.190 \qquad 0.219 \\ 327.96 \qquad 0.765 \qquad 0.179 \qquad 0.215 \\ \hline \text{The Bunsen coefficients were calculated by the compiler.} \\ \text{The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. \\ \text{Smoothed Data: } \Delta G^{O}/J \text{ mol}^{-1} = -\text{RT ln } X_1 = -2196.4 + 66.256 \text{ T} \\ \text{Std. Dev. } \Delta G^{O} = 26.3, \text{ Coef. Corr. } = 0.9998 \\ \Delta H^{O}/J \text{ mol}^{-1} = -2196.4, \Delta S^{O}/J \text{ mol}^{-1} = -66.256 \\ \hline T/K \qquad \text{Mol Fraction } \Delta G^{O}/J \text{ mol}^{-1} \\ \hline X_1 \times 10^3 \\ \hline 278.15 \qquad 0.895 \qquad 16,233 \\ 288.15 \qquad 0.839 \qquad 17,558 \\ 308.15 \qquad 0.816 \qquad 18,220 \\ 318.15 \qquad 0.794 \qquad 18,883 \\ \hline \end{array}$		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
$\frac{327.96}{278.15} = \frac{0.765}{0.179} = \frac{0.215}{0.215}$ The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln X_{1} = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4$ , $\Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{O}/J \mod^{-1}$ $\frac{X_{1} \times 10^{3}}{278.15} = \frac{16,233}{0.895} = \frac{16,233}{16,233}$ 298.15 0.866 16,895 298.15 0.816 18,220 318.15 0.794 18,883		
The Bunsen coefficients were calculated by the compiler. The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = -RT \ln X_{1} = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{\circ} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{\circ}/J \mod^{-1} = -2196.4$ , $\Delta S^{\circ}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{\circ}/J \mod^{-1}$ $X_{1} \times 10^{3}$ 278.15 0.895 16,233 288.15 0.866 16,895 298.15 0.816 18,220 318.15 0.794 18,883		
The solubility values were adjusted to an oxygen partial pressure of 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln X_{1} = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4$ , $\Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ $T/K \mod Fraction \Delta G^{O}/J \mod^{-1}$ $X_{1} \times 10^{3}$ $278.15 \qquad 0.895 \qquad 16,233$ 288.15 0.839 17,558 308.15 0.816 18,220 318.15 0.794 18,883		
101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \mod^{-1} = -RT \ln X_{1} = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{O} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{O}/J \mod^{-1} = -2196.4$ , $\Delta S^{O}/J K^{-1} \mod^{-1} = -66.256$ $T/K$ Mol Fraction $\Delta G^{O}/J \mod^{-1}$ $X_{1} \times 10^{3}$ 278.15 0.895 16,233 288.15 0.866 16,895 298.15 0.839 17,558 308.15 0.816 18,220 318.15 0.794 18,883		
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = -RT \ln X_1 = -2196.4 + 66.256 T$ Std. Dev. $\Delta G^{\circ} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{\circ}/J \mod^{-1} = -2196.4$ , $\Delta S^{\circ}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{\circ}/J \mod^{-1}$ $X_1 \times 10^3$ $\overline{278.15}$ 0.895 16,233 288.15 0.866 16,895 298.15 0.816 18,220 318.15 0.794 18,883		
Std. Dev. $\Delta G^{\circ} = 26.3$ , Coef. Corr. = 0.9998 $\Delta H^{\circ}/J \mod^{-1} = -2196.4$ , $\Delta S^{\circ}/J K^{-1} \mod^{-1} = -66.256$ T/K Mol Fraction $\Delta G^{\circ}/J \mod^{-1}$ $\frac{X_1 \times 10^3}{278.15}$ 288.15 0.895 16,233 288.15 0.866 16,895 298.15 0.839 17,558 308.15 0.816 18,220 318.15 0.794 18,883		
$\Delta H^{O}/J = -2196.4, \Delta S^{O}/J K^{-1} mol^{-1} = -66.256$ $T/K = \frac{X_1 \times 10^3}{0.895} = \frac{16,233}{16,233}$ $288.15 = 0.866 = 16,895$ $298.15 = 0.839 = 17,558$ $308.15 = 0.816 = 18,220$ $318.15 = 0.794 = 18,883$		
$\begin{array}{c cccc} \hline T/K & \text{Mol Fraction} & \Delta G^{O}/J \text{ mol}^{-1} \\ & & \\ \hline \hline & & \\ \hline \hline & & \\ \hline & & \\ \hline & & \\ \hline \hline & & \\ \hline & & \\ \hline \hline & & \\ \hline \hline & & \\ \hline \hline \\ \hline & & \\ \hline \hline \\ \hline & & \\ \hline \hline \hline \\ \hline \hline \hline \\ \hline \hline \hline \hline \\ \hline \hline \hline \hline \\ \hline \\ \hline \hline$		
$\begin{array}{c cccc} \hline T/K & \text{Mol Fraction} & \Delta G^{O}/J \text{ mol}^{-1} \\ & & \\ \hline \hline & & \\ \hline \hline & & \\ \hline & & \\ \hline & & \\ \hline \hline & & \\ \hline & & \\ \hline \hline & & \\ \hline \hline & & \\ \hline \hline \\ \hline & & \\ \hline \hline \\ \hline & & \\ \hline \hline \hline \\ \hline \hline \hline \\ \hline \hline \hline \hline \\ \hline \hline \hline \hline \\ \hline \\ \hline \hline$		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		
278.150.89516,233288.150.86616,895298.150.83917,558308.150.81618,220318.150.79418,883		
278.150.89516,233288.150.86616,895298.150.83917,558308.150.81618,220318.150.79418,883		
288.15       0.866       16,895         298.15       0.839       17,558         308.15       0.816       18,220         318.15       0.794       18,883		
308.15 0.816 18,220 318.15 0.794 18,883		
318.15 0.794 18,883		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:		
The solubility apparatus is based on (1) Oxygen. Air Products and		
the design of Morrison and Billett Chemicals Co. 99.6 per cent.		
(1) and the version used is described (2) 2-methyl-l-propanol. Fisher Co.		
The decassing apparatus is that Certified grade (99 mole		
described by Battino, Banzhof, Bogan, per cent).		
and Wilhelm (3). ESTIMATED ERROR:		
Degassing. Up to 500 cm <sup>3</sup> of solvent $\delta T/K = 0.03$		
is placed in a flask of such size $\delta P/mmHg = 0.5$		
that the liquid is about 4 cm deep. $\delta X_1 / X_1 = 0.01$		
The liquid is rapidly stirred, and vacuum is intermittently applied REFERENCES:		
through a liquid No trap until the		
permanent gas residual pressure drops 1. Morrison, T. J.; Billett, F.		
Solubility Determination. The de- Danforth, W. F.		
gassed solvent is passed in a thin I im of them son 1969		
taining solute gas plus the solvent yapor at a total pressure of one atm. 3. Battino, R.; Banzhof, M.;		
The volume of gas absorbed is found by Bogan, M.; Wilhelm, E.		
difference between the initial and Anal. Chem. <u>1971</u> , 43, 806.		
final volumes in the buret system.		

ORIGINAL MEASUREMENTS: Makranczy, J.; Rusz, L.; Balog-Megyery, K. Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
PREPARED BY:
C.L. Young
wald Mole fraction efficient of oxygen*,x <sub>O2</sub>
ntanol
0.000630
kanol
L38 0.000706
INFORMATION
SOURCE AND PURITY OF MATERIALS: No details given.
ESTIMATED ERROR: $\delta x_{O_2} = \pm 3\%$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszpremi Vegyip. Egy. Kozl. <u>1957</u> , 1, 55. Chem. Abstr. <u>1961</u> , 55,3175h.

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Ijams, C. C.	
(2) Aliphatic alcohols; $C_7H_{16}O$ and $C_8H_{18}O$	Ph.D. thesis, <u>1941</u> , Vanderbilt University, Nashville, TN.	
VARIABLES: T/K = 298.15 P/kPa = 101.325	PREPARED BY:	
EXPERIMENTAL VALUES:	L	
T/K Mol Fraction $x_1 \times 10^3$ C	Bunsen Ostwald coefficient Coefficient	
l-Heptanol; C <sub>7</sub> H <sub>16</sub> O	; [111-70-6]	
298.15 1.08	0.171 0.187	
l-Octanol; C <sub>8</sub> H <sub>18</sub> O;	[111-87-5]	
298.15 1.15	0.163 0.178	
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified so that small solvent sample (2 cm <sup>3</sup> ) could be used with almost 100 per cent recovery of the solvent. An improved temperature control	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Air Reduction Co. Purity 99.5 per cent.</li> <li>(2) Aliphatic alcohols. Purified. Vapor pressure and boiling point also reported in the thesis.</li> </ul>	
system was used.	ESTIMATED ERROR:	
	δT/K = 0.05	
	REFERENCES: 1. Van Slyke, D. D. J. Biol. Chem. <u>1939</u> , 130, 545.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) 1-Heptanol; C<sub>7</sub>H<sub>16</sub>O; [111-70-</pre>	Makranczy, J.; Rusz, L.; 6] Balog - Megyery, K.
or 1-Octanol; C <sub>8</sub> H <sub>18</sub> O; [111-87-5]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES:	PREPARED BY:
T/K = 298	C.L. Young
EXPERIMENTAL VALUES:	
	stwald Mole fraction of oxygen*, x <sub>O2</sub>
1.	-Heptanol
298.15 101.3	0.131 0.000759
1-	-Octanol
298.15 101.3	0.183** 0.00118
* calculated by compiler	
+ partial pressure of oxygen	n
** appears to be an error in reference.	table 1 of the source
AUXILIARY INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos	5
was used.	No details given
	PETIMATED EDDOD.
	ESTIMATED ERROR: $\delta x = +38$
	$\delta x_{O_2} = \pm 3\%$
	REFERENCES :
	<ol> <li>Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G.</li> </ol>
	Veszpremi Vegyip. Egy. Kozl.
	<u>1957</u> , 1, 55. Chem. Abstr. <u>1961</u> , 55, 3175h.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wilcock, R. J.; Battino, R.; Danforth, W. F.; Wilhelm, E.
(2) 1-Octanol; C <sub>8</sub> H <sub>17</sub> OH; [111-87-5]	J. Chem. Thermodyn. <u>1978</u> , 10,817-22.
VARIABLES: T/K = 283.35 - 298.13	PREPARED BY: A. L. Cramer
P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $X_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient L
283.35 1.159 298.13 1.132	0.1662 0.1724 0.1602 0.1749
The Bunsen coefficients were calculat	ed by the compiler.
The solubility values were adjusted t 101.325 kPa (1 atm) by Henry's law. Smoothed Data: $\Delta G^{O}/J \text{ mol}^{-1} = -RT \ln$	o an oxygen partial pressure of $x_1 = -1120.1 + 60.160 T$
$\Delta H^{O}/J \text{ mol}^{-1} = -1120.1$	$\Delta S^{\circ}/J K^{-1} mol^{-1} = -60.160$
	ction $\Delta G^{O}/J \text{ mol}^{-1}$
T/K Mol Fra $X_1 \times X_2 \times X_1 \times X_2 $	
283.15 1.1	
288.15 1.1 293.15 1.1	
298.15 1.1	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus is based on	(1) Oxygen. Air Products and Chemi-
the design of Morrison and Billett (1) and the version used is described by Battino, Evans, and Danforth (2).	cals Co. 99.6 per cent. (2)1-octanol. Eastman Organic Chemicals. Distilled, density
The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3).	$\rho_{298.15} = 0.8247 \text{ g cm}^{-3}$
Degassing. Up to 500 cm <sup>3</sup> of solvent	ESTIMATED ERROR:
is placed in a flask of such size that the liquid is about 4 cm deep.	$\delta T/K = 0.03$
The liquid is rapidly stirred, and vacuum is intermittently applied	$\begin{array}{rcl} \delta P/mmHg &= & 0.5\\ \delta X_1/X_1 &= & 0.01 \end{array}$
through a liquid N2 trap until the	REFERENCES:
permanent gas residual pressure drops to 5 microns.	1. Morrison, T. J.; Billett, F.
Solubility Determination. The de-	J. Chem. Soc. <u>1948</u> , 2033.
gassed solvent is passed in a thin	2. Battino, R.; Evans, F. D.;
film down a glass helical tube con- taining solute gas plus the solvent	Danforth, W. F. J. Am. Oil Chem. Soc. <u>1968</u> ,
vapor at a total pressure of one atm. The volume of gas absorbed is	45, 830.
found by difference between the	<ol> <li>Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E.</li> </ol>
initial and final volumes in the buret system. The solvent is col-	Anal. Chem. <u>1971</u> , 43, 806.
lected in a tared flask and weighed.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wilcock, R. J.; Battino, R. Danforth, W. F.; Wilhelm, E.	
(2) 1-Decanol; C <sub>10</sub> H <sub>21</sub> OH; [112-30-1]		
	J. Chem. Thermodyn. <u>1978</u> , 10,817-22.	
VARIABLES:	PREPARED BY:	
T/K = 282.74 - 313.56 P/kPa = 101.325	A. L. Cramer	
F/RF4 = 101.525		
EXPERIMENTAL VALUES:		
T/K Mol Fraction	Bunsen Ostwald	
$x_1 \times 10^3$	Coefficient Coefficient α L	
282.74 1.263	0.1496 0.1549	
298.10 1.219	0.1428 0.1558	
313.56 1.237	0.1429 0.1641	
The Bunsen coefficients were calculat	ed by the compiler.	
The solubility values were adjusted to 101.325 kPa (1 atm) by Henry's law.	o an oxygen partial pressure of	
	Х <sub>1</sub> = -475.93 + 57.247 т	
	-	
Std. Dev. ΔG <sup>O</sup> = 35.1,	Coef. Corr. = 0.9992	
$\Delta H^{O}/J mol^{-1} = -475.9,$	$\Delta S^{O}/J K^{-1} mol^{-1} = -57.247$	
T/K Mol Fra	ction $\Delta G^{O}/J \text{ mol}^{-1}$	
x <sub>1</sub> x	10 <sup>3</sup>	
278.15 1.2 288.15 1.2	•	
298.15 1.2	4 16,592	
308 15 1.2 318.15 1.2		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
The solubility apparatus is based on the design of Morrison and Billett	(1) Oxygen. Air Products and Chemicals Co. 99.6 per cent.	
(1) and the version used is described	(2) 1-Decanol. Eastman Organic	
by Battino, Evans, and Danforth (2). The degassing apparatus is that	Chemicals. Distilled density	
described by Battino, Banzhof, Bogan,	$\rho_{298.15} = 0.8206 \text{ g cm}^{-3}$ .	
and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent	ESTIMATED ERROR:	
is placed in a flask of such size	$\delta T/K = 0.03$ $\delta P/mmHq = 0.3$	
that the liquid is about 4 cm deep. The liquid is rapidly stirred, and	$\delta X_1 / X_1 = 0.01$	
vacuum is intermittently applied	± ±	
through a liquid N <sub>2</sub> trap until the permanent gas residual pressure drops	REFERENCES :	
to 5 microns.	1. Morrison, T. J.; Billett, F.	
Solubility Determination. The de-	J. Chem. Soc. <u>1948</u> , 2033.	
gassed solvent is passed in a thin film down a glass helical tube con-	2. Battino, R.; Evans, F. D.; Danforth, W. F.	
taining solute gas plus the solvent	J. Am. Oil Chem. Soc. <u>1968</u> ,	
vapor at a total pressure of one atm. The volume of gas absorbed is	45, 830.	
found by difference between the	[3. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E.	
initial and final volumes in the buret system. The solvent is col-	Anal. Chem. <u>1971</u> , 43, 806.	
lected in a tared flask and weighed.		
	J	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Makranczy, J.; Rusz, L.;
(2) 1-Nonanol; $C_{9}H_{20}O$ ; [143-08-8]	Balog-Megyery, K.
or	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
1-Decanol; $C_{10}H_{28}O$ ; [112-30-1]	
VARIABLES:	PREPARED BY:
T/K = 298	C.L. Young
EXPERIMENTAL VALUES:	
$T/K P^+/kPa$ Ostwald	
T/K P'/kPa Ostwald coefficie	Mole fraction of mt oxygen*, x <sub>O2</sub>
	- 02
l-Nc	nanol
298.15 101.3 0.124	0.000886
1-De	canol
298.15 101.3 0.122	0.000954
* calculated by compiler	
+ partial pressure of oxygen.	
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Volumetric method. The apparatus	
of Bodor, Bor, Mohai, and Sipos (1)	
was used.	No details given.
	ESTIMATED ERROR:
	$\delta x_{O_2} = \pm 3\%$
	02
	PEPEPENena
	REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.;
	Sipos, G.
	Veszpremi Vegyip. Egy. Kozl. 1957, 1, 55.
	<i>Chem. Abstr.</i> <u>1961</u> , 55,3175h.

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; $O_2$ ; [7782-44-7]	Makranczy, J.; Rusz, L.;		
(2) 1-Undecanol; $C_{11}H_{24}O$ ; [112-42-5]	Balog-Megyery, K.		
$(2)$ 1-01decalor; $C_{11}n_{2}t_{0}$ ; $[112-42-5]$	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.		
1-Dodecanol; C <sub>12</sub> H <sub>26</sub> O; [112-53-8]			
VARIABLES:	PREPARED BY:		
T/K = 298	C.L. Young		
EXPERIMENTAL VALUES:			
T/K P <sup>+</sup> /kPa Ostwald co	efficient Mole fraction of oxygen*, x <sub>O2</sub>		
1-Unde	ecanol		
298.15 101.3 0.12	0.00103		
1-Dod	ecanol		
298.15 101.3 0.1	18 0.00108		
* calculated by comp	iler		
+ partial pressure of oxygen			
+ partial pressure of			
+ partial pressure o			
+ partial pressure of			
+ partial pressure o			
+ partial pressure o			
+ partial pressure o			
+ partial pressure o			
+ partial pressure o			
+ partial pressure o			
	INFORMATION		
	INFORMATION SOURCE AND PURITY OF MATERIALS:		
AUXILIARY METHOD/APPARATUS/PROCEDURE:			
AUXILIARY			
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus	SOURCE AND PURITY OF MATERIALS:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given.		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given.		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR:		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta x_{O_2} = \pm 3\%$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.;		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta x_{O_2} = \pm 3$ % REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos. G. Veszpremi Vegyip. Egy. Kozl.		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta x_{O_2} = \pm 3$ % REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos. G. Veszpremi Vegyip. Egy. Kozl. 1957, 1, 55.		
AUXILIARY METHOD/APPARATUS/PROCEDURE: Volumetric method. The apparatus of Bodor, Bor, Mohai, and Sipos (1)	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta x_{O_2} = \pm 3$ % REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos. G. Veszpremi Vegyip. Egy. Kozl.		

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Cauquil, G.
(2) Cyclohexanol; C <sub>6</sub> H <sub>14</sub> O; [108-93-0]	J. Chim. Phys. <u>1927</u> , <sup>24</sup> , 53-5.
VARIABLES:	PREPARED BY:
T/K = 299.15 P/kPa = 102.125	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
	Bunsen Ostwald efficient Coefficient α L
299.15 8.55	0.181 0.198
The author reported the Os compiler calculated the Bu mole fraction solubility v (1 atm).	nsen coefficient and the
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a flask and a mercury leveling bulb to control the pressure. The solvent volume was measured, the gas introduced over the solvent. The gas absorbed was found by difference between the initial and final gas volumes.	<ol> <li>Oxygen. Purity not stated.</li> <li>Cyclohexanol. Source not given. Distilled. B.p. (766 mmHg) T/K 334.0. Degassed and tested to be air free.</li> </ol>
	ESTIMATED ERROR: $\delta L/L = 0.05$ (compiler)
	REFERENCES :

204D 01791770 -	ADTOTIVAL MELOUDENERS
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Metschl, J.
<pre>(2) 2-Propanone or acetone; C<sub>3</sub>H<sub>6</sub>O; [67-64-1]</pre>	J. Phys. Chem. <u>1924</u> , 28, 417-37.
VARIABLES:	PREPARED BY:
T/K = 298.15 P/kPa = 101.325	M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:	
	Bunsen Ostwald efficient Coefficient α L
298.15 6.60	0.200 0.218
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed solvent is saturated with oxygen at 6 to 10 different pressures between 1.5 and 4.5 atm. The pressure is reduced to one atm,	<ol> <li>Oxygen. Commercial cylinder. Prepared by Linde process, 97 per cent pure.</li> <li>Acetone. Chemically pure.</li> </ol>
and the "supersaturated gas" is shaken out of the solvent and measured. The slope of a plot of the volume of	Dried over anhydrous copper sulfate and distilled.
gas reduced to standard conditions shaken out of 100 cm <sup>3</sup> of solvent <i>vs.</i> the pressure of saturation is nearly identical to the solubility-pressure graph (Henry's law). The slope of the curve is used to obtain the Bunsen coefficient. From the method	ESTIMATED ERROR:
of calculation the value represents the volume of gas shaken out of the solvent when the pressure is reduced from 2 to 1 atm.	REFERENCES:

(1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) 2-Propanone or Acetone; C <sub>3</sub> H <sub>6</sub> O; [67-64-1] VARIABLES: T/K = 194.85 - 313.15 Total P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction $\frac{X_1 \times 10^3}{194.85} - \frac{\alpha}{0.3010} - \frac{L}{0.2147}$ Horiuti, J. Sci. Papers Inst. Phys. Chem (Tokyo)(Jpn) <u>1931/32</u> , 17, 10 Sci. Papers Inst. Phys. Phy	
$\begin{array}{c c} \hline & & \\ (2) & 2 - \text{Propanone or Acetone; } C_{3}H_{6}O; \\ \hline & & \\ [67-64-1] \end{array} \end{array} \qquad \begin{array}{c} \text{Sci. Papers Inst. Phys. Chem} \\ \hline & & \\ (\text{Tokyo})(\text{Jpn}) \ \underline{1931/32}, \ 17, \\ \hline & \\ (\text{Tokyo})(\text{Jpn}) \ \underline{1931/32}, \ 17, \\ \hline & \\ \hline & \\ \text{Total P/kPa = 101.325} \end{array} \end{array} \qquad \begin{array}{c} \text{PREPARED BY:} \\ \hline & & \\ \text{M. E. Derrick} \\ \hline & & \\ \text{H. L. Clever} \end{array}$	
$\begin{array}{c ccccc} T/K &= 194.85 - 313.15 & M. & E. & Derrick \\ \hline Total P/kPa &= 101.325 & H. & L. & Clever \\ \hline \\ $	
Total P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mol Fraction Bunsen Ostwald $X_1 \times 10^3$ Coefficient Coefficient $\alpha$ L	
T/K Mol Fraction Bunsen Ostwald $X_1 \times 10^3$ Coefficient Coefficient L	
$X_1 \times 10^3$ Coefficient Coefficient $\alpha$ L	
212.650.82330.27940.2175231.850.80110.26540.2253251.950.80060.25840.2385273.150.81210.25500.2550283.150.82470.25550.2649293.150.83400.25490.2736303.150.85050.25640.2846	
313.15 0.8669 0.2577 0.2954	
Smoothed Data: $\ln X_1 = -12.6970 + 7.18725/(T/100) + 2.9360 \ln (T/100)$	100)
Standard error about the regression line = $1.18 \times 10^{-6}$	
T/K Mol Fraction T/K Mol Fraction	n
$x_1 \times 10^3$ $x_1 \times 10^3$	
<u>193.15</u> 0.8734 263.15 0.8047	-
203.15         0.8433         273.15         0.8124           213.15         0.8226         283.15         0.8227	
223.15 0.8091 293.15 0.8354	1
233.15 0.8015 303.15 0.8503	
243.15 0.7988 <u>313.15 0.8671</u> 253.15 0.8000	-
The Ostwald coefficient was measured at a total pressure of one atm Bunsen coefficient and the mole fraction solubility values were cal by the compiler for a gas pressure of one atm assuming the gas to b ideally and the Ostwald coefficient to be independent of pressure.	lculated
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:	
The apparatus consists of a gas buret, a solvent reservoir, and an absorption pipet. The volume of the pipet was determined at various (1)Oxygen. Prepared in the la tory by heating potassium manganate (Kahlbaum). Gas tionated in liquid air.	per-
miniscus heights by weighing a quan- tity of water. The miniscus height was read with a cathetometer. (2)2-Propanone. Nippon Pure Co. or Merck. Extra pure recrystallized with sodium	grade,
The dry gas introduced into the Stored over calcium degassed solvent. The gas and sol- chloride then fractionated	1
vent are mixed with a magnetic stir-	. Normar
rer until saturation. Care taken to prevent solvent vapor from mixing	
with the solute gas in the gas buret. ESTIMATED ERROR:	
The volume of gas was determined from	
a gas buret reading, the volume of $\delta T/K = 0.05$ the solvent was determined from the miniscus height in the absorption pipet.	
If the gas and solution are assumed to be ideal the fitted equation the following thermodynamic values.	gives
T/K $\Delta G^{\circ}/kJ \mod^{-1} \Delta H^{\circ}/J \mod^{-1} \Delta S^{\circ}/J K^{-1} \mod^{-1} \Delta C_{p}^{\circ}/J K^{-1}$	mol <sup>-1</sup>
273.15 16.160 692 -56.63 24.41	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kretschmer, C. B.; Nowakowaska, J.;
-	Wiebe, R.
(2) 2-Propanone or acetone; C <sub>3</sub> H <sub>6</sub> O;	Ind. Eng. Chem. <u>1946</u> , 38, 506-9.
[67-64-1]	1. Ang. onem. <u>1940</u> , 00, 300 S.
VARIABLES: $m/k = 240$ lf = 200 lf	PREPARED BY:
T/K = 248.15 - 298.15 P/kPa = 101.325	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald
$x_1 \times 10^3$ C	oefficient Coefficient α L
248.15 0.8115	0.2631 0.2390
273.15 0.8192 298.15 0.8440	0.2570 0.2570 0.2560 0.2794
The Ostwald coefficients were measure (1 atm). The compiler calculated the values for an oxygen partial pressure Ostwald coefficient was independent of	Bunsen coefficient and mole fraction of 101.325 kPa (1 atm) assuming the
Smoothed Data: $\ln x_1 = -6.8904 - 0.5$	703/(T/100K)
Standard error about	the regression line = $8.06 \times 10^{-6}$
	Mol Fraction
	$x_1 \times 10^3$
253.15	0.812
263.15	0.819
273.15	0.826
283.15 293.15	0.832 0.838
200 15	0.040
298.15	0.840
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was similar to that of	(1) Oxygen. Source not given.
Horiuti (1), it consisted of a gas	Contained 0.4 per cent N2.
buret, manometer, and absorption pipet equipped with a magnetic	Passed through Drierite to dry.
stirrer. All volumes were calibrated	(2) 2-Propanone. Source not given.
by mercury displacement.	Treated with Ag <sub>2</sub> O, dried over
The solvent was partly degassed by boiling under reflux. About 40 cm <sup>3</sup>	CaSO <sub>4</sub> , distilled, b.p.
of solvent was admitted into the	$(760 \text{ mmHg})/^{\circ}C$ 56.10 - 56.14,
absorption pipet, and pumped on to	density, $\rho_{4}^{25}/g \text{ cm}^{-3}$ 0.78490.
complete the degassing. Dry gas, measured in the buret, was admitted,	
final equilibrium was established	ESTIMATED ERROR:
after 1 to 3 hours stirring. During the solution process the total pres-	Gas buret $\delta V/cm^3 = 0.005$ Average deviation from the mean 0.3%,
sure was kept at one atm by additions	maximum deviation 0.9% (authors).
of dry gas.	
The solubility value was corrected	REFERENCES:
for the increase of solvent volume with gas absorption, and for the	1. Horiuti, J.
nitrogen impurity in the oxygen.	J. Sci Papers Inst. Phys. Chem. Res. (Tokyo) <u>1931</u> , 17, 125.
	100. (10,g0) <u>1331</u> , 17, 123.

COMPONENTS :		ORIGINAL MEASUREMENTS:
(l) Oxygen; O <sub>2</sub>	; [7782-44-7]	Bub, G.K.; Hillebrand, W. A.
- (2) 2-Propanon [67-64-1]	e (Acetone); C <sub>2</sub> H <sub>6</sub> O;	J. Chem. Eng. Data <u>1979</u> , 24, 315-9.
VARIABLES:		PREPARED BY:
т/к = 297-	318	R. Battino
EXPERIMENTAL VALUES	:	. 1
	т/к н	a 10 <sup>4</sup> x <sub>1</sub> <sup>b</sup>
<sup>b</sup> Mole f	297.4 12 297.8 12 297.8 12 303.2 11 303.2 11 303.2 11 303.6 11 303.6 11 307.8 11 308 11 308 11 308 11 312.6 11 312.8 11 312.8 11 313.5 11 317.2 11 318 11 318 11	86       9.432         83       8.453         73       8.525         61       8.613         71       8.540         80       8.475         43       8.749         53       8.673         85       8.439         64       8.591         84       8.446         64       8.726         71       8.540         44       8.742         /mole fraction.         lculated by compiler at 1 bar
(10 14		( INFORMATION
a built-in Cla with temperatu used to detect and changes in electrode was saturated with were taken of with oxygen an into the flask could be deter		SOURCE AND PURITY OF MATERIALS; (1) 99.996% pure (2) Fluka p.a. grade s

COMPONENTS :			ORIGINAL MEASUREMENTS:
(1) Oxygen; 0 <sub>2</sub> ;	[7782-44-7]		Bub, G. K.; Hillebrand, W. A.
-		~ 1	
(2) 2-Butanone;	C <sub>4</sub> H <sub>8</sub> O;[78-93.	-3]	J. Chem. Eng. Data <u>1979</u> , 24, 315-9.
VARIABLES:			PREPARED BY:
T/K = 298-3	32		R. Battino
EXPERIMENTAL VALUES:			
_	т/к	H <sup>a</sup>	10 <sup>3</sup> x <sub>1</sub> <sup>b</sup>
	298.2	986	
	298.2 298.6	999 1000	_
	298.6	990	
	302.7	964	
	303.7	963	
	307.9	974	
	308.2 308.6	988 969	
	308.9	969	
	313.2	979	
	313.7	960	
	314.2	969	
	318.4 319.2	947 954	
	323.2	963	
	323.4	924	
	323.6	950	
	327.8 332.2	963 936	
	fraction solu r partial pres		calculated by compiler at gas.
		AUXILIARY	INFORMATION
METHOD / APPARATUS / PROC	CEDURE :	····	SOURCE AND PURITY OF MATERIALS:
A 100 cm <sup>3</sup> round- a built-in Clar			(1) 99.996% pure
with temperature	e compensation	n was	,
used to detect and changes in electrode was c saturated with were taken of t with oxygen and into the flask. could be determ	concentration alibrated with air. One cm <sup>3</sup> he ketone satu these were in The solubili	. The h water samples urated njected	
oxygen concentr		e	
known volumes.			ESTIMATED ERROR:
			$\delta T/K = \pm 0.1$ , compiler's estimate $\delta H/H = \pm 0.024$ , authors' estimate
			REFERENCES :

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Bub, G. K.; Hillebrand, W. A.
(2) 2-Pentanone; C <sub>5</sub> H <sub>10</sub> O; [107-87-9	] J. Chem. Eng. Data <u>1979</u> , 24, 315-9.
VARIABLES:	PREPARED BY:
T/K = 298-342	R. Battino
EXPERIMENTAL VALUES:	- L
<u>Т/К Н</u>	$10^{3}x_{1}^{b}$
	04 1.106
	00 1.111 83 1.133
	09 1.100
	76 1.142
	90 1.124 88 1.126
	14 1.094
	97 1.115
	76 1.142
	93 1.120 82 1.134
	87 1.127
	37 1.127
	76 1.142
	86 1.129 86 1.129
	68 <b>1.152</b>
334.7 8	67 1.153
	89 1.125 77 1.140
<sup>a</sup> Henry's Law constant in bar/mo <sup>b</sup> Mole fraction solubility calcu	
partial pressure of gas.	
AUXILIA	RY INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A 100 cm round-bottom flask with built-in Clark oxygen electrode wi	
temperature compensation was used to detect oxygen concentrations an	(2) Fluka p.a. grade
changes in concentration. The electrode was calibrated with wate	
saturated with air. One cm <sup>3</sup> sample	
were taken of the ketone saturated	
with oxygen and these were injected	1
into the flask. The solubility could be determined from the oxyge:	
concentrations and the known	
volumes.	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1$ , compiler's estimate
	$\delta H/H = \pm 0.024$ , author's estimate
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Bub, G. K.; Hillebrand, W. A.		
L			
(2) 2-Hexanone; C <sub>6</sub> H <sub>12</sub> O; [591-78-6]	J. Chem. Eng. Data <u>1979</u> , 24, 315-9.		
VARIABLES:	PREPARED BY:		
T/K = 298-344	R. Battino		
EXPERIMENTAL VALUES:	b		
т/к H <sup>8</sup>	10 <sup>3</sup> ×1 <sup>b</sup>		
298.2 855			
298.5 860 298.7 850			
307.7 847			
307.7 865			
308.4 849			
309.0 850			
316.5 381 318.2 863			
318.2 993			
318.2 883			
326.1 889			
327.0 864			
328.0 895 335.7 897	,		
336.2 906			
336.6 881			
337.0 912			
337.2 871 341.2 893			
341.2 893 343.7 896			
343.7 874			
<sup>a</sup> Henry's Law constant in bar/	mole fraction		
<sup>b</sup> Mole fraction solubility cal			
partial pressure of gas.	culated by compiler at 1 bar		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
A 100 cm <sup>3</sup> round-bottom flask with a			
built-in Clark oxygen electrode with temperature compensation was	(1) 99.996% pure		
used to detect oxygen concentrations	(2) Fluka p.a. grade		
and changes in concentration. The			
electrode was calibrated with water saturated with air. One $cm^3$			
samples were taken of the ketone			
saturated with oxygen and these			
were injected into the flask. The			
solubility could be determined from the oxygen concentrations and			
the known volumes.	ESTIMATED ERROR:		
	$\delta T/K = \pm 0.1$ , compiler's estimate		
	$\delta H/H = \pm 0.024$ , author's estimate		
	REFERENCES :		

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Guerry, D. Jr.		
(2) Cyclohexanone; C <sub>6</sub> H <sub>10</sub> O; [108-94-1]	Ph. D. thesis, <u>1944</u> , Vanderbilt University Nashville, TN		
VARIABLES:	PREPARED BY:		
T/K= 293-298 P/kPa= 101.325	H. L. Clever		
EXPERIMENTAL VALUES:			
T/K Mol Fraction $x_1 \times 10^4$	Bunsen Ostwald Coefficient Coefficient α L		
293.15 6.38 298.15 6.36	0.138 0.148 0.137 0.150		
The Ostwald coefficients	were calculated by the		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
A modified Van Slyke-Neill manometric apparatus (1, 2) was used.	(1) Oxygen. Air Reduction Co. Purity 99.5 per cent.		
The modifications were improved temperature control, and procedures that allowed small samples (2 cm <sup>3</sup> ) with almost 100 per cent recovery of the solvent.	(2) Cyclohexanone. Eastman Kodak Co. Purified and distilled, b. p. (754.5 mmHg) t/°C 155.19 (corr.). Refractive index, density, and vapor pressure data are in the thesis.		
	ESTIMATED ERROR: $\delta T/K = 0.05$		
	REFERENCES: 1. Ijams, C. C. Ph. D. thesis, <u>1941</u> Vanderbilt University		
	<ol> <li>Van Slyke, D. D. J. Biol. Chem. <u>1939</u>, 130, 545.</li> </ol>		

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Christoff, A.
<pre>(2) 1,1'-Oxybisethane or diethyl     ether; C<sub>4</sub>H<sub>10</sub>O; [60-29-7]</pre>	Z. Phys. Chem. <u>1912</u> ,79,456-60.
VARIABLES: T/K = 273.15 P/kPa = Atmospheric	PREPARED BY: M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^3$ Co	Bunsen Ostwald Defficient Coefficient $\alpha$ L
273.15 1.90	0.4235 0.4235
The Bunsen coefficient ar were calculated by the co	
The value is 2.0 per cent reported by Horiuti at 27 is preferred.	lower than the value 73.15. The Horiuti value
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus is a modified Ostwald apparatus described by Just (1), and modified by Skirrow (2). The apparatus consists of a thermostated gas buret and an absorption flask.	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Prepared from KClO<sub>3</sub>.</li> <li>(2) Diethylether. Merck and Co. Stated to be pure and anhydrous.</li> </ul>
The modification involes the use of vapor free gas in the gas buret. A correction is made for the vapor pressure of the liquid. A steel capillary tube with a stopcock, which prevents the gas and the liquid vapor from mixing in the buret, is used to connect the absorption flask and the buret.	ESTIMATED ERROR: $\delta L/L = 0.03$
	<pre>REFERENCES: 1. Just, G.     Z. Phys. Chem. <u>1901</u>, 37, 342. 2. Skirrow, F. W.     Z. Phys. Chem. <u>1902</u>, 41, 139.</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Horiuti, J.
<pre>(2) 1,1-Oxybisethane or Diethylether; C<sub>4</sub>H<sub>10</sub>O; [60-29-7]</pre>	Sci.Papers Inst. Phys. Chem. Res. (Tokyo)(Jpn) <u>1931/32</u> , 17, 125-256.
VARIABLES:	PREPARED BY:
T/K = 195.05 - 293.15	M. E. Derrick
Total P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	L
T/K Mol Fraction	Bunsen Ostwald coefficient Coefficient
	α L
195.05 2.537 213.05 2.287	0.6309 0.4505 0.5550 0.4329
232.65 2.067	0.4983 0.4244
253.25 1.996 273.15 1.939	0.4581 0.4247 0.4325 0.4325
293.15 1.432	0.4203 0.4511
Smoothed Data: $\ln x_1 = 2.34441 - 9.5$	3953/(T/100) - 5.17850 ln (T/100)
Standard error about the regression 1	$\frac{1}{2}$
T/K Mol Fraction	T/K Mol Fraction
$X_1 \times 10^3$	$x_1 \times 10^3$
$\frac{1}{193.15}$ 2.47	$\frac{n_1 + 10}{253.15}$ $\frac{1.96}{1.96}$
203.15 2.43	263.15 1.85
213.15 2.36 223.15 2.27	273.15 1.74 283.15 1.64
233.15 2.17 243.15 2.07	293.15 1.53
The Ostwald coefficient was measured Bunsen coefficient and the mole fract by the compiler for a gas pressure of ideally and the Ostwald coefficient t	ion solubility values were calculated one atm assuming the gas to behave
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas	(1) Oxygen. Prepared in the labora-
buret, a solvent reservoir, and an absorption pipet. The volume of the	tory by heating potassium per- manganate (Kahlbaum). Gas frac-
pipet was determined at various miniscus heights by weighing a	tionated in liquid air.
quantity of water. The miniscus	(2) 1,1-Oxybisethane. Merck's "for analysis". Stored over sodium
height was read with a cathetometer.	amalgam and distilled. Constant
The dry gas introduced into the degassed solvent. The gas and sol-	boiling within 0.01 <sup>0</sup> C.
vent are mixed with a magnetic stir-	
ror until caturation Caro taken	1
rer until saturation. Care taken to prevent solvent vapor from mixing	
to prevent solvent vapor from mixing with the solute gas in the gas buret.	ESTIMATED ERROR:
to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of	ESTIMATED ERROR: $\delta T/K = 0.05$
to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from	
to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet.	δT/K = 0.05
to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. If the gas and solution are assumed to the following thermodynamic values.	$\delta T/K = 0.05$ to be ideal the fitted equation gives
to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. If the gas and solution are assumed to the following thermodynamic values. $T/K  \Delta G^{O}/kJ \text{ mol}^{-1}  \Delta H^{O}/J \text{ mol}^{-1}$	$\delta T/K = 0.05$ to be ideal the fitted equation gives $\Delta S^{0}/J K^{-1} mol^{-1} \Delta C_{p}^{0}/J K^{-1} mol^{-1}$
to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. If the gas and solution are assumed to the following thermodynamic values.	$\delta T/K = 0.05$ to be ideal the fitted equation gives

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Guerry, D. Jr.		
<pre>(2) 1,1'-Oxybispropane or dipropyl     ether; C<sub>6</sub>H<sub>14</sub>O; [111-43-3]</pre>	Ph.D. thesis, 1944, Vanderbilt University, Nashville, TN.		
VARIABLES:	PREPARED BY:		
T/K = 293-298 P/kPa = 101.325	H. L. Clever		
EXPERIMENTAL VALUES:			
T/K Mol Fraction $x_1 \times 10^4$	Bunsen Ostwald Coefficient Coefficient αL		
293.1518.8298.1519.1	0.310 0.333 0.312 0.341		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: A Van Slyke-Neill Manometric Appara- tus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample.			
An improved temperature control system was used.			
SOURCE AND PURITY OF MATERIALS:	ESTIMATED ERROR:		
<ol> <li>Oxygen. Air Reduction Co. Purity 99.5 per cent.</li> </ol>	$\delta T/K = 0.05$		
<ul><li>(2) Dipropyl ether. Eastman Kodak</li><li>Co. Refluxed four hours over</li></ul>			

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Outmone O = 7702 44 7			
(1) Oxygen; $O_2$ ; 7782-44-7 (2) Cyclic ethers; $C_4H_8O$ , $C_4H_8O_2$ , and $C_5H_{10}O$	Guerry, D. Jr. Ph. D. thesis, <u>1944</u> , Vanderbilt University, Nashville, TN		
VARIABLES:	PREPARED BY:		
T/K = 293 <sup>-</sup> 298 P/kPa = 101.325	H. L. Clever		
EXPERIMENTAL VALUES: T/K Mol Fraction	Bunsen Ostwald		
$x_1 \times 10^4$	Coefficient Coefficient		
	; C <sub>4</sub> H <sub>8</sub> O; [109-99-9]		
293.15 8.03	0.222 0.238		
298.15 8.16	0.224 0.245		
1,4-Dioxane; C <sub>4</sub> H			
293.15 5.20 298.15 5.38	0.137 0.147 0.141 0.154		
Tetrahydro-2H-py	yran; C <sub>5</sub> H <sub>10</sub> O; [142-68-7]		
293.15 9.41	0.217 0.233 0.221 0.241		
298.15 9.64	0.221 0.241		
AUXILIARY			
	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	1		
A Van Slyke-Neill Manometric	INFORMATION b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.)		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) 1,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7)</pre>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> )	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) 1,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr)</pre>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) 1,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di-</pre>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample. An improved temperature control	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) 1,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by</pre>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample.	<ul> <li>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.)</li> <li>l,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr)</li> <li>Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepare from tetrahydrofurfuryl alcohol. b.p.(750.6mmHg)t/C 87.52 (corr.).</li> </ul>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample. An improved temperature control	<ul> <li>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.)</li> <li>l,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr)</li> <li>Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepared from tetrahydrofurfuryl alcohol. b.p.(750.6mmHg)t/C 87.52 (corr.).</li> </ul>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample. An improved temperature control system was used. SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air reduction Co.	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) l,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepare from tetrahydrofurfuryl alcohol. b.p.(750.6mmHg)t/C 87.52 (corr.). ESTIMATED ERROR:</pre>		
A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample. An improved temperature control system was used. SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air reduction Co. Purity 99.5 per cent.	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) l,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepared from tetrahydrofurfuryl alcohol. b.p.(750.6mmHg)t/C 87.52 (corr.). ESTIMATED ERROR:</pre>		
<ul> <li>A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used.</li> <li>The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm<sup>3</sup>) could be used with almost complete recovery of the sample.</li> <li>An improved temperature control system was used.</li> <li>SOURCE AND PURITY OF MATERIALS: <ol> <li>Oxygen. Air reduction Co. Purity 99.5 per cent.</li> <li>Cyclic ethers.</li> </ol> </li> </ul>	<pre>b. p. (752.7 mmHg) t/°C 65.50- 65.54 (corr.) l,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. (743.7 mmHg) t/°C 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepare from tetrahydrofurfuryl alcohol. b.p. (750.6mmHg) t/C 87.52 (corr.). ESTIMATED ERROR:</pre>		
<ul> <li>A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used.</li> <li>The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm<sup>3</sup>) could be used with almost complete recovery of the sample.</li> <li>An improved temperature control system was used.</li> <li>SOURCE AND PURITY OF MATERIALS: <ol> <li>Oxygen. Air reduction Co. Purity 99.5 per cent.</li> <li>Cyclic ethers.</li> <li>Tetrahydrofuran. Eastman Kodak C Refluxed several times over Na.</li> </ol> </li> </ul>	b. p. $(752.7 \text{ mmHg}) \text{ t/}^{\circ}\text{C}$ 65.50- 65.54 (corr.) 1,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. $(743.7)^{\circ}$ mmHg) t/ $^{\circ}$ C 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepare from tetrahydrofurfuryl alcohol. b.p. (750.6mmHg) t/C 87.52 (corr.). ESTIMATED ERROR: $\delta T/K = 0.05$ REFERENCES: 1. Van Slyke, D. D. J. Biol. Chem. <u>1939</u> , 130, 545. 2. Ijams, C. C.		
<ul> <li>A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used.</li> <li>The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm<sup>3</sup>) could be used with almost complete recovery of the sample.</li> <li>An improved temperature control system was used.</li> <li>SOURCE AND PURITY OF MATERIALS: <ol> <li>Oxygen. Air reduction Co. Purity 99.5 per cent.</li> <li>Cyclic ethers. Tetrahydrofuran. Eastman Kodak C</li> </ol> </li> </ul>	b. p. $(752.7 \text{ mmHg}) \text{ t/}^{\circ}\text{C}$ 65.50- 65.54 (corr.) 1,4-Dioxane. Eastman Kodak Co. Purified and distilled from Na under a nitrogen atm. b.p. $(743.7 \text{ mmHg}) \text{ t/}^{\circ}\text{C}$ 100.81 - 100.82.(corr) Tetrahydro-2H-pyran. Prepared by the catalytic reduction of 2,3-di- hydropyran, which had been prepared from tetrahydrofurfuryl alcohol. b.p. (750.6mmHg) t/C 87.52 (corr.). ESTIMATED ERROR: $\delta T/K = 0.05$ REFERENCES: 1. Van Slyke, D. D. J. Biol. Chem. 1939, 130, 545.		

Oxygen	Solubilities	up t	o	200 I	<pa< th=""></pa<>
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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Horiuti, J.
(2) Acetic acid, methyl ester or Methyl acetate; C <sub>3</sub> H <sub>6</sub> O <sub>2</sub> ;	Sci. Papers Inst. Phys. Chem. Res. (Tokyo) (Jpn) <u>1931/32</u> , 17, 125-256.
[79-20-9]	
VARIABLES:	PREPARED BY:
T/K = 194.75 - 313.15	M. E. Derrick
Total P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald
x <sub>1</sub> x 10 <sup>3</sup>	Coefficient Coefficient
194.75 0.8327	0.2666 0.1901
212.35 0.8153	0.2556 0.1987
232.25 0.8172	0.2500 0.2126
252.35 0.8304 273.15 0.8567	0.2477 0.2288 0.2488 0.2488
283.15 0.8695	0.2488 0.2488
295.00 0.8872	0.2503 0.2703
303.15 0.9007	0.2513 0.2789
313.15 0.9120	0.2510 0.2877
	.6638/(T/100) + 2.1142 ln (T/100)
Standard error about the regression	
T/K Mol Fraction	T/K Mol Fraction
$x_1 \times 10^3$	$x_1 \times 10^3$
193.15 0.8326	263.15 0.8423
203.15 0.8226 213.15 0.8176	273.15 0.8541 283.15 0.8677
213.15 0.8176 223.15 0.8166	293.15 0.8827
233.15 0.8191	303.15 0.8991
243.15 0.8245	313.15 0.9168
253.15 0.8323	
The Ostwald coefficient was measured	at a total pressure of one atm. The
Bunsen coefficient and the mole frac	tion solubility values were calculated
by the compiler for a gas pressure o ideally and the Ostwald coefficient	to be independent of pressure.
ideally and the obtward coefficient	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas	(1) Oxygen. Prepared in the labora-
buret, a solvent reservoir, and an	tory by heating potassium perman-
absorption pipet. The volume of the	
pipet was determined at various	tionated in liquid air.
miniscus heights by weighing a quan- tity of water. The miniscus height	(2) Acetic acid, methyl ester. Merck. Extra pure grade treated with
was read with a cathetometer.	phosphorous pentoxide several
The dry gas introduced into the de-	times and distilled several times.
gassed solvent. The gas and solvent	Normal boiling point, 57.12°C.
are mixed with a magnetic stirrer	
until saturation. Care taken to	
prevent solvent vapor from mixing	
prevent solvent vapor from mixing with the solute gas in the gas buret.	
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from	
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of	• • • • • • • • • • • • • • • • • • •
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from	• • • • • • • • • • • • • • • • • • •
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet.	$\delta T/K = 0.05$
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet.	• • • • • • • • • • • • • • • • • • •
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. If the gas and solution are assumed	$\delta T/K = 0.05$ to be ideal the fitted equation gives
prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. If the gas and solution are assumed the following thermodynamic values.	$\delta T/K = 0.05$ to be ideal the fitted equation gives

COMPONENTS		LOPT	CINAL MEACURE	NTC .	
$\begin{array}{c} \text{OMPONENTS:} \\ \hline \\ \hline \\ \hline \\ \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $			ORIGINAL MEASUREMENTS:		
<ol> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) 2-Propanone or acetone; C<sub>3</sub>H<sub>6</sub>O;</li> </ol>		1	Kretschmer, C. B.; Nowakowska, J.; Wiebe, R.		
[67-64-1]		Ind	l. Eng. Chem.	<u>1946</u> , <i>38</i> , 506-9.	
(3) Ethanol; C <sub>2</sub> H <sub>6</sub> O;	[64-17-5]				
VARIABLES: $T/K = 273.1$	15 - 323.15	PRE	PARED BY:		
P/kPa = 101.3		1	P. L. Long		
Ethanol/vol % = 50			н.	L. Clever	
		l			
EXPERIMENTAL VALUES:					
		nsen	Ostwald		
	Coefi		Coefficient		
		α	L		
	273.15 0.2	2409	0.2409		
		2338 2310	0.2552 0.2733		
	JZJ.IJ U.4	¢ ) T ()	0.2/33		
The Ostwald coefficie (1 atm). The compile oxygen partial pressu coefficient was indep	er calculated are of 101.325	the Bun 5 kPa (1	sen coeffici	ent value for an	
The solvent is aceton	le in ethanoi,	, 50 per	cent by voi	ume .	
·					
	AUXII	LIARY INF	ORMATION		
METHOD/APPARATUS/PROCEDUR	Е:	sou	DRMATION RCE AND PURITY	OF MATERIALS:	
The apparatus was sim	E: nilar to that	of (1)	RCE AND PURITY Oxygen. So	urce not given. Con-	
The apparatus was sim Horiuti (1), it consi	E: nilar to that isted of a gas	of (1)	RCE AND PURITY Oxygen. So tained 0.4	urce not given. Con- per cent N <sub>2</sub> . Passed	
The apparatus was sim Horiuti (1), it consi buret, manometer, and pipet equipped with a	E: milar to that isted of a gas d absorption a magnetic	of (1) s	RCE AND PURITY Oxygen. So tained 0.4 through Dri	urce not given. Con- per cent N <sub>2</sub> . Passed erite to dry.	
The apparatus was sim Horiuti (1), it consi buret, manometer, and pipet equipped with a stirrer. All volumes	E: milar to that isted of a gas d absorption a magnetic s were calibra	of (1) s	RCE AND PURITY Oxygen. So tained 0.4 through Dri 2-Propanone Treated wit	urce not given. Con- per cent N <sub>2</sub> . Passed erite to dry. . Source not given. h Ag <sub>2</sub> O, dried over	
The apparatus was sim Horiuti (1), it consi buret, manometer, and pipet equipped with a stirrer. All volumes by mercury displacement	E: milar to that isted of a gas d absorption a magnetic s were calibra ent.	of (1) s ated (2)	RCE AND PURITY Oxygen. So tained 0.4 through Dri 2-Propanone Treated wit CaSO4, dist	urce not given. Con- per cent N <sub>2</sub> . Passed erite to dry. . Source not given. h Ag <sub>2</sub> O, dried over illed, b.p. (760 mmHg)/	
The apparatus was sim Horiuti (1), it consi buret, manometer, and pipet equipped with a stirrer. All volumes by mercury displacement The solvent was parti	E: milar to that isted of a gas d absorption a magnetic s were calibra ent. ly degassed by	of (1) s ated (2)	RCE AND PURITY Oxygen. So tained 0.4 through Dri 2-Propanone Treated wit CaSO4, dist °C 56.10-56	urce not given. Con- per cent N <sub>2</sub> . Passed erite to dry. . Source not given. h Ag <sub>2</sub> 0, dried over illed, b.p. (760 mmHg)/ .14, density, $\rho_4^{25}/$	
The apparatus was sim Horiuti (1), it consi buret, manometer, and pipet equipped with a stirrer. All volumes by mercury displacement	E: milar to that isted of a gas d absorption a magnetic s were calibra ent. ly degassed by About 40 cr	of (1) s ated (2)	RCE AND PURITY Oxygen. So tained 0.4 through Dri 2-Propanone Treated wit CaSO <sub>4</sub> , dist °C 56.10-56 g cm <sup>-3</sup> 0.78	urce not given. Con- per cent N <sub>2</sub> . Passed erite to dry. . Source not given. h Ag <sub>2</sub> O, dried over illed, b.p. (760 mmHg)/ .14, density, $\rho_4^{25}/$ 490.	
The apparatus was sim Horiuti (1), it consi buret, manometer, and pipet equipped with a stirrer. All volumes by mercury displacement The solvent was part boiling under reflux. of solvent was admitt absorption pipet, and	E: nilar to that isted of a gas d absorption a magnetic s were calibra- ent. Ly degassed by About 40 cr ted into the d pumped on to	of (1) s (2) ym3 o (3)	RCE AND PURITY Oxygen. So tained 0.4 through Dri 2-Propanone Treated wit CaSO4, dist °C 56.10-56 g cm <sup>-3</sup> 0.78 Ethanol. S	urce not given. Con- per cent N <sub>2</sub> . Passed erite to dry. . Source not given. h Ag <sub>2</sub> O, dried over illed, b.p. (760 mmHg)/ .14, density, $\rho_4^{25}/$ 490.	
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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Schläpfer, P.; Andykowski, T.;
(2) Various solvents (see table below)	Bukowieck, A. Schweiz. Arch. Angew. Wiss. Tech. <u>1949</u> , 15, 299-307.
VARIABLES:	PREPARED BY:
T/K = 293	R. Battino
EXPERIMENTAL VALUES:	
Solvent	L <sup>a</sup>
20°C (2931	<)
methanol; CH <sub>4</sub> O; [67-56-1]	0.247
ethanol; $C_2H_6^70; [64-17-5]$	0.243
1-propanol; C <sub>3</sub> H <sub>8</sub> O; [540-67-0]	0.214
2-propanol; C <sub>3</sub> H <sub>8</sub> O; [67-63-0]	0.247
1-butanol; C <sub>4</sub> H <sub>10</sub> O; [71-36-3]	0.212
2-propanone (acetone); C <sub>3</sub> H <sub>6</sub> O;	[67-64-1] 0.274
methyl acetate; C <sub>3</sub> H <sub>6</sub> O <sub>2</sub> ; [79-2	
ethyl acetate; $C_4 H_8 O_2$ ; [141-7	
diethyl ether; $C_4H_{10}O$ ; [60-29	
tetra chloroethane (carbon te CCl <sub>4</sub> ; [56-23-5]	
tetrachloroethylene; C <sub>2</sub> Cl <sub>4</sub> ;	[127-18-4] 0.199
petroleum ether	0.438
olefin poor gasoline	0.334
cracked gasoline	0.326
2,2,4-trimethylpentane (isood	ctane); C <sub>8</sub> H <sub>18</sub> ;
[540-84-1]	0.335
	continued on following page
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
The solvents were saturated with air	(l) From air.
at 20°C. Then the dissolved oxygen was determined iodimetrically with a	(2) The specific gravity is given
thisulfate titration. For five of the solvents the solubility was	in the original paper for all of the solvents used.
determined via a physical method	
(manometric/volumetric, described in the paper) since there were inter-	
ferences to the iodimetric method.	
	ESTIMATED ERROR:
	$\delta L/L = \pm 0.025$ , authors' estimate.
	REFERENCES :

COMPONENT	rs :	EVALUATOR:	
(2)	Oxygen; O <sub>2</sub> ; [7782-44-7] Various solvents (see table below)	Schläpfer, P.; Aud Bukowieck, A. Schweiz. Arch. Ang <u>1949</u> , 15, 299-3	ew. Wiss. Tech.
CRITICAL	EVALUATION: cont	inued	
	Solvent		La
	paraffin oil		0.159
	benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]		0.219
	p-xylene; C <sub>8</sub> H <sub>10</sub> ; [106-42-3]		0.220
	dimethoxymethane (methylal);	C <sub>3</sub> H <sub>8</sub> O <sub>2</sub> ; [109-87-5]	0.325
	castor oil	• • -	0.151
	water H <sub>2</sub> O; [7732-18-5]		0.033
	aniline; C <sub>6</sub> H <sub>7</sub> N; [62-53-3]		0.107 <sup>b</sup>
	1,4-dioxane; C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> ; [123-91-	1]	0.174 <sup>b</sup>
	2,4,6-trimethy-1,3,5-trioxane C <sub>6</sub> H <sub>12</sub> O <sub>3</sub> ; [123-63-7]	(paraldehyde);	0.281 <sup>b</sup>
	ethylene glycol; C <sub>2</sub> H <sub>6</sub> O <sub>2</sub> ; [107	-21-1]	0.014 <sup>b</sup>
	1,2,3-propanetriol (glycerin)	• C H.O. • [56-81-5]	0.008 <sup>b</sup>

a Ostwald coefficient.

<sup>b</sup> Determined by physical method described in paper.

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Metschl, J.		
<pre>(2) Tetrachloromethane; CCl<sub>4</sub>; [56-23-5]</pre>	J. Phys. Chem. <u>1924</u> , 28, 417-37.		
VARIABLES: T/K = 298.15 P/kPa = 101.325	PREPARED BY: M. E. Derrick H. L. Clever		
EXPERIMENTAL VALUES:	L		
T/K Mol Fraction $x_1 \ge 10^4$ Cc	Bunsen Ostwald Defficient Coefficient α L		
298.15 9.74	0.225 0.246		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
The degassed solvent is saturated with oxygen at 6 to 10 different pressures between 1.5 and 4.5 atm.	<ul> <li>(1) Oxygen. Commercial cylinder. Prepared by Linde process, 97 per cent pure.</li> </ul>		
The pressure is reduced to one atm, and the "supersaturated gas" is shaken out of the solvent and measured.	(2) Tetrachloromethane. Chemically pure. Dried over KOH and distilled.		
The slope of a plot of the volume of gas reduced to standard conditions shaken out of $100 \text{ cm}^3$ of solvent $vs$ .			
the pressure of saturation is nearly identical to the solubility-pressure graph (Henry's law). The slope of the curve is used to obtain the Bunsen coefficient. From the method of calculation the value represents	ESTIMATED ERROR:		
the volume of gas shaken out of the solvent when the pressure is reduced from 2 to 1 atm.	REFERENCES:		

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Horiuti, J.
<ul> <li>(2) Tetrachloromethane; CCl<sub>4</sub>;</li> </ul>	sci. Papers Inst. Phys. Chem. Res.
[56-23-5]	(Tokyo)(Jpn) <u>1931/32</u> , 17, 125-256.
VARIABLES:	PREPARED BY:
T/K = 273.15 - 333.15	M. E. Derrick
Total $P/kPa = 101.325$	H. L. Clever
	1
EXPERIMENTAL VALUES: T/K Mol Fraction	Bunsen Ostwald
-	Coefficient Coefficient
$\frac{x_1 \times 10^3}{222}$	<u> </u>
273.15 1.203 283.15 1.199	0.2865 0.2865 0.2823 0.2926
293.15 1.201	0.2792 0.2996
303.15 1.199	0.2754 0.3052
313.15 1.201 323.15 1.205	0.2725 0.3124 0.2701 0.3196
333.15 1.203	0.2661 0.3246
Smoothed Data: $\ln x_1 = -7.8804 + 1.6$	
Standard error about the regression ]	line = $1.89 \times 10^{-6}$
T/K Mol Fraction	T/K Mol Fraction
$x_1 \times 10^3$	$x_{1} \times 10^{3}$
$\frac{1}{273.15}$ $\frac{1}{1.202}$	$\frac{1}{313.15}$ $\frac{1}{1.201}$
283.15 1.201	323.15 1.203
293.15 1.200	333.15 1.205
<u>303.15 1.200</u> If the gas and solution are assumed t	o be ideal the fitted equation gives
the following thermodynamic values.	o be received internet interest equation gives
$T/K \Delta G^{\circ}/kJ \text{ mol}^{-1} \Delta H^{\circ}/J \text{ mol}^{-1}$	$\frac{1}{\Delta S^{\circ}/J K^{-1} mol^{-1}} \Delta C_{p}^{\circ}/J K^{-1} mol^{-1}}$
$\frac{1}{273.15} 1000000000000000000000000000000000000$	$-\frac{10^{-7}}{-56.3}$ $\frac{10^{-7}}{4.61}$
298.15 16.671 11	-55.9 4.61
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a gas	(1) Oxygen. Prepared in the labora-
buret, a solvent reservoir, and an absorption pipet. The volume of the	tory by heating potassium perman-
pipet was determined at various	ganate (Kahlbaum). Gas frac- tionated in liquid air.
miniscus heights by weighing a quan-	(2) Tetrachloromethane. Kahlbaum.
tity of water. The miniscus height	
	Dried, and distilled. Normal
was read with a cathetometer.	
The dry gas introduced into the	Dried, and distilled. Normal boiling point 76.74 <sup>0</sup> C.
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir-	
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to	
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret.	boiling point 76.74 <sup>0</sup> C.
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from	boiling point 76.74 <sup>0</sup> C.
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of	boiling point 76.74 <sup>°</sup> C. ESTIMATED ERROR:
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the	boiling point 76.74 <sup>0</sup> C.
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption	boiling point 76.74 <sup>°</sup> C. ESTIMATED ERROR:
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the	boiling point 76.74 <sup>°</sup> C. ESTIMATED ERROR:
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. The Ostwald coefficient was measured	boiling point 76.74°C. ESTIMATED ERROR: $\delta T/K = 0.05$ at a total pressure of one atm. The
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. The Ostwald coefficient was measured Bunsen coefficient and the mole fract	boiling point 76.74°C. ESTIMATED ERROR: $\delta T/K = 0.05$ at a total pressure of one atm. The ion solubility values were calculated
The dry gas introduced into the degassed solvent. The gas and sol- vent are mixed with a magnetic stir- rer until saturation. Care taken to prevent solvent vapor from mixing with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet. The Ostwald coefficient was measured	boiling point 76.74 °C. ESTIMATED ERROR: $\delta T/K = 0.05$ at a total pressure of one atm. The ion solubility values were calculated one atm assuming the gas to behave

COMPONENTS:		ORIGINAL MEA	SUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Naumenko,	N. K.	
(2) Tetrachlorometha [56-23-5]	ane; CCl <sub>4</sub> ;	Candidate	es thesis, <u>1970</u> ,	Leningrad.
VARIABLES: T/K = 298. P/kPa = 101.		PREPARED BY:	H. L. Clever	<u> </u>
EXPERIMENTAL VALUES:		<u></u>		
т/к	Mol Fraction $x_1 \times 10^3$	Bunsen Coefficient α	Ostwald Coefficient L	
298.15	1.00	0.231	0.252	
	fraction solubil			
The Bunse by the co	en and Ostwald co ompiler.	oefficients	were caclulated	
		INFORMATION		
METHOD ADDADATIC (DROCEDUD				
METHOD/APPARATUS/PROCEDUR	L:		UDIMU OF MATERIALC.	
		SOURCE AND P	URITY OF MATERIALS:	
Probably used volume desribed by Naumenko	etric method		URITY OF MATERIALS:	
	etric method			
	etric method		formation.	
	etric method	No in	formation.	
	etric method	No in	formation.	
	etric method	No in ESTIMATED ER REFERENCES: 1. Chaenko Naumen	formation.	nskii, I. A

ORIGINAL MEASUREMENTS:
Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
J. Fluorine Chem. <u>1977</u> , 9, 137-46.
PREPARED BY:
C. L. Young
Mole fraction $+$ of oxygen $x_{O_2}$
0.00303
Ficient x 10 <sup>2</sup> , units were stated as the barometric pressure, assumed otal pressure of 101.325 kPa using INFORMATION
SOURCE AND PURITY OF MATERIALS;
(1) No details given. (2) A 3M sample, boiling pt. 72.8°C. ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2$ % REFERENCES:

COMPONENTS :	ORIGINAL MEASUREMENTS:	
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) 1,1,1,3,3,4,4,5,5,5-decafluoro-2- (trifluoromethyl)-2-pentanol;</li> </ul>	Lawson, D.D.; Moacanin, J.; Scherer, K.V.; Terranova, T.J.; Ingham, J.D.	
C <sub>6</sub> HF <sub>13</sub> O; [67728-22-7]	J. Fluorine Chem. <u>1978</u> , <sup>12</sup> ,221-36.	
VARIABLES:	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:		
T/K Solubility *	Mole fraction <sup>+</sup> of oxygen ${}^{x}O_{2}$	
298.15 44.3	0.00374	
<pre>* appears to be the Ostwald coefficient x 10<sup>2</sup>, units were stated as cm<sup>3</sup>O<sub>2</sub>/100 cm<sup>3</sup> (total pressure was assumed to be 1 atmosphere) <sup>+</sup> calculated by compiler for a total pressure of 101.325 kPa using density given in source</pre>		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;	
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved sample of liquid analysed by gas chromatography using a molecular sieve to retain the fluoro- carbon. Details not given in source but method in ref. (1) was equivalent.	<ul><li>(1) No details given.</li><li>(2) Prepared by Jet Propulsion Laboratory, Caltech.</li></ul>	
	ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3\%$ (estimated by compiler)	
	REFERENCES: 1. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr. J. Fluorine Chem. <u>1977</u> , 9, 137-146.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Naumenko, N. K.; Mukhin, N. N.
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Aleskovskii, V. B.
(2) Halobenzenes; C <sub>6</sub> H <sub>5</sub> X	Zh. Prikl. Khim. (Leningrad) <u>1969</u> , 42, 2522-8.
	J. Appl. Chem. <u>1969</u> , 42, 2376-81.
VARIABLES: T/K = 298.15	PREPARED BY:
$O_2 P/kPa = 101.325$	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald
$x_1 \times 10^4$ Co	Bunsen Ostwald efficient Coefficient α L
Fluorobenzene; C <sub>6</sub> H <sub>5</sub> F; [462	-06-6]
298.15 15.08 0.36	0 0.393
Chlorobenzene; C <sub>6</sub> H <sub>5</sub> Cl; [10	8-90-7]
298.15 8.98 0.19	7 <u>+</u> 0.006 0.215
Bromobenzene; C <sub>6</sub> H <sub>5</sub> Br; [108	-86-1]
298.15 7.48 0.15	9 <u>+</u> 0.004 0.174
Iodobenzene; C <sub>6</sub> H <sub>5</sub> I; [591-5	0-4]
298.15 5.10 0.10	2 <u>+</u> 0.005 0.111
The absolute errors are calc of three or four determinati	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The oxygen solubility was determined by a volumetric gas method.	SOURCE AND PURITY OF MATERIALS:
The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum gage.	The source and purity of the materials were not given.
The liquids were saturated with oxygen under an oxygen partial pressure of about 760 mmHg at 25°C for 2 hours. The amount of gas absorbed was then determined.	ESTIMATED ERROR: $\delta T/K = 0.1$
Details of the method are given in an earlier paper (1).	$\delta \alpha / \alpha = 0.023$ (relative)
	REFERENCES: 1. Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. Zh. Prikl. Khim. <u>1969</u> , 42, 2090.
	1

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Horiuti, J.
<pre>(2) Chlorobenzene; C<sub>6</sub>H<sub>5</sub>Cl; [108-90-7]</pre>	Sci. Papers Inst. Phys. Chem. Res. (Tokyo)(Jpn) <u>1931/32</u> ,17, 125-256.
VARIABLES:	PREPARED BY:
T/K = 273.15 - 353.15 Total P/kPa = 101.325	M. E. Derrick H. L. Clever
EXPERIMENTAL VALUES: T/K Mol Fraction	
T/K Mol Fraction X <sub>1</sub> x 10 <sup>3</sup>	Bunsen Ostwald Coefficient Coefficient
$\frac{1}{273.15}$ $\frac{1}{0.7776}$	$\frac{\alpha}{0.1748}$ $\frac{L}{0.1748}$
283.15 0.7815	0.1740 0.1804
293.15 0.7874 303.15 0.7902	0.1736 0.1863 0.1725 0.1915
313.15 0.7966	0.1722 0.1974
323.15 0.8023 333.15 0.8105	0.1717 0.2031 0.1717 0.2094
343.15 0.8213	0.1722 0.2163
353.15 0.8250	0.1712 0.2214
Smoothed Data: $\ln x_1 = -9.51003 + 3.$	
Standard error about the regression l	ine = $1.63 \times 10^{-6}$
T/K Mol Fraction	T/K Mol Fraction
x <sub>1</sub> x 10 <sup>3</sup>	$x_1 \times 10^3$
273.15 0.7780	323.15 0.8036
283.15 0.7815 293.15 0.7859	333.15 0.8108 343.15 0.8184
303.15 0.7911 313.15 0.7970	353.15 0.8266
The Ostwald coefficient was measured	ion solubility values were calculated one atm assuming the gas to behave
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus consists of a gas buret, a solvent reservoir, and an absorption pipet. The volume of the pipet was determined at various miniscus heights by weighing a quan- tity of water. The miniscus height was read with a cathetometer.	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. Prepared in the labora- tory by heating potassium perman- ganate (Kahlbaum). Gas frac- tionated in liquid air.</li> <li>(2) Chlorobenzene. Kahlbaum. Dried, and distilled. Normal boiling</li> </ul>
The dry gas introduced into the de- gassed solvent. The gas and solvent are mixed with a magnetic stirrer until saturation. Care taken to prevent solvent vapor from mixing	point 131.96 <sup>0</sup> C.
with the solute gas in the gas buret. The volume of gas was determined from a gas buret reading, the volume of the solvent was determined from the miniscus height in the absorption pipet.	ESTIMATED ERROR: $\delta T/K = 0.05$
If the gas and solution are assumed t the following thermodynamic values.	o be ideal the fitted equation gives
T/K $\Delta G^{\circ}/kJ \mod^{-1} \Delta H^{\circ}/J \mod^{-1}$	$\frac{1}{\Delta S^{\circ}/J K^{-1} mol^{-1}} \frac{\Delta C_{p}^{\circ}/J K^{-1} mol^{-1}}{\Delta C_{p}^{o}/J K^{-1} mol^{-1}}$
273.1516.258235.5298.1517.713489.0	-58.66 10.18 -57.77 10.18

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Guerry, D. Jr.
(2) 1-Chlorohexane; C <sub>6</sub> H <sub>11</sub> Cl; [544-10-5]	Ph.D. thesis, <u>1944</u> , Vanderbilt University, Nashville, TN.
VARIABLES: T/K = 293-298 P/kPa = 101.325	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^4$	Bunsen Ostwald Coefficient Coefficient
293.15         13.5           298.15         13.5	0.220 0.236 0.220 0.240
compiler.	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A Van Slyke-Neill Manometric Appara- tus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm <sup>3</sup> ) could be used with almost complete recovery of the sample. An improved temperature control system was used.	
SOURCE AND PURITY OF MATERIALS:	ESTIMATED ERROR:
(1) Oxygen. Air Reduction Co. Purity 99.5 per cent.	$\delta \mathbf{T}/\mathbf{K} = 0.05$
<ul> <li>(2) 1-Chlorohexane. Eastman Kodak</li> <li>Co. Purified, distilled from</li> <li>P<sub>2</sub>O<sub>5</sub> in a N<sub>2</sub> atm. B.p. (746.6 mmHg) t/°C 134.66 (corr.).</li> <li>Refractive index, density, and vapor pressure data are in the</li> </ul>	REFERENCES: 1. Van Slyke, D. D. <i>J. Biol. Chem.</i> <u>1939</u> , 130, 545. 2. Ijams, C. C.

COMPONENTS :		ORIGINAL MEASUREMENTS:
	[7782-44-7]	
(1) Oxygen; O <sub>2</sub> ;		Evans, D. F.; Battino, R.
(2) Hexafluorobe [392-56-3]	nzene; C <sub>6</sub> F <sub>6</sub> ;	J. Chem. Thermodyn. <u>1971</u> , 3,753-60.
VARIABLES:		PREPARED BY:
T/K = 2 P/kPa = 1	282.92 - 297.81 .01.325	H. L. Clever
EXPERIMENTAL VALUE		
	T/K Mol Fraction $\underline{x_1 \times 10^3}$	Bunsen Ostwald Coefficient Coefficient
	282.922.479283.212.468	0.491 0.509 0.489 0.507
	297.562.417297.812.422	0.469 0.511 0.471 0.513
The Bunsen coef	ficients were calculate	d by the compiler.
	values were adjusted to atm) by Henry's law.	an oxygen partial pressure of
Smoothed Data:	$\Delta G^{O}/J \text{ mol}^{-1} = -RT \ln X$	-
	Std. Dev. $\Delta G^{O} = 5.7$ , C	
		$\Delta S^{\circ}/J \kappa^{-1} mol^{-1} = 53.371 T$
		tion $\Delta G^{O}/J \text{ mol}^{-1}$
	X1 × 1	03
	278.15 2.48	
283.15 2.46 14,139 288.15 2.45 14,406		
293.15 2.43 14,673		
	298.15 2.41	14,939
		INFORMATION
METHOD ADDADATIC /D		
	apparatus is based on	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Products and
	Norrison and Billett sion used is described	Chemicals Co. 99.6 per cent.
by Battino, Eva	ins, and Danforth (2).	(2) Hexafluorobenzene. Imperiel Smelting Co., Avnomouth, U.K.
	pparatus is that ttino, Banzhof, Bogan,	GC purity 99.7%, density,
and Wilhelm (3)		$\rho_{298.15} = 1.60596 \text{ g cm}^{-3}.$
	to 500 cm <sup>3</sup> of solvent	Purification described Anal. Chem. 1968, 40, 224.
	flask of such size that bout 4 cm deep. The	
	ly stirred, and vacuum	ESTIMATED ERROR: $\delta T/K = 0.03$
liquid N <sub>2</sub> trap	ly applied through a until the permanent	$\delta P/mmHg = 0.5$ $\delta X_1/X_1 = 0.005$
gas residual pr 5 microns.	essure drops to	REFERENCES:
Solubility Dete	rmination. The de-	1. Morrison, T. J.; Billett, F.
gassed solvent	is passed in a thin	J. Chem. Soc. <u>1948</u> , 2033.
	ss helical tube con- gas plus the solvent	2. Battino, R.; Evans, F. D.; Danforth, W. F.
vapor at a tota	1 pressure of one atm.	J. Am. Oil Chem. Soc. 1968,
	as absorbed is found between the initial and	45, 830. 3. Battino, R.; Banzhof, M.;
final volumes in	n the buret system.	Bogan, M.; Wilhelm, E.
flask and weigh	collected in a tared med.	Anal. Chem. <u>1971</u> , 43, 806.

Asseler, E.P.; Iltis, R.; lark, L.C. Jr. <i>Fluorine Chem.</i> <u>1977</u> , 9, 137-46. C. L. Young Mole fraction <sup>+</sup> of oxygen
<i>Fluorine Chem.</i> <u>1977</u> , 9, 137-46. EPARED BY: C. L. Young
C. L. Young
C. L. Young
Nolo fraction <sup>+</sup> of owners
Nolo frontion <sup>+</sup> of owner
$x^{0}$
0.00232
lent x $10^2$ stated as m1/100 m1 pressure, assumed to be . pressure of 101.325 kPa
ORMATION
URCE AND PURITY OF MATERIALS: ) No details given. ) Imperial Smelting Co Chemicals id., boiling pt. 81.5°C. TIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2$ % FERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:	
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) 1,1,1,2,2,3,3,5,5,5-Decafluoro-4- methoxy-4-(trifluoromethyl)-</li> </ul>	Lawson, D.D.; Moacanin, J.; Scherer, K.V.; Terranova, T.F.; Ingham, J.D.	
pentane; C <sub>7</sub> H <sub>3</sub> F <sub>13</sub> O; [67728-33-0]	J. Fluorine Chem. <u>1978</u> , 12, 221-36.	
VARIABLES :	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:		
T/K Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$	
298.15 48.1	0.00462	
<pre>* appears to be the Ostwald coefficient x 10<sup>2</sup>, units were stated as cm<sup>3</sup>O<sub>2</sub>/100 cm<sup>3</sup> (total pressure was assumed to be 1 atmosphere) * calculated by compiler for a total pressure of 101.325 kPa using density given in source</pre>		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE: Oxygen bubbled through fulorocarbon in stirred cell. When saturation achieved sample of liquid analysed by gas chromatography using a molecular sieve to retain the fluoro- carbon. Details not given in source but method in ref. (1) was equivalent.	SOURCE AND PURITY OF MATERIALS: (1) No details given. (2) Prepared by Jet Propulsion Laboratory, Caltech.	
	ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3$ % (estimated by compiler) REFERENCES: 1. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr. J. Fluorine Chem. <u>1977</u> , 9, 137-46.	

CONTONENTE	OPICINAL MEACUREMENTS
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Ijams, C. C.
<pre>(2) 1-Bromoheptane; C<sub>7</sub>H<sub>15</sub>Br; [629-04-9]</pre>	Ph.D. thesis, <u>1941</u> , Vanderbilt Univ- ersity, Nashville, TN.
VARIABLES: T/K = 298.15 P/kPa = 101.325	PREPARED BY: H. L. Clever
· · · · · · · · · · · · · · · · · · ·	
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^3$ C	BunsenOstwaldCoefficientCoefficient $\alpha_{-}$ L
298.15 1.32	0.189 0.206
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A Van Slyke-Neill Manometric Apparatus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified so that small solvent sample (2 cm <sup>3</sup> ) could be used with almost 100 per cent recovery of the solvent. An improved temperature control system was used.	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air Reduction Co. Purity 99.5 per cent. (2) 1-Bromoheptane. Purified. Vapor pressure and boiling point also reported in the thesis.</pre> ESTIMATED ERROR:
	J. Bioł. Chem. <u>1939</u> , 130, 545.

COMPONENTS:	ORIGINAL MEASUREMENTS:	
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) 1-Bromo-1,1,2,2,3,3,4,4,5,6,6,6- dodecafluoro-5-(trifluoromethyl)- hexane; C<sub>7</sub>F<sub>15</sub>Br; [50279-29-3]</pre>	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr. J. Fluorine Chem. <u>1977</u> , 9, 137-46.	
VARIABLES:	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:		
T/K Solubility *	Mole fraction $^+$ of oxygen ${x \atop o_2}$	
298.15 51.4	0.00475	
	•	
<pre>* appears to be the Ostwald coefficient x 10 stated as ml/100 ml (total pressure was the barometer pressure, assumed to be 1 atmosphere) + calculated by compiler for a total pressure of 101.325 kPa using density given in source</pre>		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 μl Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	<ul> <li>(1) No details given.</li> <li>(2) Pennwalt Corp. sample, boiling pt. 120°C.</li> </ul>	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, I.C. Jr.	
<pre>(2) 1-Chloro-1,1,2,2,3,3,4,4,5,6,6,6- dodecafluoro-5-(trifluoromethy1)- hexane; C<sub>7</sub>F<sub>15</sub>Cl; [63243-37-8]</pre>	J. Fluorine Chem. 1977, 9, 137-46.	
VARIABLES:	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:		
T/K Solubility *	Mole fraction $+$ of oxygen $x^{\circ}O_{2}$	
298.15 52.7	0.00490	
<pre>(total pressure was the barometer pressure, assumed to be l atmosphere)  * calculated by compiler for a total pressure of 101.325 kPa using density given in source AUXILIARY INFORMATION</pre>		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	<ul> <li>(1) No details given.</li> <li>(2) Pennwalt Corp sample boiling pt. 108°C.</li> <li>ESTIMATED ERROR:</li> </ul>	
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$	
	REFERENCES :	

ORIGINAL MEASUREMENTS:
Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
J. Fluorine Chem. <u>1977</u> , 9, 137-46.
PREPARED BY:
C. L. Young
Mole fraction $+$ of oxygen $x^{O_2}$
0.00456
Ficient x 10 <sup>2</sup> stated as the barometer pressure, otal pressure of 101.325 kPa
INFORMATION
SOURCE AND PURITY OF MATERIALS: (1) No details given. (2) ISC Chemicals, Avonmouth, UK sample, boiling pt 76°C. ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{0_2} = \pm 2\%$ REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Gjaldbaek, J. C.
2	
(2) Hexadecafluoroheptane or Perfluoroheptane; C <sub>7</sub> F <sub>16</sub> ;	Acta Chem. Scand. <u>1952</u> , 6, 623-33.
[335-57-9]	
······································	
VARIABLES: T/K = 298.11 - 298.15	PREPARED BY:
Total $P/kPa = 101.325$	J. Chr. Gjaldbaek
10tal P/KPa - 101.325	
EXPERIMENTAL VALUES:	
T/K Mol Fraction	Bunsen Ostwald Coefficient Coefficient
$x_1 \times 10^3$	
298.11 5.51	0.544 0.594
298.15 5.55	0.548 0.598
The mole fraction and Ostwald solubil	ity values were calculated by the
compiler.	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A calibrated all-glass combined man-	(1)Oxygen. Prepared by heating
ometer and bulb was enclosed in an	KMnO <sub>4</sub> , 99.7 percent O <sub>2</sub> , 0.3 per-
air thermostat and shaken until	cent N <sub>2</sub> .
equilibrium. Mercury was used for calibration and as the confining	2
liquid. The solvents were degassed	(2)Hexadecafluoroheptane. E. I. duPont Co. Distilled, boiling
in the apparatus. Details are in	point 82.3 - 82.4°C at 753.7 mmHg.
references 1 and 2.	perio ente entre de restrictions
The absorped volume of gas was cal-	1
culated from the initial and final amounts, both saturated with solvent	
vapor. The amount of solvent was	
determined by the weight of dis-	ESTIMATED ERROR:
placed mercury.	$\delta T/K = 0.05$
The saturation of the liquid with	
	$\delta X_{1}/X_{1} = 0.015$
the gas was carried out close to	$\delta x_1 / x_1 = 0.015$
the gas was carried out close to atmospheric pressure. The solubility	$\delta X_1 / X_1 = 0.015$ REFERENCES:
the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos- phere gas pressure assuming Henry's	REFERENCES: 1. Lannung, A.
the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos-	REFERENCES:
the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos- phere gas pressure assuming Henry's	REFERENCES: 1. Lannung, A. J. Am. Chem. Soc. <u>1930</u> , 52, 68.
the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos- phere gas pressure assuming Henry's	REFERENCES: 1. Lannung, A. J. Am. Chem. Soc. <u>1930</u> , 52, 68. 2. Gjaldbaek¦ J. C.
the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos- phere gas pressure assuming Henry's	REFERENCES: 1. Lannung, A. J. Am. Chem. Soc. <u>1930</u> , 52, 68.
the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos- phere gas pressure assuming Henry's	REFERENCES: 1. Lannung, A. J. Am. Chem. Soc. <u>1930</u> , 52, 68. 2. Gjaldbaek¦ J. C.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) Benzene, bis(trifluoromethyl)-; C<sub>6</sub>H<sub>4</sub>(CF<sub>3</sub>)<sub>2</sub>; [26545-61-9]</pre>	J. Fluorine Chem. <u>1977</u> , 9, 137-46.
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x^{0}$
298.15 35.4	0.00631
<pre>* appears to be the Ostwald coeffic (total pressure was the barometer l atmosphere) * calculated by compiler for a tota using density given in source</pre>	pressure, assumed to be
	INFORMATION
METHOD/APPARATUS/PROCEDURE: Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume for oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	SOURCE AND PURITY OF MATERIALS; (1) No details given. (2) Pierce Chem. Co. sample, boiling pt. 116°C. ESTIMATED ERROR:
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$ REFERENCES:

COMPONENTS :		OBICINAL MEACUDENENTS.
<pre>(1) Oxygen; O<sub>2</sub>; (2) 2-Ethoxy-1,1, decafluoro-2-</pre>	[7782-44-7] 1,3,3,4,4,5,5,5- (trifluoromethy1)- F <sub>13</sub> O; [67728-34-1]	ORIGINAL MEASUREMENTS: Lawson, D.D.; Moacanin, J.; Scherer, K.V.; Terranova, T.F.; Ingham, J.D. J. Fluorine Chem. <u>1978</u> , 12, 221-36.
MADIADI DO -		
VARIABLES:		PREPARED BY:
T/K	= 298	C. L. Young
EXPERIMENTAL VALUES:		
EAFERIMENTAL VALUES.		
T/K	Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$
298.15	49.9	0.00514
+ calculated by density gives	n in source	l pressure of 101.325 kPa using
METHOD/APPARATUS/PRO	CEDURE .	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled thi in stirred cell. achieved sample of by gas chromatogra molecular sieve to carbon. Details n	rough fluorocarbon When saturation f liquid analysed	<ul> <li>(1) No details given.</li> <li>(2) Prepared by Jet Propulsion Laboratory, Caltech.</li> </ul>
		ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3\%$ (estimated by compiler)
		(estimated by compiler)
		REFERENCES: 1. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
		J. Fluorine Chem. <u>1977</u> , 9, 137-46.

COMPONENTS :			ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ;	[7782-44	-7]	Tham, M. K.; Walker, R. D. Jr.; Modell, J. H.
<pre>(2) Heptafluorot buty1)-furan perfluorotet C<sub>8</sub>F<sub>16</sub>O; [404</pre>	or Perf rahydrof	luorobutyl uran or FC-80;	J. Chem. Eng. Data <u>1973</u> , 18, 385-6.
WADTART PC -			
VARIABLES: T/K= 2 P/kPa= 1	98.15 - 01.325	323.15	PREPARED BY: T. D. Kittredge H. L. Clever
EXPERIMENTAL VALUES	:		
-	Т/К	Mol Fraction	Bunsen Ostwald
		$x_1 \times 10^3$	$\begin{array}{c} \text{Coefficient} & \text{Coefficient} \\ \underline{\alpha} & \underline{\mathbf{L}} \end{array}$
	298.15	5.60	0.536 0.585
	303.15	5.58	0.530 0.588
	310.15	5.50	0.517 0.587
	313.15 323.15	5.50 5.40	0.514 0.589 0.497 0.588
		_	were calculated by the compiler. $x_1 = -1187.0 + 47.073 T$
			Coef. corr. = 0.9997
			$0,  \Delta S^{0}/J \ K^{-1} \ mol^{-1} = -47.073$
	ΔH /J		
		T/K Mol Fr X <sub>l</sub> x	action $\Delta G^{\circ}/J \text{ mol}^{-1}$ 10 <sup>3</sup>
		298.15 5.	•
		303.15 5. 308.15 5.	•
		313.15 5.	•
		318.15 5.	44 13,789
		323.15 5.	41 14,025
		AUXILIARY	INFORMATION
METHOD/APPARATUS/PF	OCEDURE:		SOURCE AND PURITY OF MATERIALS:
The apparatus and by Shoor, Walkes	nd proce r and Gu	dure described bbins (1) were	<pre>(1)Oxygen. Source not given. Minimum     purity 99.6 per cent.</pre>
used. The solver saturator immer			(2)FC-80. Minnesota Minning and
temperature bat			Manufacturing Co. A mixture of
sed through the	liquid	by a fritted	several isomers. The authors also
glass disk at a			measured the density and viscosity of the solvent at several temper-
m <sup>-1</sup> . After an in period of 30 min			atures. At 298.15 K the density is
withdrawn with			1.7657 g cm <sup>-3</sup> and the viscosity is
syringe at 15 m	inute in	tervals and	1.3953 centipoise.
analyzed chroma Elmer 900 gas c			ESTIMATED ERROR:
thermal conduct:			
solubility at o	ne atmos	phere partial	$\delta T/K = 0.05$
pressure of the value of three	gas was	the mean	$\delta x_1 / x_1 = 0.005$ (Compiler)
which agreed wi	thin the		REFERENCES :
experimental er	ror.		1. Shoor, S. K.; Walker, R. D. Jr.;
			Gubbins, K. E. J. Phys. Chem. <u>1969</u> , 73, 312.

COMPONENTS :		ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [778	32-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) 1-Bromo-1,1,2,2, 7,7,8,8,8-heptad (Perfluorooctyl C<sub>8</sub>F<sub>17</sub>Br; [423-55</pre>	<pre>lecalfluoro-octane bromide);</pre>	J. Fluorine Chem. <u>1977</u> , 9,137-46.
VARIABLES :		PREPARED BY:
T/K =	298	C. L. Young
EXPERIMENTAL VALUES:		
т/к	Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$
298.15	52.7	0.00566
as ml/100 ml ( to be l atmosp	total pressure was here) compiler for a tot ven in source	cient x 10 <sup>2</sup> , units were stated the barometric pressure, assumed al pressure of 101.325 kPa using
		INFORMATION
METHOD/APPARATUS/PROCEDU		SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled throu in stirred cell. Wh achieved samples of with a hypodermic Pr 50 µl Pressure-Lok s 15 samples taken and Average peak height that of average peak injection of the sam oxygen. Chromatogra consisted of 13x mol 70°C. Helium was us	en saturation liquid removed ecision Sampling yringe. At least chromatographed. compared with height for e volume of phic column ecular sieve at	(1) No details given. (2) A 3M sample, boiling pt 140.5°C. ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$ REFERENCES:

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) Octadecafluorooctane (Perfluorooctane); CgF18; [307-34-6]</pre>	J. Fluorine Chem. <u>1977</u> , 9, 137-46.
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x^{O_2}$
298.15 52.1	0.00534
<pre>(total pressure was the baromet     l atmosphere)     +     calculated by compiler for a to     using density given in source </pre>	
METHOD/APPARATUS/PROCEDURE: Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 µl Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	SOURCE AND PURITY OF MATERIALS: (1) No details given. (2) PCR sample boiling pt range 100-105°C. Probably a mixture of isomers. ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2$
	REFERENCES:

(1) Oxygen;				ORIGINAL MEASUREM	NTC .	
(1) Oxygen,			ľ		2N15:	
	(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Zander, R.		
4,5~her (nonaf] fluorol	which is mosp tafluorotet luorobutyl)f putyltetrahy [335-36-4]	rahydro-5- uran or per drofuran;		Res. exp. Med.	<u>1974</u> , 2	164, 97-109.
	K= 283.15 - a= 12 - 101	323.15		PREPARED BY: H.	L. Cleve	er
EXPERIMENTAL V	ALUES:					
Temperature Range T/K	Gas Phase; Volume Per Cent Oxygen	Oxygen Partial Pressure <sup>2</sup> p/mmHg	Re	nsen Coefficie gression Equat cm <sup>3</sup> cm <sup>-3</sup> atm <sup>-1</sup>	nt ion	Number of Experimental Points
283.15 - 32	3.15 12	91.2	α = 0	.369 - 0.00041	t∕°C	24
(10 - 50 °	C) 35	266 0	$\alpha = 0$	.466 - 0.00073	t∕°C	20
	100	760 0	α = 0	.491 - 0.00096	t∕°C	20
						he total
		AUXILI	IARY I			
METHOD/APPARAT	US/PROCEDURE :	AUXILI		NFORMATION SOURCE AND PURITY	OF MATERI	
Equilibrati liquid phas minutes in (1) design. The oxygen	on bewteen es was estal a Tonometer content of	the gas and blished in 4 of the Laug the gas phas	45 e se		o inform nnesota	ALS: ation. Mining and
Equilibrati liquid phas minutes in (1) design. The oxygen was determi analyzer (s	on bewteen es was estal a Tonometer content of ned by a Scl ee footnote	the gas and olished in 4 of the Laue the gas phas holander gas 1 above).	45 e se	SOURCE AND PURITY (1) Oxygen. N (2) FC-75. Mi Manufactu	o inform nnesota	ALS: ation. Mining and
liquid phas minutes in (1) design. The oxygen was determi analyzer (s The saturat ferred to a	on bewteen es was estal a Tonometer content of ned by a Scl	the gas and olished in 4 of the Laue the gas phas holander gas l above). was trans- apparatus fo	45 e se s	SOURCE AND PURITY (1) Oxygen. N (2) FC-75. Mi Manufactu	o inform nnesota	ALS: ation. Mining and
Equilibrati liquid phas minutes in (1) design. The oxygen was determi analyzer (s The saturat ferred to a the solubil The 64 expe at temperat were fitted table above used to con	on bewteen i es was estal a Tonometer content of ned by a Sci ee footnote ed solution Van Slyke a ity determin rimental mea ures of 10, to the equa . The smooth struct a gra vs. oxygen nd a nomogra ent oxygen a artial press	the gas and olished in 4 of the Laue the gas phas holander gas l above). was trans- apparatus fon ation. asurements m 30, and 50 ations in the hed data were aph of Bunse partial am for the as a function	45 e se s or nade c ne e en	SOURCE AND PURITY (1) Oxygen. N (2) FC-75. Mi Manufactu received. ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha / \alpha = 0.03$ 0.05 REFERENCES: 1. Laue, D. Pflugers A:	above 10 - 0.10 b	ALS: ation. Mining and

		ORIGINAL MEASU	JREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Sargent, J.	W.; Seffl, R. J.
(2) FC-80, which is mostly a mixture of isomers of perfluorobutyl- tetrahydrofuran. For example 2,2,3,3,4,4,5-heptafluorotetra-		Fed. Proc.	<u>1970</u> , <i>29</i> , 1699 - 1703.
	probutyl)furan; C	<sub>8</sub> F <sub>16</sub> 0; [335-3	6-4]
VARIABLES:		PREPARED BY:	
T/K =298.1 Total P/kPa =101.3	•		A. L. Cramer H. L. Clever
EXPERIMENTAL VALUES:			
T	emperature	Oxygen Solu	bility
t	:/°C T/K g	0 <sub>2</sub> 1000 g <sup>-1</sup>	cm <sup>3</sup> O <sub>2</sub> 100 cm <sup>-3</sup>
-	25 298.15	0.361	48.8
	37 310,15	0.354	48.5
The	e authors solubil be the Ostwald c	ity, cm <sup>3</sup> O <sub>2</sub> l pefficient ti	00 cm <sup>-3</sup> , appears mes 100.
ļ.	AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDU		-1	RITY OF MATERIALS:
METHOD/APPARATUS/PROCEDUR The equilibrium app cm <sup>3</sup> three neck flask water condenser, a t gas dispersing tube the fluid surface le and 35 cm <sup>3</sup> of solven the flask. Gas is bu solvent for 2 - 3 h. liter sample is slow gas tight syringe. T injected into a gas The results of three analyises are averag	RE: aratus is a 50 equiped with a hermometer, and a extending below evel. Between 25 it are placed in bbled through the An 80 micro- ly taken into a he sample is chromatograph. sampling and	(1) Oxygen. Commerce (2) FC-80. Manufac organic	Source not given. ial cylinder. Minnesota Mining and turing Co. All H in an compound are replaced by mons electrochemical (1)

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Lawson, D.D.; Moacanin, J.;
_	Scherer, K.V.; Terranova, T.F.;
(2) 1,1,1,2,2,3,3-Heptafluoro-4,4-bis (trifluoromethyl)-heptane;	Ingham, J.D.
$C_{9}H_{7}F_{13}$ ; [67728-31-8]	J. Fluorine Chem. <u>1978</u> , <sup>12</sup> , 221-36.
VARIABLES:	PREPARED BY:
т/к = 298	C. L. Young
EXPERIMENTAL VALUES:	I
T/K Solubility	Mole fraction $+$ of oxygen
	$r_{O_2}$
	02
298.15 46.7	0.00494
*	<b>a</b>
* appears to be the Ostwald coeffic as cm <sup>3</sup> O <sub>2</sub> /100 cm <sup>3</sup> (total pressure)	ient x 10 <sup>2</sup> , units were stated
as cm 0 <sub>2</sub> /100 cm (cotar pressure	was assumed to be I atmosphere,
+ calculated by compiler for a tota	1 pressure of 101.325 kPa using
density given in source	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon	(1) No details given.
in stirred cell. When saturation	
achieved sample of liquid analysed by gas chromatography using a	(2) Prepared by Jet Propulsion Laboratory, Caltech.
molecular sieve to retain the fluoro-	
carbon. Details not given in source	
but method in ref.(1) was equivalent.	
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3\%$
	(estimated by compiler)
	REFERENCES :
	l. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
1	
	J. Fluorine Chem. <u>1977</u> ,9, 137-146,

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Lawson, D.D.; Moacanin, J.; Scherer, K.V.; Terranova, T.F.;
<pre>(2) 1,1,1,2,2,3,3,5,5,5-Decafluoro-4- propoxy-4-(trifluoromethyl)- pentane; C<sub>9</sub>H<sub>7</sub>F<sub>13</sub>O; [67728-35-2]</pre>	Ingham, J.D. J. Fluorine Chem. <u>1978</u> , 12,221-36.
· · · · · · · ·	
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$
298.15 45.8	0.00509
<pre>* appears to be the Ostwald coeffic as cm<sup>3</sup>O<sub>2</sub>/100 cm<sup>3</sup> (total pressure * calculated by compiler for a tota density given in source</pre>	was assumed to be 1 atmosphere)
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fulorocarbon in stirred cell. When saturation achieved sample of liquid analysed by gas chromatography using a molecular sieve to retain the fluoro- carbon. Details not given in source but method in ref. (1) was equivalent.	(1) No details given. (2) Prepared by Jet Propulsion Laboratory, Caltech.
	ESTIMATED ERROR: $5\pi/T = \frac{1}{2}$
	$\delta T/K = \pm 0.3;  \delta x_{O2} = \pm 3$ % (estimated by compiler)
	REFERENCES :
	1. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
	J. Fluorine Chem. <u>1977</u> , 9, 137-146.

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) 1-Chloro-1,1,2,2,3,3,4,4,5,5,6,6, 7,8,8,8-hexadecafluoro-7- (trifluoromethyl)-Octane; C<sub>9</sub>F<sub>19</sub>Cl; [63243-38-9]</pre>	J. Fluorine Chem. <u>1977</u> , 9, 137-46.
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x^{0}_{2}$
298.15 45.6	0.00511
<pre>* appears to be the Ostwald coeffic (total pressure was the barometer l atmosphere) + calculated by compiler for a tota using density given in source AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	pressure, assumed to be
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume for oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	<ul><li>(1) No details given.</li><li>(2) Pennwalt Corp. boiling pt. 151°C.</li></ul>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.;
(2) Eicosafluorononane,	Clark, L.C. Jr.
(Perfluorononane); C <sub>9</sub> F <sub>20</sub> ; [375-96-2]	J. Fluorine Chem. 1977, 9, 137-46.
VARIABLES:	PREPARED BY:
T/K = 298	
1/K - 298	C. L. Young
EXPERIMENTAL VALUES:	L
EXPERIMENTAL VALUES:	
*	<b>_</b>
T/K Solubility	Mole fraction $+$ of oxygen
	<sup><i>x</i></sup> O <sub>2</sub>
298.15 49.6	0.00535
* appears to be the Ostwald coeffic	ient x 10 stated as m1/100 m1
(total pressure was the barometer	
l atmosphere)	
+ galgulated by compiler for a to	tal programs of 101 225 kpa
calculated by compiler for a to using density given in source	cal pressure of 101.323 kPa
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon in stirred cell. When saturation	(1) No details given.
achieved samples of liquid removed	(2) Armageddon Chem. Co., purified,
with a hypodermic Precision Sampling	boiling pt. 119°C
50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed.	
Average peak height compared with	
that of average peak height for injection of the same volume of	
oxygen. Chromatographic column	
consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	
volt. herrum was used as carrier gas.	ESTIMATED ERROR:
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Tham, M. K.; Walker, R. D. Jr.;
(2) 1,1,1,2,2,3,3,4,4,5,5,6,6-Trideca-	Modell, J. H.
<pre>fluoro-6-[1,2,2,2-tetrafluoro-1- (trifluoromethyl)ethoxy]-hexane or</pre>	J. Chem. Eng. Data 1973, 18, 385-6.
Perfluoro-l-isopropoxy hexane or	
Caroxin-F; $C_9F_{20}O$ ; [37340-18-4] or	
[41719-16-8] VARIABLES:	PREPARED BY:
T/K = 298.15 - 323.15	T. D. Kittredge
P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	I
T/K Mol Fraction	Bunsen Ostwald
$X_1 \times 10^3$	Coefficient Coefficient
298.15 6.60 303.15 6.57	0.515 0.562 0.509 0.565
310.15 6.48	0.497 0.564
313.15 6.47 323.15 6.30	0.494 0.566 0.474 0.561
The Bunsen and Ostwald coefficient	s were calculated by the compiler.
Smoothed Data: $\Delta G^{\circ}/J \mod^{-1} = -RT$	$\ln x_1 = -1495.4 + 46.727 \text{ T}$
	-
	9, Coef. corr. 0.9997
$\Delta H^{\circ}/J \text{ mol}^{-1} = -149$	5.4, $\Delta S^{\circ}/J K^{-1} mol^{-1} = -46.727$
T/K Mol	Fraction $\Delta G^{\circ}/J \text{ mol}^{-1}$
	x 10 <sup>3</sup>
	······································
	6.63 12,436 6.56 12,670
308.15	6.50 12,903
	6.44 13,137 6.38 13,371
	6.32 13,604
	TURADU. #TAU
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The method of Shoor, Walker and Gubbins (1) was used. The solvent was	<pre>(1)Oxygen. Source not given. Minimum    purity 99.6 per cent.</pre>
placed in a saturator immersed in a constant temperature bath. The gas	(2)Caroxin-F. Allied Chemical Corp.
was dispersed through the liquid by a	Purity > 99.9 per cent as supplied.
fritted glass disk at a rate of about 40 cm <sup>3</sup> m <sup>-1</sup> . After an initial equili-	The authors also measured the density and viscosity of the solv-
bration period of 30 minutes, samples	ent at several temperatures. At
were withdrawn at 15 minute intervals and analyzed chromatographically	298.15 K the density is 1.7449 g $\rm cm^{-3}$ and the viscosity is 1.5405
(Perkin-Elmer 900 gas chromatograph	centipoise.
with thermal conductivity detector). The solubility at one atmosphere	ESTIMATED ERROR:
partial pressure of the gas was the	
mean value of three consecutive samples which agreed within the	$\delta T/K = 0.05$ $\delta X_1/X_1 = 0.005(compiler)$
limits of experimental error.	
	REFERENCES:
	1. Shoor, S. K.; Walker, R. D. Jr.;
	Gubbins, K. E. J. Phys. Chem. 1969, 73, 312.
	, , , , , , , , , , , , , , , , ,

COMPONENTS:	ORIGINAL MEASUREMENTS:	
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) 1,1,1,2,2,3,3-Heptafluoro-4,4-bis     (trifluoromethyl)-octane;     C<sub>10</sub>H<sub>9</sub>F<sub>13</sub>; [67728-32-9]</pre>	Lawson, D.D.; Moacanin, J.; Scherer, K.V.; Terranova, T.F.; Ingham, J.D. J. Fluorine Chem. <u>1978</u> , 12,221-36.	
	······································	
VARIABLES:	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:	I	
T/K Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$	
298.15 46.6	0.00530	
<pre>* appears to be the Ostwald coefficient x 10<sup>2</sup>, units were stated as cm<sup>3</sup>O<sub>2</sub>/100 cm<sup>3</sup> (total pressure was assumed to be 1 atmosphere) + calculated by compiler for a total pressure of 101.325 kPa using density given in source AUXILIARY INFORMATION</pre>		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved sample of liquid analysed by gas chromatography using a molecular sieve to retain the fluoro- carbon. Details not given in source but method in ref. (1) was equivalent.	<ul> <li>No details given.</li> <li>Prepared by Jet Propulsion Laboratory, Caltech.</li> </ul>	
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3\%$	
	(estimated by compiler)	
	REFERENCES:	
	l. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.	
	J. Fluorine Chem. <u>1977</u> , 9, 137-46.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) 1,1,1,2,2,3,3-Heptafluoro-6-</pre>	Lawson, D.D.; Moacanin, J.; Scherer. K.V.; Terranova, T.F.; Ingham, J.D.	
<pre>methyl-4,4-bis (trifluoromethyl)- heptane; C<sub>10</sub>H<sub>9</sub>F<sub>13</sub>; [67728-33-0]</pre>	J. Fluorine Chem. <u>1978</u> , 12, 221-36.	
VARIABLES:	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:		
T/K Solubility *	Mole fraction $+$ of oxygen $x^{O_2}$	
298.15 43.6	0.0502	
* appears to be the Ostwald coefficient x l0 <sup>2</sup> , units were stated as cm <sup>3</sup> O <sub>2</sub> /100 cm <sup>3</sup> (total pressure was assumed to be l atmosphere) + calculated by compiler for a total pressure of 101.325 kPa using density given in source		
	INFORMATION	
METHOD/APPARATUS/PROCEDURE: Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved sample of liquid analysed by gas chromatography using a molecular sieve to retain the fluoro- carbon. Details not given in source but method in ref. (1) was equivalent.	SOURCE AND PURITY OF MATERIALS: (1) NO details given. (2) Prepared by Jet Propulsion Laboratory, Caltech.	
-	ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3$ % (estimated by compiler) REFERENCES: 1. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr. J. Fluorine Chem. <u>1977</u> , 9, 137-46.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.	
<pre>(2) Octadecafluorodecahydronaphthalene, (Perfluorodecalin); C10F18; [306-94-5]</pre>	J. Fluorine Chem. <u>1977</u> , 9, 137-46.	
WARTARY DO -		
VARIABLES:	PREPARED BY:	
T/K = 298	C. L. Young	
EXPERIMENTAL VALUES:		
T/K Solubility *	Mole fraction <sup>+</sup> of oxygen ${}^{x}O_{2}$	
298.15 40.3	0.00390	
<pre>* appears to be the Ostwald coefficient x 10<sup>2</sup> stated as ml/100 ml (total pressure was the barometer pressure, assumed to be 1 atmosphere) + calculated by compiler for a total pressure of 101.325 kPa using density given in source</pre>		
METHOD /APPARATUS / PROCEDURE :	INFORMATION	
	SOURCE AND PURITY OF MATERIALS: (1) No details given.	
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	(2) Imperial Smelting Co Chemicals Ltd, boiling pt. 142°C.	
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2$ %	
	REFERENCES:	

COMPONENTS :		ORIGINAL MEASU	UREMENTS:
(1)Oxygen; 0 <sub>2</sub> ; [77	82-44-7]	Tham, M. K. Modell,	.; Walker, R. D. Jr.; J. H.
fluoromet hyl) et Perfluoro-1,4-	-Octafluoro-1,4- rafluoro-1-(tri- hoxy) butane or diisopropoxy butane 10F22O2;[23228-90-2	J. Chem. Er	ng. Data <u>1973</u> , 18, 385-6.
VARIABLES: T/K= 298. P/kPa =101.	15 - 323.15 325		T. D. Kittredge H. L. Clever
EXPERIMENTAL VALUES:			
	$X_1 \times 10^3$		Ostwald Coefficient L
30 31 31	3.15       6.50         3.15       6.40         0.15       6.30         3.15       6.28	0.449 0.439 0.428 0.424	0.490 0.487 0.486 0.486
32	3.15 6.20	0.412	0.487
Smoothed Data: $\Delta G^{\dagger}$	$J = - RT \ln$	$x_1 = -1489.7$	' + 46.900 T
Sto	1. dev. $\Delta G^{0} = 8.9$ , (	Coef. corr. =	• 0.9999
ΔΗ	$^{0}/J.mol^{-1} = -1489.7$		
	T/K Mol I X <sub>1</sub>	Fraction ∆G <sup>0</sup> x 10 <sup>3</sup>	/J mol <sup>-1</sup>
	298.15	.47 12	,494
	303.15	5.41 12	,728
	313.15	5.29 13	,963 ,197
			,432,666
The Bunsen and Ost	wald coefficients v	vere calculat	ed by the compiler.
	AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCE	DURE :	SOURCE AND PUR	RITY OF MATERIALS:
The method of Shoo Gubbins was used		j purity 9	Source not given. Minimum 9.6 per cent.
a constant tempera	ture bath. The gas	(2)Caroxin-	D. Allied Chemical Corp.
was bubbled through fritted glass disk	for 30 minutes,	The auth	99.9 per cent as supplied. ors also measured the
	5 minute intervals phy. The solubilit	solvent.	and viscosity of the At 298,15 K the density
	tm partial pressure	e] is 1.746	5 g cm <sup>-3</sup> and the viscosity 9 centi poise.
three consecutive	samples which agree		
within the limits error.	of experimental	ESTIMATED ERRO	
			$\delta T/K = 0.05$ $\delta X_1/X_1 = 0.005(compiler)$
		REFERENCES :	
		1. Shoor, S Gubbins,	. K.; Walker, R. D.; K. E.
		J. Phys.	Chem. <u>1969</u> , 73, 312.
L			

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R;
<pre>(2) 1,1,1,2,3,3-hexafluoro-2 (heptafluoropropoxy)-3-[1,2,2- trifluoro-2-(1,2,2,2-tetra- fluoroethoxy)-1-(trifluoromethyl) ethoxy]-propane; C<sub>11</sub>HF<sub>23</sub>O<sub>3</sub>; [3330-16-3]</pre>	Clark, L.C. Jr. J. Fluorine Chem. <u>1977</u> , 9, 137-46.
VARIABLES:	PREPARED BY:
т/к =298	C. L. Young
-,	
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x^{O_2}$
298.15 47.3	0.00683
<pre>*    appears to be the Ostwald coeffic (total pressure was the barometer l atmosphere) +    calculated by compiler for a tota using density given in source</pre>	r pressure, assumed to be
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon	(1) No details given.
in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume for oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	(2) DuPont sample, boiling pt. 152°C.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2$

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Lawson, D.D.; Moacanin, J.; Scherer, K.V.; Terranova, T.F.;
<pre>(2) 1,1,1,7,7,7-Hexafluoro-2,2,6,6- tetrakis (trifluoromethyl)-</pre>	Ingham, J.D.
heptane; $C_{11}H_6F_{18}$ ; [67728-37-4]	J. Fluorine Chem. <u>1978</u> , 12,221-36.
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction <sup>+</sup> of oxygen
	<sup>x</sup> O <sub>2</sub>
298.15 35.8	0.00478
*	
appears to be the Ostwald coeffic as cm <sup>3</sup> O <sub>2</sub> /100 cm <sup>3</sup> (total pressure)	ient x 10°, units were stated was assumed to be 1 atmosphere)
+ calculated by compiler for a tota	
density given in source	I pressure of 101.325 kPa using
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon in stirred cell. When saturation	(1) No details given.
achieved sample of liquid analused	(2) Prepared by Jet Propulsion
by gas chromatography using a molecular sieve to retain the fluoro-	Laboratory, Caltech.
carbon. Details not given in source but method in ref.(1) was equivalent.	
	ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 3\%$
	(estimated by compiler)
	REFERENCES :
	l. Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
1	J. Fluorine Chem. <u>1977</u> , 9, 137-46.
1	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; $O_2$ ; [7782-44-3]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) Heptadecafluorodecahydro   (trifluoromethyl)-Naphthalene,   (Perfluoromethyldecalin);   C<sub>11</sub>F<sub>20</sub>; [51294-16-7]</pre>	J. Fluorine Chem. <u>1977</u> , 9,137-46.
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$
298.15 38.4	0.00406
<ul> <li>* appears to be the Ostwald coeff (total pressure was the baromet l atmosphere)</li> <li>+ calculated by compiler for a to using density given in source</li> </ul>	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	<pre>(1) No details given. (2) Imperial Smelting Co. Chemicals Ltd. sample, boiling pt. 160°C. ESTIMATED ERROR:</pre>
	ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$ REFERENCES:

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) Tricyclo[3,3,1,3,7] decane tetradecafluorobis (trifluoromethyl)- (Perfluorodomethyladamatane); C<sub>12</sub>F<sub>20</sub>; [63267-58-3]</pre>	J. Fluorine Chem. <u>1977</u> , 9, 137-46.
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$
298.15 39.4	0.00420
<pre>* appears to be the Ostwald coeffic (total pressure was the barometer l atmosphere) + calculated by compiler for a tota using density given in source</pre>	r pressure, assumed to be
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas	ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.; Clark, L.C. Jr.
<pre>(2) 3,6,9,12-Tetraoxapentadecane, 1,1,1,2,4,4,5,7,7,8,10,10,11,13, 13,14,14,15,15,15-eicosafluoro- 5,8,11-tris(trifluoromethyl)- C<sub>14</sub>HF<sub>29</sub>O<sub>4</sub>; [26738-51-2]</pre>	J. Fluorine Chem. <u>1977</u> , 9, 137-46.
VARIABLES: T/K = 298	PREPARED BY: C. L. Young
EXPERIMENTAL VALUES:	L
T/K Solubility *	Mole fraction $^+$ of oxygen ${}^{x}O_2$
298.15 42.2	0.00759
<pre>appears to be the Ostwald coeffic (total pressure was the barometer l atmosphere) + calculated by compiler for a tota using density given in source</pre>	pressure, assumed to be
METHOD/APPARATUS/PROCEDURE: Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 µl Oressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	SOURCE AND PURITY OF MATERIALS: (1) No details given. (2) DuPont sample, boiling pt. 194°C. ESTIMATED ERROR: $\delta T/K = \frac{+}{-0.3};  \delta x_{O_2} = \frac{+}{-2}$ REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P.; Iltis, R.;
(2) 3,6,9,12,15-Pentaoxaoctadecane,	Clark, L.C. Jr.
1,1,1,2,4,4,5,7,7,8,10,10,11,13,	J. Fluorine Chem. 1977, 9, 137-46.
13,14,16,16,17,17,18,18,18- tricosafluoro-5,8,11,14-tetrakis	
(trifluoromethyl)-; C <sub>17</sub> HF <sub>35</sub> O <sub>5</sub> ;	
[37486-69-4]	
VARIABLES:	PREPARED BY:
T/K = 298	C. L. Young
EXPERIMENTAL VALUES:	
T/K Solubility *	Mole fraction <sup>+</sup> of oxygen
	<sup>x</sup> O <sub>2</sub>
	02
298.15 39.7	0.00853
*	2
appears to be the Ostwald coeff	icient x 10 stated as m1/100 m1
(total pressure was the baromet l atmosphere)	er pressure, assumed to be
i admosphere)	
+ calculated by compiler for a to	tal pressure of 101.325 kPa
using density given in source	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon	<ol> <li>No details given.</li> </ol>
in stirred cell. When saturation	(2) Du Pont sample, boiling pt.
achieved samples of liquid removed with a hypodermic Precision Sampling	224°C.
50 µl Pressure-Lok syringe. At least	
15 samples taken and chromatographed.	
Average peak height compared with that of average peak height for	
injection of the same volume of	
oxygen. Chromatographic column	
consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	
, o c. nerium was used as carrier gas.	ESTIMATED ERROR:
	$\delta T/k = \pm 0.3 \cdot \delta T = \pm 29$
1	$\delta T/k = \pm 0.3;  \delta x_{O_2} = \pm 2\%$
	REFERENCES:

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Wesseler, E.P; Iltis, R.; Clark,
<pre>(2) 3,6,9,12,15,21,24,27- Nonaoxatriacontane, 1,1,1,2,4,4, 5,7,7,8,10,10,11,13,13,14,16,16, 17,19,19,20,22,22,23,25,25,26,28, 28,29,29,30,30,30,-</pre>	L.C. Jr. J. Fluorine Chem. <u>1977</u> , 9, 137-46.
<pre>pentacontafluoro- 5,8,11,14,17, 20,23,26,octakis (trifluoromethyl)</pre>	PREPARED BY:
C <sub>29</sub> HF <sub>59</sub> O <sub>9</sub> ; [58979-41-2]	C.L. Young
VARIABLES:	
T/K = 298 EXPERIMENTAL VALUES:	
	Mole fraction <sup>+</sup> of
	oxygen <sup>x</sup> O <sub>2</sub>
298.15 33.3	0.0118
<ul> <li>* appears to be the Ostwald were stated as ml/100 ml barometric pressure, assu</li> <li>+ calculated by compiler fo 101.325 kPa using the den</li> </ul>	(total pressure was the med to be 1 atmosphere). r a total pressure of
AUXILIARY INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid removed with a hypodermic Precision Sampling 50 $\mu$ l Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier	
gas.	ESTIMATED ERROR: $\delta T/K = \pm 03; \ \delta x_{O_2} = \pm 2\%$ REFERENCES:

CONDONENTS	OPICINAL MEASUPENSIVES
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Gjaldbaek, J. C.
(2) Carbon disulfide; CS <sub>2</sub> ; [75-15-0]	Acta Chem. Scand. <u>1952</u> , 6, 623-33.
-	
VARIABLES:	PREPARED BY:
T/K = 297.97 - 298.15 Total P/kPa = 101.325	J. Chr. Gjaldbaek
EXPERIMENTAL VALUES:	L
T/K Mol Fraction $X_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient α L
297.97 0.445	0.164 0.179
298.15 0.439	0.162 0.177
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A calibrated all-glass combined man- ometer and bulb was enclosed in an air thermostat and shaken until equilibrium. Mercury was used for calibration and as the confining liquid. The solvents were degassed in the apparatus. Details are in references 1 and 2. The absorped volume of gas was cal- culated from the initial and final amounts, both saturated with solvent vapor. The amount of solvent was determined by the weight of dis- placed mercury. The saturation of the liquid with the gas was carried out close to atmospheric pressure. The solubility values were reported for one atmos-	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Prepared by heating $KMnO_4$ , 99.7 percent $O_2$ , 0.3 per- cent $N_2$ . (2) Carbon disulfide. Merck Co. Analytical reagent grade, boiling point 46.21 - 46.26°C. ESTIMATED ERROR: $\delta T/K = 0.05$ $\delta X_1/X_1 = 0.015$ REFERENCES:
values were reported for one atmos- phere gas pressure assuming Henry's law is obeyed.	<ul> <li>REFERENCES:</li> <li>1. Lannung, A. J. Am. Chem. Soc. <u>1930</u>, 52, 68.</li> <li>2. Gjaldbaek, J. C. Acta Chem. Scand. <u>1952</u>, 6, 623.</li> </ul>

ORIGINAL MEASUREMENTS:
Dymond, J. H.
J. Phys. Chem. <u>1967</u> , 71, 1829-31.
PREPARED BY: M. E. Derrick H. L. Clever
J
Bunsen Ostwald Coefficient Coefficient α L
0.0494 0.0539
INFORMATION
<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Stuart Oxygen Co. Dried. (2) Dimethyl Sulfoxide. Matheson, Coleman, and Bell Co. Spectro- quality reagent, dried, and a fraction frozen out. Melting pt.: 18.37°C. ESTIMATED ERROR: REFERENCES: 1. Dymond, J.; Hildebrand, J. H. Ind. Eng. Chem. Fundam. 1967,</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Baird, W. R.; Foley, R. T.	
(2) Sulfinylbismethane or dimethyl sulfoxide; C <sub>2</sub> H <sub>6</sub> OS; [67-68-5]	J. Chem. Eng. Data <u>1972</u> , 17, 355-7.	
VARIABLES: T/K = 298.15 P/kPa = 101.325	PREPARED BY: P. L. Long H. L. Clever	
EXPERIMENTAL VALUES:	L	
T/K Mol Fraction $x_1 \times 10^3$ C	BunsenOstwaldoefficientCoefficient $\alpha \times 10^2$ L $\times 10^2$	
298.15 0.109 3	$.42 \pm 0.08^{1}$ 3.73	
<sup>1</sup> Average of four measurem	ents <u>+</u> average deviation.	
<sup>1</sup> Average of four measurements $\pm$ average deviation. The compiler calculated the mole fraction and Ostwald coefficient values.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
The apparatus and procedure used were based on those described by Morrison and Billett (1). Gas saturation is achieved by allowing a thin film of solvent to flow down a glass helix containing the gas and solvent vapor at a total pressure of one atm. About 100 cm <sup>3</sup> of solvent is saturated at a flow rate of $2 - 3$ cm <sup>3</sup> m <sup>-1</sup> .	<ol> <li>Oxygen. No information.</li> <li>Dimethyl sulfoxide. Matheson, Coleman and Bell. Fractionally distilled under reduced pres- sure through spinning band column. Use 40 percent from the center of an initial one liter sample.</li> </ol>	
The authors solubility values for oxygen dissolved in water and in dimethylsulfoxide were 3.5 and 21 per cent lower, respectively, than values reported by other workers. The authors reported a Bunsen coef-	ESTIMATED ERROR: $\delta T/K = 0.5$ $\delta \alpha / \alpha = 0.023 - 0.050$ (authors)	
ficient which they had calculated from their measured Ostwald coef- ficients.	REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) Sulfinylbismethane or dimethyl sulfoxide; C<sub>2</sub>H<sub>6</sub>OS; [67-68-5]</li> </ul>	<ul> <li>Chaenko, N. V.; Sukhova, G. I.; Naumenko, N. K.; Kedrinskii, I. A.</li> <li>Zh. Fiz. Khim. <u>1979</u>, 53, 1989-92.</li> <li>Russ. J. Phys. Chem. 1979, 53, 1133-4.</li> </ul>	
VARIABLES: T/K = 298.15 (?) $O_2 P/kPa = \sim 21.3$ (air at one atm)	PREPARED BY: H. L. Clever	
EXPERIMENTAL VALUES:		
T/K Mol Fra	$ \begin{array}{c} 10^{4} & \begin{array}{c} \text{Coefficient} \\ \text{cm}^{3} (\text{STP}) & \text{cm}^{-3} \\ \hline 06 & 0.063 \pm 0.010 \\ \hline \end{array} $	
<sup>1</sup> The temperature is not given in the paper. However, the authors quote values from another of their papers in which all values were measured at 298.15 K. The solvent was saturated with dry air at a total pressure of one atm. The oxygen partial pressure in dry air is $\sim 0.21$ atm. The solubility values above are for that partial pressure of oxygen.		
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
The oxygen concenttation was deter- mined by an electrochemical sensor. The sensor was calibrated against oxygen saturated ethanol. The Bunsen coefficient of oxygen in ethanol was taken to be 0.213 cm <sup>3</sup> cm <sup>-3</sup> atm <sup>-1</sup> . Solutions were saturated in a 20 cm <sup>3</sup> cell in 3 hours without stirring.	<ul> <li>(1) Oxygen. Dry air.</li> <li>(2) Dimethylsulfoxide. Freshly distilled after special purification.</li> </ul>	
The solvent water content was determined by the Fisher method. Water content of $0.0053 - 0.017$ % had no effect on the oxygen solubility The sensitivity of the method with respect to oxygen is 3 µg dm <sup>-3</sup> .	ESTIMATED ERROR: .The authors state that the relative error in O <sub>2</sub> concentration is 9.9 per cent. REFERENCES:	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Chaenko, N. V.; Sukhova, G. I.; Naumenko, N. K.; Kedrinskii, I. A.
(2) Nitromethane; CH <sub>3</sub> NO <sub>2</sub> ; [75-52-5]	Zh. Fiz. Khim. <u>1979</u> , 53, 1989-92.
	Russ. J. Phys. Chem. <u>1979</u> , 53, <u>1133-4</u> .
VARIABLES:	PREPARED BY:
T/K = 298.15 (?) O <sub>2</sub> P/kPa = 21.3 (air at one atm)	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Frac x <sub>1</sub> x 1	tion Absorption 0 <sup>4</sup> Coefficient cm <sup>3</sup> (STP) cm <sup>-3</sup>
298.15 <sup>1</sup> 4.64	0.194 ± 0.004
However, the authors of their papers whic The solvent was satu total pressure of or pressure in dry air	a not given in the paper. a quote values from another th were measured at 298.15. arated with dry air at a ne atm. The oxygen partial is ~0.21 atm. The solubility the partial pressure of
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The oxygen concentration was deter- mined by an electrochemical sensor. The sensor was calibrated against oxygen saturated ethanol solution. The Bunsen coefficent of oxygen in ethanol was taken as 0.213 cm <sup>3</sup> cm <sup>-3</sup> atm <sup>-1</sup> .	<ul> <li>(1) Oxygen. Dry air.</li> <li>(2) Nitromethane. Freshly distilled after special purification.</li> </ul>
Solutions were saturated in three hours without stirring.	
The solvent water content was determined by the Fisher method. Water content of 0.0053 - 0.017 % had no effect on the oxygen solubility.	ESTIMATED ERROR: The authors state that the relative error in $O_2$ concentration is 4 - 5 per cent.
The sensitivity of the method with respect to oxygen is 3 $\mu g$ dm <sup>-3</sup> .	REFERENCES :

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Baird, W. R.; Foley, R. T.
<pre>(2) N-methyl-N-nitroso-methanamine or N-nitroso-dimethylamine; C2H6N2O; [62-75-9]</pre>	J. Chem. Eng. Data <u>1972</u> , 17, 355-7.
VARIABLES:	PREPARED BY:
T/K = 298.15 P/kPa = 101.325	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
T/K Mol Fraction $x_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient α x 10 <sup>2</sup> L x 10 <sup>2</sup>
298.15 0.200	$6.05 \pm 0.20^1$ $6.60$
<sup>1</sup> Average of four measures	ments <u>+</u> average deviation.
The mole fraction and Os were calculated by the co	
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;
The apparatus and procedure used were based on those described by Morrison	(1) Oxygen. No information.
and Billett (1). Gas saturation is achieved by allowing a thin film of solvent to flow down a glass helix containing the gas and solvent vapor at a total pressure of one atm. About 100 cm <sup>3</sup> of solvent is saturated at a flow rate of $2 - 3$ cm <sup>3</sup> m <sup>-1</sup> .	(2) N-nitroso-dimethylamine. Matheson, Coleman and Bell. Fractionally distilled under reduced pressure through spinning band column. Use 40 percent from the center of an initial one liter sample.
The authors solubility values for oxygen dissolved in water and in dimethylsulfoxide were 3.5 and 21 per cent lower, respectively, than	ESTIMATED ERROR:
values reported by other workers. The authors reported a Bunsen coeffi- cient which they had calculated from their measured Ostwald coefficients.	$\delta T/K = 0.5$ $\delta \alpha / \alpha = 0.023 - 0.050$ (authors) REFERENCES: 1. Morrison, T. J.; Billett, F.
	J. Chem. Soc. <u>1948</u> , 2033.

(1) Oxygen; O <sub>2</sub> ; [		OKIGINAL P	1EASUREMENTS:	
	(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Amster, A. B.; Levy, J. B.	
<pre>(2) Nitric acid, propyl ester or 1-propyl nitrate; C<sub>3</sub>H<sub>7</sub>NO<sub>3</sub>; [627-13-4]</pre>			J. Am. Rocket Soc. <u>1959</u> , 29, 870-1.	
	oom temperature" 0 - 84.66	PREPARED I	BY: M. E. De H. L. Cl	
EXPERIMENTAL VALUES:		**************************************		
Pressure	Solubility <sup>1</sup>	Mol Fraction	Bunsen	Ostwald
P/mmHg <sup>1</sup> P/kPa	mol g <sup>-1</sup> x 10 <sup>6</sup>	<i>x</i> <sub>1</sub> × 10 <sup>4</sup>		Coefficient L
21028.022530.023030.7	1.9 2.0 1.9	2.0 2.1 2.0	0.17 0.16 0.15	0.18 0.17 0.16
40053.341054.742556.744058.7	4.2 4.1 4.5 3.8	4.4 4.3 4.7 4.0	0.19 0.18 0.19 0.16	0.20 0.19 0.20 0.17
62082.763084.063584.7	7.3 7.1 7.2	7.7 7.5 7.6	0.21 0.20 0.20	0.23 0.22 0.22
Density values	officient values for the solvent	assuming a t		293.15 К.
Density values		assuming a t	emperature of	293.15 К.
Density values	for the solvent	assuming a t	emperature of ple at the tem	293.15 К.
METHOD/APPARATUS/PROCH The apparatus con tion flask connec spiral to a mercu capillary (1). The gas is shaken liquid. A weighed is placed in the the gas is taken flask minus the 1 solubility is cal Solubility/mol g	AUXIL AUXIL EDURE: sists of an absorted by a flexible ry filled with the degass quantity of lig flask. The volume as the volume of iquid volume. The culated from	assuming a t were availab NARY INFORMATIO SOURCE AND (1) Oxy per dry (2) Nit Sou vid e of the	emperature of ple at the tem N O PURITY OF MATER gen. Technica cent. Passed ring tube. cric acid, pro proce and purit ERROR: δP/mmHg =	293.15 K. mperature. RIALS: 1 grade. 99.5 through a pyl ester. y not given.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Guerry, D. Jr.
(2) Cyclic amines; C <sub>4</sub> H <sub>9</sub> N, C <sub>5</sub> H <sub>5</sub> N, and C <sub>5</sub> H <sub>10</sub> N	Ph.D. thesis, <u>1944</u> , Vanderbilt University, Nashville, TN.
VARIABLES: T/K = 293-298 P/kPa = 101.325	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
$\frac{T/K}{x_1 \times 10^4}$ Mol Fraction	Bunsen Ostwald oefficient Coefficient α L
Pyrrolidine; C <sub>4</sub> H <sub>9</sub> N	
293.15 6.04	0.163 0.175
298.15 6.06	0.163 0.178
Pyridine; C <sub>5</sub> H <sub>5</sub> N; [	110-86-1]
293.15 4.55	0.127 0.136 0.127 0.139
298.15 4.58 Piperidine: C H N	
Piperidine; C <sub>5</sub> H <sub>11</sub> N 293.15 7.44	0.169 0.181
298.15 7.35	0.166 0.181
AUXILIARY	INFORMATION
<pre>METHOD/APPARATUS/PROCEDURE: A Van Slyke-Neill Manometric Appara- tus manufactured by the Eimer and Amend Co. was used. The procedure of Van Slyke (1) for pure liquids was modified (2) so that small solvent samples (2 cm<sup>3</sup>) could be used with almost complete recovery of the sample. An improved temperature control system was used. SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Air reduction Co. Purity 99.5 per cent.</pre>	SOURCE AND PURITY OF MATERIALS: Pyrrolidine. Pyrrole was prepared and catalytically reduced to pyrrolidine. B.p. (750 mmHg) t/°C 88.12 - 88.26 (corr.). Pyridine. Mallincrodt Chemical Co. Purified and distilled. B.p. (743.9 mmHg) t/°C 114.96 - 115.06 (corr.). Piperidine. Part was a commercial sample (Eastman Kodak Co.), part pre- pared by reduction of pyridine. B.p. (752.4 mmHg) t/°C 106.00 - 106.17. ESTIMATED ERROR: $\delta T/K = 0.05$
(2) Cyclic amines. The pyridine and pyrrolidine were distilled from BaO under a N <sub>2</sub> atmosphere. The piperidine was distilled from KOH under a N <sub>2</sub> atmosphere. Experimental data on refractive index, density and vapor pres- sure are in the thesis.	<pre>REFERENCES: 1. Van Slyke, D. D. J. Biol. Chem. <u>1939</u>, 130, 545. 2. Ijams, C. C. Ph.D. thesis, <u>1941</u> Vanderbilt University</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Naumenko, N. K.; Mukhin, N. N.
	Aleskovskii, V. B.
(2) Nitrobenzene; C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub> ; [98-95-3]	2h. Prikl. Khim. (Leningrad) <u>1969</u> , 42, 2522-8.
	J. Appl. Chem. USSR, <u>1969</u> , 42, 2376-81.
VARIABLES:	PREPARED BY:
T/K = 298.15 O <sub>2</sub> P/kPa = 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	I
T/K Mol Fraction $x_1 \times 10^4$	Bunsen Ostwald Coefficient Coefficient $\alpha$ L
298.15 4.95	0.108 ± 0.0041 0.118
The Ostwald coefficient the compiler.	values were calculated by
The absolute errors are of three or four determ	calculated from the results inations.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The oxygen solubility was determined by a volumetric gas method.	The source and purity of the
The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum gage.	materials were not given.
The liquids were saturated with oxygen under an oxygen partial pressure of about 760 mmHg at 25°C for 2 hours. The amount of gas absorbed was then determined.	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.023$ (relative)
Details of the method are given in an earlier paper (1).	REFERENCES: 1. Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. 2h. Prikl. Khim. <u>1969</u> , 42, 2090.

COMPONENTS: (1) Oxygen; $O_2$ ; [7782-44-7] (2) Aromatic amines; $C_6H_7N$ , $C_7H_9N$ , $C_8H_{11}N$ , and $C_{10}H_{15}N$ VARIABLES: T/K = 298.15 $O_2$ P/kPa = 101.325	ORIGINAL MEASUREMENTS: Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. Zh. Prikl. Khim. (Leningrad) <u>1969</u> , 42, 2522-28. J. Appl. Chem. USSR, <u>1969</u> , 42, 2376-81. PREPARED BY: H. L. Clever
$x_1$ x 10         Benzenamine or aniline; C         298.15       2.26       0.03         N-Methylbenzenamine; C7H9H         298.15       2.91       0.03         2-Methylbenzenamine; C7H9H       298.15       3.18       0.03         3-Methylbenzenamine; C7H9H       298.15       3.95       0.03         N,N-Dimethylbenzenamine; C       7H9H       298.15       3.95       0.03         N,N-Dimethylbenzenamine; C       298.15       7.18       0.12         N-Ethylbenzenamine; C       8H1H       298.15       7.66       0.12         N,N-Dimethylbenzenamine; C       8H1H       298.15       7.66       0.12	$552 \pm 0.00056  0.0603$ N; $[100-61-8]$ $603 \pm 0.002  0.0658$ N; $[95-53-4]$ $663 \pm 0.0011  0.0724$ N; $[108-44-1]$ $817 \pm 0.0046  0.0892$ $C_8^{H}_{11}N;  [121-69-7]$ $27 \pm 0.0040  0.139$ N; $[103-69-5]$ $36 \pm 0.0036  0.148$
AUXILIARY METHOD/APPARATUS/PROCEDURE: The oxygen solubility was determined by a volumetric gas method. The liquids were deaerated for 20 to 30 minutes under reduced pressure with the aid of an oil pump. The deaeration was monitored from the readings of a thermocouple vacuum gage. The liquids were saturated with oxygen under an oxygen partial pressure of about 760 mmHg at 25°C for 2 hours. The amount of gas absorbed was then determined. Details of the method are given in an earlier paper (1).	INFORMATION SOURCE AND PURITY OF MATERIALS: The source and purity of the materials were not given. The Ostwald coefficient values were calculated by the compiler. The absolute errors are calculated from the results of three or four determinations. ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta a/a = 0.023$ (relative) REFERENCES: 1. Naumenko, N. K.; Mukhin, N. N. Aleskovskii, V. B. Zh. Prikl. Khim. <u>1969</u> , 42, 2090.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Morrison, T. J.; Johnstone, N. B. B.
(2) N,N,N-Triethyl ethanaminium bromide or tetraethyl ammonium bromide; C <sub>8</sub> H <sub>20</sub> NBr; [71-91-0]	J. Chem. Soc. <u>1955</u> , 3655-9.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: T/K= 298.15 P/kPa= 101.325 <sup>m</sup> C <sub>8</sub> H <sub>20</sub> NBr/mol kg <sup>-1</sup> = 0, 1.0	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	l
IN DRIDATED VALUE.	
$T/K$ $k_s =$	$k_{sx} =$
(1/m) log(	
298.15 -0.046	
	-0.031
The salt effect parameter measurements. The solubil S <sup>0</sup> /cm <sup>3</sup> (STP) kg <sup>-1</sup> , and in S/cm <sup>3</sup> (STP) kg <sup>-1</sup> . Neither in the paper. Only the k <sub>S</sub> calculated the value of t using the mole fraction o	ity of oxygen in water, one molal salt solution, solubility value is given value is given. The compiler he salt effect parameter
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The degassed salt solution flows in a thin film down as absorption helix containing the oxygen gas and solvent vapor at a total pressure of one atm. The volume of gas absorbed is measured in an attached buret system (1,2).	<ol> <li>Oxygen. British Oxygen Co., Ltd.</li> <li>Tetraethyl ammonium bromide. No information given.</li> <li>Water. No information given.</li> </ol>
	FSTTMATED EDDAD.
	ESTIMATED ERROR: δk <sub>s</sub> = 0.010 (authors)
	REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. 1948, 2033; ibid. 1952, 3819.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-3]	Wesseler, E.P.; Iltis, R.; Clark, L. C. Jr.
<pre>(2) 1,1,2,2,3,3,4,4,4-nonafluoro-N,N- bis (nonafluorobutyl) -1- butanamine, (Perfluorotributyl- amine); C<sub>1</sub>,F<sub>2</sub>,N;</pre>	J. Fluorine Chem. <u>1977</u> , 9,134-46.
[311-89-7]	
VARIABLES:	PREPARED BY:
т/к = 298	C. L. Young
EXPERIMENTAL VALUES:	<b>t</b>
T/K Solubility *	Mole fraction $+$ of oxygen $x_{O_2}$
298.15 38.4	0.00552
as ml/100 ml (total pressure wa to be 1 atmosphere)	icient x 10 , units were stated s the barometric pressure, assumed tal pressure of 101.325 kPa using
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Oxygen bubbled through fluorocarbon in stirred cell. When saturation achieved samples of liquid remoced with a hypodermic Precision Sampling 50 µl Pressure-Lok syringe. At least 15 samples taken and chromatographed. Average peak height compared with that of average peak height for injection of the same volume of oxygen. Chromatographic column consisted of 13X molecular sieve at 70°C. Helium was used as carrier gas.	(1) No details given. (2) A 3M sample, boiling pt $174^{\circ}$ C. ESTIMATED ERROR: $\delta T/K = \pm 0.3;  \delta x_{O_2} = \pm 2\%$
	REFERENCES:

	PREPARED BY: A. L. Cramer H. L. Clever ygen Solubility $0 g^{-1} cm^3 o_2 100 cm^{-3}$ 2 38.9 6 40.3 $cm^3 o_2 100 cm^{-3}$ , appears
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below the fluid surface level. Between 25 and 35 cm <sup>3</sup> of solvent are placed in the flask. Gas is bubbled through the solvent for 2 - 3 h. An 80 micro- liter sample is slowly taken into a gas tight syringe. The sample is injected into a gas chromatograph. The results of three sampling and analyses are averaged. The chromatograph is an F and M Model 720 equipped with a thermal conductivity detector at 320 °C, and a 6' by ¼" stainless steel column packed with 13X molecular sieve at room temperature. The apparatus is calibrated with pure gas samples. Details of the procedure were furnished by R. D. Danielson of the 3 M Co.	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given. Commercial cylinder. (2) FC-47. Minnesota Mining and Manufacturing Co. All H in.an organic compound are replaced by F by Simons electrochemical process (1).</pre> ESTIMATED ERROR: &T/K = 0.1 & c/c = 0.01 (reproducibility) = 0.05 (absolute) REFERENCES: 1. Simons, J. H., Editor Fluorine Chemistry Academic Press, New York, <u>1950</u> .

COMPONENTS :	ORIGINAL MEASUREMENTS:	
(1)Oxygen; O <sub>2</sub> ; [7782-44-7]	Kobatake, Y.; Hildebrand, J. H.	
<pre>(2)1,1,2,2,3,3,4,4,4-Nonafluoro-N,N- bis(nonafluorobuty1)-1-butamine; (C<sub>4</sub>F<sub>9</sub>)<sub>3</sub>N; [311-89-7]</pre>	J. Phys. Chem. <u>1961</u> , 65, 331-5.	
VARIABLES:		
T/K = 278.80 - 304.65 P/kPa = 101.325	PREPARED BY: M. E. Derrick H. L. Clever	
EXPERIMENTAL VALUES:		
T/K Mol Fraction $x_1 \times 10^3$	Bunsen Ostwald Coefficient Coefficient L	
278.80 5.542 287.50 5.395 297.16 5.218	0.365 0.373 0.349 0.367 0.330 0.359	
304.65 5.096	0.317 0.358	
Std. Dev. $\Delta G^{\circ} = 2.9, C$ $\Delta H^{\circ}/J \text{ mol}^{-1} = -2,312.6$	5, $\Delta S^{\circ}/J \ K^{-1} \ mol^{-1} = -51.480$ tion $\Delta G^{\circ}/J \ mol^{-1}$ 5 5 12,264 72 12,521 35 12,779 01 13,036	
	INFORMATION	
METHOD/APPARATUS/PROCEDURE: The apparatus consists of a gas- measuring buret, an absorption pipet, and reservoir for solvent. The buret is thermostated at 25°C, the pipet at any temperature from 5 to 30°C. The solvent is degassed by freezing with liquid nitrogen, evacuating, then boiling with a heat lamp. The solvent never comes into contact with stopcock grease. The amount of gas is determined by P-V measurements in the gas buret before and after admission of the gas into the pipet. No solvent vapor is allowed into the buret system. The solvent is magnetically stirred for up to 24 hours until equilibrium is reached. Ideal gas behavior and Henry's law are assumed to calculate the mole fraction solubility at a gas partial	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Linde Oxygen Co. Standard grade, 99.7 % oxygen. (2) $(C_4F_9)_3N$ . Minnesota Mining and Manufacturing Co. dried, frac- tionated, bp. 178.5 - 179.0°C. ESTIMATED ERROR: $\delta X_1/X_1 = 0.003$ REFERENCES:	
pressure of one atm.		

COMPONENTS :		r	ORIGINAL MEASUREMENTS:		
(1) Oxygen; $O_2$ ; [7782-44-7] (2) EQ 42 which is 1 1 2 2 3 3 4 4 4-		Zander, R.			
<pre>(2) FC-43 which is 1,1,2,2,3,3,4,4,4- nonafluoro-N,N-bis(nonafluoro- buty1)-1-butanamine or perfluoro- tributylamine; C12F27N; [311-89-7]</pre>					
VARIABLES: T/K = 283.15 - 323.15 P/kPa = 6 - 101		PREPARED BY: H. L. Clever			
EXPERIMENTAL VALUES:			<b>1</b>		
Temperature Range, T/K	Gas Phase; Volume Per Cent Oxygen	Oxygen Partial Pressure p/mmHg	Bunsen Coefficient Regression Equation $\alpha/cm^3 cm^{-3} atm^{-1}$	Number of Experimental Points	
283.15 - 323.15	6	45.6	$\alpha = 0.223 + 0.00005 t/^{0} C$	38	
	12	91.2	$\alpha = 0.282 - 0.00021 t/^{0} C$	25	
	25	190	$\alpha = 0.353 - 0.00071 t/°C$	31	
	50	380	$\alpha = 0.383 - 0.00083 t/^{0}C$	59	
	100	760	$\alpha = 0.398 - 0.00093 t/°C$	82	
pressure was 7	60 mmHg.	) reported	haved ideally and that th I the Bunsen coefficient B O2 equation above gives	at 310.15 K	
		AUXILIARY I	INFORMATION		
METHOD/APPARATUS/PRO	CEDURE :	ſ	SOURCE AND PURITY OF MATERIALS:		
Equilibration be	tween the ga	s and	(1) Oxygen. No information.		
minutes in a Ton (2) design.	Liquid phases was established in 45 minutes in a Tonometer of the Laue (2) design.		(2) FC-43. Minnesota Min Manufacturing Co. Us received.	ing and ed as	
The oxygen conte was determined b analyzer (see fo	v a Scholand	er das I			
The saturated solution was trans- ferred to a Van Slyke apparatus for the solubility determination.		tus for	The solubility measureme at the five temperatures 40, and 50 °C. ESTIMATED ERROR:		
The 235 experimental measurements were fitted to the equations in the table above. The smoothed data were used to construct a graph of Bunsen coefficient vs. oxygen partial		$\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.03$	above 100 mmHg O <sub>2</sub> - 0.10 below		
volume per cent function of oxyg and temperature.	pressure and a nomogram for the volume per cent of oxygen as a function of oxygen partial pressure		<ol> <li>Zander, R. Pflug. Arch. <u>1973</u>, 34</li> <li>Laue, D. Pflugers Arch. Gesamt</li> </ol>		
The solubility a from Henry's law	appears to de v above 100 m	epart mHg O <sub>2</sub> .	Pflugers Arch. Gesamt Menschen Tiere <u>1951</u> ,	254, 142.	

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-	71		ORIGINAL MEASUREMENTS:			
<ul><li>(2) 1-Hexadecanaminium, N,N,N-trimethyl bromide (Cetyl trimethyl ammonium</li></ul>			Matheson, I. B. C.; King, A. D. J. Coll. Interface Sci. <u>1978</u> , 66, 464-9.			
bromide or CTAB); C <sub>19</sub> H <sub>42</sub> N.Br; [57-09-0]			404 5.			
(3) Water; H <sub>2</sub> O; [7732-18-5]						
VARIABLES: T/K = 298.15		PR	EPARE	D BY:		
P/kPa =273.7 - 954.9 (39 CTAB/mol kg <sup>-1</sup> H <sub>2</sub> O= 0 - 0	.7-138.5 ps: .300	ig)		н. L.	Clever	
EXPERIMENTAL VALUES:						
	Pressure pounds per square inch, gauge	Volu gas evol ml		Ambient Pressure mmHg	Ambient Temperature °C	Henry's constant K x 10 <sup>3</sup> mol Ar kg <sup>-1</sup> H <sub>2</sub> O atm <sup>-1</sup>
298.15 0	49.3	12.	-	746.3	25.1	
	71.5 74.7	18. 18.		743.5 745.5	25.2 24.8	
	108.5 122.0	26. 29.		747.0 745.5	24.8 25.9	1.41±0.02
0.100						
0.100	46.0 81.3	12. 21.		745.3 747.1	25.8 27.0	
	88.3 122.0	23. 31.		747.0 746.6	25.1 26.1	
	138.5	36.		742.0	24.7	1.50±0.02
0.200	41.0	11.	5	745.8	23.0	
	78.3 100.5	22. 28.		747.9 747.8	22.0 22.4	1.64±0.02
0.300	39.7	13.		735.9	23.0	
0.300	71.0	21.	9	743.7	22.5	
	92.3	28.	9	742.6	22.5	1.82±0.03
	AUXILIA	DV TNI				
					00	
METHOD/APPARATUS/PROCEDURE: The apparatus consists o	f a jacketed	a 1			OF MATERIALS:	n. Chemical
thermostated thick-walle brass bomb which rests o speed magnetic stirrer.	d cylindrica n a variable	al	(1) Oxygen. Source not given. Chemically pure or equivalent of 99.5 mol per cent purity or better.			
to the bomb is connected manifold, and an exit li	to a gas	(2	(2) 1-Hexadecanaminium, N,N,N-tri-			
ted to a Warburg manomet	er. Bourden		methyl bromide. Eastman Chemical. Technical grade, recrystallized			tallized
gauges are used to recor sure.	d the pres-		from ethyl acetate-ethanol mixture and dried in vacuo.			
The solution, consisting of 100 g of water and the colloidal electrolyte,			(3)Water. Laboratory distilled.			
is contained in a glass liner inside of the bomb. The solution is degassed			ESTIMATED ERROR:			
by evacuation to just ab vapor pressure and then		r		517/17	0.2	
several hours. The gas i over the solution at the				$\delta K/K = 0.$	.02	
sure and the solution is	-		~ <u> </u>			
a minimum of five hours. The gas is vented to atm						
solution is collected in atmospheric pressure and	ambient ter	npera	ture.	. Correct	ions for gas	s lost dur-
ing venting and thermal equilibration and The solubility is reported as Henry's co						
gas molality/pressure, m		<u> </u>			yub ny wa	

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]			
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS:		
4	Ke, P. J.; Ackman, R. G.		
(2) Triglyceride oil (herring)	J. Am. Oil Chemists' Soc. <u>1973</u> , 50, 429-35.		
VARIABLES: T/K = 293.15 - 353.15 P/kPa = partial pressure of oxygen in air at 101.325 kPa	PREPARED BY: P. L. Long H. L. Clever		
EXPERIMENTAL VALUES:			
Temperature Density Peroxide	Bunsen Coefficient/a <sup>1</sup>		
t/°C T/K ρ/g cm <sup>-3</sup> Value meq kg <sup>-1</sup>	Polarographic Chemical Displacement Exponential Method <sup>2</sup> Method <sup>3</sup> Dilution Method		
40[sic]0.911463.820293.150.91512.0200.915121.4200.915179.5	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		
40 313.15 0.9034 2.3 40 0.9034 84.0	0.128(+6%) 0.141(+9%) 0.122(+6%) 0.289 (-)		
AUXILI	IARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: Polarographic exponential dilution	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Breathing grade		
METHOD/APPARATUS/PROCEDURE: Polarographic exponential dilution method (1). The oil was degassed by the method Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oi was transferred to a glass vessel a weighed. The vessel was so con- structed that the ratio V <sub>top</sub> air space/V <sub>oil</sub> was between 0.0704 and 0.0981. A magnetic stip	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Breathing grade compressed air. of (2) Herring oil. Oil from whole herring ( <u>chipea harengus</u> ) obtained from local commercial reduction plant in Nova Scotia.		
METHOD/APPARATUS/PROCEDURE: Polarographic exponential dilution method (1). The oil was degassed by the method Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oi was transferred to a glass vessel a weighed. The vessel was so con- structed that the ratio V <sub>top</sub> air space/V <sub>oil</sub> was between	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Breathing grade compressed air. (2) Herring oil. Oil from whole herring ( <u>chipea harengus</u> ) obtained from local commercial reduction plant in Nova Scotia.		

COMPONENTS :	ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Ke, P. J.; Ackman, R. G.			
(2) Triglyceride oils	J. Am. Oil Chemists' Soc. <u>1973</u> , 50, 429-35.			
VARIABLES:	PREPARED BY:			
T/K =293.15 - 353.15 P/kPa =Oxygen at partial pressure in air at 101.325 (1 atm).	P. L. Long H. L. Clever			
SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Breathing grade compressed air.				
(2) Triglyceride oils. Redfish oil. <sup>3</sup> Oil from redfish ( <u>sebastes marinus</u> ) viscera and scrap. Capelin oil. <sup>3</sup> Oil from whole capelin ( <u>mallofus villosus</u> ). Herring oil. <sup>4</sup> Oil from whole herring ( <u>chipea harengus</u> ). Mackerel oil. <sup>3</sup> Oil from mackerel ( <u>scomber scombrus</u> ). Harp seal oil. <sup>4</sup> Oil from harp seal ( <u>Phoca groenlandica</u> ) blubber. Flounder oil. <sup>3</sup> Oil from flounder ( <u>Pseudopleuronectes americanus</u> ) viscera and scrap. Cod liver oil. <sup>4</sup> Oil from cod ( <u>Gadus morhua</u> ) livers.				
<sup>3</sup> Oils obtained from local commercial re	eduction plants in Nova Scotia.			
Oils produced in a pilot scale reduct The Fisheries Research Board of Canada				
experiment was in progress. continued on following page				
AUXILIARY	INFORMATION			
ME THOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
Polarographic exponential dilution method (1).	See above.			
The oil was degassed by the method of Battino $et \ al.$ (2).				
A 155 - 159 cm <sup>3</sup> sample of degassed oil was transferred to a glass vessel and weighed. The vessel was so constructed that the ratio Vtop air space/Voil was between 0.0704 and 0.0981. A magnetic stir- ring bar (120 rpm) and a polarographic oxygen sensor were placed in the	ESTIMATED ERROR:			
sample. Air was bubbled through the sample at 15 cm <sup>3</sup> m <sup>-1</sup> for two hours. The air was stopped, and helium gas preheated to the sample temperature	Solubility values are the average of three determinations with relative standard deviation of 7 % or less.			
was introduced into the oil at a rate of 7 - 10 cm <sup>3</sup> m <sup>-1</sup> . The oxygen concentration was measured as a function of the volume of helium passed through the solution. A plot	REFERENCES: 1. Aho, L.; Wahlroos, O. J. Am. Oil Chem. Soc. <u>1967</u> ,44,65.			
of log (O <sub>2</sub> ) vs.V <sub>helium</sub> is linear. The slope is a function of the Ostwald coefficient. The Ostwald coefficient	2. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E. Anal. Chem. 1971, 45, 806.			

**Biological Fluids** 

			Biological	i lulus	
OMPONENTS	:			ORIGINAL MEAS	UREMENTS :
(1) Oxyg	gen; 0 <sub>2</sub> ;	[7782-44-7	ני :	Ke, P. J.; Ac	kman, R. G.
(2) Trio	glyceride	e oils		J. Am. Oil Ch 50, 429-35	emists' Soc. <u>1973</u> , •
XPERIMEN	ITAL VALU	ES:	conti	nued	<u> </u>
-	cature	Density	Bunsen Coefficient	Parts per <sup>1</sup> Millon <sup>2</sup>	cm <sup>3</sup> (STP) O <sub>2</sub> 100 cm <sup>-</sup> of oil <sup>2</sup>
t∕°C	т/к	ρ/g cm <sup>-3</sup>	α	μg g-1	
Redfis	sh oil				
20	293.15	0.9184	0.074	24.2	1.55
40 60	313.15 333.15	0.9061 0.8931	0.078 0.088	25.8 29.6	1.64 1.84
80	353.15	0.8931	0.012	4.1	0.25
Capeli	in oil				
20	293.15		0.060	19.5	1.25
40 60	313.15 333.15	0.9049 0.8920		26.6 34.4	1.68 2.14
80		0.8798	0.025	8.5	0.52
Herrin	ng oil				
20	293.15	0.9151	0.110	35.8	2.29
40 60	313.15 333.15	0.9034 0.8904	0.128 0.135	42.2 45.2	2.26 2.81
80	353.15	0.8785	0.076	25.8	1.58
Mackeı	cel oil				、
20	293.15	0.9192	0.042	13.6	0.87
40 60	313.15 333.15	0.9074 0.8952	0.078 0.086	25.6 28.7	1.62 1.79
80	353.15	0.8828	0.011	3.7	0.23
Harp s	seal oil				
20	293.15	0.9220	0.090	29.1	1.87
40 60	313.15 333.15	0.9087 0.8970	0.108 0.114	35.7 37.9	2.26 2.37
80	353.15	0.8844	0.030	10.1	0.62
Flound	ler oil				
20	293.15	0.9234	0.075	23.2	1.55
40 60	313.15 333.15	0.9115 0.8977	0.078 0.081	25.6 26.9	1.63 1.69
80	353.15	0.8853	0.029	9.6	0.59
Cod liv	ver oil				
20	293.15	0.9205	0.124	39.9	2.58
40 60	313.15 333.15	0.9139 0.9002	0.146 0.130	47.6 43.0	3.04 2.70
80	353.15	0.8896	0.018	6.0	0.37

<sup>1</sup>The Bunsen coefficients are for an oxygen partial pressure of 101.325 kPa (1 atm or 760 mmHg).

<sup>2</sup> The parts per million and the volume  $O_2$  (STP) per 100 cm<sup>3</sup> oil are for the partial pressure of oxygen in air (<u>ca</u>. 0.21 atm or 160 mmHg).

COMPONENTS:	NTS:		ORIGINAL MEASUREMENTS:
(l) Oxyg	ygen: 0 <sub>2</sub> ; [7782-44-7]		Tomoto, N.; Kusano, K.
(2) Soyb	ybean Oil		Yukagaku <u>1967</u> , 16, 108-13. Chem. Abs <i>tr.</i> <u>1967</u> , 66, 196141z.
VARIABLES:			PREPARED BY:
VARIADDED.			
- / 202	212		
T/K = 303	-343		R. Battino
T/K = 303	-343		R. Battino
T/K = 303 EXPERIMENTAL			k. Battino
		т <sup>а</sup> /к	$\alpha^{b}/cm^{3}(STP)cm^{-3}atm^{-1}$
	VALUES:	т <sup>а</sup> /к 303	
	VALUES: t/°C		$\alpha^{b}/cm^{3}(STP)cm^{-3}atm^{-1}$

<sup>b</sup> Bunsen coefficient.

AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Described in the paper	<pre>SOURCE AND PURITY OF MATERIALS: (1) (2) Saponification value: 192.0; acid value: 0.17; iodine value: 128.5; unsaponifiable: 0.33%; d<sub>30</sub>: 0.9132 g cm<sup>-3</sup>; M.W.: 877 g mol<sup>-1</sup>; molar volume: 960.4 cm<sup>3</sup> mol<sup>-1</sup>.</pre>
	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.02$ , compiler's estimate. REFERENCES:

.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Aho, L.; Wahlroos, O.
(2) Vegetable oils	J. Am. Oil Chemists' Soc. <u>1967</u> , 44, 65-6.
VARIABLES :	PREPARED BY:
T/K= 295 - 296	P. L. Long H. L. Clever

EXPERIMENTAL VALUES:

Tempe	Ostwald	
t/ºC	T/K	Coefficient
Soybean	oil, raw	
22-23	∿295.6	0.173
Soybean	oil, refine	đ
22-23	∿295.6	0.170
Sunflowe	er seed oil,	raw
22-23	∿295.6	0.151
Sunflowe	er seed oil,	refined
22-23	∿295.6	0.100

AUXILIARY	INFORMATION SOURCE AND PURITY OF MATERIALS:
The apparatus consisted of a sample vessel with magnetic stirrer, a gas buret, a silver/gold oxygen sensing electrode, and various recorders. Exponential dilution method. The apparatus was filled with a known volume of liquid. Helium, flow rate $4 - 7 \text{ cm}^3 \text{ m}^{-1}$ , was the dilution gas. The gas volumes which had flowed through, and the oxygen electrode readings were corrected for the pressure of gas in the buret. The method was tested on $O_2 + H_2O$ with argon as the carrier gas. A distribution (Ostwald) coefficient of 0.031 was measured at 22 °C.	<pre>(1) Oxygen. No information. (2) Vegetable oils. No information. The peroxide values of each oil were measured. ESTIMATED ERROR: Standard deviation 3 % (authors) REFERENCES:</pre>

COMPONENTS :		ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782	-44-7]	Vibrans, F. C.			
(2) Animal and vegeta	(2) Animal and vegetable oils		0il and soap 1935, 12, 14-5.		
VARIABLES:		PREPARED BY:			
T/K = 296-299, 318.15 P/kPa = 101.3		P. L. Long H. L. Clever			
EXPERIMENTAL VALUES:			• • •		
EAI ERITERIAL VALUES.					
T/K	Solubility, cm	<sup>3</sup> (273.15 K, 1 atm) O <sub>2</sub>	$100 \text{ cm}^{-3}$		
	Experiment		Av.		
Corn oil	<u> </u>	<u></u>			
	11.30 11.24		11.21		
	10.90 10.80	11.08	10.93		
Cottonsee			11 0-		
296.15-299.15 318.15	10.73 10.80		11.05 10.77		
Hydrogena	ted cottonseed o	pil			
318.15	11.36 11.08	11.12 11.28	11.21		
Steam ren	dered lard				
318.15	11.32 10.78	11.14 11.44	11.17		
METHOD /APPARATUS / PROCEDURE		INFORMATION SOURCE AND PURITY OF MATER			
		(1) Oxygen. From comme	ercial cylinders		
Van Slyke manometri	c method (1).	Source or purity (2) Corn oil. Commerce bought on market. of its class.	ial sample		
		Cottonseed oil. Co bought on market. of its class.			
		Lard. From a mixtu and cutting fats.			
		ESTIMATED ERROR: $\delta T/K = 3 \text{ at ro}$ $2 \text{ at } 3$ $\delta c/c = 0.04 \text{ (a)}$	oom temperature 18 K (45 °C) author)		
		REFERENCES:			
		1. Van Slyke, D. D.; J. Biol. Chem. 192 and 575.			

Diologic	
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ;[7782-44-7]	Schaffer, P. S.; Haller, H. S.
(2) Animal and vegetable oils	0il and Soap <u>1943</u> , 20, 161-2.
VARIABLES:	PREPARED BY:
T/K =313.15, 333.15 P/kPa =101.325	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
T/K cm <sup>3</sup> (273.15	$K_{1}$ l atm) $O_{2}$ 100 cm <sup>-3</sup>
Cottonseed oil	
313.15	12.7
Butter oil	
313.15 333.15	14.2 12.7
Lard	
313.15	11.5
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus consists of a reaction flask connected to a water jacketed gas buret, a mercury leveling bulb, and a differential manometer. The reaction vessel is attached to a shaking mechanism in an air bath. A 50 cm <sup>3</sup> sample of oil is placed in the flask. Heat and vacuum are applied to remove dissolved gases. The sample is cooled to the temper- ature of the measuremnt. Oxygen gas is admitted, a zero reading is taken. The system is shaken until the sample takes up no more gas at a pressure of 1 atm. Three determinations were made on each sample.	

ORIGINAL MEASUREMENTS:
Davidson, D.; Eggleton, P.; Foggie, P. Quart. J. Exptl. Physiol. <u>1952</u> , 37, 91-105.
PREPARED BY:
R. Battino
K <sup>r</sup> p
Oil
.5 0.1117
in
.5 0.1186
liquid)
0.114
Y INFORMATION
SOURCE AND PURITY OF MATERIALS:
No details given.
ESTIMATED ERROR: $\delta L/L = \pm 0.08$ , compiler's estimate. $\delta T/K = \pm 0.01$ , but reported to $0.1^{\circ}C$ or $1^{\circ}C$ . REFERENCES:

Biologic	
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Battino, R.; Evans, F. D.; Danforth, W. F.
(2) Olive Oil	J. Am. Oil Chemists' Soc. <u>1968</u> , 45, 830-3.
VARIABLES:	PREPARED BY:
T/K = 298.26 - 327.93 P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
$\frac{T/K}{x_1 \times 10^3}$	Bunsen Ostwald Coefficient Coefficient α L
298.26 5.07	0.1162 0.1269
308.20 5.10 318.53 5.22	0.1171 0.1312 0.1185 0.1382
327.93 5.29	0.1195 0.1434
Smoothed Data: $\Delta G^{\circ}/J \text{ mol}^{-1} = -RT \ln T$	$X_{1} = 1240.9 + 39.809 T$
Std. Dev. $\Delta G^{\circ} = 11.2$ ,	-
	$\Delta S^{\circ}/J K^{-1} mol^{-1} = -39.809$
T/K Mol Frac X <sub>1</sub> x 1	ction $\Delta G^{O}/J$ mol <sup>-1</sup> 10 <sup>3</sup>
298.15 5.0	5 13,110
308.15 5.13	3 13,508
318.15 5.2 328.15 5.2	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus is based on the design by Morrison and Billett (1) and the version used is a modification of the	<pre>(1) Oxygen. Matheson Co., Inc. min. vol. % purity 99.999.</pre>
apparatus of Clever, Battino, Saylor and Gross (2).	(2) Olive Oil. A. U.S.P., Fisher Scientific Company., 0.58% free fatty acid.
Degassing. The solvent is sprayed	B. Nutritional Biochemicals
into an evacuated chamber of an all glass apparatus; it is stirred and	Corp., 0.30% free fatty acid. The density was measured and
heated until the pressure drops to the vapor pressure of the liquid.	fitted to the equation $\rho/g \text{ cm}^{-3} = 0.9152 - 0.000468 \text{ t/C}.$
Solubility Determination. The de-	The average mol wt is $884 \pm 45$ (3).
gassed liquid passes in a thin film	ESTIMATED ERROR:
down a glass spiral tube at a total pressure of one atm of solute gas	$\delta T/K = 0.03$
plus solvent vapor. The gas absorbed	$\delta P/mmHg = 0.5 \\ \delta x_1/x_1 = 0.005$
is measured in the attached buret system, and the solvent is collected	1, 1
in a tared flask and weighed.	REFERENCES:
	1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033.
	2. Clever, H. L.; Battino, R.; Saylor, J. H.; Gross, P. M.
	J. Phys. Chem. <u>1957</u> , 61, 1078.
	3. Johnson, L. F.; Shoolery, J. N. Anal. Chem. <u>1962</u> , 34, 1136.
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COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Power, G.G.; Stegall, H.		
(2) Olive oil.	J. Appl. Physiol. <u>1970</u> , 19, 145-9.		
VARIABLES:	PREPARED BY:		
T/K = 285 - 310	C.L. Young		
EXPERIMENTAL VALUES:			
T/K Bunsen coefficient, α	S.D. No. of measurements		
310.15 0.117 298.15 0.119	0.002 5 0.001 5		
285.15 0.121	0.002 5		
* Standard deviation.			
AUXILIARY	INFORMATION		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Liquid saturated with gas in a stirred cell. 5.0 cm <sup>3</sup> samples of liquid removed in a calibrated	(1) Matheson Co. sample, purity better than 99.7 mole per cent.		
syringe and amount of gas extracted by two extraction in a van Slyke apparatus determined. Details in source and ref. (1).	(2) No details given.		
	ESTIMATED ERROR:		
	$\delta T/K = \pm 0.1$		
	REFERENCES :		
	<ol> <li>Power, G.G.</li> <li>J. Appl. Physiol. <u>1968</u>, 24, 468.</li> </ol>		

COMPONENTS:	ORIGINAL MEASU	REMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Ackman, R. G.	
(2) Olive oil	J. Am. Oil ( 50, 429-3	Chemists'Soc. 35.	<u>1973</u> ,
VARIABLES:	PREPARED BY:		
T/K = 293.15 - 353.15	P. L. Long		
P/kPa = partial pressure of oxygen in air at 101.325 kPa		H. L. Cle	
EXPERIMENTAL VALUES:			
Temperature Density Peroxide t/°C T/K p/g cm <sup>-3</sup> Value -	Bunse	n Coefficien	t/α <sup>1</sup>
meg kg <sup>-1</sup> PC	olarographic Exponential Dilution Method	Chemical Method <sup>2</sup>	Displacement Method <sup>3</sup>
	).102( <u>+</u> 6%) ).106( <u>+</u> 6%)	0.109( <u>+</u> 8%) 0.150( <u>+</u> 15%)	0.098( <u>+</u> 6%) 0.107( <u>+</u> 8%)
40 313.15 0.9114 1.0 0	).110( <u>+</u> 5%)	0.121(+10%)	
<sup>3</sup> Displacement method of Becker, E.; Ne Anstrichm. <u>1966</u> , 68, 135. Details of			
AUXILIARY			
METHOD /APPARATUS / PROCEDURE :	INFORMATION		
		ITY OF MATERIAL	S :
Polarographic exponential dilution	SOURCE AND PUR (1) Oxygen.	Breathing g	
Polarographic exponential dilution method (1). The oil was degassed by the method of Battino et al. (2).	SOURCE AND PUR (1) Oxygen. compres (2) Olive o	Breathing g sed air. il. Italian	grade origin.
Polarographic exponential dilution method (1). The oil was degassed by the method of Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oil was transferred to a glass vessel and weighed. The vessel was so con- structed that the ratio $V_{top}$ air space/ $V_{oil}$ was between 0.0704 and 0.0981. A magnetic stir-	SOURCE AND PUR (1) Oxygen. compres (2) Olive o	Breathing o sed air.	grade origin.
Polarographic exponential dilution method (1). The oil was degassed by the method of Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oil was transferred to a glass vessel and weighed. The vessel was so con- structed that the ratio V <sub>top</sub> air space/V <sub>oil</sub> was between 0.0704 and 0.0981. A magnetic stir- ring bar (120 rpm) and a polarographic oxygen sensor were placed in the	SOURCE AND PUR (1) Oxygen. compres (2) Olive o	Breathing o sed air. il. Italian in retail sto	grade origin.
Polarographic exponential dilution method (1). The oil was degassed by the method of Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oil was transferred to a glass vessel and weighed. The vessel was so con- structed that the ratio V top air space /Voil 0.0704 and 0.0981. A magnetic stir- ring bar (120 rpm) and a polarographic oxygen sensor were placed in the sample. Air was bubbled through the sample at 15 cm <sup>3</sup> m <sup>-1</sup> for two hours. The air was stopped, and helium gas preheated to the sample temperature	SOURCE AND PUR (1) Oxygen. compres (2) Olive o Bought ESTIMATED ERRO Solubility three deter	Breathing o sed air. il. Italian in retail sto R:	grade origin. ore. e average of ch relative
Polarographic exponential dilution method (1). The oil was degassed by the method of Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oil was transferred to a glass vessel and weighed. The vessel was so con- structed that the ratio $V_{top}$ air space/ $V_{oil}$ was between 0.0704 and 0.0981. A magnetic stir- ring bar (120 rpm) and a polarographic oxygen sensor were placed in the sample. Air was bubbled through the sample at 15 cm <sup>3</sup> m <sup>-1</sup> for two hours. The air was stopped, and helium gas preheated to the sample temperature was introduced into the oil at a rate	SOURCE AND PUR (1) Oxygen. compres (2) Olive o Bought ESTIMATED ERRO Solubility three detern standard de	Breathing of sed air. il. Italian in retail sto R: values are th minations wit	grade origin. ore. e average of ch relative
Polarographic exponential dilution method (1). The oil was degassed by the method of Battino et al. (2). A 155-159 cm <sup>3</sup> sample of degassed oil was transferred to a glass vessel and weighed. The vessel was so con- structed that the ratio $V_{top}$ air space $V_{oil}$ was between	SOURCE AND PUR (1) Oxygen. compres (2) Olive o Bought ESTIMATED ERRO Solubility three detern standard der REFERENCES: 1. Aho, L.; J. Am. O	Breathing of sed air. il. Italian in retail sto Walues are the minations wite viation of 78 Wahlroos, 0.	grade origin. ore. e average of th relative f or less. <u>1967</u> , 44, 65

3/2	•	Oxygen Solubili	ties up to 200 kPa	
COMPONENTS:			ORIGINAL MEASUREMENTS:	
(1) Oxygen; O;	2; [7782-44	-7]	Power, G. G.	
(2) Human blood	1		J. Appl. Physiol.	<u>1968</u> , 24, 468-74.
VARIABLES:			PREPARED BY:	
			C. L	. Young
EXPERIMENTAL VALU	ES:	T/K = 310	.15	Corrected
Treatment	P <sub>O2</sub> /mmHg	P <sub>O2</sub> /kPa	Bunsen Coefficient, α/cm <sup>3</sup> (STP)cm <sup>-3</sup> atm <sup>-1</sup> o	Bunsen Coefficient,
	<u> </u>		a/cm*(STP)cm *acm *o	/Cm <sup>-</sup> (SIF)Cm <sup>-</sup> acm
K <sub>3</sub> Fe(CH) <sub>6</sub> , 3.2g/100 ml saponin	706	94.1	0.0231	0.0249
$K_3 Fe(CN)_6$ ,	375	50.0	0.0218	0.0236
3.2g/100 ml Triton-X	382 382	50.9 50.9	0.0204 0.0209	0.0222 0.0227
	382	50.9	0.0202	0.0220
NaNO <sub>2</sub> ,	398	53.1	0.0221	0.0225
0.05g/100 ml	398 398	53.1 53.1	0.0216 0.0216	0.0220 0:0220
NaNO <sub>2</sub> ,	382	50.9	0.0219	0.0227
1.0g/100 ml	382	50.9	0.0217	0.0225
	382 382	50.9 50.9	0.0219 0.0221	0.0227 0.0229
	382	50.9	0.0215	0.0223
NaNO <sub>2</sub> ,	366	48.8	0.0234	0.0242
(l.0g/100 ml) freeze-thaw	366 366	48.8 48.8	0.0223 0.0217	0.0231 0.0225
hemolysis	366	48.8	0.0228	0.0236
	366 366	48.8 48.8	0.0229 0.0233	0.0237 0.0241
			Avera	ge 0.0230 ± 0.000
		AUXILIARY	INFORMATION	
METHOD / APPARATUS /	PROCEDURE:	· . · · ·	SOURCE AND PURITY OF MA	TERIALS:
Liquid samples	were equil:	ibrated with	1	
gas and then t	he dissolve	d gas was		
stripped out u	nder vacuum	and		
measured in a	manometric '	Van Slyke	Details give	n under method.
apparatus. V	arious amou	nts of		
$K_3 Fe(CN)_6$ or N	laNO <sub>2</sub> were a	dded to		
the blood to p	revent the :	formation		
of oxyhemoglob	oin. The al	bove		
results have b	een correcto	ed for the	ESTIMATED ERROR:	
decrease in so	-	e to the	$\delta T/K = \pm 0.03$	•
presence of th	ese salts.			
			REFERENCES:	

		1				
COMPONENTS:	4.4 71			UREMENTS :		
(1) Oxygen: 0 <sub>2</sub> ; [7782	-40-1]			-		ey-Whyte, J.
(2) Human blood		J. A	lppl.	Physiol.	<u>1969</u> , 1	27, 592-6.
(3) Krebs-Henseleit s human blood, and with added NaNO <sub>2</sub>	olution, human plasma					
VARIABLES:		PREPAR	ED BY:			
T/K = 291-310				R. Batti	ino	
Concentration						
EXPERIMENTAL VALUES:		<b>_</b>				······································
	$10^2 \alpha^a / \text{cm}^3$ (			1		
	Hb <sup>b</sup> concn./ (g/100 ml)	t 18	28	37		
	2.5 2	.90	2.49	2.19		
	7.8 2 13.3 2	.93	2.50 2.52	2.20 2.22		
	17.1 2	.96 .99 .04	2.55	2.25		
		.04 .14	2.60	2.29		
	27.0 3	• 1 7	2.70	£.JU		
<ul> <li><sup>a</sup> Bunsen coefficient.</li> <li>the asterisked value</li> <li><sup>b</sup> Hemoglobin concentra</li> </ul>	which is for	13 det	ermin:	ations.	ninations	s, except
Gelment	, ,	51170				0 m])
Solvent	No. Detns.	ſ	Па )	-	on/(g/10)	
Krebs-Henseleit	14		27		2.25	2.20
Human Blood	14	2.	,		2.225	2.18
Human Plasma	12		1	2.16	2.135	2.085
<sup>a</sup> Bunsen coefficient.						
	AUXILIARY	INFORMA	TION			
METHOD/APPARATUS/PROCEDURE:		SOURCE	AND PL	RITY OF M	ATERIALS:	
Solubilities determine Slyke method. Smoothe	d recommended	(1)	Argo Prec	n-free, ision Ga	99.99%, as Produc	from cts.
values for oxygen solu human blood reported 1 intervals, and for fou	5-40°C in lK	(2)	From	each of	six nor	rmal and 2-42 years.
trations.	b concen		See	original	paper i	for details.
		1				
		ESTIMA	TED ERF	ROR:	• • • • • • • • • • • • • • • • • • • •	
		δ Τ / Χ	τ = ±0	.05		
		1	$u = \pm 0$			
		REFERE		<u></u>		
		1				

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxvgen; 0 <sub>2</sub> ; [7782-44-7]	Roughton, F.J.W.; Severinghaus, J.M.
(2) Human blood	J. Appl. Physiol. 1973, 35, 861-9.
VARIABLES:	PREPARED BY:
T/K = 273 - 310	R. Battino
EXPERIMENTAL VALUES:	
Bunsen Coeffic	
t/°C T/K <sup>a</sup> 10 <sup>2</sup> α/cm <sup>3</sup> (STP) cr	n <sup>-3</sup> atm <sup>-1</sup> Ostwald Coefficient <sup>a</sup>
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4.59 4.53
22 295 2.91d	3.14
37 310 2.387 <sup>e</sup>	2.710
<sup>a</sup> Calculated by compiler.	
<sup>b</sup> Mean of 27 determinations using	r electrode method.
<sup>c</sup> Mean of 4 determinations using	
d Mean of 10 determinations using	
e Mean of 22 determinations using	g electrode method.
$f_{\alpha(t^{\circ}C, blood)} = \alpha(t^{\circ}C, water) $ relationship given by authors a	<pre>k (0.9373 + 0.00160 t/°C); celating solubility in</pre>
pure water to that in human blo	
AUXILIARY	INFORMATION
METHOD /AP PARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
They used the Van Slyke method for	(1) No details given.
checking at 0°C. The other measure- ments were made using a Radiometer	(2) 50 cm <sup>3</sup> of venous blood drawn each
oxygen electrode which was covered with 25 micron polyethylene.	from four normal non-smoking males into a heoarinized glass
Temperature was controlled to +0.05°C	syringe. Hb concentration averaged 15.5 g/100 cm <sup>3</sup> (range
Solutions were degassed by shak- ing in oiled syringes with a vacuum.	15.0 - 16.8).
Details are given in the paper.	
	ESTIMATED ERROR:
	$\delta \alpha / \alpha = \pm 0.03$ (compiler's estimate)
	REFERENCES:

Вюю	gical Fluids 375
COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen: 0 <sub>2</sub> ; [7782-44-7]	Christoforides, C.; Hedley-Whyte, J.
(2) Human blood	J. Appl. Phusiol. <u>1976</u> , 40, 815-8.
VARIABLES:	PREPARED BY:
T/K = 273-295 Concentration	R. Battino
EXPERIMENTAL VALUES:	
	rp)cm <sup>-3</sup> atm <sup>-1</sup>
Hb <sup>b</sup> concn/(g/100 ml	
HB conch/(g/100 ml	1) t/°C 0 6 12
5.6 10.2	4.40 3.76 3.23 4.43 3.78 3.28
15.7	4.52 3.86 3.34
22.5	4.67 4.05 3.45
<sup>a</sup> Bunsen coefficie	
<sup>b</sup> Hemoglobin conce	
ΔΙΙΥΤΙΤΑΙ	RY INFORMATION
METHOD /APPARATUS /PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Solubilities determined by the	(1) Argon-free, 99,99%, from
van Slyke method. Smoothed recommended values at four Hb	Precision Gas Products.
concentrations and 0 to 15°C at 1K intervals also given.	(2) From four healthy non-smoking men, aged 25-41. See original paper for details of handling.
	ESTIMATED ERROR:
	ESTIMATED ERROR: $\delta T/K = \pm 0.05$ $\delta \alpha/\alpha = \pm 0.01$
	$\delta T/K = \pm 0.05$ $\delta \alpha/\alpha = \pm 0.01$
	$\delta T/K = \pm 0.05$
	$\delta T/K = \pm 0.05$ $\delta \alpha/\alpha = \pm 0.01$
	$\delta T/K = \pm 0.05$ $\delta \alpha/\alpha = \pm 0.01$
	$\delta T/K = \pm 0.05$ $\delta \alpha/\alpha = \pm 0.01$
	$\delta T/K = \pm 0.05$ $\delta \alpha / \alpha = \pm 0.01$

COMPONENTS:	
(1) 0 $(1)$ 0 $(7792 - 44 - 7)$	ORIGINAL MEASUREMENTS:
(1) Oxygen: 0 <sub>2</sub> ; [7732-44-7]	Christoforides, C.; Laasberg, L.Y.;
(2) Human blood plasma	Hedley-Whyte, J.
	J. Appl. Physiol. 1969, <u>26</u> , 56-60.
	(cf. ibid. <u>1969</u> , 26, <u>R1</u> 2 for corrn.)
	corr.,
VARIABLES:	PREPARED BY:
T/K = 291 - 310	
P/kPa = 20 - 98	R. Battino
P/KPa = 20 = 38	
EXPERIMENTAL VALUES:	2 4 3
t <sup>a</sup> /°C T/K <sup>b P</sup> 0 <sub>2</sub> /mm Hg 10 <sup>2</sup> L <sup>b</sup>	,c $\frac{10^2 a' cm^3 (STP)}{cm^{-3} atm^{-1}}$ No. $\sigma^f$
$1 \frac{1}{2} $	, $c = \frac{10 \text{ a/cm} (STP)}{\text{cm}^3 \text{ atm}^{-1}}$ Detns. $\sigma^f$
······································	
18         291.15         737.4         3.04           28         301.15         724.4         2.71	
37 310.15 149.6 2.42	
37 310.15 355.2 2.43	2.14 10 0.006
37 310.15 534.1 2.44 37 310.15 705.6 2.44	
57 510.15 705.0 2.22	2.13 13 0.000
a Controlled to ±0.05 K.	
_	
<sup>b</sup> Calculated by compiler.	
<sup>C</sup> Ostwald coefficient.	
<sup>d</sup> Bunsen coefficient.	
e Number of determinations at that	partial pressure of oxygen.
	4
<sup>r</sup> Authors' calculated standard devi	ation.
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Standard van Slyke manometric	(1) Argon-free, 99.99% from
technique employed. Also some	Precision Gas Products
measurements made with an oxygen	(2) Blood obtained from a 31 year-
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the
measurements made with an oxygen electrode. Paper reports calcu-	
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper.
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR:
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR: δT/X = ±0.05
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR: δT/X = ±0.05
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR: $\delta T/X = \pm 0.05$ $\delta \alpha / \alpha = \pm 0.01$ , authors' estimate
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR: $\delta T/X = \pm 0.05$ $\delta \alpha / \alpha = \pm 0.01$ , authors' estimate
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR: $\delta T/X = \pm 0.05$ $\delta \alpha / \alpha = \pm 0.01$ , authors' estimate
measurements made with an oxygen electrode. Paper reports calcu- lated values at 1% intervals from	old healthy man, and the plasma separated. Details given in the original paper. ESTIMATED ERROR: $\delta T/X = \pm 0.05$ $\delta \alpha / \alpha = \pm 0.01$ , authors' estimate

	· · · · · · · · · · · · · · · · · · ·
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7] Wise, D.L.; Houghton, G.	
(2) Human hemoglobin	Biophys. J. <u>1969</u> , 9,36-53.
(3) Water; H <sub>2</sub> 0; [7732-18-5]	
-	
VARIABLES:	PREPARED BY:
T/K = 283 - 333 concentration	R. Battino
EXPERIMENTAL VALUES:	$10^2 \alpha^{\rm C}$
$t/^{\circ}C$ $T/K^{a}$ $10^{2}L^{a,b}$	$cm^3$ (STP) $cm^{-3}$ $atm^{-1}$ $s^d$
5 wt % packed	d red cells
	4.61 46.1
10 283.2 4.70 20 293.2 3.96 20 203.2 3.32	3.69 37.0 3.00 30.1
30 303.2 3.33 40 313.2 3.10	2.70 27.2
50 323.2 3.04	2.57 26.0
60 333.2 2.85	2.34 23.8
10 wt % packed	d red cells
10 283.2 6.85	6.61 66.1
20 293.2 3.30	4.99 49.9
30 303.2 4.67 40 313.2 4.10	4.21 42.3 3.58 36.1
40 313.2 4.10 50 323.2 4.01	3.39 34.3
50 323.2 4.01 60 333.2 3.56	2.92 29.7
20 wt % packed	d red cells
10 283.2 9.59	9.25 92.6
20 293.2 8.08	7.53 75.4
30         303.2         6.75           40         313.2         5.62           50         323.2         4.74	6.08 61.1 4.90 49.4
1 50 525.2 4.74	4.01 40.6
60 333.2 4.21	3.45 35.6
	continued on following page
AUXILIARY	INFORMATION
ME THOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Used an adaptation of the Morrison	(1) No details given.
and Billett apparatus(1), but with	
the gas capacity of the manometer- buret system being about 15 cm <sup>3</sup> .	(2) Prepared from just out-dated human red blood cells. Mixed
The storage spiral, the absorption	with degassed water to make
spiral, and the manometer-buret	up solutions.
system were thermostatted in glass	-
jackets through which water from a thermostat circulated.	(3) Boiled and deionized.
	FORTMARD EDDOD
	ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.01$
	$\delta T/K = \pm 0.1$
	REFERENCES:
	1. Morrison, T.J.; Billett, F.
	J. Chem. Soc. <u>1952</u> , 3819-22.

Wise, D.L.; Houghton, G. Biophys. J. <u>1969</u> , 9, 36-53. ned
ned
led
lution. Solubilities fitted $(T/K)$ .
B C
406.59 6.59453 339.30 5.37665 724.42 -0.64668
1

	Biologic		3/3
COMPONENTS: (1) Oxygen; O <sub>2</sub> ;	[7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.	
(2) Hemoglobin		Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.	
(3) Water; H <sub>2</sub> O;	[7732-18-5]		
VARIABLES: T/K = 3 P/kPa = 1	10.15 01.325 (l atm)	PREPARED BY: H. L. Clever	
EXPERIMENTAL VALUES	S:		
т/к	α 100 cm <sup>-</sup> ° -	icient	
		$\frac{m^{-3} \text{ atm}^{-1}}{2} = \frac{k = (1/c) \ln (\alpha/\alpha_0)}{2}$	ĺ
310.15		+ 7 + 8	
		± 10 +0.00070	
$\frac{1}{1} k/g^{-1}10$	0 cm <sup>3</sup>		
<u> </u>	AUXILIARY	INFORMATION	
METHOD/APPARATUS/PI	ROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
	lyke method (1).	(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.	
constant gas vo	ample volume and Dume are carefully	(2) Hemoglobin. No information.	
unextracted gas reabsorption co	e correction for s is made, but the prrection is not	(3) Water. Distilled.	
necessary for c			
thermostated to	s undertaken in a nometer. A 2 cm³ tly transferred to		
the Van Slyke a	pparatus for analysis.	ESTIMATED ERROR:	
The solubility value is from t of ten literatu	of oxygen in water he authors analysis re values (2).	$\begin{array}{rcl} \delta \mathbf{T}/\mathbf{K} &= & 0.1 \\ \delta \alpha / \alpha &= & 0.01 \end{array}$	
		REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. <i>J. Biol. Chem.</i> <u>1924</u> , 61, 523.	
		2. Zander, R.; Euler, R.	
		Measurement of Oxygen, Edited b Degn, H.; Balslev, I.; Brook, R Elsevier, Amsterdam, 1976,p.271	Y
			•

0 Oxygen Solubilities up to 200 kPa						
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Human Serum (3) Corticosteroids; [50-04-4], [125- 04-2], [151-73-5], [1715-33-9], [2375-03-3], and [2392-39-4]	ORIGINAL MEASUREMENTS: Gainer, J. V. Jr.; Gainer, J. L.; Kelly, R. Steroids <u>1976</u> , 28, 307-10.					
VARIABLES: T/K = 298.15 O <sub>2</sub> P/kPa = about 101.325 Corticosteroid/µg cm <sup>-3</sup> = 0 - 200	PREPARED BY: H. L. Clever					
EXPERIMENTAL VALUES:						

continued on following page

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: Reconstituted human serum was placed in a beaker, antifoaming agent (Antifoamer-A, Dow Corning) was added, oxygen was bubbled through the solution for 10 minutes, and a sample was taken in an airtight syringe. The sample was injected into a gas chromatograph for the determination of the oxygen by the method of The sample passed Navarri (1). through a drying tube of  $CaSO_4$ . The chromatograph used a Beckman GC2A thermal conductiviety detector and was fitted with a molecular sieve column. Preliminary tests showed that the O2 solubility was the same in plasma and serum, that the antifoamer did not change the solubility, and that  $O_2$  was not absorbed in the drying column. Data read from small graphs.

Evaluator's Comment. The large changes in  $O_2$  solubility with small concentrations of corticosteroids are startling. Confirmation by other workers is desirable.

SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given. 99 per cent purity.

- (2) Human serum. Lyophilized human serum was reconstituted for use.
- (3) Corticosteroids. Commercial samples. Sources given in table above, along with Chem. Abstr. index formulas.

ESTIMATED ERROR:  $\delta T/K = 1$ Authors say values were average of repeated tests with values falling within a 5 per cent range.

**REFERENCES:** 

 Navarri, R. M. Mass Transport in Biological Systems. Ph.D. Dissertation, University of Virginia, Charlottesville, VA 1970. **Biological Fluids** 

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1)Oxygen; O <sub>2</sub> ; [7782-44-7]	Gainer, J. V. Jr.; Gainer, J. L.; Kelly, R.
(2)Human Serum	• •
(3)Corticosteroids; [50-04-4], [125- 04-2], [151-73-5], [1715-33-9], [2375-03-3], and [2392-39-4]	Steroids <u>1976</u> , 28, 307-10.
EXPERIMENTAL VALUES:	tinued
9-Fluoro-llβ,17,21-trihydroxy-l6a-met Dexamethasone sodium phosphate or Dec C <sub>22</sub> H <sub>30</sub> FO <sub>8</sub> P.2Na; [2392-39-4]	hyl-1,4-pregnadiene-3,20-dione or
Solubility Ratio: (O <sub>2</sub> in serum + steroid/O <sub>2</sub> in serum)x. Steroid/µg cm <sup>-3</sup>	100 +42 +38 +37 + 5 - 5 0.5 2.5 5. 25. 100.
9-Fluoro-llβ, l7, 21-trihydroxy-l6β-m Betamethasone sodium phosphate or Cele [151-73-5]	ethyl-1,4-pregnadiene-3, 20-dione or estone <sup>R</sup> , Schering; C <sub>22</sub> H <sub>30</sub> FO <sub>8</sub> P.2Na;
Solubility Ratio: (O <sub>2</sub> in serum + steroid/O <sub>2</sub> in serum)x Steroid/µg cm <sup>-3</sup>	100 +42 +38 +35 +15 + 2 0.625 2.5 5. 10. 20.
Cortisone acetate, Upjohn Co.; C <sub>23</sub> H <sub>30</sub>	D <sub>6</sub> ; [50-04-4]
Solubility Ratio: (O2 in serum + steroid/O2 in serum)x: Steroid/µg cm <sup>-3</sup>	100 0 -20 -19 -10 -12 1. 12. 30. 110. 225.
116, 17, 21-trihydroxy-1,4-pregnadiene succinate or Meticortelone <sup>R</sup> , Schering	e-3, 20-dione or Presnisolone sodium , Co.; C <sub>25</sub> H <sub>32</sub> O <sub>8</sub> .Na; [1715-33-9]
Solubility Ratio: (O <sub>2</sub> in serum + steroid/O <sub>2</sub> in serum)x: Steroid/µg cm <sup>-3</sup>	100 -20 -17 -24 -12 2.5 5. 40. 80.
The two compounds listed below were st cortisone and the prednisolone but no	tated to behave similarly to the data were given.
Hydrocortisone sodium succinate or So [125-04-2]	lu Cortef <sup>R</sup> , Upjohn Co.; C <sub>25</sub> H <sub>34</sub> O <sub>8</sub> .Na;
<pre>11β,17,21-trihydroxy-6a-methyl-1,4-pro Methylprednisolone sodium succinate of C<sub>26</sub>H<sub>34</sub>O<sub>8</sub>.Na; [2375-03-3]</pre>	egnadiene-3,20-dione or r Solu Medrol <sup>R</sup> , Upjohn Co.;

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COMPC	NENTS:	ORIGINAL MEASUREMENTS:				
(D	Oxygen; O <sub>2</sub> ; [7782-44-7]	Power, G.G.; Stegall, H.				
(2)	Phosphate buffer and human red cell ghosts in phosphate buffer.	J. Appl. Physiol. <u>1970</u> , 29, 145-9.				
VARIA	ABLES:	PREPARED BY:				
	T/K = 310	C.L. Young				
EXPER	RIMENTAL VALUES:					
	α	S.D. No. of measurements.				
		te Buffer 00055 7				
	Ghosts suspen	sion in buffer				
		00128 6 0011 3				
	* Standard deviation					
	§ Disrupted membranes					
	$\alpha^{\circ}$ ghost = ( $\alpha$ ghost suspension - = 0.113 ± 0.097	α buffer) / g ghost cm <sup>-3</sup>				
	AUXILIARY	INFORMATION				
METHO	DD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;				
sti	o 12 cm <sup>-3</sup> samples placed in a rrer cell and gas, saturated with	(1) Matheson sample, purity better than 99.7 mole per cent.				
for ed	er vapor passed through liquid 30 -60 mins. Samples of saturat- liquid withdrawn and transferred	(2) See method.				
gas	Van Slyke apparatus. Dissolved removed under reduced pressure.					
cen	cell ghosts prepared by trifugation of human blood and					
buf	ing the cells using phosphate fer of pH 7.4. Ghost separated	ESTIMATED ERROR:				
Was	high speed centrifugation. hed with phosphate buffer contain-	LOTTATLD ERKOR.				
ing	0.01M sodium nitrite.	$\delta T/K = \pm 0.1$				
		REFERENCES:				
	•					

COMPONENTS :			ORIGINAL MEASUREMENTS:			
(1) Oxygen; (		4-71				
			Power, G. G. J. Appl. Physiol. 1968, 24, 468-74.			
(2) Human pulmonary tissue			J. Appl. Physiol	. <u>1968</u> , 24, 468-74.		
VARIABLES:			PREPARED BY:			
T/K = 31	0		C. L. 3	Young		
			L			
EXPERIMENTAL VALU	JES:	T/K = 310.1	.5			
			Bunsen	Corrected Bunsen		
Treatment	P <sub>O₂</sub> /mmHg	P <sub>O₂</sub> /kPa	Coefficient,	Coefficient,		
		α,	/cm <sup>3</sup> (STP) cm <sup>-3</sup> atm <sup>-1</sup>	$\alpha/cm^{3}(STP)cm^{-3}atm^{-1}$		
NaNO <sub>2</sub> ,	372	49.6	0.0212	0.0220		
1.0g/100 ml	372 372	49.6 49.6	0.0201 0.0198	0.0209 0.0206		
	372	49.6	0.0220	0.0228		
	372 372	49.6 49.6	0.0224 0.0204	0.0232 0.0212		
	372	49.6	0.0202	0.0210		
	372	49.6	0.0205	0.0213		
K₃Fe(CN)6, 3.2g/100 ml	365 365	48.7 48.7	0.0194 0.0190	0.0212 0.0208		
saponin	365	48.7	0.0195	0.0213		
	365 365	48.7 48.7	0.0186 0.0184	0.0204 0.0202		
	365	48.7	0.0199	0.0217		
	365	48.7	0.0186	0.0204		
	365	48.7	0.0206	0.0224		
			Avera	age 0.0213 ± 0.0008		
		AUXILIARY	INFORMATION			
METHOD /APPARATUS	/PROCEDURE:		SOURCE AND PURITY OF N	IATERIALS :		
Sample of tis	sue homogeni	.sed; no				
effort was ma			Dotaile given	under method.		
Samples were	-	•		under method.		
and then diss						
out under vac						
manometric Va						
Various amoun						
were added to the tissue to prevent formation of oxyhemoglobin. The above results have been corrected for the decrease in solubility due			ESTIMATED ERROR:			
			$\delta T/K = \pm 0.03.$			
to the presen	ce of these	salts.	REFERENCES :			
			1			
1						
			l			

COMPONENTS :			ORIGINAL MEASUREMENTS:			
			ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Power, G. G.			
(2) Sheep placental tissue			J. Appl. Physiol.	. <u>1968</u> , 24, 468-74.		
VARIABLES:			PREPARED BY:			
T/K = 310			С. L.	. Young		
EXPERIMENTAL VALU	IFC.					
		T/K = 310.]	.5			
			Bunsen	Corrected Bunsen		
Treatment	PO2/mmHg	P <sub>O2</sub> /kPa	Coefficient,	Coefficient, $\alpha/cm^3$ (STP) cm <sup>-3</sup> atm <sup>-1</sup>		
		0	/cm°(STP)cm°acm	a/em <sup>o</sup> (STP)em <sup>o</sup> atm <sup>-1</sup>		
$K_{3}Fe(CN)_{6}$	366	48.8 48.8	0.0198 0.0207	0.0214 0.0223		
2.9g/100 ml Triton-X	366 366	48.8	0.0198	0.0214		
NaNO <sub>2</sub> ,	366	48.8	0.0217	0.0244		
0.9g/100 ml Triton-X		48.8 48.8	0.0214 0.0206	0.0221 0.0213		
NaNO <sub>2</sub> , 1.0g/100 ml	368 368	49.1 49.1	0.0178 0.0189	0.0186 0.0197		
	368 368	49.1 49.1	0.0194 0.0183	0.0202 0.0191		
	200	47.1	010103			
		AUXILIARY	INFORMATION			
METHOD APPARATUS	PROCEDURE .					
HE THOD AT TAKATOS	TROCEDURE:		SOURCE AND PURITY OF M	MIENIALS;		
Samples of ti						
effort was ma						
Samples were	-		Details given	under method.		
and then diss under vacuum						
manometric Va						
Various amour						
were added to	-					
formation of		-	ESTIMATED ERROR:			
above results have been corrected for the decrease in solubility due			$\delta T/K = \pm 0.03.$			
to the preser	nce of these	salts.	REFERENCES:			
1			l			

COMPONENTS:			ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Wong, S. S.; DiMicco, J. A.; Standaert, D. G.; Dretchen, K. L.			
(2) Krebs solution			J. Gen. Physiol. <u>1977</u> , 69, 655-66.			
(3) FC-80 which	is most	ly a mixture				
of isomers tetrahydrof	or peril Suran; C81	F160; e.g. se	e [335-36-4]			
VARIABLES: T/K =	310.15		PREPARED BY:			
P/kPa =9	91.9 - 94	.8	A. L. Cramer H. L. Clever			
FC-80 emulsion/		= 20				
EXPERIMENTAL VALUES:						
т/к	Tension	Time after oxygen bubbl ceases, t/m	Volume Per <sub>3</sub> Cent ing Oxygen, cm 100 cm <sup>-3</sup>			
ŀ	(rebs sol	ution				
310.15		0	2.23 ± 0.03			
	± 11.6 graph	60	1.43 ± 0.03			
I	Emulsion:	80 per cent FC-80	Krebs solution, 20 per cent			
310.15	711.6 ± 9.29	0	8.03 ± 0.44			
	graph	60	7.53 ± 0.41			
		AUXILIARY	INFORMATION			
METHOD/APPARATUS/PRO	CEDURE:		SOURCE AND PURITY OF MATERIALS:			
The emulsion was	formed b	by sonicating	(1) Oxygen. No information.			
a mixture of FC- for 30 minutes.	80 and Kr	rebs solution	(2) Krebs solution. Prepared in			
The Krebs soluti	on or the	e emulsion	distilled water. See bottom of left column.			
The Krebs solution or the emulsion were thermostated at 36 - 38 °C. A mixture of 95 per cent oxygen and 5 per cent carbon dioxide was bubbled through the solvent for 60 minutes.			(3) FC-80. Minnesota Mining and Manufacturing Co. Used as received.			
Total oxygen was oxygen analyzer was measured wit	and oxyge	en tension	ESTIMATED ERROR:			
The Krebs soluti			$\delta T/K = 1$			
g dm <sup>-3</sup> was:			The maximum standard error is 5.5 % of the mean.			
NaCl KCl $0.3$ MgSO4 $\cdot$ 7H <sub>2</sub> O $0.2$ CaCl <sub>2</sub> $0.2$ KH <sub>2</sub> PO <sub>4</sub> $0.1$ NaHCO <sub>3</sub> 2.1 Dextrose Emulsiving agent 150 mg per 100 c	29 28 .6 . was Plu:	ronic F68	REFERENCES :			

.

COMPONENTS:			ORIGINAL MEASUREMENTS:			
<ul> <li>(1) Oxygen; O<sub>2</sub>; [7782-44-7]</li> <li>(2) Aqueous physiologic salt</li> </ul>			Navari, R. M.; Rosenblum, W. I.; Kontos, H. A.; Patterson, J. L.			
(2) Aqueous p solution		c salt	Res. Exp. Med. <u>1977</u> , 170, 169-80.			
3,3,4,4,4	4-nonafluo	rgely 1,1,2,2, ro-N,N-bis(nona anamine; C12F27	-			
VARIABLES: T/H	K = 310.15		PREPARED BY:			
, i	a = 6.66 -		Н. L.	Clever		
Emulsion of EXPERIMENTAL VAL		oncentrations	<u> </u>			
		Emulaion 0	xygen Solubility <sup>1</sup>	Diffusion		
т/к	Oxygen Pressure p/mmHg		cm <sup>3</sup> O <sub>2</sub> /cm <sup>3</sup>	Coefficient <sup>2</sup> 10 <sup>-5</sup> D/cm <sup>2</sup> s <sup>-1</sup>		
310.15	50 100 150 760	22	0.0040±0.0010 0.0090±0.0010 0.0143±0.0011 0.0797±0.0011	2.43±0.07 2.79±0.10 2.88±0.08 2.93±0.09		
	150 760	25	0.0180±0.0010 0.0932±0.0011	2.84±0.01 3.03±0.09		
	150 760	33	0.0200±0.0010 0.1173±0.0082	2.96±0.09 3.21±0.14		
	50 100 150 760	* 3	0.23 <sup>4</sup> 0.28 <sup>4</sup> 0.31 <sup>4</sup> 0.36 <sup>4</sup>			
<sup>3</sup> Pure F( <sup>4</sup> Values The solul cients.	C-47, not read from bility val The author	an emulsion. a graph (Fig 2 ues read from t s call it a sol	standard deviatior ) in the paper. the graph appear to ubility coefficier	be Bunsen coeffi-		
describe	how it is	calculated.	INFORMATION			
	(PROGRAUDE -			V477777110		
METHOD/APPARATUS	•	mongurod by the	SOURCE AND PURITY OF (1) Oxygen. No ir			
gas chromato	graph meth	od of Shoor et	(2) Physiologic			
solvent vapo:	r, was pas	aturated with sed through	Ion Na H	Ca Cl Lactate		
the degassed liquid in the saturation cell at a rate of 50 ml m <sup>-1</sup> . Twenty microliter samples of the gas-satura- ted liquid were withdrawn and analy- zed chromatographically at 15 m intervals. When readings remained constant for one hour the solution was assumed to be saturated. The time for saturation was less than 2 hours. The apparatus was calibrated with pure dry oxygen.			A non-ionic de F-68/g dm <sup>-3</sup> adjust the PH	etergent, Pluronic 48; Tris buffer to to 7.30 ± 0.10. Larity/mOsm dm <sup>-3</sup>		
The results confirm the report of Zander (2) that oxygen solubility in FC-47 does not obey Henry's law in either the pure liquid or the emul- sion. The departure from Henry's law appears to be more pronounced at oxygen partial pressures below 150 mmHg. Emulsion prepared by sonication.			Gubbins, K. J. Phys. Chem 2. Zander. R.	Walker, R. D. Jr.; E. . <u>1969</u> , 73, 312. . <u>1974</u> , 164, 97.		

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.				
(2) Globulins, bovine	Z. Naturforsch., C: Biosci. <u>1976</u> ,				
(3) Water; H <sub>2</sub> O; [7732-18-5]	31C, 339-52.				
VARIABLES: T/K = 310.15	PREPARED BY: H. L. Clever				
P/kPa = 101.325 (1 atm)					
EXPERIMENTAL VALUES:	1				
T/K Globulins, bovine	Bunsen Constant <sup>1</sup>				
$g 100 \text{ cm}^{-3}$	Coefficient				
<u>10<sup>4</sup>α</u> ,	$/cm^3 cm^{-3} atm^{-1} k=(1/c) ln (\alpha/\alpha_0)$				
$\alpha$ -Globulin, bovine					
310.15 0 5	241 237 + 4				
10	$\begin{array}{r} 237 + 4 \\ 224 + 5 \\ -0.00703 \end{array}$				
β-Globulin, bovine	-0.00703				
310.15 0	241				
10	220 + 5 213 + 5				
	-0.00856				
-Globulin, bovine					
310.15 0 10	241 232 + 3				
20	232 + 3214 + 7-0.00589				
<sup>1</sup> k/g <sup>-1</sup> 100 cm <sup>3</sup>					
AUXILIARY	INFORMATION				
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:				
Classical Van Slyke method (l).	(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.				
The apparatus sample volume and constant gas volume are carefully	(2) Globulins, bovine. No informa- tion.				
calibrated. The correction for unextracted gas is made, but the					
reabsorption correction is not necessary for oxygen.	(3) Water. Distilled.				
Equilibration is undertaken in a thermostated tonometer. A 2 cm <sup>3</sup>					
sample is directly transferred to					
the Van Slyke apparatus for analysis.	ESTIMATED ERROR:				
The solubility of oxygen in water value is from the authors analysis of ten literature values (2).	$\begin{array}{rcl} \delta T/K &= & 0.1 \\ \delta \alpha / \alpha &= & 0.01 \end{array}$				
	REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. 1924, 61, 523.				
	<ol> <li>Zander, R.; Euler, R. Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R. Elsevier, Amsterdam, 1976, p.271.</li> </ol>				

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COMPONENTS:					ORIGINAL MEASUREMENTS:					
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]				Shkolnikova, R.I.						
(2) Various solutions - see below				Uch. Zap. Leningr. Gos. Univ., Ser. Khim. Nauk. <u>1959</u> , [18], 64-86.						
							tr. <u>196</u>			
VARIABLES					PREPAR	ED DV	<u> </u>			
VIIII DELO	T/K =	283-313			rKEFAR	ED DI	•			
	P/kPa Concer	= 101 ntration			V	. Kat	tovic			
EXPERIMENT	AL VALUES		litu of	0	. in c	~~	Albumin			
			lity of 75%	Oxygei	1.15%		1.6		1	998
L (80	т <sup>а</sup> /к	$10^{3}a^{b}$	10 <sup>3</sup> L <sup>C</sup>	10 <sup>3</sup> 0		0 <sup>3</sup> L	-	10 <sup>3</sup> L	$10^3 \alpha$	10 <sup>3</sup> L
t/°C	T/K		TO T	10 0	ι <u>ι</u>	0 Г	10 α	10 5	10 α	
10	283	34.8	36.1	30.9		2.0	28.2	29.2	26.3	27.3
15 20	288 293	31.1 28.3	32.8 30.4	28.1	. 2	9.6 6.1	26.0 22.1	27.4 23.7	24.5 21.4	25.8 23.0
25	298	25.7	28.1	23.0	) 2	5.1	20.4	22.3	18.1	19.8
30	303	23.1	25.6	21.9		4.3	18.2	20.2	17.8	19.7
35 40	308 313	21.3 19.6	24.0 22.5	20.4		3.0 0.7	17.8 16.0	20.1 18.4	16.2 15.4	18.4 17.6
a Calc	ulated 1	oy compil	er.			·-				
		ficient i	_	P) cm	-3 atm	-1.				
C Ostv	ald coef	ficient.								
							continue	a on re	DITOMIN	g page
			AUX	ILIARY	INFORM	ATION				
METHOD/APH			2		SOURCE	AND 1	PURITY OF	MATERIA	LS;	
manometr	ic/volur	rmined by netric ap	paratus		(1) 99.98-99.99% pure					
describe	d in the	e paper.					n and eg			9
						purif	fied by	dialys:	is.	
					ESTIM	TED F	RROR:			
					δα/α	= ±0	0.015, a	uthor's	s estima	ate
					DEPER	NORG	· · · · · · · · · · · · · · · · · · ·			
					KEFER	ENCES:				

COMPONENTS:	EVALUATOR:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Shkol'nikova, R.I.
(2) Various solutions - see below	Uch. Zap. Leningr. Gos. Univ., Ser. Khim. Nauk. <u>1959</u> , [18], 64-86. Chem. Abstr. <u>1961</u> , 55, 25443b.

CRITICAL EVALUATION:

continued

	Solub	-	Dxygen in G	elatin 59	5	10	ક
t/°C	т <sup>а</sup> /к	$10^3 \alpha^b$	10 <sup>3</sup> L <sup>C</sup>	10 <sup>3</sup> α	10 <sup>3</sup> L	10 <sup>3</sup> a	10 <sup>3</sup> L
10	283	34.9	36.2	29.4	30.5	26.2	27.2
15	288	32.3	34.7	28.0	29.2	24.1	25.5
20	293	30.0	32.2	26.9	28.9	22.6	24.2
25	298	26.6	29.0	22.4	24.4	19.3	22.1
30	303	21.0	23.3	18.1	20.2	16.0	17.7
35	308	19.3	21.8	17.9	20.0	14.7	16.6
40	313	17.1	19.6	14.5	16.6	12.9	14.3

<sup>a</sup> Calculated by compiler.

<sup>b</sup> Bunsen coefficient in cm<sup>3</sup>(STP) cm<sup>-3</sup> atm<sup>-1</sup>.

<sup>c</sup> Ostwald coefficient.

•					
Solubility	of	Oxygen	in	Egg	Albumin

			75%	1.15	8
t/°C	т <sup>а</sup> /к	$10^3 \alpha^b$	10 <sup>3</sup> L <sup>C</sup>	10 <sup>3</sup> a	10 <sup>3</sup> L
10	283	35.5	36.8	31.4	32.5
15	288	33.4	35.2	29.5	31.1
20	293	29.8	31.9	26.0	27.9
25	298	27.2	29.7	25.0	27.3
30	303	25.2	27.9	22.8	25.3
35	308	24.1	27.2	21.4	24.1
40	313	22.4	25.7	19.6	22.5

<sup>a</sup> Calculated by compiler.

<sup>b</sup> Bunsen coefficient in cm<sup>3</sup>(STP) cm<sup>-3</sup> atm<sup>-1</sup>.

<sup>c</sup> Ostwald coefficient.

		Hydrated	l Iron Oxid	le	Hydrated	Aluminum 10 <sup>3 b</sup>	Oxide
t/°C	т <sup>а</sup> к	0.1%	0.5%	0.8%	0.1%	0.35%	0.42%
20	293	30.1	29.6	27.9	31.0	28.7	26.0
30 40	303 313	25.3 21.3	21.5 16.1	20.1 13.0	26.5 23.1	26.5 23.1	21.1 16.5

<sup>a</sup> Calculated by compiler.

<sup>b</sup> Bunsen coefficient in cm<sup>3</sup>(STP) cm<sup>-3</sup> atm<sup>-1</sup>.

<sup>c</sup> Concentrations are presumably in wt per cent.

COMPONENTS:	<u> </u>			ORIG	NAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Shkol'nikova, R. I.			
(2) Serum Albumin			Uch. Zap. Leningr. Gos. Univ., Ser. Khim. Nauk. <u>1959</u> , Nr. 18, 64-86.			
(3) Water; H <sub>2</sub> O; [7732-18-5]			Chem. Abstr. <u>1961</u> , 55, 25443b.			
VARIABLES:		T/K = 283.15	- 313 15	PREP.	ARED BY:	
serum all		'kPa = 101.32 't % = 0.575	5		A. L. C H. L. C	
EXPERIMENTA	L VALUES	:				
	T/K			um A	lbumin	
		0.575 Bunsen	wt % Ostwald		1.15 Bunsen	wt % Ostwald
		Coefficient	Coefficie		Coefficient	
	83.15	34.8	36.1		30.9	32.0
	88.15 93.15	31.1 28.3	32.8 30.4		28.1 24.3	29.6 26.1
	98.15	25.7	28.1		24.5	25.1
	03.15	23.1	25.6		21.9	24.3
3	08.15	21.3	24.0		20.4	23.0
3.	13.15	19.6	22.5		18.1	20.7
	T/K			um A	lbumin	
		1.68			1.99	
		Bunsen Coefficient	Ostwald		Bunsen Coefficient	Ostwald
2	83.15	28.2	29.2	<u></u>	26.3	27.3
21	88.15	26.0	27.4		24.5	25.8
	93.15	22.1	23.7		21.4	23.0
	98.15	20.4	22.3		18.1	19.8
	03.15	18.2	20.2		17.8	19.7
	08.15 13.15	17.8 16.0	20.1 18.4		16.2 15.4	18.4 17.6
	mol <sup>-1</sup>	in water, and			1.68, and 1.99	, 2710, 2510, and wt % serum
<u> </u>			AUXILIARY	INFO	RMATION	
METHOD / APP	ADATHS /PI	OCEDURE .		ISOUR	CE AND PURITY OF M	ATERIALS .
The appar	ratus a	nd procedure dified (1).	of		Oxygen. Source Stated to be 9	e not given.
					per cent.	
						No information.
				(3)	Water. No info	rmation.
				EST	MATED ERROR:	
				REFI	RENCES :	
				1.	Lannung, A. J. Am. Chem. So	oc. <u>1930</u> , 52, 68.
				<u> </u>		

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Shkol'nikova, R. I.	
(2) Ovalbumin	Uch. Zap. Leringr. Gos. Univ., Ser. Khim. Nauk. 1959, Nr. 18, 64-86.	
(3) Water; H <sub>2</sub> O; [7732-18-5]		
	Chem. Abstr. <u>1961</u> , 55, 25443b.	
VARIABLES:	PREPARED BY:	
T/K = 283.15 - 313.15	A. L. Cramer	
P/kPa = 101.325 Ovalbumin/Wt % = 0.515, 1.15	H. L. Clever	
EXPERIMENTAL VALUES:		
T/K Ovalbumin/Wt % 0.515	Ovalbumin/Wt % 1.15	
Bunsen Ostwald	Bunsen Ostwald	
$\frac{\alpha \times 10^3}{L \times 10^3}$	t Coefficient Coefficient $\alpha \times 10^3$ L x $10^3$	
283.15 35.5 36.8	31.4 32.5	
288.15 33.4 35.2 293.15 29.8 31.9	29.5 31.1 26.0 27.9	
298.15 27.2 29.7	25.0 27.3	
303.15 25.2 27.9 308.15 24.1 27.2	22.8 25.3 21.4 24.1	
313.15 22.4 25.7	19.6 22.5	
AUXILIARY	INFORMATION	
ME THOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
The apparatus and procedure of	(1) Oxygen. Source not given.	
Lannung were modified (1).	Stated to be 99.98 - 99.99 per cent.	
	-	
	(2) Ovalbumin. No information.	
	(3) Water. No information.	
	l l	
	ESTIMATED ERROR:	
	ESTIMATED ERROR:	
	ESTIMATED ERROR:	
	REFERENCES: 1. Lannung, A.	
	REFERENCES :	
	REFERENCES: 1. Lannung, A.	
	REFERENCES: 1. Lannung, A.	
	REFERENCES: 1. Lannung, A.	

392 Oxygen Solubilit	les up to 200 kPa
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.
(2) Albumins (3) Water; H <sub>2</sub> O; [7732-18-5]	Z. Natruforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
VARIABLES: T/K = 310.15 P/kPa = 101.325 (1 atm)	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
g 100 cm °	sen Constant <sup>1</sup> icient $n^{-3} atm^{-1} = k=(1/c) ln (\alpha/\alpha_0)$
Albumin, bovine	
	$\frac{+}{+}$ $\frac{4}{2}$ -0.00417
Ovalbumin	
	$\frac{+}{+}$ $\frac{6}{8}$ -0.00744
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Classical Van Slyke method (1). The apparatus sample volume and constant gas volume are carefully calibrated. The correction for unextracted gas is made, but the reabsorption correction is not necessary for oxygen.	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.</li> <li>(2) Albumins. No information.</li> <li>(3) Water. Distilled</li> </ul>
Equilibration is undertaken in a thermostated tonometer. A 2 cm <sup>3</sup> sample is directly transferred to the Van Slyke apparatus for analysis. The solubility of oxygen in water value is from the authors analysis of ten literature values (2).	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$
	<pre>REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. 1924, 61, 523. 2. Zander, R.; Euler, R. Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R. Elsevier, Amsterdam, 1976, p.271.</pre>

	ai Fiulds 393
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) 2-Methyl-1-propanol or Isobutanol; C <sub>4</sub> H <sub>10</sub> O; [78-83-1] (3) Cholest-5-en-3β-ol or Cholesterol; C <sub>27</sub> H <sub>46</sub> O; [57-88-5] VARIABLES: T/K = 310.65 Total P/kPa = 101.325 EXPERIMENTAL VALUES: T/K Mass Fraction Ost Cholesterol Coeff $\frac{W_3}{310.65}$ 0.0 0. 310.64 0.0522 0.	ORIGINAL MEASUREMENTS: Byrne, J. E.; Battino, R.; Danforth, W. F. J. Chem. Thermodyn. <u>1974</u> , 6, 245-50.
s	wald coefficients in Isobutanol esterol solution, respectively.
AUXTLIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan, and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied through a liquid nitrogen trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de- gassed solvent is passed in a thin film down a glass helical tube con- taining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and final volumes in the buret system. The solvent is col- lected in a tared flask and weighed.	<pre>SOURCE AND PURITY OF MATERIALS; (1) Oxygen. Matheson Co., Inc. 99.995 per cent. (2) 2-methyl-1-propanol or isobutanol. Fisher Scientific Certified.</pre>

COMPONENTS				DICTO	
COMPONENTS :		792-44-71	ľ		MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			-	, J. E.; Battino, R.; nforth, W. F.	
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]			1 02	em. Thermodyn. 1974, 6, 245-50.	
(3) Cephal	lin			e. ch	em. Inermougn. 1914, 0, 243-30.
L					
VARIABLES:	F/K = 310	. 65	11	PREPAREI	
	kPa = 101				H. L. Clever
EXPERIMENTA		Maga Theation	Ostw	-14	"Salting Out" Parameter
ł	Т/К	Mass Fraction Cephalin	Coeffi		_
		w <sub>3</sub>	L		$k = (1/W_3) \log (L_0/L_w)$
	310.59	0.0	0.2	379	
1	310.61 310.64	0.0 0.0	0.2		
	310.66	0.0	0.2		
	310.60	0.1008	0.2	22	
1	310.63	0.1008	0.2		0.25 <u>+</u> 0.09
	310.65	0.1996	0.2	04	
]	310.68	0.1996	0.2		0.30 <u>+</u> 0.05
	310.62	0.3015	0.1	91	
	310.63	0.3015	0.1		$0.32 \pm 0.03$
	310.65	1.0	0.1	12*	
$L_0$ and $L_w$ are the oxygen Ostwald coefficie and in the benzene + cephalin solution, re					
		AU X	(ILIARY I	NFORMAI	TION
METHOD/APPA	RATUS / PROCI	EDURE :	1	SOURCE	AND PURITY OF MATERIALS:
The solu	bility ap	paratus is bas	ed on	(1) Ox	ygen. Matheson Co., Inc.
the desi	gn of Mor	rison and Bill on used is des	ett		995 per cent.
by Batti	no, Evans	and Danforth	(2).	(2) Be Re	enzene. J. T. Baker Analyzed agent Grade. 99.9 mol per cent,
The dega	ssing app d by Batt	aratus is that ino, Banzhof, I	Bogan.	tł	hiophene free.
and Wilh	elm (3).	_			phalin. Nutritional Biochemicals
Degassin	g. Up to	$500 \text{ cm}^3 \text{ of so}$	lvent		rp. Homostatic phosphatide tained from bovine brain tissue.
is place	d in a fl liquid i	ask of such signals about 4 cm d	ze eep.		sed as received.
that the liquid is about 4 cm deep. The liquid is rapidly stirred, and					
vacuum is intermittently applied through a liquid nitrogen trap until			ESTIMAT	ED ERROR: $\delta T/K = 0.01$	
the permanent gas residual pressure		sure		$\delta P/mmHg = 0.5$	
drops to 5 microns.				$\delta L_{O}/L_{O} = 0.01$	
gassed s	Solubility Determination. The de- gassed solvent is passed in a thin				$\delta L_{W}/L_{W} = 0.02$
film dow	n a glass	helical tube	con-	REFEREN	CES: crison, T. J.; Billett, F.
vapor at	a total	s plus the solution of one	e atm.	J.	Chem. Soc. 1948, 2033.
The volu	me of gas	absorbed is for the initiation of the second	ound		ctino, R.; Evans, F. D.; nforth, W. F. J. Am. Oil
final vo	lumes in	the buret syst	em.	Che	em. Soc. 1968, 45, 830.
The solv	-	llected in a t	ared		tino, R.; Banzhof, M.; gan, M.; Wilhelm, E.
flask an	d woidhoo				

COMPONENTS:	ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Byrne, J. E.; Battino, R.; Danforth, W. F.			
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]				
(3) Lecithin.	J. Chem. Thermodyn. <u>1974</u> , 6, 245-50.			
VARIABLES:	PREPARED BY:			
T/K = 310.65 Total P/kPa = 101.325	H. L. Clever			
EXPERIMENTAL VALUES:				
T/K Mass Fract				
Lecithir	$L \qquad \qquad Coefficient \qquad k = (1/W_3) \log (L_0/L_w)$			
310.59 0.0	0.2270			
310.61 0.0	0.2379 0.2349			
310.64 0.0	0.2326			
310.66 0.0	0.2318			
310.62 0.1007 310.63 0.1007				
310.63 0.1007	$-0.217$ $0.34 \pm 0.09$			
310.63 0.2025 310.64 0.2025				
510.64 0.2025	$5  0.206  0.29 \pm 0.05$			
310.59 0.2993 310.61 0.2993				
310.01 0.2993	$0.192$ $0.28 \pm 0.03$			
310.59 0.3986 310.60 0.3986				
310.60 0.3986	5 0.178 0.30 $\pm$ 0.02			
310.65 1.0	0.117*			
*Extrapolated oxyg lecithin.	gen solubility in hypothetical liquid			
$\mathtt{L}_{o}$ and $\mathtt{L}_{w}$ are the oxygen Ostwald coefficients in benzene and				
in the benzene + lecithin solution, respectively.				
	AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The solubility apparatus is	based on (1)Oxygen. Matheson Co., Inc.			
the design of Morrison and (1) and the version used is	described			
by Battino, Evans and Danfo	orth (2). Reagent Crade 99 9 mel per cent			
The degassing apparatus is described by Battino, Banzh	that this have from			
and Wilhelm (3).	(3) Lecithin. Nutritional Bio-			
Degassing. Up to 500 cm <sup>3</sup> o				
is placed in a flask of suc the liquid is about 4 cm de	in size that received			
liquid is rapidly stirred,				
is intermittently applied t liquid nitrogen trap until	the ESTIMATED ERROR: $\delta T/K = 0.01$			
permanent gas residual pres	ssure drops $\delta P/mmHg = 0.5$			
	The de- $\begin{array}{c} \delta L / L = 0.01 \\ \delta L_w^{o} / L_w^{o} = 0.02 \end{array}$			
Solubility Determination. gassed solvent is passed in	a thin			
film down a glass helical t	ube con- REFERENCES:			
taining solute gas plus the vapor at a total pressure o	of one atm. J. Chem. Soc. <u>1948</u> , 2033.			
The volume of gas absorbed	is found 2. Battino, R.; Evans, F. D.;			
by difference between the i final volumes in the buret				
The solvent is collected in	a tared 3. Battino, R.; Banzhof, M.;			
flask and weighed.	Bogan, M.; Wilhelm, E. Anal. Chem. 1971. 43, 806.			

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Byrne, J. E.; Battino, R.;
(2) Benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]	Danforth, W. F.
<pre>(2) Cholest-5-en-3β-ol or Cholesterol; (3) Cholest-5-en-3β-ol or Cholesterol; C<sub>27</sub><sup>H</sup>46<sup>O</sup>; [57-88-5]</pre>	J. Chem. Thermodyn. <u>1974</u> , 6,245-50.
VARIABLES:	PREPARED BY:
T/K = 310.65 Total P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
	twald "Salting Out" Parameter ficient $k = (1/W_3) \log (L_0/L_w)$
	. 2379
	.2349 .2326
	.2318
	.225 .225 0.33 <u>+</u> 0.17
	.220 .218 0.28 <u>+</u> 0.09
	.207 .208 0.27 <u>+</u> 0.05
310.65 1.0 0	.126
S #	twald coefficients in benzene terol solution, respectively.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The solubility apparatus is based on the design of Morrison and Billett (1) and the version used is described by Battino, Evans and Danforth (2). The degassing apparatus is that described by Battino, Banzhof, Bogan,	<ul> <li>(1)Oxygen. Matheson Co., Inc. 99.995 per cent.</li> <li>(2)Benzene. J. T. Baker Analyzed Reagent Grade. 99.9 mol per cent, thiophene free.</li> </ul>
and Wilhelm (3). Degassing. Up to 500 cm <sup>3</sup> of solvent is placed in a flask of such size that the liquid is about 4 cm deep. The liquid is rapidly stirred, and vacuum is intermittently applied	(3)Cholesterol. Source not given. Recrystalized from benzene.
through a liquid nitrogen trap until the permanent gas residual pressure drops to 5 microns. Solubility Determination. The de-	ESTIMATED ERROR: $\delta T/K = 0.01$ $\delta P/mmHg = 0.5$ $\delta L_0/L_0 = 0.01$
gassed solvent is passed in a thin film down a glass helical tube con- taining solute gas plus the solvent vapor at a total pressure of one atm. The volume of gas absorbed is found by difference between the initial and final volumes in the buret system. The solvent is col- lected in a tared flask and weighed.	$\delta L_w/L_w = 0.02$ REFERENCES: 1. Morrison, T. J.; Billett, F. J. Chem. Soc. <u>1948</u> , 2033. 2. Battino, R.; Evans, F. D.; Danforth, W. F. J. Am. Oil Chem. Soc. <u>1968</u> , 45, 830. 3. Battino, R.; Banzhof, M.; Bogan, M.; Wilhelm, E. Anal. Chem. <u>1971</u> , 43, 806.

## The solubility of oxygen at 310.15 K (37 °C) in some complex aqueous mixtures. EXPERIMENTAL COMPONENTS 2 Ξ G Solute, $\sim$ Various below q per 100 cm<sup>3</sup> Oxygen; 1. 2. 7. з. 4. 5. 6. 8. 9. 10. Water; Component D-Glucose; C H O ; 10 10 10 7.5 5 10 -10 H<sub>2</sub>0; 6 12 6 VALUES substances 0 [50-99-7] N Sodium chloride; NaCl; 2.9 2.9 1.34 2.5 0.18 2:41 1.16 7.5 \_ 5 \_ [7732-18-5 7782-44-7 [7647-14-5] Ovalbumin 10 10 4 \_ given 4-Hydroxyproline; 10 4 C<sub>5</sub>H<sub>9</sub>NO<sub>3</sub>; [6912-67-0] ----Ë Albumin, bovine 2 -table Choline chloride; 8 4 15 15 $C_{615}N_{2}O_{2}$ .Cl [51-83-2] Lysine; C H N O; [6899-06-5]<sup>14</sup><sup>2</sup><sup>2</sup> 10 10 10 ----\_ N N ORIGINAL Zander, • Naturforsc 31C, 339-5 a-Globin, bovine 1 2 1 \_ \_ я. MEASUREMNTS $\gamma$ -Globin, bovine 2 -\_ \_ \_ 52. Chondroitinsulfuric 4 4 acid с: Urea; CH N O; 15 Biosci. 6 20 20 [57-13-6] 2 1976 Bunsen coefficient 174±3 138±4 143±4 182±3 188±3 188±3 195±10 180±3 37±6 9±4 $10^{4} \alpha/cm^{3} cm^{-3} atm^{-1}$

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**Biological Fluids** 

COMPONENTS: (1) Oxygen; O <sub>2</sub> ;		OPTOTNAL MEASURE	·
2	[7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.	
(2) Urea; CH <sub>4</sub> N <sub>2</sub>	0; [57-13-6]	Z. Naturforsch., C: Ba 31C, 339-52.	<i>losci.</i> <u>1976</u> ,
(3) Water; H <sub>2</sub> O;	[7732-18-5]	510, 555-52.	
VARIABLES:		PREPARED BY:	
T/K = 3 $P/kPa = 1$		H. L. Cleve	er
EXPERIMENTAL VALUE	S:		
т/к	Urea	Bunsen Constan	21
	g 100 cm <sup>-3</sup>	Coefficient	
	10*	$/cm^3 cm^{-3} atm^{-1} = k = (1/c) ln$	(α/α <sub>0</sub> )
310.15	0	241	
}	10 20	222 + 3 206 + 5	
	30	183 + 3	
	40	173 + 2	
	50	$154 \pm 1$	
	60	$146 \pm 4$ -0.008	52²
<sup>1</sup> k/g <sup>-1</sup> 10	)0 cm <sup>3</sup>		
<sup>2</sup> The real	atont und dator	ned from solubility data be	ween
0 and 3	$30 \text{ g} 100 \text{ cm}^{-3}$ .		
	,, , ,		
METHOD/APPARATUS/P	AU	LIARY INFORMATION	
			IAIS:
Classical Van S		SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co	Purity 99.9
	ROCEDURE: Slyke method (1).	SOURCE AND PURITY OF MATER	Purity 99.9
The apparatus s constant gas vo	ROCEDURE: Slyke method (1). sample volume and plume are careful	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum	. Purity 99.9 2.
The apparatus s constant gas vo calibrated. Th	ROCEDURE: Slyke method (1). sample volume and plume are careful he correction for	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. Th unextracted gas	ROCEDURE: Slyke method (1). sample volume and plume are careful he correction for s is made, but th	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. Th unextracted gas	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th prrection 1s not	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. Th unextracted gas reabsorption co necessary for o	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen.	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled	. Purity 99.9 2. tion.
The apparatus a constant gas vo calibrated. Th unextracted gas reabsorption co necessary for o Equilibration a	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. Th unextracted gas reabsorption co necessary for o Equilibration : thermostated to	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. Th unextracted gas reabsorption co necessary for o Equilibration : thermostated to sample 1s direct	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration for thermostated to sample is direct Van Slyke appar	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volumy (2) Urea. No informa (3) Water. Distilled o the ESTIMATED ERROR:	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration : thermostated to sample is direct Van Slyke appart	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat the authors analy	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$	. Purity 99.9 2. tion.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat the authors analy	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.;	<pre>. Purity 99.9 e. tion Neill, J. M.</pre>
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat the authors analy	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volume (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.; J. Biol. Chem. 19 2. Zander, R.; Euler	. Purity 99.9 e. tion. Neill, J. M. 24, 61, 523. , R.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat the authors analy	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.; J. Biol. Chem. 19 2. Zander, R.; Euler Measurement of Ox:	. Purity 99.9 2. tion. Neill, J. M. 24, 61, 523. , R. Agen, Edited by
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat the authors analy	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.; J. Biol. Chem. 19 2. Zander, R.; Euler Measurement of Ox Degn, H.; Balslev	Neill, J. M. 24, 61, 523. , R. /gen, Edited by , I.; Brook, R.
The apparatus s constant gas vo calibrated. The unextracted gas reabsorption connecessary for of Equilibration of thermostated to sample is direct Van Slyke appart The solubility value is from the	ROCEDURE: Slyke method (1). sample volume and olume are careful he correction for s is made, but th orrection 1s not oxygen. is undertaken in onometer. A 2 cm ctly transferred ratus for analysi of oxygen in wat the authors analy	SOURCE AND PURITY OF MATER (1) Oxygen. Linde Co per cent by volum (2) Urea. No informa (3) Water. Distilled b the ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.; J. Biol. Chem. 19 2. Zander, R.; Euler Measurement of Ox:	Neill, J. M. 24, 61, 523. , R. /gen, Edited by , I.; Brook, R.

COMPONENTS .	OPICINAL WEACHDENENTS.
COMPONENTS: (1) Oxygen; $O_2$ ; [7782-44-7] (2) Urea; $CH_4N_2O$ ; [57-13-6] (3) Water; $H_2O$ ; [7732-18-5]	ORIGINAL MEASUREMENTS: Popovic, M.; Niebelschutz, H.; Reuss, M. European. J. Appl. Microbiol. Biotechnol. <u>1979</u> , 8, 1-15.
VARIABLES: Concentration T/K = 298	PREPARED BY: C.L. Young
EXPERIMENTAL VALUES:	L
T/K Concentration /g dm <sup>-3</sup>	Oxygen solubility $S \times 10^3$ /mol dm <sup>-3</sup>
298.15 6.75 13.50	1.239 1.217
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium cell. Volumetric apparatus in which known volume of gas was added to a known volume of liquid and the equilibrium pressure measured. Details in source and ref. (1).	
	ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler). REFERENCES: 1. Krauss, W.; Gestrich, W. <i>Chem. Ing. Techn.</i> <u>1977</u> , 6, 35.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Zander, R.
(2) Amino acids	Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
(3) Water; H <sub>2</sub> O; [7732-18-5]	5167 555 52.
VARIABLES:	PREPARED BY:
T/K = 310.15 P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
	nsen Constant <sup>1</sup> ficient
$\frac{10^{4}  \alpha/cm^{3}}{cm^{3}}$	$cm^{-3} atm^{-1} k=(1/c) ln (\alpha/\alpha_0)$
Glycine; C <sub>2</sub> H <sub>5</sub> NO <sub>2</sub> ; [56-40-	-6]
310.15 0 24	L 7 + 2
	9 + 1
	-0.02868
4-Hydroxyproline; C <sub>5</sub> H <sub>9</sub> NO	3; [6912-67-0]
310.15 0 24 10 20	
20 16	2 + 1 3 + 1
	-0.01799
L-Alanine; C <sub>3</sub> H <sub>7</sub> NO <sub>2</sub> ; [56-4	
310.15 0 24 10 19	0 + 2
20 14	9 <del>+</del> 4 7 <del>+</del> 1
30 11	-0.02390
Cysteine; C <sub>3</sub> H <sub>7</sub> NO <sub>2</sub> S; [437]	L-52-2], see [52-90-4]
310.15 0 24	
	3 + 3 7 + 4
20 9	-0.05255
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Classical Van Slyke method (1).	(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.
The apparatus sample volume and constant gas volume are carefully calibrated. The correction for un-	(2) Amino acids. No information.
extracted gas is made, but the	(3) Water. Distilled.
reabsorption correction is not necessary for oxygen.	
Equilibration is undertaken in a	
thermostated tonometer. A 2 cm <sup>3</sup>	
sample is directly transferred to the Van Slyke apparatus for analysis.	
_	ESTIMATED ERROR: $\delta T/K = 0.1$
The solubility of oxygen in water value is from the authors analysis of	$\delta \alpha / \alpha = 0.01$
ten literature values (2).	
	REFERENCES:
	1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u> , 61, 523.
$^{1}$ k/g <sup>-1</sup> 100 cm <sup>3</sup>	2. Zander, R.; Euler, R. Measurement of Oxygen, Edited by
	Degn, H.; Balslev, I.; Brook, R.
	Elsevier, Amsterdam, 1976, p.271.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ;	[7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.
(2) Lysine; C <sub>6</sub> H	4 2 2; [6899-06-5]	Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
	5-87-1] and [70-54-2]	JTC, JJJ-JZ.
(3) Water; H <sub>2</sub> O;	[7732-18-5]	
VARIABLES:		PREPARED BY:
T/K = 31 P/kPa = 10		H. L. Clever
EXPERIMENTAL VALUES:		
т/к	4	nsen Constant <sup>1</sup> ficient
	$\frac{10^4 \alpha/cm^3}{10^4 \alpha/cm^3}$	$cm^{-3} atm^{-1} k=(1/c) ln (\alpha/\alpha_0)$
310.15	0 24 10 17	7 + 5
	20 13	3 + 4
	30 9 40 5	3 + 4 2 + 2 1 + 4 4 + 1
	50 2	$4 \pm 1$ -0.03097 <sup>2</sup>
$\frac{1}{1 k/g^{-1}10}$		
	AUXILIARY	INFORMATION
METHOD/APPARATUS/PRO	CEDURE :	SOURCE AND PURITY OF MATERIALS:
Classical Van Sl	yke method (1).	(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.
The apparatus sa constant gas vol	ume are carefully	(2) Lysine. No information.
calibrated. The unextracted gas reabsorption cor sary for oxygen.	is made, but the rection is not neces-	(3) Water. Distilled.
thermostated ton sample is direct	undertaken in a cometer. A 2 cm <sup>3</sup> ly transferred to the	
van Siyke appara	tus for analysis.	ESTIMATED ERROR:
	f oxygen in water e authors analysis e values (2).	$\begin{array}{rcl} \delta T/K &= & 0.1 \\ \delta \alpha / \alpha &= & 0.01 \end{array}$
		REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u> , 61, 523.
		<ol> <li>Zander, R.; Euler, R. Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R. Elsevier, Amsterdam, 1976, p.271.</li> </ol>
1		

COMPONENTS: (1) Oxygen; O <sub>2</sub> ;	[7782-44-7]		ORIGINAL MEASUR Zander, R.	REMENTS:	
(2) N-(Aminoimi	nomethyl)-N-met creatine; C <sub>4</sub> H <sub>9</sub> N		Z. Naturfors 31C, 339		Biosci. <u>1976</u> ,
(3) Water; H <sub>2</sub> C	; [7732-18-5]				
VARIABLES: T/K = 3 P/kPa = 1	10.15 01.325 (1 atm)		PREPARED BY: H.	L. Cleve	er
EXPERIMENTAL VALUES	:				
т/к	Creatine C <sub>3</sub> /g 100 cm <sup>-3</sup>	Co	Bunsen efficient m <sup>3</sup> cm <sup>-3</sup> atm <sup>-1</sup>		stant <sup>1</sup> ln ( $\alpha/\alpha_0$ )
310.15	0 5 10		$ \begin{array}{r} 241\\ 226 + 1\\ 209 + 3 \end{array} $	-0.	.01392
<sup>1</sup> k/g <sup>-1</sup> 10	0 cm <sup>3</sup>				
	IA	JXILIARY	INFORMATION		
	AARDUDR				
The apparatus s constant gas vo calibrated. Th	lyke method (1) ample volume and lume are careful e correction for is made, but th rrection is not	d lly r	SOURCE AND PUR (1) Oxygen. per cent (2) Creatine (3) Water.	Linde Co by volum . No int	o. Purity 99.9 ne. formation.
thermostated to sample is direc the Van Slyke a The solubility	s undertaken in nometer. A 2 cr tly transferred pparatus for and of oxygen in wat he authors analy re values (2).	n <sup>3</sup> to alysis. ter	δΤ	R: /K = 0.1 $/\alpha = 0.03$	1
			J. Biol. 2. Zander, Measurem Degn, H.	Chem. 19 R.; Euler ent of Ox ; Balsley	; Neill, J. M. 924, 61, 523. r, R. <i>xygen</i> , Edited by v, I.; Brook, R. dam, 1976, p.271.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.
(2) Cholines	Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
(3) Water; H <sub>2</sub> O; [7732-18-5]	5,6, 555 5-1
2	
VARIABLES: T/K = 310.15	PREPARED BY:
P/kPa = 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Choline Bun	
g $100 \text{ cm}^{-3}$ Coeff $10^{+}\alpha/\text{cm}^{3}$ c	icient $m^{-3}$ atm <sup>-1</sup> k=(1/c) ln ( $\alpha/\alpha_0$ )
2-Hydroxy-N,N,N-trimethy choline chloride; C <sub>5</sub> H <sub>14</sub> N	l ethanaminium chloride or DCl; [67-48-1]
310.15 0 241	
	$\frac{+}{+}$ 2
30 171	$\mp$ 2
50 125 70 100	$\frac{1}{1}$ 2 $\frac{1}{1}$ 2
	-0.01261 <sup>2</sup>
2-Acetoxy-N,N,N-trimethy acetylcholine chloride;	l ethanaminium chloride or C <sub>7</sub> H <sub>16</sub> NO <sub>2</sub> Cl; [60-31-1] <sup>3</sup>
310.15 0 241	, 10 2
10 211 20 182	$\frac{+}{+}$ $\frac{3}{6}$
30 159	<u>+</u> 7
	-0.01389
$^{1}$ k/g <sup>-1</sup> 100 cm <sup>3</sup>	
<sup>2</sup> The value of k is based on so.	lubility data between 0 and
$30 \text{ g} 100 \text{ cm}^{-3}$ . <sup>3</sup> The author used the name acet	
assumed it was the chloride.	Icusting, inc compare
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Classical Van Slyke method (1).	(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.
The apparatus sample volume and constant gas volume are carefully	(2) Cholines. No information.
calibrated. The correction for	
unextracted gas is made, but the reabsorption correction is not	(3) Water. Distilled.
necessary for oxygen.	
Equilibration is undertaken in a	
thermostated tonometer. A 2 cm <sup>3</sup>	
sample is directly transferred to the Van Slyke apparatus for analysis.	
•••••	ESTIMATED ERROR: $\delta T/K = 0.1$
The solubility of oxygen in water value is from the authors analysis of	$\delta \alpha / \alpha = 0.01$
ten literature values (2).	
	REFERENCES:
	<ol> <li>Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u>, 61, 523.</li> </ol>
	2. Zander, R.; Euler, R.
	Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R.
	Elsevier, Amsterdam, 1976, p.271.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782,44-7]	ORIGINAL MEASUREMENTS: Zander, R.
(2) ADP and ATP	Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 310.15 P/kPa = 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	nsen Constant <sup>1</sup>
	ficient Constant
g 100 cm 10 <sup>+</sup> α/cm <sup>3</sup>	$cm^{-3} atm^{-1} k=(1/c) ln (\alpha/\alpha_0)$
Adenosine 5'-(trihydroge C <sub>10</sub> H <sub>15</sub> N <sub>5</sub> O <sub>10</sub> P <sub>2</sub> ; [58-64-0]	n diphosphate) or ADP;
310.15 0 24	1 5 + 7
10 20	2 + 5
20 19	0 + 2 -0.01463
Adenosine 5'-(tetrahydro C <sub>10</sub> H <sub>16</sub> N <sub>5</sub> O <sub>13</sub> P <sub>3</sub> ; [56-65-5]	gen triphosphate) or ATP;
310.15 0 24 5 22	1 0 + 4
	$ \begin{array}{c} 0 + 4 \\ 7 + 6 \\ 4 + 6 \end{array} $
20 17	-0.01634
$\frac{1}{k/g^{-1}100}$ cm <sup>3</sup>	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: Classical Van Slyke method (1).	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Linde Co. Purity 99.9 per cent by volume.
The apparatus sample volume and con- stant gas volume are carefully	(2) ADP and ATP. No information.
calibrated. The correction for unextracted gas is made, but the	(3) Water. Distilled.
reabsorption correction is not necessary for oxygen.	
Equilibration is undertaken in a thermostated tonometer. A 2 $cm^3$	
sample is directly transferred	
to the Van Slyke apparatus for analysis.	ESTIMATED ERROR:
The solubility of oxygen in water	$\begin{array}{rcl} \delta \mathbf{T}/\mathbf{K} &= & 0.1 \\ \delta \alpha / \alpha &= & 0.01 \end{array}$
value is from the authors analysis of ten literature values (2).	
	REFERENCES:
	<ol> <li>Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u>, 61, 523.</li> </ol>
	2. Zander, R.; Euler, R. Measurement of Oxygen, Edited by
	Degn, H.; Balslev, I.; Brook, R. Elsevier, Amsterdam, 1976, p.271.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.
(2) Carbohydrates	Z. Naturforsch., C: Biosci. 1976,
	31C, 339-52.
(3) Water; H <sub>2</sub> O; [7732-18-5]	
VARIABLES:	PREPARED BY:
T/K = 310.15 P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Carbohydrates	Bunsen Constant <sup>1</sup> Coefficient
g 100 cm <sup>-3</sup> 10 <sup>4</sup>	$\alpha/cm^3cm^{-3}$ atm <sup>-1</sup> k=(1/c) ln ( $\alpha/\alpha_0$ )
Glycogen	
310.15 0	241
2 10	233 <u>+</u> 3 209 <del>+</del> 5
20	$188 \pm 2$
25	$157 \pm 9$ -0.01517
Glycosamine	
310.15 0	241
10	191 + 1
20 30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	-0.02586
Chondroitin sulfuric	acid
310.15 0	241 184 + 5
10 20	144 + 5 146 + 5
	-0.02558
$1 k/g^{-1}100 cm^{3}$	
AUXILI	ARY INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Classical Van Slyke method (1).	(1) Oxygen. Linde Co. Purity 99.9 per cent by volume.
The apparatus sample volume and constant gas volume are carefully	(2) Carbohydrates. No information.
calibrated. The correction for un-	-
extracted gas is made, but the	(3) Water. Distilled.
reabsorption correction is not necessary for oxygen.	
Equilibration is undertaken in a	
thermostated tonometer. A 2 cm <sup>3</sup>	
sample is directly transferred to the Van Slyke apparatus for analysi	s.
	ESTIMATED ERROR:
The solubility of oxygen in water value is from the authors analysis of ten literature values (2).	$\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$
	REFERENCES :
	<pre>1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u>, 61, 523.</pre>
	2. Zander, R.; Euler, R.
	Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R.
	Elsevier, Amsterdam, 1976, p.271.
L	

400				
COMPONENTS:			ORIGINAL MEASU	REMENTS:
<pre>(1) Oxygen; 0<sub>2</sub>;</pre>	[7782-44-7]		Zander, R.	
(2) Carbohydrat	es		Z. Naturfors	ch., C: Biosci. <u>1976</u> ,
			310, 339-5	
(3) Water; H <sub>2</sub> O:	[//32-18-5]			
VARIABLES:			PREPARED BY:	
T/K = 3 $P/kPa = 1$			н.	L. Clever
P/KPa = 1	01.325			
EXPERIMENTAL VALUES			I	
т/к	Carbohydrates		Bunsen	Constant <sup>1</sup>
	$g 100 \text{ cm}^{-3}$		efficient	
	J	10 <sup>4</sup> a/c	m <sup>3</sup> cm <sup>-3</sup> atm <sup>-1</sup>	$k=(1/c)$ ln $(\alpha/\alpha_0)$
 De	xtrin			
310.15	0	n	44	
310.12	10	2	19 + 5	
	20	1	89 <u>+</u> 4	-0.01155
In	uline			
310.15	0	_	44	
	2 10	2	33 + 1 12 + 5	
	20	1	89 <u>+</u> 4	-0.01262
				-0.01202
St	arch			
310.15	0		44	×
	2 10		29 <u>+</u> 2 06 <u>+</u> 4	
	20	ī	$83 \pm 3$	
				-0.01462
<sup>1</sup> k/g <sup>-1</sup> 10	$0 \text{ cm}^3$			
	A		INFORMATION	
METHOD/APPARATUS/PF Classical Van S		•	(1) Oxygen.	ITY OF MATERIALS: Linde Co. Purity 99.9 : by volume.
The apparatus s				
constant gas vo calibrated. Th	e correction fo	or	Carbohyd	rates. No information
unextracted gas	is made, but t	he	(3) Water. D	vistilled.
reabsorption co necessary for o		-		
Equilibration i		a	1	
thermostated to	nometer. A 2 c	m <sup>3</sup>		
sample is direc the Van Slyke a	tly transferred	l to alvsis	ļ	
			ESTIMATED ERRO	R:
The solubility value is from t of ten literatu	he authors anal		4 · · · · · · · · · · · · · · · · · · ·	$\frac{T}{K} = 0.1$
			REFERENCES :	· · · · · · · · · · · · · · · · · · ·
			1. Van Slyk	e, D. D.; Neill, J. M. Chem. <u>1924</u> , 61, 523.
			2. Zander,	R.; Euler, R.
,			Degn, H.	nent of Oxygen, Edited by ; Balslev, I.; Brook, R.
			Elsevier	, Amsterdam, 1976, p.271.

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COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Zander, R.
<ul> <li>(2) α-D-Glucopyranose, 1-(dihydrogen phosphate) or α-Glucose-1- phosphate; C<sub>6</sub>H<sub>13</sub>O<sub>9</sub>P; [59-56-3]</li> <li>(3) Water; H<sub>2</sub>O; [7732-18-5]</li> </ul>	n Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
VARIABLES: T/K = 310.15 P/kPa = 101.325	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
T/K α-Glucose-l-	Bunsen Constant <sup>1</sup>
phosphate (	Coefficient /cm <sup>3</sup> cm <sup>-3</sup> atm <sup>-1</sup> k=(1/c) ln ( $\alpha/\alpha_0$ )
$\frac{C_3}{g} 100 \text{ em}^{-1}$	
310.15 0 5 10 20	241 212 + 1 183 + 1 139 + 2 -0.02733
AUXILIAI	RY INFORMATION
METHOD/APPARATUS/PROCEDURE: Classical Van Slyke method (1). The apparatus sample volume and	SOURCE AND FURITY OF MATERIALS: (1) Oxygen. Linde Co. Purity 99.9 per cent by volume.
constant gas volume are carefully calibrated. The correction for unextracted gas is made, but the	(2) α-Glucose-1-phosphate. No information.
reabsorption correction is not necessary for oxygen.	(3) Water. Distilled.
Equilibration is undertaken in a thermostated tonometer. A 2 cm <sup>3</sup> sample is directly transferred to	
the Van Slyke apparatus for analysi	S. ESTIMATED ERROR:
The solubility of oxygen in water value is from the authors analysis of ten literature values (2).	$\delta T/K = 0.1$ $\delta \alpha / \alpha = 0.01$
	<pre>REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u>, 61, 523.</pre>
	<ol> <li>Zander, R.; Euler, R. Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R. Elsevier, Amsterdam, 1976, p.271</li> </ol>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Shkol'nikova, R. I.
(2) Gelatin	
	Uch. Zav. Leningr. Gos. Univ., Ser. Khim. Nauk. <u>1959</u> , Nr. 18, 64-86.
(3) Water; H <sub>2</sub> O; [7732-18-5]	Chem. Abstr. 1961, 55, 25443b.
VARIABLES:	PREPARED BY:
T/K = 283.15 - 313.15 P/kPa = 101.325	A. L. Cramer
Gelatin/Wt % = 1 - 10	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Gelatin/Wt % l	Gelatin/Wt % 5
Bunsen Ostwald Coefficient Coefficie	
283.15 34.9 36.2	29.4 30.5
288.15 32.3 34.7 293.15 30.0 32.2	28.0 29.2 26.9 28.9
298.15 26.6 29.0	22.4 24.4
303.15 21.0 23.3 308.15 19.3 21.8	18.1 20.2 17.9 20.0
313.15 17.1 19.6	14.5 16.6
	atin/Wt % 10
Bunse Coeffic	
283.15 26.2	27.2
288.15 24.1 293.15 22.6	
298.15 19.3	
303.15 16.0	
308.15 14.7 313.15 12.9	*
cal mol <sup>-1</sup> in water, and 1, 5, and 10	wt % gelatin respectively.
AIIXTLIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS; (1) Oxygen. Source not given.
The apparatus and procedure of Lannung were modified (1).	Stated to be 99.98 - 99.99 per cent.
	(2) Gelatin. No information.
	(3) Water. No information.
	POTIMATED EDDOD.
	ESTIMATED ERROR:
	REFERENCES :
	1. Lannung, A.
	J. Am. Chem. Soc. <u>1930</u> , 52, 68.

<pre>COMPONENTS: (1) Oxygen;</pre>		ORIGINAL MEASUREMENTS:
	0 <sub>2</sub> ; [7782-44-7]	Zander, R.
(2) 1,2,3-P C <sub>3</sub> H <sub>8</sub> O <sub>3</sub> ;	ropanetriol or glyce: [56-81-5]	rine; Z. Naturforsch., C: Biosci. <u>1976</u> , 31C, 339-52.
(3) Water;	H <sub>2</sub> 0; [7732-18-5]	
VARIABLES :		PREPARED BY:
T/K	= 310.15 = 101.325	H. L. Clever
EXPERIMENTAL V	ALUES:	L
т/к	1,2,3-Propanetriol g 100 cm <sup>-3</sup>	Bunsen Constant <sup>1</sup> Coefficient $10^{4}\alpha/cm^{3}cm^{-3} atm^{-1} k=(1/c) ln (\alpha/\alpha_{0})$
310.15	0 10 20 30 126	241 219 + 4 197 + 1 184 + 3 42 + 52 -0.00938
<sup>2</sup> Pure gl	ycerine	
		KILIARY INFORMATION
The apparate constant gas calibrated. extracted ga	US/PROCEDURE: an Slyke method (1). us sample volume and s volume are carefull The correction for as is made, but the n correction is not	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Linde Co. Purity 99.9 per cent by volume. (2) 1,2,3-Propanetriol. No
Classical Va The apparate constant gas calibrated. extracted gas reabsorption necessary for Equilibration thermostate sample is do the Van Sly The solubility value is from	US/PROCEDURE: an Slyke method (1). us sample volume and s volume are carefull The correction for as is made, but the n correction is not	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Linde Co. Purity 99.9 per cent by volume. (2) 1,2,3-Propanetriol. No information. (3) Water. Distilled. (3) Water. Distilled. ESTIMATED ERROR: er $\delta T/K = 0.1$

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COMPONENTS:		ORIGINAL MEASUREMENTS:
<ol> <li>Oxygen; O<sub>2</sub>; [778</li> <li>1,2,3-Propanetricar</li> </ol>		Popovic, M.; Niebelschutz, H.; Reuss, M.
2-hydroxy-, (Citri		European. J. Appl. Microbiol.
C <sub>6</sub> H <sub>8</sub> O <sub>7</sub> ; $[77-92-9]$ (3) Water; H <sub>2</sub> O; $[7732-$	.19_51	Biotechnol. <u>1979</u> , 8, 1-15.
J) Water, 160, [7732-	-10-5]	
VARIABLES:	<del> </del>	DEPARED BV.
Concentration		PREPARED BY: C.L. Young
T/K = 298	L	
·		l
EXPERIMENTAL VALUES:		
т/к	Concentration	Oxygen solubility,
	$/g dm^{-3}$	Oxygen solubility, S x 10 <sup>3</sup> /mol dm <sup>-3</sup>
298.15	25 40	1.242 1.196
	40 50	1.198
	75.6	1.148
	100 150	1.137 1.083
	200	0.983
	AUXILIARY	INFORMATION
METHOD 'APPARATUS/PROCEDUI		INFORMATION SOURCE AND PURITY OF MATERIALS:
METHOD APPARATUS/PROCEDU	RE :	SOURCE AND PURITY OF MATERIALS;
METHOD APPARATUS/PROCEDU Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i (1).	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS; No details given.
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS; No details given.
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS: No details given.
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS; No details given.
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS: No details given.
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR:
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: δT/K = ±0.1; δS = ±2%
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler).
Stirred equilibrium apparatus in which k gas was added to a k liquid and the equil measured. Details i	RE: cell. Volumetric mown volume of mown volume of ibrium pressure	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler). REFERENCES: 1. Krauss, W.; Gestrich, W.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782 (2) Gluconic acid; C <sub>6</sub> [133-42-6] (3) Water; H <sub>2</sub> O; [7732	;H <sub>12</sub> C <sub>7</sub> ;	ORIGINAL MEASUREMENTS: Popovic, M.; Niebelschutz, H.; Reuss, M. <i>European. J. Appl. Microbiol.</i> <i>Biotechnol.</i> <u>1979</u> , 8, 1-15.
VARIABLES: $T/K = 298$		PREPARED BY:
Concentration	1	C.L. Young
EXPERIMENTAL VALUES:	<u></u> _,,,,,,,,,_	
T/K	Concentration /g dm³	Oxygen solubility, S x 10 <sup>3</sup> /mol dm <sup>-3</sup>
298.15	10 15 20 25 35 50 100 150 200 300 400 500	1.251 1.223 1.213 1.210 1.218 1.192 1.121 1.013 0.991 0.956 0.889 0.802
	AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDUR	E:	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium of apparatus in which kn gas was added to a kn liquid and the equili measured. Details in ref. (1).	nown volume of nown volume of brium pressure	No details given
		ESTIMATED ERROR:
		$\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$
		(estimated by compiler)
		REFERENCES:
		l. Krauss, W.; Gestrich, W. <i>Chem. Ing. Techn.</i> <u>1977</u> , 6, 35.

12	Oxygen Solubiliti		
COMPONENTS:		ORIGINAL MEASUREMENTS:	
(1) Oxygen;	0 <sub>2</sub> ; [7792-44-7]	Müller, C.	
(2) d-Glucos	se; C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ; [50-99-7]	Z. Physik. Chem.	<u>1912, 81, 483-503.</u>
(3) Water; H	H <sub>2</sub> 0; [7732-19-5]		
VARIABLES:		PREPARED BY:	
T/K = 293 - P/kPa = 101.325		R. Battino	
EXPERIMENTAL VALUE		R. Succino	
T/K <sup>a</sup>	Weight Percentage d-Glucose	Ostwald Coeff. <sup>b</sup> $10^{2}L$	Bunsen Coeff. <sup>C</sup> $10^{2}\alpha$
294.35	10.84	2.856	2.650
294.65	20.7	2.375	2.202
293.05	33.8	1.946	1.814
293.65	51.9	1.491	1.378
294.85	58.84	1.318	1.221
-	e reported to 0.1°C. efficient calculated by fficient.	compiler.	
<sup>b</sup> Ostwald coe	efficient calculated by	compiler.	
<sup>b</sup> Ostwald coe	efficient calculated by	compiler.	
<sup>b</sup> Ostwald coe <sup>c</sup> Bunsen coef	efficient calculated by fficient. AUXILIARY		MATERIALS;
b Ostwald coe c Bunsen coef ETHOD/APPARATUS/P Water is dega vacuum. The about 600 cm <sup>3</sup>	AUXILIARY PROCEDURE: absorption vessel is and is separately	INFORMATION SOURCE AND PURITY OF N (1) From the hea	MATERIALS: ting of KMnO4 and ncentrated KOH
b Ostwald coe C Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm <sup>3</sup> thermostatted measuring sys	AUXILIARY AUXILIARY PROCEDURE: absorption vessel is and is separately a from the buret gas stem. Both are	INFORMATION SOURCE AND PURITY OF N (1) From the hear washed in con	ting of $KMnO_4$ and ncentrated $KOH$
b Ostwald coe C Bunsen coef Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original page	AUXILIARY AUXILIARY PROCEDURE: assed by pumping under absorption vessel is and is separately from the buret gas stem. Both are a copper capillary otake is measured on The absorption flask 11 liquid volumes were th mercury. The er contains details and	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in con solution.	ting of $KMnO_4$ and ncentrated $KOH$ from Merck.
b Ostwald coe C Bunsen coef Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm <sup>3</sup> thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original pape a drawing of Solubilities	AUXILIARY AUXILIARY PROCEDURE: assed by pumping under absorption vessel is and is separately d from the buret gas stem. Both are a copper capillary btake is measured on The absorption flask 11 liquid volumes were the mercury. The er contains details and the apparatus. were also <b>reported</b> in	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in con- solution. (2) d-Glucose - 1	ting of $KMnO_4$ and ncentrated $KOH$ from Merck.
b Ostwald coe C Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original pape a drawing of Solubilities aqueous solut	AUXILIARY AUXILIARY PROCEDURE: assed by pumping under absorption vessel is and is separately d from the buret gas stem. Both are a copper capillary btake is measured on The absorption flask 1 liquid volumes were ith mercury. The er contains details and the apparatus.	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in consolution. (2) d-Glucose - : (3) No comment by ESTIMATED ERROR:	ting of KMnO4 and ncentrated KOH from Merck. y author.
b Ostwald coe C Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm <sup>3</sup> thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original pape a drawing of Solubilities aqueous solut	AUXILIARY AUXILIARY ROCEDURE: assed by pumping under absorption vessel is and is separately d from the buret gas stem. Both are a copper capillary btake is measured on The absorption flask ll liquid volumes were ith mercury. The er contains details and the apparatus. were also <b>reported</b> in tions of sucrose,	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in consolution. (2) d-Glucose - : (3) No comment by ESTIMATED ERROR:	ting of $KMnO_4$ and ncentrated $KOH$ from Merck.
b Ostwald coe C Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm <sup>3</sup> thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original pape a drawing of Solubilities aqueous solut	AUXILIARY AUXILIARY ROCEDURE: assed by pumping under absorption vessel is and is separately d from the buret gas stem. Both are a copper capillary btake is measured on The absorption flask ll liquid volumes were ith mercury. The er contains details and the apparatus. were also <b>reported</b> in tions of sucrose,	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in col- solution. (2) d-Glucose - : (3) No comment by ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.91$ , est	ting of KMnO4 and ncentrated KOH from Merck. y author.
b Ostwald coe C Bunsen coef Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original pape a drawing of Solubilities aqueous solut	AUXILIARY AUXILIARY ROCEDURE: assed by pumping under absorption vessel is and is separately d from the buret gas stem. Both are a copper capillary btake is measured on The absorption flask ll liquid volumes were ith mercury. The er contains details and the apparatus. were also <b>reported</b> in tions of sucrose,	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in col- solution. (2) d-Glucose - : (3) No comment by ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.91$ , est	ting of KMnO4 and ncentrated KOH from Merck. y author.
b Ostwald coe C Bunsen coef Bunsen coef METHOD/APPARATUS/P Water is dega vacuum. The about 600 cm thermostatted measuring sys connected by tube. Gas up gas burets. volume and al calibrated wi original pape a drawing of Solubilities aqueous solut	AUXILIARY AUXILIARY ROCEDURE: assed by pumping under absorption vessel is and is separately d from the buret gas stem. Both are a copper capillary btake is measured on The absorption flask ll liquid volumes were ith mercury. The er contains details and the apparatus. were also <b>reported</b> in tions of sucrose,	INFORMATION SOURCE AND PURITY OF M (1) From the hear washed in col- solution. (2) d-Glucose - : (3) No comment by ESTIMATED ERROR: $\delta \alpha / \alpha = \pm 0.91$ , est	ting of KMnO4 and ncentrated KOH from Merck. y author.

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: Zander, R.	
(2) D-Glucose, C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ; [50-99-7]	Z. Naturforsch., C: Biosci. <u>1976</u> ,	
(3) Water; H <sub>2</sub> O; [7732-18-5]	31C, 339-52.	
114 DT 4 DT 100		
VARIABLES: $T/K = 310.15$	PREPARED BY: H. L. Clever	
P/kPa = 101.325		
EXPERIMENTAL VALUES:	I	
T/K Disaccharide Bun		
a 100 cm °	icient $(1/2) = (1/2)$	
	$m^{3}cm^{-3} atm^{-1} = k = (1/c) ln (\alpha/\alpha_{0})$	
2 2	41 30 + 1	
10 2 20 1	05 〒 2 78 〒 3	
	-0.01562	
$^{1}k/g^{-1}100 \text{ cm}^{3}$		
	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Linde Co. Purity 99.9	
Classical Van Slyke method (1).	per cent by volume.	
The apparatus sample volume and constant gas volume are carefully	(2) D-Glucose. No information	
calibrated. The correction for		
unextracted gas is made, but the reabsorption correction is not	(3) Water. Distilled.	
necessary for oxygen.		
Equilibration is undertaken in a thermostated tonometer. A 2 cm <sup>3</sup>		
sample is directly transferred to the		
Van Slyke apparatus for analysis.		
	ESTIMATED ERROR:	
The solubility of oxygen in water value is from the authors analysis of ten literature values (2).	ESTIMATED ERROR: $\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$	
value is from the authors analysis	$\begin{array}{rcl} \delta \mathbf{T}/\mathrm{K} &= & 0.1\\ \delta \alpha / \alpha &= & 0.01 \end{array}$	
value is from the authors analysis	$\delta T/K = 0.1$	
value is from the authors analysis	$\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u> , 61, 523. 2. Zander, R.; Euler, R.	
value is from the authors analysis	$\delta T/K = 0.1$ $\delta \alpha/\alpha = 0.01$ REFERENCES: 1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u> , 61, 523.	

114	Oxygen Solubiliti	es up to 200 kPa	
COMPONENTS: ORIGINAL MEASUREMENTS:			:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Müller, C.	
(2) Sucrose; (	2 <sub>12</sub> <sup>H</sup> 22 <sup>O</sup> 11;[57-50-1]	Z. Physik. Chem.	<u>1912, 81, 493-503.</u>
(3) Water; H <sub>2</sub> C	<b>;</b> [7732-18-5]		
VARIABLES:		PREPARED BY:	
T/K = 289-290 P/kPa = 101.325		R. Battino	·····
EXPERIMENTAL VALUES:			
T/K <sup>a</sup> Wei	ght Percentage Sucrose	Ostwald Coeff. <sup>b</sup> 10 <sup>2</sup> L	Bunsen Coeff. <sup>C</sup> 10 <sup>2</sup> α
289.15	12.1	3.082	2.911
288.75	24.38	2.502	2.367
289.75	29.44	2.241	2.113
288.75	42.96	1.672	1.582
289.35	49.25	1.428	1.348
290.35	50.	1.384	1.302
	AUXILIARY	INFORMATION	<u></u>
METHOD/APPARATUS/PROCEDURE: Water is degassed by pumping under vacuum. The absorption vessel is about 600 cm <sup>3</sup> and is separately thermostatted from the buret gas measuring system. Both are connected by a copper capillary tube. Gas uptake is measured on the gas burets. The absorption flask volume and all liquid volumes were calibrated with mercury. The original paper contains details and a drawing of the apparatus. Solubilities were also reported in aqueous solutions of d-glucose, glycerol, and chloral hydrate.		<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) From the heating of KMnO<sub>4</sub> and washed in concentrated KOH solution.</li> <li>(2) Chemically pure from Merck in Darmstadt.</li> <li>(3) No comment by author</li> </ul> ESTIMATED ERROR: δα/α = ±0.01, estimated by compiler.	
	hloral hydrate.	$3a/a = \pm 0.01$ , es	

ζ

Biologi	cal Fluids 41
COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS: MacArthur, C. G.
(2) Sucrose; C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ; [57-50-1]	J. Phys. Chem. <u>1916</u> , 20, 495-502.
(3) ™ater; H <sub>2</sub> O; [7732-18-5]	
VARIABLES: $T/K = 298.15$	PREPARED BY: H. L. Clever
$O_2 P/kPa = \sim 21.2 (O_2 \text{ in air at} c_3/mol dm^{-3} = 0 - 2 $ one atm)	
EXPERIMENTAL VALUES:	
T/K Sucrose c <sub>3</sub> /mol dm <sup>-3</sup>	Solution Solubility <sup>2</sup> density <sup>1</sup> cm <sup>3</sup> (STP) O <sub>2</sub> $\rho/g$ cm <sup>-3</sup> per dm <sup>3</sup>
298.15 0.0 0.125 0.25	1.000 5.78 1.015 5.40 1.033 4.82
0.5 1 2	1.068 4.39 1.147 3.20 1.336 1.84
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The solutions were thermostated in tall cylinder open to the air.	(1) Oxygen. Air at one atm.
They were shaken by hand several times a day for a period of four	(2) Sucrose. No information.
days. A sample of 250 cm <sup>3</sup> was analyzed for oxygen by a modified Winkler method.	(3) Water. No information.
	ESTIMATED ERROR: The solubility values may be in 5 to 10 per cent error. The salt concen- trations above one mol $dm^{-3}$ may be in error by 10 per cent.
	REFERENCES:
	1

COMPONENTS :				ORIGIN	AL MEASUREMENT	S:	
(1) Oxygen	; 0 <sub>2</sub> ; [778	2-44-7]		Hikit	ca, H.; Asai	, S.; Azuma, Y.	
(2) Sucros	(2) Sucrose; C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ;				Can. J. Chem. Eng. <u>1978</u> , 56, 371-4.		
(3) Water;	н <sub>2</sub> 0; [773	2-18-5]					
VARIABLES:				PREPAR	ED BY:		
	T/K = 288-318 Concentration			R. Battino			
EXPERIMENTAL V	ALUES:						
t/°C	T <sup>a</sup> /K	Sucrose ( wt %	kmol	m <sup>-3</sup>	P/kg m <sup>-3</sup>	$10^{3}C^{*}/kmol m^{-3}$	
25 25 25 25 25 25 15 35 45	298 298 298 298 298 298 298 288 308 318	0 12.0 23.5 33.5 43.0 54.0 54.0 54.0 54.0	0 0.3 0.7 1.1 1.4 1.9 1.9 1.9	54 2 9 7 8 5	997 1047 1097 1144 1188 1248 1253 1237 1232	1.26 <sup>b</sup> 1.06 0.883 0.738 0.626 0.480 0.563 0.425 0.381	
a Calcul b For pu 101.32	re water. 5 kPa part	Correspond: ial pressure	e of	a mole gas of	e fraction s E 2.28 x 10-	olubility at 5.	
b For pu	re water. 5 kPa part	Correspond: ial pressure	s to a	a mole gas of	e fraction s E 2.28 x 10-	olubility at 5.	
b For pu	re water. 5 kPa part	ial pressure	e of	a mole gas of INFORM	E 2.28 x 10-	olubility at 5.	
b For pu	5 kPa part	ial pressure	e of	gas of	E 2.28 x 10-	5.	
b For pu 101.32 METHOD/APPARATI Used the m (1). A kn brought in quantity o latter att vacuum for Equilibriu	US/PROCEDURE: ethod of M own volume to contact f gas-free ained by b about ten m is estab and the vo	AUXII AUXII arkham and H of gas is with a know solution, to oiling under hours. lished by lume of	e of LIARY Kobe wn the	INFORM	E 2.28 x 10-	<sup>5</sup> .	
b For pu 101.32 METHOD/APPARATI Used the m (1). A kn brought in quantity o latter att vacuum for Equilibriu agitation	US/PROCEDURE: ethod of M own volume to contact f gas-free ained by b about ten m is estab and the vo	AUXII AUXII arkham and H of gas is with a know solution, to oiling under hours. lished by lume of	e of LIARY Kobe wn the	gas of	TED ERROR:	<pre>5</pre>	
b For pu 101.32 METHOD/APPARATI Used the m (1). A kn brought in quantity o latter att vacuum for Equilibriu agitation	US/PROCEDURE: ethod of M own volume to contact f gas-free ained by b about ten m is estab and the vo	AUXII AUXII arkham and H of gas is with a know solution, to oiling under hours. lished by lume of	e of LIARY Kobe wn the	gas of	TED ERROR:	<sup>5</sup> .	
b For pu 101.32 METHOD/APPARATI Used the m (1). A kn brought in quantity o latter att vacuum for Equilibriu agitation	US/PROCEDURE: ethod of M own volume to contact f gas-free ained by b about ten m is estab and the vo	AUXII AUXII arkham and H of gas is with a know solution, to oiling under hours. lished by lume of	e of LIARY Kobe wn the	gas of INFORM SOURCE NC ESTIMA &C */C REFERE 1. Ma	ATION AND PURITY OF AND PURITY OF AND PURITY OF AND ERROR: $2^* = \pm 0.01$ , ENCES: arkham, A. E	<pre>5</pre>	

COMPONENTS:	ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Zander, R.			
(2) Disaccharides; $C_{12}H_{22}O_{11}$	Z. Naturforsch., C: Biosci. <u>1976</u> , 339-52.			
(3) Water; H <sub>2</sub> O; [7732-18-5]				
{				
VARIABLES:	PREPARED BY:			
T/K = 310.15 P/kPa = 101.325 (1 atm)	H. L. Clever			
P/KPa 101.325 (1 acm)				
EXPERIMENTAL VALUES:	L			
	Bunsen Constant <sup>1</sup>			
T/K Disaccharide	coefficient			
g 100 cm <sup>-3</sup> 1	$0^{4}\alpha/cm^{3}cm^{-3}$ atm <sup>-1</sup> k=(1/c) ln ( $\alpha/\alpha_{0}$ )			
β-D-fructofuranosy C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ; [57-50-	/l-α-D-glucopyranoside or sucrose; ·1]			
310.15 0	241			
2	234 ± 1			
10 20	215 ± 3 189 ± 4			
	-0.01195			
4-O-α-D-glucopyram C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ; [69-79-	nosyl-D-glucose or maltose; -4]			
310.15 0 20	241 190 ± 1			
$4-0-\beta-D-galactopy C_{12}H_{22}O_{11}; [63-42-$	ranosyl-D-glucose or lactose; 3].			
310.15 0 20	241 187 ± 3			
$\frac{1}{k/g^{-1}100}$ cm <sup>3</sup>				
AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Classical Van Slyke method (1).	<ol> <li>Oxygen. Linde Co. Purity 99.9 per cent by volume.</li> </ol>			
The apparatus sample volume and	(2) Disaccharides. No information.			
constant gas volume are carefully calibrated. The correction for un-	()) Noton Distilled			
extracted gas is made, but the reab- sorption correction is not necessary for oxygen.	(3) Water. Distilled.			
Equilibration is undertaken in a				
thermostated tonometer. A 2 cm <sup>3</sup> sample				
is directly transferred to the Van Slyke apparatus for analysis.	ESTIMATED ERROR:			
	$\delta T/K = 0.1$			
The solubility of oxygen in water value is from the authors analysis of	$\delta \alpha / \alpha = 0.01$			
ten literature values (2).	· · · · · · · · · · · · · · · · · · ·			
	REFERENCES :			
	1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u> , 61, 523.			
	2. Zander, R.; Euler, R. Measurement of Oxygen, Edited by Degn, H.; Balslev, I.; Brook, R. Elsevier, Amsterdam, 1976, p. 271.			
h				

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) O <sub>x</sub> ygen; 0 <sub>2</sub> : [7782-44-7]	Liu, M.S.; Branion, R.M.R.;
(2) Fermentation medium	Duncan, D. $W$ .
	Biotechnol. Bioeng. <u>1973</u> , 15, 213-6.
VARIABLES:	PREPARED BY:
T/X = 308 Concentration	P. Battino
EXPERIMENTAL VALUES: 35°C;	308 K
Concentration	Solubility /mg liter
<u>4.5</u> к <sup>а</sup>	6.92
9 X 13.5 K	6.68 6.66
18 X	7.06
a Fermențation medium of Silver liter <sup>-1</sup> ferrous ion.	man and Lundgren (1) with 4.5 g
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;
Saturation solubilities were derived from determining oxygen partial pressures with a polarographic oxygen electrode as a function of time with the electrode being in the stirred medium.	
	ESTIMATED ERROR:
	±3% in solubilitv (estimated by comoiler).
	REFERENCES :
	<ol> <li>Silverman, M.P.; Lundgren, D.G. J. Bacteriol. <u>1959</u>, 78, 326.</li> </ol>

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782- (2) Fermentation media (3) Methanol; CH <sub>4</sub> O; [4	100 -	ORIGINAL MEASUREMENTS: Popovic, M.; Niebelschutz, H.; Reuss, M. European J. Appl. Microbiol. Biotechnol. <u>1979</u> , 8, 1-15.
VARIABLES: T/K = 298 Concentration		PREPARED BY: C.L. Young
EXPERIMENTAL VALUES:		
т/к	Concentration of methanol (volumethanol)	of Oxygen solubility, me%) x 10 <sup>3</sup> /mol dm <sup>-3</sup>
298.15	1 2 3	1.200 1.175 1.150
	AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE	:	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium co apparatus in which kno gas was added to a kno liquid and the equilib measured. Details in ref. (1).	own volume of own volume of orium pressure	(2)Medium contained 6.0 g dm <sup>-3</sup> (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> ;0.94 g dm <sup>-3</sup> K <sub>2</sub> HPO <sub>4</sub> ; 0.71 g dm <sup>-3</sup> KH <sub>2</sub> PO <sub>4</sub> ; 0.82 g dm <sup>-3</sup> MgSO <sub>4</sub> .7H <sub>2</sub> O; 0.08 g dm <sup>-3</sup> NaCl; 0.06 g dm <sup>-3</sup> CaCl <sub>2</sub> . 2H <sub>2</sub> O: Remainder H <sub>2</sub> O.
		<pre>ESTIMATED ERROR:</pre>

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ORIGINAL MEASUREMENTS: Popovic, M.; Niebelsch Reuss, M. European. J. Appl. Mic Biotechnol. <u>1979</u> , 8, 1 PREPARED BY: C.L. Young entration /g dm <sup>-3</sup> Oxygen solubility S x 10 <sup>3</sup> /mol dm <sup>-3</sup> 10 1.205 50 1.189 100 1.154	robiol. -15.
Reuss, M. European. J. Appl. Mic Biotechnol. <u>1979</u> , 8, 1 PREPARED BY: C.L. Young entration /g dm <sup>-3</sup> 10 1.205 50 1.189	robiol. -15.
C.L. Young C.L. Young Oxygen solubility $S \times 10^3$ /mol dm <sup>-3</sup> 10 1.205 50 1.189	· · · · · · · · · · · · · · · · · · ·
C.L. Young C.L. Young Oxygen solubility $S \times 10^3$ /mol dm <sup>-3</sup> 10 1.205 50 1.189	· · · · · · · · · · · · · · · · · · ·
10 1.205 50 1.189	· ,
10 1.205 50 1.189	· ,
50 1.189	
	<i>.</i> .
AUXILIARY INFORMATION	
SOURCE AND PURITY OF MATERIALS	;
Volumetric Lume of No details given Lume of pressure and ref.	
ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 22$ (estimated by compile REFERENCES: 1. Krauss, W.; Gestrich <i>Chem. Ing. Techn.</i> <u>19</u>	er) , W.
lu lu pr	ume of ume of cessure and ref.No details givenESSURe and ref.ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2$ (estimated by compil REFERENCES: 1. Krauss, W.; Gestrich

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Yeast extract. (3) Water; H <sub>2</sub> O; [7732-18-5]	ORIGINAL MEASUREMENTS: Popovic, M.; Niebelschutz, H.; Reuss, M. European. J. Appl. Microbiol. Biotechnol. <u>1979</u> , 8, 1-15.
VARIABLES:	PREPARED BY:
T/K = 298 Concentration	C.L. Young
EXPERIMENTAL VALUES:	
T/K Concentration /g dm <sup>-3</sup>	
298.15 5 10	1.255 1.228
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium cell. Volumetric apparatus in which known volume of gas was added to a known volume of liquid and the equilibrium pressure measured. Details in source and ref. (1).	
	ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler)

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [773 (2) Molasses (3) Water; H <sub>2</sub> O; [773 VARIABLES: Concentratio	32-18-5]	ORIGINAL MEASUREMENTS: Popovic, M.; Niebelschutz, H.; Reuss, M. European. J. Appl. Microbiol, Biotechnol. <u>1979</u> , 8, 1-15. PREPARED BY: C.L. Young
T/K = 298	·	
EXPERIMENTAL VALUES: T/K	Concentration /g dm <sup>-3</sup>	Oxygen solubility, S x 10 <sup>3</sup> /mol dm <sup>-3</sup>
298.15	5 66 80 106 150 238 278	1.243 1.192 1.752 1.128 1.112 1.019 0.840
·		
	AUXILIARY	INFORMATION
METHOD - APPARATUS / PROCEDU	· · · · · · · · · · · · · · · · · · ·	INFORMATION SOURCE AND PURITY OF MATERIALS:
METHOD APPARATUS/PROCEDU Stirred equilibrium apparatus in which J gas was added to a J of liquid and the ec ure measured. Deta: and ref. (1).	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium apparatus in which J gas was added to a J of liquid and the eq ure measured. Deta:	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS: No details given.
Stirred equilibrium apparatus in which J gas was added to a J of liquid and the eq ure measured. Deta:	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium apparatus in which J gas was added to a J of liquid and the eq ure measured. Deta:	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$
Stirred equilibrium apparatus in which J gas was added to a J of liquid and the eq ure measured. Deta:	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler)
Stirred equilibrium apparatus in which J gas was added to a J of liquid and the eq ure measured. Deta:	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler) REFERENCES:
Stirred equilibrium apparatus in which J gas was added to a J of liquid and the eq ure measured. Deta:	RE: cell. Volumetric known volume of known volume guilibrium press-	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler)

COMPONENTS :		
	ORIGINAL MEASUREMENTS:	
<pre>(1) Oxygen; O<sub>2</sub>; [7782-44-7] (2) Antifoam. (3) Water; H<sub>2</sub>O; [7732-18-5]</pre>	Popovic, M.; Niebelschutz, H.; Reuss, M. European, J. Appl. Microbiol. Biotechnol. <u>1979</u> , 8, 1-15.	
VARIABLES:	PREPARED BY:	
Concentration T/K = 296	C.L. young	
EXPERIMENTAL VALUES:		
T/K Conce. x 10 <sup>3</sup>	ntration Oxygen solubility, vol/vol S x 10 <sup>3</sup> /mol dm <sup>-3</sup>	
0 0 0 0 0 0 0 0 0 0 0 0	.011.320.021.328.051.329.071.336.101.344.151.327.201.300.501.290.801.286.201.271.501.240	
	AUXILIARY INFORMATION	
METHOD APPARATUS PROCEDURE: Stirred equilibrium cell. Vo apparatus in which known volu gas was added to a known volu liquid and the equilibrium pr measured. Details in source ref. (1).	SOURCE AND PURITY OF MATERIALS: olumetric (2Antifoam was Contraspum 210 ume of supplied by Zoehiemmer and Schw ume of Lahnstein Rhein.	arz,

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; $O_2$ ; [7782-44-7] (2) Xanthan	Popovic, M.; Niebelschutz, H.; Reuss, M.
(3) Water; H <sub>2</sub> O; [7732-18-5]	European J. Appl. Microbiol. Biotechnol. <u>1979</u> , 8, 1-15.
VARIABLES:	PREPARED BY:
T/K = 298 Concentration	C.L. Young
EXPERIMENTAL VALUES:	
T/K Concentration /g dm <sup>-3</sup>	Oxygen solubility, $S \times 10^3$ /mol dm <sup>-3</sup>
298.15 1 5	1.250 1.251
	-
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium cell. Volumetric apparatus in which known volume of gas was added to a known volume of liquid and the equilibrium pressure measured. Details in source and ref. (1).	No details given.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$ (estimated by compiler)
	REFERENCES :
	1. Krauss, W.; Gestrich, W.
	Chem. Ing. Techn. <u>1977</u> , 6, 35

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Pullulan (3) Water; H <sub>2</sub> O; [7732-18-5]	ORIGINAL MEASUREMENTS: Popovic. M.; Niebelschutz, H.; Reuss, M. European. J. Appl. Microbiol. Biotechnol. <u>1979</u> , 8, 1-15.
VARIABLES: Concentration T/K = 298	PREPARED BY: C.L. Young
EXPERIMENTAL VALUES:	
T/K Concentration /g dm <sup>-3</sup>	Oxygen solubility, S x 10 <sup>3</sup> /mol dm <sup>-3</sup>
298.15 1 10 20	1.266 1.241 1.240
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Stirred equilibrium cell. Volumetric apparatus in which known volume of gas was added to a known volume of liquid and the equilibrium pressure measured. Details in source and ref. (1).	No details given.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \ \delta S = \pm 2\%$
	(estimated by compiler)
	<pre>(estimated by compiler) REFERENCES: 1. Krauss, W.; Gestrich, W. Chem. Ing. Techn. <u>1977</u>, 6, 35.</pre>

OMPONENTS:		ORIGINAL M				
(1) Oxygen; O <sub>2</sub> ; [		Moditi	Moditis, I.Z.			
	( <sub>22</sub> 0 <sub>11</sub> ; [57-50-1)	Izv. Vyssh. Uchebn. Zaved. Pisch. Tehnolog, <u>1976</u> , (3), 193-41.				
<ul> <li>(3) Ethanol; C<sub>2</sub>H<sub>6</sub></li> <li>(4) Water; H<sub>2</sub>O; [7</li> </ul>						
(5) Various wines		Chem.	Chem. Abstr. 85; 175431g.			
RIABLES:		PREPARED B	Υ:			
T/K = 298			V. Katovic			
XPERIMENTAL VALUES:	Alcohol Su	ucrose	Solutility of oxygen <sup>a</sup>			
	g	8	Obtained			
Water	-	-	8.4			
Alcohol solution	10	-	9.0			
Alcohol solution	20	-	9.0			
Sugar solution	-	5	7.9			
-	-	10	7.8			
Wines						
Port wine	18	10	7 0			
Muscatel			7.9			
	16	16	7.1			
Madeira "Heres"	19 20	4 3	8.4 8.3			
	AUXILIAR	Y INFORMATIO	· · · · · · · · · · · · · · · · · · ·			
ETHOD/APPARATUS/PROCED			PURITY OF MATERIALS:			
The amount of determined using a	URE: f oxygen was a gas chromato- acked with silica	SOURCE AND				
The amount of determined using a graph. Columns pa gel and molecular s	URE: f oxygen was a gas chromato- acked with silica	SOURCE AND	PURITY OF MATERIALS: ails given.			
The amount of determined using a graph. Columns pa gel and molecular s	URE: f oxygen was a gas chromato- acked with silica	SOURCE AND	PURITY OF MATERIALS: ails given.			
The amount of determined using a graph. Columns pa gel and molecular s	URE: f oxygen was a gas chromato- acked with silica	SOURCE AND No det ESTIMATED Error	PURITY OF MATERIALS: ails given.			
determined using a graph. Columns pa gel and molecular s	URE: f oxygen was a gas chromato- acked with silica	SOURCE AND No det ESTIMATED Error	PURITY OF MATERIALS: ails given. ERROR: in solubility ca. ±2% iler's estimate).			
The amount of determined using a graph. Columns pa gel and molecular s	URE: f oxygen was a gas chromato- acked with silica	SOURCE AND No det ESTIMATED Error (comp	PURITY OF MATERIALS: ails given. ERROR: in solubility ca. ±2% iler's estimate).			

COMPONENTS:			ORIGINAL ME	ASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Fal'kovich, Yu.E.; Dimenov. A.T.;			
(2) Sucrose; $C_{12}^{H}_{22}O_{11}^{O}$ ; [57-50-1]			Moditis, I.Z.; Strukova, V.E.			
	_			Izv. Vyssh. Uchebn. Zaved. Pisch. Tekhnolog., <u>1977</u> , (7), 56-9.		
(4) Water; H						
(5) Various	wines		Chem. Ab.	str.,	, <i>87</i> , 66545j.	
VARIABLES:	ARIABLES :			:		
T/K = 288-308 Concentration				R. Batt	ino	
					·····	
EXPERIMENTAL VALUE		_a				
	Water solution	C <sub>o</sub>				
		15°C	25°C	35°C		
	Ethanol/(%)					
	0	10.2	8.4	7.2		
	10	11.6	9.0	7.8		
	15 20	$11.4 \\ 11.6$	9.0	8.0		
	40 70	10.4 21.0	10.4 21.2	10.0		
	Sucrose	27.0	<i>4</i> ,⊥ • ∠	£1.2		
	g/100 ml					
	5 10	9.7 9.1	7.9 7.8			
	15	0.3	/.4	6.2		
	20 25	7.3 6.4	6.6 6.0			
	30	5.6	5.2	4.9		
	60	2.2	2.1	2.0		
	a Solubility o	f oxygen	in ma0, r	)er		
	a Solubility of l liter of so	olution.				
		<u> </u>		continued	on following page	
	ł	AUXILIARY	INFORMATION			
METHOD / APPARATUS / F	ROCEDURE :		SOURCE AND	PURITY OF M	ATERIALS:	
The solutions	were saturated	with	(1) Fro	om air.		
	nutes at constant The dissolved of		(2 3 4)	No detai	le given	
was determine	d by gas chroma	tography	(2,3,4)	No accar	is groom.	
			ESTIMATED E	ERROR:		
1			REFERENCES:			

Oxygen Solubilities up to 200 kPa

COMPONE	NTS:			E	EVALUATOR:				
(1)	Oxygen; O <sub>2</sub> ; [7782-44-7]				Fal'kov	ich, Yu	.E.; P	inenov	, A.T.;
(2)	Sucrose; C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ; [57-50-1]			)-1]		tis, I.			
(3) (4)	Ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5] Water; H <sub>2</sub> O; [7732-18-5]				Izv. Vy Tobh	ssh. Uc nolog.	hebn. 1977	Zaved.	Pisch.
(5)	Various wines								
(5) Various wines					Chem. A	bstr.	, 8	7, 665	45j.
FXPERIM	ENTAL VALUES:			contin	ued				
	Sucrose	С	a atd	liffere	nt % of	alcohol			
	g/100 ml	0	10	15			70	-	
	0	8.4	9.0	8.9	9.0	10.4	21.2		
	1	-	9.0	8.9 8.9	9.0 8.9	10.4			
	2 3	-	8.9 8.7	-	8.9	10.2	21.0		
	4	_	3.6	<u> </u>	8.7	10.0	20.2		
	5	8.0	-	8.6	8.6	-			
	8	-	8.4	-	8.4	-	-		
	10 12	7.8	- 8.0	-	8.0 7.8	-	-		
	15	7.4	-	_	-	-	-		
					7 1	_	_		
	16	-	7.6	-	7.1	-	-		
	18	-	-	6.9		-	-		
			7.6 			-	-		
	18 20  <sup>a</sup> Solub	6.6 oility o	6.8	6.9 _		 liter o	f		
	18 20 	6.6 oility o	6.8	6.9 _	6.9 _	_ _ liter o	f		
	18 20  <sup>a</sup> Solub	6.6 oility o	6.8 f oxyge	6.9 - n in m	6.9 _ g0 <sub>2</sub> per		ca		
	18 20  <sup>a</sup> Solub	6.6 oility o	6.8 f oxyge	6.9 - en in m	6.9 _	e		25°C	
	18 20 a Solub solut	6.6 ility o ion.	6.8 f oxyge Alco	6.9 - en in m	6.9 - gO <sub>2</sub> per Sucros	e	C <sup>a</sup> o		
	18 20 a Solub solut Type of wi	6.6 ility o ion.	6.8 f oxyge Alco	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros	e ml	co o 50°C	25°C	
	18 20 a Solub solut Type of wi dry	6.6 ility o ion. ne:	6.8 f oxyge Alco %	6.9 m in m phol	6.9 - gO <sub>2</sub> per Sucros g / 100	e ml	c <sup>a</sup> 50°C 12.8	25°C	
	18 20 a Solub solut Type of wi	- 6.6 ility o ion. ne: " "here	6.8 f oxyge Alco %	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros	e ml	co o 50°C	25°C	
	18 20 a Solub solut Type of wi dry "madeira port win dessert	- 6.6 ility o ion. ne: " "here	- 6.8 f oxyge Alco % 10-1 s" 16-1	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros g ∕ 100 3-4 7-10 16	e ml	Co 50°C 12.8 12.2 11.7 10.2	25°C 8.9 8.4 7.9 6.8	
	18 20 a Solub solut Type of wi dry "madeira port win dessert must	- 6.6 ility o ion. ne: " "here	- 6.8 f oxyge Alco % 10-1 s" 16-1 17-1	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros g∕100: - 3-4 7-10 16 15	e ml	Co 50°C 12.8 12.2 11.7 10.2 9.4	8.9 8.4 7.9 6.8 7.4	
	18 20 a Solub solut Type of wi dry "madeira port win dessert	- 6.6 ility o ion. ne: " "here	- 6.8 f oxyge Alco % 10-1 s" 16-1 17-1	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros g ∕ 100 3-4 7-10 16	e ml	Co 50°C 12.8 12.2 11.7 10.2	25°C 8.9 8.4 7.9 6.8	
	18 20 a Solub solut Type of wi dry "madeira port win dessert must Cognac:	- 6.6 ility o ion. ne: " "here	- 6.8 f oxyge Alco % 10-1 s" 16-1 17-1 16 - -	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros g / 100 3-4 7-10 16 15 20	e ml	Co 50°C 12.8 12.2 11.7 10.2 9.4 8.2	25°C 8.9 8.4 7.9 6.8 7.4 6.5	
	18 20 a Solub solut Type of wi dry "madeira port win dessert must Cognac: 3*	- 6.6 ility o ion. ne: " "here	6.8 f oxyge Alco % 10-1 16-1 17-1 17-1 - 40	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros g / 100 3-4 7-10 16 15 20 1.5	e ml	Co 50°C 12.8 12.2 11.7 10.2 9.4 8.2 10.5	25°C 8.9 8.4 7.9 6.8 7.4 6.5 10.2	
	18 20 a Solub solut Type of wi dry "madeira port win dessert must Cognac:	f.6 ility o ion. ne: " "here e	- 6.8 f oxyge Alcc % 10-1 16-1 17-1 16 - - 40 41	6.9 en in m phol	6.9 - gO <sub>2</sub> per Sucros g / 100 3-4 7-10 16 15 20	e ml	Co 50°C 12.8 12.2 11.7 10.2 9.4 8.2	25°C 8.9 8.4 7.9 6.8 7.4 6.5	

OMPONENTS:	ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Moditis, I.Z.; Strukova, V.E.; Fal'kovich, Yu.E.			
(2) Water solutions of alcohol and sugar	Vinodel Vinograd. SSSR <u>1977</u> , (4) 15-8.			
(3) Wines	Chem. Abstr. <u>1977</u> , 87; 51587a.			
/ARIABLES:	PREPARED BY:			
T/K = 298 Concentration	V. Katovic			
EXPERIMENTAL VALUES:				
Sugar/% S <sup>a</sup>	alcohol Wine % (vol) S <sup>a</sup>			
10% (vol) alcohol	white table 10 9.0			
1 0 0	red table 10 8.9			
1 9.0 2 8.8	"Heres" 19 8.4			
4 8.4	Madeira 19 8.3 Port wine			
8 8.5	white 19 8.0			
12 8.2	Dessert white 16 8.0			
	Dessert red 16 7.0			
20 7.0	Tokai "AZOS" 16 6.6			
20% (vol) alcohol	â			
1 9.0	<sup>a</sup> Solubility of oxygen at 25°C			
2 8.7	(298 K) in mgO <sub>2</sub> per l liter of wine.			
4 8.5	wille.			
8 8.5 12 7.8				
20 6.2				
<sup>a</sup> Solubility of oxygen at 25°C (298 K) in mgO <sub>2</sub> per 1 liter of solution.				
<pre>a Solubility of oxygen   at 25°C (298 K) in   mgO<sub>2</sub> per 1 liter of</pre>				
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution.</pre>	INFORMATION			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution.</pre>	INFORMATION SOURCE AND PURITY OF MATERIALS:			
<sup>a</sup> Solubility of oxygen at 25°C (298 K) in mgO <sub>2</sub> per 1 liter of solution. AUXILIARY				
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS:			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given.			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given. ESTIMATED ERROR:			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given. ESTIMATED ERROR:			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given. ESTIMATED ERROR:			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given. ESTIMATED ERROR:			
<pre>a Solubility of oxygen at 25°C (298 K) in mgO<sub>2</sub> per l liter of solution. AUXILIARY METHOD/APPARATUS/PROCEDURE:</pre>	SOURCE AND PURITY OF MATERIALS: (1) From air. (2,3) No details given. ESTIMATED ERROR:			

	· · · ·				
COMPONENTS:			ORIGINAL MEASUREMENTS	:	
(l) Oxygen;	02; [7782-44-	7]	Rewick, R. T.;	Tolberg, W. E.;	
(2) Hydroge	n fluoride; HF;		J. Chem. Eng. Da	ta <u>1970</u> , 15, 527-30.	
[7	664-39-3]				
-	-				
VARIABLES:			PREPARED BY:		
т/к =	273-293		C. L. Young		
			-		
EXPERIMENTAL	VALUES:				
т/к	Total pressure	Partial pressure		Mole fraction * of oxygen,	
	P/kPa	P/kPa	/mol kg <sup>-1</sup>	<sup>x</sup> O <sub>2</sub>	
292.95	843.9	741.3	0.160	0.00320	
272.94	726.6	678.6	0.153	0.00307	
		AUXILIARY	INFORMATION		
METHOD/APPARA	TUS/PROCEDURE:		SOURCE AND PURITY OF	MATERIALS;	
Static equi metal. Ki	ilibrium cell mac nown amounts of c	le of Monel	(l) High purity s General Dynam	ample obtained from	
added to k fluoride i absorbed ca	nown amount of hy n cell. Quantit alculated from eq	drogen ty of gas	-	ple obtained from	
pressure a	nd cell volume.				
			ESTIMATED ERROR:	m — +Je	
			$\delta T/K = \pm 0.02; \delta$	$x_{O_2} = \pm 2\%$ by compiler).	
				ol combitcil.	
			REFERENCES:		
<u></u>					

	ORIGINAL MEASUREMENTS:		
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Dornte, R.W.; Ferguson, C.V.		
(2) Sulfur dioxide; SO <sub>2</sub> ;	Ind. Eng. Chem. 1939, 31, 112-3.		
VARIABLES:	PREPARED BY:		
T/K = 213 - 253	R. Battino		
EXPERIMENTAL VALUES:	······································		
t/°C T	/K <sup>a</sup> K <sup>b</sup>		
	13.2 0.12		
	13.2 0.59 23.2 1.63		
	23.2 2.14		
-40 2	33.2 5.2		
	33.2 4.05 <sup>C</sup> 43.2 10.2		
	43.2 10.2		
	53.2 25.2		
	53.2 24.8 53.2 30.1 <sup>C</sup>		
Authors give $\log_{10} K = 9.710 - 965$	her points by the static method. 50/(4.58 T/K) as a smoothing		
Authors give $\log_{10} K = 9.710 - 961$ equation good to $\pm 10$ %.			
Authors give log <sub>10</sub> K = 9.710 - 96 equation good to ±10%. AUXILIARY	50/(4.58 T/K) as a smoothing INFORMATION		
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Authors give log <sub>10</sub> K = 9.710 - 961 equation good to ±10%. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of a gas buret, a differential manometer, and two 10 cm <sup>3</sup> bulbs. The bulbs were in a dewar flask whose temper- ature was controlled manually by adding dry ice. Measurements could be taken while the gas was circu- lating or static. Gas uptake was read on the buret. Corrections were applied for the lines being at	50/(4.58 T/K) as a smoothing INFORMATION SOURCE AND PURITY OF MATERIALS:		
Authors give log <sub>10</sub> K = 9.710 - 961 equation good to ±10%. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of a gas buret, a differential manometer, and two 10 cm <sup>3</sup> bulbs. The bulbs were in a dewar flask whose temper- ature was controlled manually by adding dry ice. Measurements could be taken while the gas was circu- lating or static. Gas uptake was read on the buret. Corrections were applied for the lines being at	50/(4.58 T/K) as a smoothing INFORMATION SOURCE AND PURITY OF MATERIALS: No details given.		
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Authors give log <sub>10</sub> K = 9.710 - 961 equation good to ±10%. AUXILIARY METHOD/APPARATUS/PROCEDURE: The apparatus consisted of a gas buret, a differential manometer, and two 10 cm <sup>3</sup> bulbs. The bulbs were in a dewar flask whose temper- ature was controlled manually by adding dry ice. Measurements could be taken while the gas was circu- lating or static. Gas uptake was read on the buret. Corrections were applied for the lines being at	50/(4.58 T/K) as a smoothing INFORMATION SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: $\delta K/K = \pm 0.1$ $\delta T/K = \pm 0.5$		
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COMPONENTS :	
	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Chang, E. T.; Gokcen, N. A.
(2) Nitrogen oxide or dinitrogen tetraoxide; N <sub>2</sub> O <sub>4</sub> ; [10544-72-6]	J. Phys. Chem. <u>1966</u> , 70, 2394-9.
VARIABLES:	PREPARED BY:
T/K = 262.02 - 303.16 P/kPa = 26.780 - 201.383	P. L. Long H. L. Clever
EXPERIMENTAL VALUES:	
The authors discuss the system further solubility data. The authors point out that their meth- tion) is not capable of removing tra- In the presence of trace amounts of I $N_2O_4$ takes place in the liquid $N_2O_4$ . to obey Sievert's law, $K = x_0/P^2$ , at If oxygen is first bubbled through the $N_2O_3$ are oxidized to $N_2O_4$ , and the ex- observed at all pressures.	hod of purification (double distilla- ace amounts of $N_2O_3$ in the $N_2O_4$ . $N_2O_3$ the reaction $\frac{1}{2}O_2(g) + N_2O_3 =$ As a result the gas appears low pressures of oxygen. The $N_2O_4$ , then the trace amounts of
	continued on following page
AUXILIARY	continued on following page
AUXILIARY METHOD/APPARATUS/PROCEDURE:	
METHOD/APPARATUS/PROCEDURE: The apparatus was of all glass con-	INFORMATION
METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS:

	TS:		ORIGINA	L MEASUREMENTS	3:		
(1) Ox	) Oxygen; O <sub>2</sub> ; [7782-44-7]			Chang, E. T.; Gokcen, N. A.			
<ul> <li>(2) Nitrogen oxide or dinitrogen- tetraoxide; N<sub>2</sub>O<sub>4</sub>; [10544-72-6]</li> </ul>			J. Phys. 6]	. Chem. <u>1966</u> ,	70, 2394-9.		
EXPERIM	ENTAL ME	ASUREMENTS :	continued				
т/к	P/atm	P/atm Henry's Constant Me			Ostwald		
		K x 10 <sup>4</sup>	$x_1 \times 10^4$	Coefficient a	Coefficient L		
262.02	0.6041	8.84	5.34				
	1.2017	8.80	10.58				
	1.3091	8.76	11.47				
	1.6119	8.83	14.23				
	1.9876	8.75	17.40				
	1.0		8.80	0.325	0.312		
273.15	0.2643	9.19	2.43				
	0.6275	9.21	5.78				
	1.1241	9.16	10.30				
	1.7950	9.12	16.37				
	1.0		9.17	0.333	0.333		
298.15	0.3728	10.09	3.76				
	0.4989	10.34	5.16				
	0.5745	10.39	5.97				
	0.9963	10.12	10.08				
	1.0809	9.90	10.70				
•	1.0	<u></u>	10.16	0.355	0.388		
303 14	0.4441	10.65	4.73				
	0.9189	10.31	9.47				
202.10			10.48				

Smoothed Data:  $\ln x_1 = -5.7652 - 3.3415/(T/100 \text{ K})$ 

T/K	Mol Fraction $x_1 \times 10^4$
258.15	8.59
263.15	8.80
268.15	9.01
273.15	9.22
278.15	9.43
283.15	9.63
288.15	9.83
293.15	10.03
298.15	10.22
303.15	10.41
308.15	10.60

COMPONENTS :			ORICI	NAL MEASUREMEN	TC .	
	[7703 44 7]					
	[7782-44-7]		ſ	ner, G. H.;	•	
(2) Nitrogen; N <sub>2</sub> ; [7727-37-9]				n. Eng. Prog		
(3) Carbon dioxi	.de; CO <sub>2</sub> ;		963, 59, NO.	44, 30-41	•	
[124-38-9	)]					
VARIABLES :			DDEDA	ARED BY:		
T/K	= 218-273		INLIA			
	Pa = 7-13 position		C. L. Y	oung		
EXPERIMENTAL VALUES	-					
EXPERIMENTAL VALUES	:					
	Mole fractions				fractions	in gas
T/K P/10 <sup>5</sup> Pa	<sup>x</sup> O <sub>2</sub> <sup>x</sup> N <sub>2</sub>		<sup>x</sup> co₂	<sup>y</sup> O <sub>2</sub>	$y_{N_2}$	<sup>y</sup> co₂
273.15 106.9	0.030 0.159		.811		0.344	0.599
l	0.0706 0.122 0.1085 0.088		.8070 .8027		0.262 0.188	0.599 0.601
	0.1525 0.051	.5 0	.7960	0.295	0.109	0.596
	0.286 0.153		.8180		0.3353	0.6105
	0.557 0.133 0.1096 0.080		).8110 ).8103		0.2865 0.1793	0.6039 0.599
	0.1356 0.066	9 0	.7975	5 0.264	0.140	0.596
222 05 124 4	0.1766 0.030		.7926		0.0684	0.5933
232.85 124.4	0.0643 0.177 0.166 0.110		).7587 ).724		0.5610 0.3190	0.2584 0.2614
	0.2572 0.052	3 0	.6905	5 0.6017	0.1416	0.2567
	0.210 0.084	- 0	.706	0.503	0.234	0.263
	0.1475 0.121 0.1327 0.130		.731		0.3575 0.4092	0.2620 0.2512
	0.058 0.180	0	.762	0.159	0.583	0.258
	0.024 0.206		.770		0.671	0.258
232.85 68.95	0.124 0.143 0.0913 0.032	1 0	.733 .8766		0.420 0.2414	0.259 0.2494
	0.0662 0.050	6 0	.8832	2 0.3858	0.3676	0.2466
	0.0477 0.066 0.0349 0.074		.8858 .8911		0.473 0.5407	0.250 0.2465
	0.0345 0.074	0 0	.0711		l on follow:	
	AUX	XILIARY	INFOR	MATION		
METHOD/APPARATUS/PF	OCEDURE :		SOURC	CE AND PURITY C	OF MATERIALS:	
Static bomb.	Pressure measure	d	(1) a	and (2) No de	tails given	•
	it tester. Temp	era-	(3)	Purified -	no other de	tails
ture measured w	Samples of liqui	d		given.		
and gas analyse	d by removing ca	rbon				
	mple with potass					
then removed wi	ion. Oxygen wa th "ammoniacal	5				
copper" solutio	n and remainder					
assumed to be n	itrogen only.					
			L			
				MATED ERROR:	<b>A</b> = 4 +	
				$K = \pm 0.2;$		
				$b_2$ , $\delta x_{N_2}$ , $\delta x_0$		
				0.002 (estin RENCES:	mated by co	mpiler).

COMPONE	ents:			ORIGINAL MEASUREMENTS:			
(1) Oxyg	gen; 02;	[7782-4	14-7]	Zenner, G. H.; Dana, L. I.			
(2) Nitr	rogen; N	2; [772]	7-37-9]	Chem. Eng. Prog. Symp. Ser. 1963,			
(3) Carb	oon dioxi	de; CO₂;	;	59, No. 44, 36-41.			
l	[124-38-9	]					
EXPERIM	MENTAL VA	LUES:	* *** **	<u> </u>			<u> </u>
		Mole fr	actions in	liquid	Mole	fractions	in gas
Т/К	P/10 <sup>5</sup> Pa	<i>x</i> 02	<i>x</i> <sub>N<sub>2</sub></sub>	<sup>x</sup> CO <sub>2</sub>	<sup>y</sup> 0 <sub>2</sub>	<sup>y</sup> N <sub>2</sub>	<sup>y</sup> CO₂
232.85	68.95	0.0686	0.0503	0.8811	0.396	0.354	0.250
		0.0516	0.0628	0.8856	0.292	0.454	0.254
		0.0610 0.0658	0.0564 0.0540	0.8826 0.8802	0.3472 0.3746	0.3936 0.3820	0.2592 0.2434
		0.0787	0.0470	0.8743	0.4436	0.3093	0.2471
232.85	51.7	0.0620 0.0482	0.0231 0.0336	0.9149 0.9182	0.4943 0.382	0.2299 0.338	0.2758 0.280
		0.0557	0.0277	0.9166	0.4479	0.2789	0.2732
		0.0376	0.0441	0.9183	0.2934	0.4256	0.2810
		0.0315 0.0269	0.0435 0.0491	0.9250 0.9240	0.2463 0.2137	0.4717 0.5035	0.2820 0.2828
		0.0564	0.0300	0.9136	0.4363	0.2893	0.2744
		0.0604	0.0242	0.9154	0.4837	0.2373	0.2790
		0.0445 0.0565	0.0325 0.0273	0.9230 0.9162	0.3714 0.4504	0.3492 0.2731	0.2794 0.2765
		0.0357	0.0427	0.9216	0.2880	0.4297	0.2823
218.15	131.0	0.0404 0.0507	0.0370 0.1885	0.9226 0.7608	0.3246 0.1448	0.3978 0.6560	0.2776 0.1992
210.10	10110	0.158	0.121	0.721	0.422	0.388	0.190
		0.0874	0.1656	0.7470	0.2522	0.5620	0.1858
		0.1410 0.1797	0.1365 0.1161	0.7225 0.7042	0.3875 0.455	0.4240 0.348	0.1885 0.197
		0.238	0.081	0.681	0.602	0.217	0.181
		0.314	0.042	0.644	0.681	0.107	0.212
218.15	103.5	0.2182 0.087	0.0922 0.109	0.6896 0.804	0.5325 0.327	0.2682 0.514	0.1993 0.159
		0.125	0.084	0.791	0.455	0.388	0.157
		0.148 0.0660	0.065	0.787	0.555 0.2427	0.287	0.158 0.1573
		0.100	0.1217 0.098	0.8123 0.802	0.473	0.600 0.369	0.158
		0.116	0.089	0.795	0.432	0.412	0.156
218.15	68.95	0.136 0.0936	0.076 0.0347	0.788 0.8717	0.499 0.5681	0.3395 0.2822	0.1615 0.1497
210.13	00.95	0.078	0.046	0.876	0.481	0.367	0.152
		0.062	0.058	0.880	0.385	0.462	0.153
		0.0610 0.0508	0.0580 0.0646	0.8810 0.8846	0.3742 0.3142	0.4677 0.5293	0.1581 0.1565
		0.041	0.073	0.886	0.250	0.598	0.152
		0.029	0.079	0.892	0.166	0.673	0.161
		0.0219 0.0133	0.0849 0.0912	0.8932 0.8955	0.1387 0.0858	0.7051 0.7596	0.1562 0.1546
		0.129	0.013	0.858	0.760	0.084	0.156
	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·				

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kubie, L. S.
(2) Mineral oil, white	J. Biol. Chem. <u>1927</u> , 72, 545-8.
VARIABLES: T/K = 297.5	PREPARED BY:
P/kPa = 101.325 (1 atm)	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Bunse a/a	en Coefficient cm <sup>3</sup> (STP) cm <sup>-3</sup> atm <sup>-1</sup>
297. 5	0.134 ± 0.004
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus was the constant volume Van Slyke and Neill type (1).	(1) Oxygen. Commercial cylinder.
	<pre>(2) Mineral oil."Amalie" brand, L. Sonneborn Sons, Inc., NY.</pre>
Saturation was attained by bubbling the gas through the oil for several	A medicinal white oil which
hours.	meets US Pharmacopeia standards. Specific gravity 0.890 - 0.895
A 1.990 $\pm$ 0.007 cm <sup>3</sup> volume of saturated solution was analyzed.	at 15 °C , viscosity 285 at 100 °F. Prepared by fractional
The Van Slyke correction factor for unextracted and redissolved gas	distillation from a naphthene base, unsaturated hydrocarbons
was 1.02.	ESTIMATED ERROR:
	$\delta T/K = 1$
	REFERENCES :
	<pre>1. Van Slyke, D. D.; Neill, J. M. J. Biol. Chem. <u>1924</u>, 56, 523.</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Baldwin, R. R.; Daniel, S. G.;
(2) Oils.	J. Appl. Chem., <u>1952</u> , 2(Apr.),161-5.
	J. Inst. Petrol., London, <u>1953</u> , 39, 105-24.
VARIABLES:	PREPARED BY:
т/к = 273.15 - 373.15	P. L. Long
$O_{2} P/kPa = 101.325$	H. L. Clever
EXPERIMENTAL VALUES:	
	ent Ostwald Coefficient
mean mol wt 670.	5 centistokes at 100 <sup>0</sup> F,
293.15 0.124	0.133
Oil A2, viscosity 26	8 centistokes at 100 <sup>0</sup> F,
mean mol wt 610.	
273.15 0.135 293.15 0.126	0.135 0.135
333.15 0.119	0.145
373.15 0.118	0.161
Oil A3, viscosity 18 mean mol wt 570.	l centistokes at 100 <sup>0</sup> F,
293.15 0.129	0.139
mean mol wt 530.	.3 centistokes at 100 <sup>0</sup> F,
293.15 0.137 <sup>1</sup>	0.147
Oil A5, viscosity 34 mean mol wt 400.	.9 centistokes at 100 <sup>0</sup> F,
273.15 0.150	0.150
293.15 0.1445 333.15 0.135	0.155 0.164
373.15 0.130	0.178
Oil Bl, viscosity 260 mean mol wt 630.	) centistokes at 100 <sup>0</sup> F,
293.15 0.120	0.129
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. From commercial cylinders,
The method consists of two opera- tions: Saturation of the liquid with	and gas analysis on a Bone and
the gas under consideration; and determination of the amount of dis-	Wheeler apparatus shows it to be at least 99.5% pure; no source
solved gas in the liquid saturated	given.
with the gas. All gases were passed through a liquid air trap to remove	(2) Oils. The oils conform to DTD-472B specifications. Composition and
water and CO <sub>2</sub> vapors before passage	physical properties of the oils
through the liquid. All gases were passed through a long coil, thermo-	are given in the appendix of the 1953 paper. The molecular weights
stated, before the saturation process.	were determined by freezing
Oil or similar liquid is deaerated by	point depression in naphthalene to within +5 percent.
passing it through a continuously evacuated vessel. Gas is then passed	
through the liquid to saturation.	
Liquid is then degassed, and trans- ferred to a storage burette, discon-	
nected from the degassing apparatus,	RFFERENCES :
thermostated, and saturated with the desired gas. Burette is now con-	
nected to another degassing apparatus,	
portions of the oil degassed and gas collected.	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Rodnight, R.
(2) Four oils	Biochem. J. 1954, 57, 661-3.
	, , , , , , , , , , , , , , , , , ,
VARIABLES:	PREPARED BY:
T/K = 311	R. Battino
EXPERIMENTAL VALUES:	
Oil a <sup>a</sup> /cr	38°C (311K) n <sup>3</sup> (STP)cm <sup>-3</sup> atm <sup>-1</sup> L <sup>b</sup>
liquid paraffin <sup>C</sup>	0.098 (5) <sup>d</sup> 0.112
olive oil <sup>e</sup>	0.102 (6) <sup>d</sup> 0.116
silicone fluid <sup>f</sup>	0.251 0.286
	0.250 0.285
	0.210 0.239
silicone fluid <sup>e</sup>	0.304 0.346
	0.297 0.338
<sup>a</sup> Bunsen coefficient.	
b Ostwald coefficient cald	culated by compiler.
C Specific gravity of 0.83	35.
d Number of duplicate dete	erminations in parentheses.
e Characterized as B.P. (]	.948).
f Viscosity of 5cS.	
e Viscosity of lcS.	
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Oxygen was introduced into a chamber containing degassed oil. The rate of absorption was monitored on a manometer. Then a fresh charge of degassed oil was added and the pressure monitored again. From knowledge of the oil volumes and the change of pressure in both cases the Bunsen coefficient could be calculated. Details and a draw- ing are given in the paper.	No details given.
	ESTIMATED ERROR:
	$\delta \alpha / \alpha = \pm 0.03$ , compiler's estimate.
	REFERENCES:
	1

COMPONENTS:	ORIGINAL MEAS	SURFMENTS .	
(1) Oxygen; O <sub>2</sub> ; [7732-44-7]			
-	Luther, H.; Rottger, H.		
(2) Paraffin Oil.	Elektrotech. Z. <u>1957</u> , A78, 462-4.		
VARIABLES:	PREPARED BY:		
T/K = 318	R. Battino	)	
P/kPa = 27-103			
EXPERIMENTAL VALUES:			
t/°C T <sup>9</sup> K 1	P∕mm Hg	S/cm <sup>3</sup> g <sup>-1</sup>	
45 318	200	0.038	
45 318	400	0.079	
45 313	600	0.117	
45 319	770	0.151	
		0.1J1	
<sup>a</sup> Calculated by compiler.			
curculated by compiler.			
			1
		· · · · · · · · · · · · · · · · · · ·	
AUXILIAR	Y INFORMATION		
		URITY OF MATERIALS:	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PU	URITY OF MATERIALS:	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by	SOURCE AND PU	ails given.	1
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an	SOURCE AND PU	ails given.	1,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU		1,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU	ails given.	1,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU	ails given.	1,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU	ails given.	1,,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecu d <sub>20</sub> =	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> ,n <sub>D</sub> <sup>20</sup> = 1.4	1,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> ,n <sub>D</sub> <sup>20</sup> = 1.4	1,597.
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecu d <sub>20</sub> = ESTIMATED ERF	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> ,n <sub>D</sub> <sup>20</sup> = 1.4	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecu d <sub>20</sub> = ESTIMATED ERF	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> , $n_D^{20} = 1.4$ ROR:	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecu d <sub>20</sub> = ESTIMATED ERF	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> , $n_D^{20} = 1.4$ ROR:	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecul $d_{20} = 1$ ESTIMATED ERF $\delta S/S = \pm 0$	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> , $n_D^{20} = 1.4$ ROR:	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecul $d_{20} = 1$ ESTIMATED ERF $\delta S/S = \pm 0$	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> , $n_D^{20} = 1.4$ ROR:	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecul $d_{20} = 1$ ESTIMATED ERF $\delta S/S = \pm 0$	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> , $n_D^{20} = 1.4$ ROR:	
METHOD/APPARATUS/PROCEDURE: Solubilities determined by an apparatus described in the paper by a combined volume and pressure	SOURCE AND PU (1) No deta (2) Molecul $d_{20} = 1$ ESTIMATED ERF $\delta S/S = \pm 0$	ails given. lar weight of 357 g mol <sup>-</sup> 0.8420 g cm <sup>-3</sup> , $n_D^{20} = 1.4$ ROR:	

Wiscelland	ous Fluids 441
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	Cannon, P.: St. Pierre, L.E.; Miller, A.A.
(2) Polydimethylsiloxane oil	J. Chem. Eng. Data <u>1960</u> , 5, 236.
VARIABLES:	PREPARED BY:
T/K = 303 P/kPa = 446 - 2169	R. Battino
EXPERIMENTAL VALUES:	
t/°C T/K <sup>a</sup> P/at	tm P/kPa <sup>a</sup> 10 <sup>4</sup> 5 <sup>b</sup>
30 303 4.40 7.80 12.00 16.3 21.4	790     12.8       1218     20.5       1653     27.7
<sup>a</sup> Calculated by compile	
<sup>b</sup> Solubility in g gas/g	
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A sample of about 10 g is placed in a sintered alumina bucket in an automatic gravimetric sorption balance. At different gas pressures the weight of dissolved gas is measured.	(l) "Tank grade." (2) 26,000 centistoke.
	ESTIMATED ERROR: $\delta S/S = \pm 0.02$ , compliler's estimate REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:	
(1)Oxygen; O <sub>2</sub> ; [7782-44-7]	Logvinyuk, V. P.: Makarenkov, V. V.	
(2) Hydrocarbon fuels and oil	Logvinyuk, V. P.; Makarenkov, V. V.; Malyshev, V. V.; Panchenkov, G. M.	
	Khim. Tekhnol. Topl. Masel 1970, 15,	
	(No. 5), 27-9. Chem. Technol. Fuels Oils (Eng. trans)	
	<u>1970</u> , 15, 353-5.	
VARIABLES: T/K = 253.15 - 365.15	PREPARED BY: S. A. Johnson	
$O_2 P/kPa = 101.325$	H. L. Clever	
	l	
EXPERIMENTAL VALUES: T/K Bunsen Coefficient	Ostwald Coefficient	
<u>α</u>		
Hydrocarbon fuel, T-1, d		
253.15 0.258 273.15 0.228 293.15 0.205 323.15 0.182	0.239 0.228	
293.15 0.205 323.15 0.182	0.220 0.215	
Hydrocarbon fuel, TS-1,		
293.15 0.220	0.236	
Hydrocarbon fuel, T-6, d 253.15 0.198	-	
253.15 0.198 273.15 0.190 293.15 0.198	0.184 0.190	
293.15 0.198 323.15 0.190	0.212 0.225	
365.15 0.152	0.203	
Hydrogenated fuel, densi	$ty \rho_{4}^{20} = 0.832$	
293.15 0.198	0.212	
Oil, MK-8, density $\rho_4^{20}$ =	0.855	
293.15 0.152	0.163	
The compiler calculated th	o Octuald coofficients	
The compiler calculated th	e ostwara coerricients.	
AUXILIARY	INFORMATION	
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
The apparatus and procedure were described in reference (1) which		
I GENERATED IN TETETENCE (T) MUTCH	No information given.	
was not available to the compiler.	No information given.	
	No information given. ESTIMATED ERROR:	
	ESTIMATED ERROR:	
	ESTIMATED ERROR:	
	ESTIMATED ERROR: $\delta \alpha / \alpha = 0.06 \text{ (authors)}$ REFERENCES: 1. Gogitidize, L. D.;Logvinyuk, V. P.;	
	ESTIMATED ERROR: δα/α = 0.06 (authors) REFERENCES: 1. Gogitidize, L. D.;Logvinyuk, V. P.; Makarenkov,V.V.;Panchenkov,G.M.;	
	<pre>ESTIMATED ERROR:</pre>	
	<pre>ESTIMATED ERROR:</pre>	

	Miscellane	ous Fluids	44
OMPONENTS:		ORIGINAL MEASUREMENTS:	
1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Ke, P. J.; Ackman, R. G.	
(2) Wax ester oils		J. Am. Oil Chemists' soc. <u>1973</u> 80, 429-35.	
VARIABLES:		PREPARED BY:	
T/K = 293.15 - 353.15 P/kPa = partial pressure of pxygen in air at 101.325 kPa		PREPARED BY: P. L. Long H. L. Clever	
EXPERIMENTAL VALUES:			
Temperature Density t/°C T/K p/g cm <sup>-3</sup>	Bunsen Coefficient a	Parts per <sup>1</sup> Million <sup>2</sup> µg g <sup>-1</sup>	cm <sup>3</sup> (STP) O <sub>2</sub> 100 cm <sup>-3</sup> of oil <sup>2</sup>
Sperm whale oil			
20293.150.877540313.150.863960323.150.851480353.150.8378	0.109 0.125 0.117 0.070	37.0 43.1 40.9 24.9	2.27 2.60 2.46 1.45
Barracudına oil			
20 293.15 0.8933 40 313.15 0.8812 60 323.15 0.8679 80 353.15 0.8553	0.092 0.095 0.080 0.058	30.4 32.1 27.5 20.2	1.91 1.98 1.67 1.21
	AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE: Polarographic exponential method (1).		SOURCE AND PURI (1) Oxygen. pressed	
The oil was degassed by th Battino et al. (2). A 155-159 cm <sup>3</sup> sample of de was transferred to a glass weighed. The vessel was s structed that the ratio	gassed oil vessel and	whale (P) obtained reduction Barracund barracud	ale oil. Oil from sperm hyseter catodon) blubber from local commercial n plant in Nova Scotia. dina oil. Oil from whole ina ( <u>Paralepis rissoi</u> was produced in pilot
Vtop air space via was be 0.0704 and 0.0981. A magning bar (120 rpm) and a polo oxygen sensor were placed sample. Air was bubbled t sample at 15 cm <sup>3</sup> m <sup>-1</sup> for t The air was stopped, and h	etic stir- arographic in the hrough the wo hours. elium gas	scale red Vancouve: Research All oils werd cold storage experiment wa ESTIMATED ER	duction plant at the r Lab of The Fisheries Board of Canada. e kept under nitrogen in at 3°C except when the as in progress.
preheated to the sample term was introduced into the oil of 7-10 cm <sup>3</sup> m <sup>-1</sup> . The oxygeneration was measured as a the volume of helium passes the solution. A plot of 1 $V_{helium}$ is linear. The slop	mperature l at a rate en concen- function of d through og $(O_2)$ vs. ope is a	three determ: standard dev: REFERENCES: 1. Aho, L.; V J. Am. Oi 2. Battino, D	inations with relative lation of 7% or less.
function of the Ostwald coe The Ostwald coefficient was	errrcient.		<i>m</i> . 1971, <i>45</i> , 806.

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Gniewosz, S.; Walfisz, A.		
(2) Petroleum	2. Phys. Chem. <u>1887</u> , 1, 70-2.		
VARIABLES: T/K = 283.15, 293.15 Pressure = "Atmospheric"	PREPARED BY: M. E. Derrick H. L. Clever		
EXPERIMENTAL VALUES:			
T/K Bunsen Coeffici α			
283.15 0.229 293.15 0.202			
The Ostwald coeffic by the compiler.	ients were calculated		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The apparatus consisted of an absorp- tion flask connected to a gas buret by a flexible lead capillary. The	(2) Petroleum. Russian petroleum.		
system was thermostated in a large water bath.	Cleaned by boiling in a large copper flask.		
The volume of oxygen absorbed in a known volume of degassed petroleum was directly measured using the gas buret.			
	ESTIMATED ERROR:		
	$\delta \alpha / \alpha = 0.05$ (compiler)		
	REFERENCES:		

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Baldwin, R. R.; Daniel, S. G.
(2) Hydrocarbon fuels	J. Appl. Chem. <u>1952</u> , 2, 161-5. J. Inst. Petrol., London, <u>1953</u> , 39, 105-24.
VARIABLES: T/K = 273.15 - 293.15 O <sub>2</sub> P/kPa = 101.325	PREPARED BY: P. L. Long H. L. Clever

EXPERIMENTAL VALUES:

T/K	Bunsen Coefficient a	Ostwald Coefficient L
100 o	ctane fuel D	
293.15	0.344	0.369
Keros	ene	
273.15 293.15	0.220 0.212	0.220 0.228

AUXILIARY INFORMATION				
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
<ol> <li>Degassing. The liquid was deaer- ated by passage through a continuousty evacuated vessel. The liquid was sat- urated with gas, then degassed again.</li> </ol>	<ol> <li>Oxygen. Commercial cylinder, sou source not given. 99.5 per cent pure by gas analysis on Bone and Wheeler apparatus.</li> </ol>			
2. Saturation of liquid with gas. The gas was passed through a liquid air trap to remove water and carbon di- oxide, then through a long coil therm- ostated at the temperature of the solubility measurement, and then bubbled through the liquid up to five hours.	estimated to be 100. Kerosene. Mean molecular weight			
3. Determination of the amount of gas liberated under vacuum from a known volume of the saturated liquid. The saturated liquid is placed in a vessel attached to a calibrated buret. The whole apparatus was initially evacu- ated. The gas released from the liquid was transferred to the calibrated bure by a Topler pump. Five operations and transfers recover all but a trace of the gas. The last trace (2 - 5 %) removed by boiling the liquid.	· · · · · · · · · · · · · · · · · · ·			

COMPONENTS :			ORIGINAL MEASUR	EMENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]		Ruppel, D.			
	(2) Liquid paraffin		Can. J. Chem. 1971, 44, 3762-4.		
(-,, F	(2) Liquid parallin			<u></u> ,,	
VARIABLES:			PREPARED BY:		
T/K = 304 - 3	63		F	R. Battino	
P/kPa = 39 -	111				
EXPERIMENTAL VALUES	5:		β <sup>b</sup> /cm <sup>3</sup> (STP)		
	P/Torr	P <sup>a</sup> /kPa	cm <sup>-3</sup> atm <sup>-1</sup>	$10^{-5} \kappa_{\rm H}^{\rm C}$	
		35°C	(308.2 K)	<u> </u>	
	290	38.7	0.052	2.76	
	397 506	52.9 67.5	0.068 0.091	2.90 2.75	
	631	84.1	0.112	2.80	
	760 834	101.3 111.2	0.135 0.150	2.80 2.76	
		• • • • • •			
			β <sup>b</sup> /cm <sup>3</sup> (STP)	<del>-</del> 5 C	
	t/°C	т <sup>а</sup> /к	cm <sup>-3</sup> atm <sup>-1</sup>	10 <sup>-5</sup> K <sup>C</sup> <sub>H</sub>	
	31	304.2	0.139	2.73	
	35	308.2	0.137	2.75 2.80	
	44 57	317.2 330.2	0.134 0.135	2.80	
	69	342.2	0.133	2.78	
	79 90	352.2 363.2	0.133 0.131	2.76 2.78	
	<u></u>				
	h	ated by compi			
	Bunsen	coefficient.		. Guartian	
	ненгу	s constant in	Torr per mol		
		AUXILIARY	INFORMATION		i
METHOD APPARATUS / PI	ROCEDURE :	#*************************************	SOURCE AND PURI	TY OF MATERIALS:	
Method based			(1) No de	tails given.	
(1). The lie with the gas				nachemia AC7014. A	
a gas stripp.	ing cell; .	and then the		ular weight of 390 sity and density,	
extracted gas chromatograp	s was anal	yzed by gas	tivel	y, at 20°C of 126	cs and
determined of	n a 2 m mo.	lecular sieve		$^{1}$ g cm $^{-3}$ . Refractive 4748 at 21.4°C.	e index
type 5A of 4	0-60 mesh a	at 50°C.		4/40 40 21.4 0.	
			ESTIMATED ERROR		
				3, compiler's estin	mate.
			$\delta T/K = \pm 0.1$		
			REFERENCES :		
			1. Gubbins	, K.E.; Carden, S.I	N.;
			Walker, 1965, 3	R.D. J. Gas Chron, 93.	maxogr.
			· · · · · · · · · · · · · · · · · · ·	•	

S:
Weatherford, W. D.; <u>1954</u> , <i>46</i> , 2376-81.
Cramer Clever
C1

т/к	Pressure/ mmHg	Mol Fraction X <sub>1</sub> x 10 <sup>3</sup>	Bunsen Coefficient α	Solubility Coefficient cm <sup>3</sup> O <sub>2</sub> (STP) g <sup>-1</sup> wax
245.35	237.8	1.00	0.156	0.064
	402.9	1.70	0.158	0.109
	602.5	2.58	0.161	0.165
	808.5	3.47	0.161	0.222
	760.0	(3.28)	0.161	0.21

The mole fraction solubility at 760  $\ensuremath{\mathsf{mmHg}}$  was calculated by the compiler.

AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The apparatus was similar to the equilibrium adsorption apparatus described by Brunauer, Emmett, and Teller (1) for the measurement of the surface area of a solid catalyst. A weighed amount of wax was placed in the apparatus. The gas and solvent were equilibrated for 20 to 60 min- utes. The gas volume in the buret system was calculated from the ideal gas law. The results of the absorption mea- surements were checked by a desorption measurement. The two measurements agreed very well.	(1) Oxygen. Prepared from KMnO <sub>4</sub> . Contained 97.8% O <sub>2</sub> , 1.1% N <sub>2</sub> , and 0.1% CO <sub>2</sub> . (2) Paraffin wax. Described as $122^{\circ}$ F English melting point wax. Molecular weight 350, actual melt point 123.2°F (323.8 K), density 0.7716 g cm <sup>-3</sup> at 293.3 K and 0.7662 g cm <sup>-3</sup> at 298.0 K. ESTIMATED ERROR: $\delta T/K = 2$ . $\delta P/mmHg = 0.2$ $\delta \alpha/cm^3 = 0.004$ (low pressure) -0.001 (high pres.) REFERENCES: 1. Brunaur, S.; Emmett, P. H.; Teller, E. J. Am. Chem. Soc. <u>1938</u> , 60, 309.			

448		Oxygen Solubilit	ies up to 200 kPa						
COMPONENTS :			ORIGINAL MEASUREM	ÆNTS:					
(1) Oxygen; O <sub>2</sub> ;	[7782-44-7	7]	Pidenour, W.	P.; Weatherford, W. D.;					
(2) Petrowax A			Capell, R.C	G.					
·/			Ind. Eng. Che	em. <u>1954</u> , <i>46</i> ,2376-81.					
VARIABLES: T/K = 354.75 P/kPa = 38.60 - 104.92		PREPARED BY: A. L. Cramer H. L. Clever							
					EXPERIMENTAL VALU	ES:		L <u></u>	
					T/K	Pressure/	Mol Fractior	n Bunsen	Solubility
	mmHg	$x_1 \times 10^3$	Coefficient	Coefficient					
		1	α	cm <sup>3</sup> O <sub>2</sub> (STP) g <sup>-1</sup> wax					
354.75	289.5	1.27	0.081	0.038					
	361.9	1.67	0.084	0.050					
	480.0 583.5	2.37 3.18	0.090 0.099	0.071 0.095					
	787.0	4.43	0.103	0.133					
		AUXILIARY	INFORMATION						
METHOD / APPARATUS /			SOURCE AND PURIT						
The apparatus v equilibrium ads				repared from KMnO4. 97.8% 02, 1.1% N2, and					
lescribed by B	runauer, Em	mett, and	0.1% CO <sub>2</sub> .						
Teller (l) for surface area of			(2) Petroway A	. Molecular weight 750					
A weighed amour			melting po	int $159.6^{\circ}F$ (352.8 K) 8039 g cm <sup>-3</sup> at 355.6 K					
the apparatus.			density 0.	$8039 \text{ g cm}^{-3} \text{ at } 355.6 \text{ K}$ g cm $^{-3}$ at $370.2 \text{ K}$ .					
vere equilibrat ites. The gas	ted for 20 volume in			g cm o ac 570.2 K.					
system was calo	culated fro	m the ideal							
jas law.									
The results of			ESTIMATED ERROR:						
surements were neasurement. 7	Checked by The two mea		0.17 K = 2.						
greed very wel			$\delta P/mmHg = 0.$						
			$\delta \alpha / cm^3 = 0.0$	004 (low pressure)					
				0.001 (high pres.)					
			REFERENCES:	0.001 (high pres.)					
			REFERENCES: 1. Brunaur, S.	0.001 (high pres.) .; Emmett, P. H.;					
			REFERENCES: 1. Brunaur, S. Teller, E.	0.001 (high pres.) .; Emmett, P. H.;					
			REFERENCES: 1. Brunaur, S. Teller, E.	0.001 (high pres.)					
			REFERENCES: 1. Brunaur, S. Teller, E.	0.001 (high pres.) .; Emmett, P. H.;					

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Steinberg, M.; Manowitz, B.
(2) Amsco 123-5	Ind. Eng. Chem. <u>1959</u> , 51, 47 - 51.
VARIABLES: $T/K = 297.15$	PREPARED BY:
P/kPa = 101.325	H. L. Clever
EXPERIMENTAL VALUES:	
T/K Abs	orption
Coe	β β
297.15	0.159
volume of gas, corrected	sorption coefficient as the to 288.15 K and 101.325 kPa,
absorbed under a total sy per unit volume (at 288.1	stem pressure of 101.325 kPa 5 K) of solvent.
	,
AUXILIAR	Y INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;
Van Slyke Method.	(1) Oxygen. Matheson Co.
	(2) Amsco 123-5. American Mineral
	Spirits Co. No. 140. Paraffin 59.6 wt %, naphthene 27.3 wt %,
	and aromatics 13.2 wt %.
	ESTIMATED ERROR:
	$\delta\beta/\beta = 0.05 - 0.10$ (authors)
	REFERENCES:
	1

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7]			
	ORIGINAL MEASUREMENTS:		
-	Sargent, J. W.; Seffl, R. J.		
(2) L-1822, which is a mixture of mostly 10-carbon fluorocarbons, including cyclic, open chain, and branched molecules.	Fed. Proc. <u>1970</u> , 29, 1699 - 1703.		
VARIABLES:	PREPARED BY:		
T/K = 298 - 310 Total P/kPa = 101.325	A. L. Cramer H. L. Clever		
EXPERIMENTAL VALUES:	<u> </u>		
Temperature	Oxygen Solubility		
t/°C T/K g O	$_{2}$ 1000 g <sup>-1</sup> cm <sup>3</sup> O <sub>2</sub> 100 cm <sup>-3</sup>		
25 298.15	0.285 41.5		
37 310.15	0.271 40.7		
	3 -3		
	ity, $cm^3 O_2 100 cm^{-3}$ , appears pefficient times 100.		
	Jerricient cimes 100.		
	•		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	INFORMATION SOURCE AND PURITY OF MATERIALS;		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup>	SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given.		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below	<pre>SOURCE AND PURITY OF MATERIALS: (1) Oxygen. Source not given. Commercial cylinder. (2) L-1822. Minnesota Mining and</pre>		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below the fluid surface level. Between 25	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. Source not given. Commercial cylinder.</li> <li>(2) L-1822. Minnesota Mining and Manufacturing Co. All H in an</li> </ul>		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below the fluid surface level. Between 25 and 35 cm <sup>3</sup> of solvent are placed in	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. Source not given. Commercial cylinder.</li> <li>(2) L-1822. Minnesota Mining and Manufacturing Co. All H in an organic compound are replaced</li> </ul>		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below the fluid surface level. Between 25 and 35 cm <sup>3</sup> of solvent are placed in the flask. Gas is bubbled through	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. Source not given. Commercial cylinder.</li> <li>(2) L-1822. Minnesota Mining and Manufacturing Co. All H in an organic compound are replaced by F by Simons electrochemical</li> </ul>		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below the fluid surface level. Between 25 and 35 cm <sup>3</sup> of solvent are placed in the flask. Gas is bubbled through the solvent for 2 - 3 h. An 80 micro-	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. Source not given. Commercial cylinder.</li> <li>(2) L-1822. Minnesota Mining and Manufacturing Co. All H in an organic compound are replaced by F by Simons electrochemical</li> </ul>		
METHOD/APPARATUS/PROCEDURE: The equilibrium apparatus is a 50 cm <sup>3</sup> three neck flask equipped with a water condenser, a thermometer, and a gas dispersing tube extending below the fluid surface level. Between 25 and 35 cm <sup>3</sup> of solvent are placed in the flask. Gas is bubbled through the solvent for 2 - 3 h. An 80 micro- liter sample is slowly taken into a	<ul> <li>SOURCE AND PURITY OF MATERIALS;</li> <li>(1) Oxygen. Source not given. Commercial cylinder.</li> <li>(2) L-1822. Minnesota Mining and Manufacturing Co. All H in an organic compound are replaced by F by Simons electrochemical</li> </ul>		
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Miscellaneous Fluids

	Miscellan	eous mulus			
COMPONENTS:		ORIGINAL MEASUR	EMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-	44-7]	Kousaka, K	.; Kise, H.	; Seno, M	ſ.
(2) Surfactants (see b		Yukaga ku <u>1</u>	<u>980</u> , 29, 17	77-80.	
(3) Water; H <sub>2</sub> O; [7732-	18-5]				
VARIABLES:		PREPARED BY:			
T/K = 298 Concentration		1	R. Battino		
		l			
	(298K)		, h		
Surfactant <sup>a</sup>	Relative com in surfacta	ncentration (S nt at indicate	5/S <sub>o</sub> )' <sup>5</sup> of ed concentr	oxygen ation	
	0.2M <sup>C</sup> 0	.4M 0.6M	0.8M	1.0M	
Sodium acetate	0.871 0	.798 0.787	0.747	0.716	
	0.897 0	.860 0.797	0.765 0.780	0.708	
Sodium pentanoate	0.887 0	.846 0.838		0.735	
Sodium octanoate		.936 0.983		-	
<sup>a</sup> Sodium acetate; Sodium propionate;					
Sodium propinate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate;					
Sodium butyrate; Sodium pentanoate; Sodium hexanoate;	ties are on a	a weight basis	5.	_	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; solvent. Solubilit;	ties are on a	a weight basis	5.	_	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; solvent. Solubilit; C Concentrations are	ties are on a	a weight basis mol dm <sup>-3</sup> , i.e	3. e., molarit	у.	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; solvent. Solubilit; c Concentrations are	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI	., molarit	у.	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solution	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI	., molarit	у.	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solution	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI	., molarit	у.	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solut	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI	3. 2., molarit TY OF MATERI 3 given.	у.	ure
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solut	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI NO details ESTIMATED ERROF	<pre>3. 2., molarit 2.TY OF MATERI 3 given. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3.</pre>	Υ·	
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solut	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI NO details ESTIMATED ERROF	<pre>3. 2., molarit 2.TY OF MATERI 3 given. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3.</pre>	ALS:	
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solut	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI No details ESTIMATED ERROF δ(S/S <sub>o</sub> )'/(	<pre>3. 2., molarit 2.TY OF MATERI 3 given. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3.</pre>	ALS:	
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solut	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI No details ESTIMATED ERROF δ(S/S <sub>o</sub> )'/(	<pre>3. 2., molarit 2.TY OF MATERI 3 given. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3.</pre>	ALS:	
Sodium butyrate; Sodium pentanoate; Sodium hexanoate; Sodium oxtanoate; b Relative solubilit; c Concentrations are METHOD/APPARATUS/PROCEDURE: Solubilities determined chromatographic method v ratios of solubilities i aqueous surfactant solution	ties are on a in units of AUXILIARY by a gas which yielded in the	a weight basis mol dm <sup>-3</sup> , i.e INFORMATION SOURCE AND PURI No details ESTIMATED ERROF δ(S/S <sub>o</sub> )'/(	<pre>3. 2., molarit 2.TY OF MATERI 3 given. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3. 3.</pre>	ALS:	

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Sinn, E.; Mattes, K.; Naumann, E.
-	
(2) Various solvents (see table below.)	Wiss. Z. Friedrich-Schiller-Univ. Jena, MathNaturwiss. Reihe
	<u>1967</u> , 16,523-9.
VARIABLES:	PREPARED BY:
т/к = 293	R. Battino
1/1 - 275	A. Battino
EXPERIMENTAL VALUES:	I
Solvent	L <sup>a</sup> l <sup>b</sup>
20°C (293	к)
n-pentane; C <sub>5</sub> H <sub>12</sub> ; [109-66-0]	0.507 0.212
n-hexane; $C_6H_{14}$ ; [110-54-3]	0.495 0.386
n-heptane; C <sub>7<sup>H</sup>16</sub> : [142-82-5]	0.390 0.346
n-octane; C <sub>8</sub> H <sub>18</sub> ; [111-65-9]	0.348 0.320
n-nonane; C <sub>9</sub> H <sub>20</sub> ; [111-84-2]	0.331 0.307
dichloromethane; CH <sub>2</sub> Cl <sub>2</sub> ; [3474	4-12-2] 0.257 0.130
trichloromethane; CHCl <sub>3</sub> ; [67-6	
tetrachloromethane; CCl <sub>4</sub> ; [56-	
1,2-dichloroethane; C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub> ;	[1300-21-6] 0.178 0.153
trichloroethylene; C <sub>2</sub> HCl <sub>3</sub> ; [7	
tetrachloroethylene; C <sub>2</sub> Cl <sub>4</sub> ; [1]	27-19-4] 0.264 0.241
1,1,2-trifluoro-1,2,2-trichlor C <sub>2</sub> Cl <sub>3</sub> F <sub>3</sub> ; [76-13-1]	coethane; 0.602 0.359
methanol; CH <sub>4</sub> O; [67-56-1]	0.231 0.188
ethanol; C <sub>2</sub> H <sub>6</sub> O; [64-17-5]	0.195 0.171
	continued on following page
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The various solvents were saturated	No details given.
with oxygen and the amount of	
dissolved oxygen was determined electrochemically using a Clark	
electrode. Details and drawings are	
given in the original paper.	
	ESTIMATED ERROR:
	$\delta L/L = \pm 0.05$ , compiler's estimate.
	REFERENCES :

452

COMPONENTS :	EVALUATOR:		······································
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Sinn, E.; Matt	hes, K.;	Naumann, E.
(2) Various solvents (see table below.)	Wiss. Z. Fried Jena, Math. <u>1967</u> , 16, 5	-Naturwi	
	l	1	
CRITICAL EVALUATION: conti	nued		
Solvent		La	<u>ر</u> ه
1-propanol; C <sub>3</sub> H <sub>8</sub> O; [540-67-0]		0.206	0.188
1-butanol; C <sub>4</sub> H <sub>10</sub> O; [71-36-3]		0.199	0.185
1-pentanol; C <sub>5</sub> H <sub>12</sub> O; [71-41-0]		0.203	0.189
1-heptanol; C <sub>7</sub> H <sub>16</sub> O; [111-70-6]		0.185	0.172
1-octanol; C <sub>8</sub> H <sub>18</sub> O; [111-87-5]		0.183	0.170
1-nonanol; C <sub>9</sub> H <sub>20</sub> O; [143-08-8]		0.173	0.161
l-decanol; C <sub>10</sub> H <sub>22</sub> O; [112-30-1]		0.161	0.150
ethylene glycol; C <sub>2</sub> H <sub>6</sub> O <sub>2</sub> ; [107-	21-1]	0.031	0.029
2,4,6-trimethoxy-1,3,5-trioxan C <sub>12</sub> H <sub>12</sub> O <sub>3</sub> ; [123-63-7]		0.206	0.190
acetone; C <sub>3</sub> H <sub>6</sub> O; [67-64-1]		0.313	0.221
methylethyl ketone; C <sub>4</sub> H <sub>8</sub> O; [78	-93-3]	0.314	0.263
diethyl ketone; C <sub>5</sub> H <sub>10</sub> O; [96-22	-0]	0.293	0.268
methylpropyl ketone; C5H100; [		0.290	0.266
formic acid (85%); CH <sub>2</sub> O <sub>2</sub> ; [64-		0.062	0.055
acetic acid; C <sub>2</sub> H <sub>4</sub> O <sub>2</sub> ; [64-19-7]		0.195	0.179
propionic acid; C <sub>3</sub> H <sub>6</sub> O <sub>2</sub> ; [79-09	-4]	0.277	0.257
n-propylamine; C <sub>3</sub> H <sub>9</sub> N; [107-10-		0.242	0.159
n-butylamine; C <sub>4</sub> H <sub>11</sub> N; [109-73-		0.272	0.216
- +-	methyl formate; $C_2H_4O_2$ ; [107-31-3]		0.106
ethyl formate; $C_{3}H_{6}O_{2}$ ; [109-94		0.355	0.247
n-octyl formate; C <sub>9</sub> H <sub>18</sub> O <sub>2</sub> ; [112		0.240	0.223
methyl acetate; $C_{3}H_{6}O_{2}$ ; [79-20-		0.276	0.200
ethyl acetate; $C_4H_8O_2$ ; [141-78-		0.314	0.265
n-propyl acetate; $C_5H_{10}O_2$ ; [10]		0.318	0.286
n-butyl acetate; $C_6H_{12}O_2$ ; [123		0.302	0.277
diethyl ether; $C_4H_{10}O$ ; [60-29-		0.485	0.191
ethane,1,1-oxybis[2-ethoxy]-(d. diethyl ether); C <sub>8</sub> H <sub>18</sub> O <sub>3</sub> ; [1]	iethylene glycol	0.205	0.191
butane,1,1'-[oxybis(2,1-ethaned (diethylene glycol di-n-buty C <sub>12</sub> H <sub>26</sub> O <sub>3</sub> ; [112-73-2]	diyloxy)bis-	0.204	0.190
1,4-dioxane; C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> ; [123-91-1]	]	0.172	0.155
dibenzyl ether; $C_{14}H_{14}O$ ; [103-]		0.086	0.080
benzene; C <sub>6</sub> H <sub>6</sub> ; [71-43-2]		0.249	0.209
toluene; C <sub>7</sub> H <sub>8</sub> ; [108-88-3]			0.195
p-xylene; C <sub>8</sub> H <sub>10</sub> ; [106-42-3]			0.235
ethyl benzene; C <sub>8</sub> H <sub>10</sub> ; [100-41-4	1]	0.219	0.199
chlorobenzene; C <sub>6</sub> H <sub>5</sub> Cl; [108-90-		0.214	0.197
bromobenzene; C <sub>6</sub> H <sub>5</sub> Br; [108-86-3		0.143	0.132
iodobenzene; C <sub>6</sub> H <sub>5</sub> I; [591-50-4]		0.110	0.103
	conti	inued on	following page

COMPON	ENTS:	EVALUATOR:		
(1)	Oxygen; O <sub>2</sub> ; [7782-44-7]	Sinn, E.; Matthes, K.: Naumann, E.		
(2)	Various solvents (see table below.	Wiss. Z. Friedrich-Schiller-Univ. Jena, MathNaturwiss. Reihe <u>1967</u> , 16, 523–9.		
CRITIC	AL EVALUATION: CONTI	nued		
	Solvent	L <sup>a</sup> $\ell^{b}$		
	nitrobenzene; C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub> ; [98-95-3	] 0.113 0.106		
aniline; C <sub>6</sub> H <sub>7</sub> N; [62-53-3]		0.070 0.065		

а Ostwald coefficient. All measurements at 20°C (293K). b

Solubility coefficient defined as  $\ell=L \frac{273}{T/K}$ 760-P/mm Hg 760

The term P/mm Hg is the saturation vapor pressure of the solvent at 293K. Vapor pressures are given in the original paper as well as temperature dependent data as graphs for tetrachloromethane, methanol, methylpropyl ketone, and water.

# OXYGEN SOLUBILITIES ABOVE 200 kPa (2 BAR)

iso Oxygen Solubilitie	es Adove 200 kpa
COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Zoss, L. M.
(2) Water; H <sub>2</sub> O; [7732-18-5]	Ph.D. thesis, <u>1952</u> Purdue University
VARIABLES: T/K= 273.15 - 604.8	PREPARED BY: H. L. Clever
Total P/kPa= 3450 - 13,790	
EXPERIMENTAL VALUES:	
Later work by O. G. McKee, Jr, Ph. shows that the 273.15 K (32 F) sol an order of magnitude to high. The temperatures appear to be reliable.	ubility values of Zoss are more than
0 <sup>2</sup> H <sup>-1</sup> C <sup>2</sup> O	t/°F O <sub>2</sub> Partial Pressure/lb in <sup>-2</sup>
The figure above was constructed by The solubility values are from their Schweichert, C. E.; Minnich, B. H. BMI-T-25, May <u>1950</u> ; Ind. Eng. Chem.	r own work, and from Pray, H. A.; Battelle Memorial Institute Report
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: The apparatus (1, 2) consists of a high pressure vessel with integral vapor and liquid sample chambers, heaters, temperature controls, auxillary pumps, and analytical equipment. The sequence of operations was: (a) the pressure vessel was evacuated, (b) charged with a known volume of water (about 175 cm <sup>-3</sup> ), (c) brought to a selected temperature level, (d)	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Oxygen. Commercial source. Stated to be 99.9<sup>+</sup> per cent pure.</li> <li>(2) Water. Distilled water, boiled three hours and cooled. Tested for pH and for oxygen content (polarography).</li> </ul>
charged with gas (under conditions of constant total pressure, constant temperature, and continual agitation) until phase equilibrium was reached, (e) fastened is a vertical position until the vapor and liquid phases separated. The vapor and liquid phase sample chambers were isolated. The vapor was analysed through a drying train and wet test meter. The liquid phase was analysed at room temperature and pressure in a buret system.	$\delta t/{}^{0}F = 0.5$ $\delta P/1b \text{ in } = 3$ $\delta S/S = 0.03$ REFERENCES: 1. Zoss, L. M.; Suciu, S.; Sibbitt, W. L.

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COMPONENTS: ORIGINAL MEASUREMENTS:					
	_	7782-44-7]	44-7] Zoss, L. M.		
(2) Water	с; н <sub>2</sub> 0; [	7732-18-5]		.D. Thesis, <u>1952</u> Irdue University	
EXPERIMENT	TAL VALUE	S:	continued		······
Tempera	ature	Pressure		Vapor Comp	
t∕°F	т/к	p/lb in <sup>-2</sup>	S/cm <sup>3</sup> (STP)g <sup>-</sup>	<sup>1</sup> c <sub>H2O</sub> /mol dm <sup>-3</sup>	mol Fraction <sup>x</sup> H <sub>2</sub> O
32	273.15	500 (34.0 atm, 3450 kPa)	2.90 1.29 2.55		₩\$1.8×8±±
80 200 328 382 417 445	299.8 366.5 437.6 467.6 487.0 502.6		0.95 <sup>1</sup> 0.72 <sup>1</sup> 0.65 <sup>1</sup> 0.57 <sup>1</sup> 0.50 <sup>1</sup> 0.30 <sup>1</sup>		
32	273.15	1000 (68.0 atm, 6895 kPa)	11.43 6.85		
93 138	307.0	0075 KPd)	2.92 1.49 1.21	0.0145	0.137
181	332.0 355.9			0.0139	0.133
202 206	367.6 369.8		1.13	0.120	0.203
313 316	429.3 430.9		1.46	0.139	0.594
421 422 467 486 593 518 532	489.3 489.8 514.8 525.4 534.8 543.15 550.9		1.70 1.501 1.301 1.151 0.941 0.541	0.687	0.882
32 90	273.15 305.4	1500 (102.1 atm, 10,340 kPa)	57.7 50.8 2.30	0.0556	0.273
184 189	357.6 360.4		1.68	0.0440	0.248
292 295	417.6 419.3		1.90	0.117	0.427
390 392	472.0 473.15		2.62	0.323	0.731
503 545 556 567 577 587	534.8 558.15 564.3 570.4 575.9 581.5		3.20 2.90 <sup>1</sup> 2.30 <sup>1</sup> 1.85 <sup>1</sup> 1.32 <sup>1</sup> 0.73 <sup>1</sup>	1.037	0.917
32	273.15	2000 (136.1 atm,		·	
88 185	304.3 358.15	13,790 kPa)	108. 2.89	0.0367 0.0166	0.155 0.090
187 285	359.3 413.7		2.19	0.0980	0.338
287 406	414.8 480.9		2.54 3.82	· · · · ·	
413 523	484.8 545.9		4.96	0.550	0.719
526 596	547.6		3.75 <sup>1</sup>	1.830	0.910
605 613	591.5 595.9		$3.20^{1}$ 2.50 <sup>1</sup>		
621 629	600.4 604.8		$1.70^{1}$ 0.90 <sup>1</sup>		

COMPONENT	S :		ORIGINAL MEASUREMENTS:
(l) Oxy	gen; 02;	[7782-44-7]	Pray, H. A.; Schweichert, C. E.; Minnich, B. H.
(2) Wat	er; H <sub>2</sub> O;	[7732-18-5]	Ind. Eng. Chem. <u>1952</u> , 44, 1147-51.
NADTADI PO			
VARIABLES	т/к = 436-	-617	PREPARED BY:
	p/bar = 7-	- 28	C. L. Young
EXPERIMEN	TAL VALUES:	<u> </u>	l
Т/К	l( P/bar	) <sup>3</sup> Mole fraction of in water, <sup>x</sup> O <sub>2</sub>	oxygen
435.9	6.89 13.8	0.11 0.22	
477.6	20.7	0.33 0.13	
	10.3	0.20	
533.1	6.89 13.8	0.46 0.65	
	20.7 27.6	0.96 1.22	
588.7	6.89 13.8	0.45	
	20.7	1.56	
616.5	7.17 12.1	0.87 1.32	
	14.1 19.3	1.63 2.11	
	19.9 21.3	1.83 2.13	•
		AUXILIARY	INFORMATION
METHOD/A	PPARATUS/PRO	DCEDURE :	SOURCE AND PURITY OF MATERIALS:
city. weight using c Cell co	Pressure me gauge and te hromel-alume ntents equil	a cell of 3 1 capa- casured with dead emperature measured al thermocouple. Librated and Liquid	No details given.
solved	gas estimate	The amount of dis- ed volumetrically.	
			ESTIMATED ERROR:
			$\delta T/K = \pm 1;  \delta P/bar = \pm 1;$
			$\delta x_{O_2} \simeq 1-5$ (estimated by compiler).
			REFERENCES :

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M	/a	te	r
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Wa	ater 455
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Pray, H.A.; Stephan, E.F.
(2) Water; H <sub>2</sub> O; [7732-18-5]	U. S. Atomic Energy Commission <u>1953</u> , BMI-840.
VARIABLES: T/K = 373 - 436	PREPARED BY:
P/MPa = 1.34 - 9.93	R. Battino
EXPERIMENTAL VALUES:	
P <sub>O2</sub> /psia P <sub>O2</sub> /MPa s <sup>b</sup> 10 <sup>4</sup> x <sub>1</sub> <sup>a,c</sup>	P <sub>O2</sub> /psia P <sup>a</sup> <sub>O2</sub> /MPa s <sup>b</sup> 10 <sup>4</sup> x1 <sup>a,c</sup>
212°F (373K)	275°F (408K)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	510 3.52 0.655 5.04 525 3.62 0.645 4.97 555 3.83 0.685 5.28 590 4.07 0.73 5.62 1090 7.51 1.42 10.94 1145 7.89 1.45 11.17 1173 8.09 1.51 11.63 1180 8.13 1.60 12.32 1195 8.24 1.60 12.32 1215 8.38 1.55 11.94 325°F (436K) 195 1.34 0.303 2.44 195 1.34 0.314 2.53 530 3.65 0.830 6.68 560 3.86 0.880 7.08 600 4.14 0.905 7.28 950 6.55 1.41 11.34 950 6.55 1.42 11.42 960 6.62 1.51 12.15 continued on following page
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: A sample of saturated solution is withdrawn from a stainless steel pressurized and thermostatted auto- clave and analyzed for the dissolved gas content. Details and a drawing are given in the paper.	SOURCE AND PURITY OF MATERIALS: No details given.
	ESTIMATED ERROR: $\delta S/S = \pm 0.03$ , compiler's estimate. REFERENCES:

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COMPONENTS:
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(1) Oxygen; O<sub>2</sub>; [7782-44-7]
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(2) Water; H<sub>2</sub>O; [7732-18-5]

ORIGINAL MEASUREMENTS:

Pray, H.A.; Stephan, E.F.

U. S. Atomic Energy Commission 1953, BMI-840.

### continued

P <sub>02</sub> /psia	P <sup>a</sup> /MPa	s <sup>b</sup>	10 <sup>4</sup> x <sub>1</sub> <sup>a,c</sup>
1410	9.72	2.12	17.06
1440	9.93		18.34

<sup>a</sup> Calculated by compiler.

<sup>b</sup> Solubility in units of ml O<sub>2</sub>(STP)/g of water.

C Mole fraction solubility at partial pressure of oxygen indicated. Henry's constants are: 373K, 6397(±240)MPa/mole fraction; 408K, 6995 (±232)MPa/mole fraction; 436K, 5537(±158)MPa/mole fraction (all calculated by compiler).

	••••••••••••••••••••••••••••••••••••••
COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	McKee, O. L. Jr.
(2) Water; H <sub>2</sub> O; [7732-18-5]	Ph.D. thesis, <u>1953</u> Purdue University
VARIABLES: T/K= 273.15 Total P/kPa= 3450 - 20,680	PREPARED BY: H. L. Clever
EXPERIMENTAL VALUES:	
	Total Oxygen essure Solubility lb in <sup>=2</sup> S/cm <sup>3</sup> (STP) g <sup>-1</sup>
	500 1.38 1.48 1.56 1.60
10	000 2.74 2.80
15	500 3.93 3.92
20	000 5.01 4.93
30	000 6.34 6.39
range from 3.5 per 1.5 to 1.5 per cent The work was carrie	ted the maximum error to cent at a solubility of t for a solubility of 6.3. ed out in the Department neering under the direction
<u></u>	AUXILIARY INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The apparatus of Zoss (1) with modifications to improve the temperature control at 32 °F, improve the sampling of the li phase sample.	h (1) Oxygen. No information given. and to (2) Water. Distilled water, boiled
Total Pressure: P/lb in <sup>-2</sup> P/atm P/kPa	ESTIMATED ERROR: See comment under table above.
500         34.0         3450           1000         68.0         6895           1500         102.1         10340           2000         136.1         13790           3000         204.1         20680	REFERENCES: 1. Zoss, L. M. Ph. D. thesis, <u>1952</u> Purdue University

	Oxygen Oblabiliti			
COMPONENTS :	······	ORIGINAL MEASUREMENTS:		
<pre>(1) Oxygen; O<sub>2</sub>;</pre>	[7782-44-7]	Stephan, E. L.; Hatfield, N. S.; Peoples, R. S.; Pray, H. A. H.		
(2) Water; H <sub>2</sub> O;	[7732-18-5]	Battelle Memorial BMI-1067, <u>1956</u> .	Institute Report	
VARIABLES:		PREPARED BY:		
T/K = 373-5		C. L. Young		
P/bar = 14-	•200		<u></u>	
EXPERIMENTAL VALUES: T/K P <sup>†</sup> /bar	Mole fraction of oxygen in liquid, <sup>x</sup> O <sub>2</sub>	T/K P <sup>†</sup> /bar	Mole fraction of oxygen in liquid, <sup>x</sup> O <sub>2</sub>	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.000301 0.000306 0.000350 0.000374 0.000422 0.000523 0.000535 0.000547 0.000699 0.000800 0.000908 0.000948 0.00129 0.00129 0.00129 0.00129 0.00129 0.00165 0.00197 0.00197 0.00199 0.00201 0.00221 0.00231	408.15 14.1 14.8 35.2 36.2 38.3 40.0 75.2 77.6 78.9 80.9 81.4 100.6 103.0 105.1 120.2 122.3 123.7 133.0 138.2 144.4 147.1 147.1 148.5 continu	0.000233 0.000265 0.000527 0.000519 0.000551 0.00114 0.00125 0.00116 0.00121 0.00129 0.00157 0.00161 0.00176 0.00178 0.00178 0.00178 0.00178 0.00197 0.00201 0.00201 0.00205 med on following page	
	AUXILIARY	INFORMATION		
METHOD / APPARATUS / P	ROCEDURE :	SOURCE AND PURITY OF M	IATERIALS :	
Gas and liquid equilibrated for 18 hours. Pressure measured with Bourdon gauge and temperature measu- red with thermocouple. Composition of liquid estimated by volumetric method. Details in source. Partial pressure estimated by sub- tracting vapor pressure from total pressure.		No details	given.	
		ESTIMATED ERROR: $\delta T/K = \pm 0.6; \delta P/ba$ $\delta x_{0_2} = \pm 0.00002$ (estimates)	ar = ±0.3; stimated by compiler	
		REFERENCES :		

Wate	r
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COMPONE	INTS:		ORIGINA	L MEASUREM	ENTS:	
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Stephan, E. L.; Hatfield, N. S.; Peoples, R. S.; Pray, H. A. H.			
(2) Wate	er; H2O;	[7732-18-5]		e Memorial 067, <u>1956</u> .	Institute Report	
EXPERIM	ENTAL VAL	UES: continu	ied			
т/к	P <sup>†</sup> /bar	Mole fraction of oxygen in liquid, <sup>x</sup> O <sub>2</sub>	т/к	P <sup>†</sup> /bar	Mole fraction of oxygen in liquid, <sup>x</sup> O <sub>2</sub>	
408.15	152.0	0.00213 0.00217	477.59	58.8 80.9	0.00135	
435.93	158.2 162.0 172.6 193.3 196.8 199.6 13.4 13.4 13.4 13.4 36.5 38.6 41.4	0.00218 0.00225 0.00233 0.00246 0.00250 0.00255 0.000244 0.000246 0.000252 0.000667 0.000707 0.000727	533.15	85.7 128.1 133.3 138.8 158.1 167.7 176.0 187.6 37.9 39.9 39.9 39.9 41.3	0.00216 0.00319 0.00336 0.00341 0.00353 0.00399 0.00413 0.00424 0.00159 0.00169 0.00165 0.00165	
477.59	65.5 65.5 66.2 97.2 99.3 132.7 138.2 156.1 163.0 171.3 179.5 192.0 198.8 17.4 18.8 19.5 35.4 36.7 37.4 56.7 58.1	0.00113 0.00114 0.00121 0.00170 0.00183 0.00233 0.00250 0.00250 0.00263 0.00271 0.00294 0.00293 0.000490 0.000490 0.000498 0.000514 0.000924 0.000924 0.000988 0.00133 0.00129	560.93	$\begin{array}{r} 42.7\\ 58.5\\ 60.6\\ 70.3\\ 74.4\\ 77.2\\ 77.8\\ 79.9\\ 88.0\\ 92.3\\ 128.2\\ 132.3\\ 136.4\\ 137.8\\ 31.4\\ 33.4\\ 63.1\\ 66.5\\ 98.9\\ 100.3 \end{array}$	0.00165 0.00252 0.00263 0.00319 0.00329 0.00329 0.00325 0.00369 0.00390 0.00536 0.00578 0.00568 0.00578 0.00584 0.00584 0.00181 0.00195 0.00385 0.00395 0.00395 0.00612 0.00619	

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Broden, A.; Simonson, R.
(2) Water; H <sub>2</sub> O; [7732-18-5]	Svensk Papperstidning <u>1978</u> ,81, 541-4. Chem. Abstr. <u>1979</u> , 90, 1427084.
VARIABLES:	PREPARED BY:
T/K = 323-423	R. Battino
P/MPa = 1-5	
EXPERIMENTAL VALUES:	
Data at the right in Figure 3 from the original paper. The following equation fits the data with a standard deviation of ±0.45 mmol dm <sup>-3</sup> . The solubility, [O <sub>2</sub> ], is expressed as mmol dm <sup>-3</sup> where the solvent volume is at the pressure and temperature of the measurement. [O <sub>2</sub> ] = 5.351 -1.252 x 10 <sup>-2</sup> (T/K) -79.54 (P/MPa) +2.135 x 10 <sup>-4</sup> (P/MPa) (T/K) <sup>2</sup> +2.125 x 10 <sup>4</sup> (P/MPa)/(T/K)	Grygen solubility. The modes/dm <sup>3</sup> $f_{0}$
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An autoclave was filled with 2 dm <sup>3</sup> of water. Bubbling oxygen through it served to degas the water and saturate it at the same. At equilibrium, 0.426 cm <sup>3</sup> samples were analyzed for oxygen via a gas chromatograph.	No details given.
	ESTIMATED ERROR: $\delta P = \pm 0.005 \text{ Ma}$ $\delta T/K = \pm 0.3$ $\delta [O_2]/[O_2] = \pm 0.01$ , compiler's estimate REFERENCES:

COMPONENTS: (1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	
(1) Oxygen; 0 <sub>2</sub> ; [7782-44-7]	ORIGINAL MEASUREMENTS:
i i i i i i i i i i i i i i i i i i i	Krieve, W.F.; Mason, D.M.
(2) Chlorine; Cl <sub>2</sub> ; [7782-50-5]	J. Phys. Chem. <u>1956</u> , 60, 374.
· · · · · · · · · · · · · · · · · · ·	
VARIABLES:	PREPARED BY:
T/K = 298	R. Battino; C.L. Young
P/kPa = 529 - 1215	
EXPERIMENTAL VALUES:	2
t/°C T/K Mol % l	$P_0^{2} x_1 P_0^{2} P_0^{2} P_0^{2}$
	.785 5.22 529
	.936 6.67 676 .31 9.13 925
	.49 10.53 1067
	.65 11.99 1215
AUXILIARY	INFORMATION
	·····
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
METHOD/APPARATUS/PROCEDURE: Measurements were carried out using 175 cm <sup>3</sup> stainless steel bombs and calibrated stainless steel bourdon tube gages. A known weight of gas from one bomb is admitted to another containing a known amount of liquid. After equilibrium is established the pressure in the second bomb is determined and the solubility calculated from the pressure and	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Matheson Co., Inc.</li> <li>(2) Commercial chlorine purified by fractional distillation to remove air and carbon dioxide.</li> </ul>
METHOD/APPARATUS/PROCEDURE: Measurements were carried out using 175 cm <sup>3</sup> stainless steel bombs and calibrated stainless steel bourdon tube gages. A known weight of gas from one bomb is admitted to another containing a known amount of liquid. After equilibrium is established the pressure in the second bomb is determined and the solubility	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>(1) Matheson Co., Inc.</li> <li>(2) Commercial chlorine purified by fractional distillation to remove air and carbon dioxide.</li> </ul>

COMPONENTS :			ORIGINAT	MEASUREMENT	rs •	
(1) Oxygen; $O_2$ ;	[7782-44-7]		ORIGINAL MEASUREMENTS: Zeininger, H.			
(2) Nitrous oxide; N <sub>2</sub> O; [10024-97-3]			Chemie-IngTech. <u>1972</u> , 44, 607-12.			
VARIABLES:			DDEDADED			
			PREPARED	BY:		
T/K = 213 P/MPa = 0				с.	L. Young	
EXPERIMENTAL VALUES: T/K P/10 <sup>5</sup> Pa	Mole frac of oxy	qen	т/к	<i>P/</i> 10 <sup>5</sup> Pa	Mole fra of oxy in liquid, <sup>x</sup> O <sub>2</sub>	gen
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.004 0.009 0.031 0.048 0.080 0.123 0.123 0.143 0.169 0.194 0.251 0.410 0.526 0.589 0.016 0.036 0.057 0.068 0.125 0.157	0.196 0.444 0.648 0.779 0.835 0.861 0.873 0.879 0.886 0.898 0.883 0.879 0.920 0.371 0.514 0.665 0.689 0.751 0.743		58.1 65.5 71.1 72.1 82.9 89.9	0.139 0.110 0.168 0.197 0.205 0.267 0.678 0.012 0.023 0.039 0.032 0.039 0.032 0.057 0.086 0.081 0.116 0.126 0.146 0.265 0.418 (con	0.756 0.744 0.805 0.771 0.830 0.787 0.166 0.306 0.393 0.432 0.478 0.527 0.536 0.536 0.607 0.625 0.663 0.666 t.)
		AUXILIARY	INFORMATI	.ON	······································	
METHOD / APPARATUS / PRO	CEDUDE .		LEOURCE AN		MATERIALS:	
Static equilibrium cell stirred with a steel ball. Samples of gas and liquid phases removed and analysed by mass spectrometry. Care was taken to avoid large changes in pressure during sampling by taking small samples. Details in source.			Nitro deter ESTIMATE $\delta T/K$ $\delta x_0$	D ERROR: = ±0.3; = ±0.01; (errors in near cri	was "pure" a gas chromato $\delta P/10^5 Pa = \pm \delta y_{O_2} = \pm 0.0$ n compositio tical region	ography. 0.2; 12 n greater

COMPONENTS: (1) Oxygen; O <sub>2</sub> ; [7782-44-7] (2) Nitrous oxide; N <sub>2</sub> O; [10024-97-3]				ORIGINAL MEASUREMENTS:				
				-	Zeininger, H.			
				ChemIngTech. <u>1972</u> , 44, 607-12.				
EXPERIM	IENTAL VAL	UES:						
T/K	<i>P/</i> 10⁵Pa	Mole fr. of ox in liquid, <sup>x</sup> O <sub>2</sub>	vgen	т/к	<i>P/</i> 10⁵Pa	Mole fr. of ox in liquid, <sup>x</sup> O <sub>2</sub>	vgen	
273.15	35.5 41.0 44.6 47.1 49.1 54.7 59.0 59.3 65.4	0.006 0.017 - 0.023 0.045 0.052 0.091 0.079 0.095	0.060 0.225 0.201 	273.15 293.15	70.4 79.0 79.6 81.1	0.13 0.205 0.203 0.10 0.059 0.092	0.450 0.155	

COMPONENTS:					ORIGINAL MEASUREMENTS:			
(1) Oxyo	gen; O <sub>2</sub> ;	[7782-44-	7]	Zenner, G. H.; Dana, L. I.				
(2) Carl	bon dioxi	de; CO₂;	[124-38-9]	Chem. 59,	Eng. Pro No. 44, 3	g. Symp. Se 6-41.	r. <u>1963</u> ,	
VARIABLES :	: T/K =234 P/MPa =			PREPARED		. Young		
EXPERIMENT	TAL VALUES:				·····			
т/к	P/MPa		raction xygen , in vapor <sup>y</sup> O <sub>2</sub>	, т/к	P/MPa	Mole fr of ox in liquid, <sup>x</sup> O <sub>2</sub>		
273.15 232.85	$\begin{array}{c} 6.03\\ 6.10\\ 6.02\\ 5.32\\ 6.97\\ 8.49\\ 9.42\\ 10.41\\ 11.11\\ 13.87\\ 12.39\\ 12.53\\ 11.15\\ 9.46\\ 7.77\\ 13.49\\ 14.77\\ \end{array}$	$\begin{array}{c} 0.0801\\ 0.063\\ 0.0603\\ 0.0432\\ 0.0843\\ 0.1293\\ 0.160\\ 0.1985\\ 0.237\\ 0.402\\ 0.331\\ 0.340\\ 0.276\\ 0.217\\ 0.1645\\ 0.403\\ 0.531 \end{array}$	0.302 0.298 0.254 0.353 0.407 0.4205 0.422 0.399 0.763 - 0.720 0.753 0.768 0.770 0.707 -	232.85	14.87 14.30 5.92 7.28 4.92 3.79 2.66 3.85 2.19 3.94 5.91 7.88 9.72 11.82 13.01 14.02	0.497 0.113 - - - 0.033 0.072 0.119 0.174 0.234 0.312 0.382 0.468	0.544 0.617 0.774 0.770 0.749 0.716 0.553 0.671 0.704 0.812 0.847 0.853 0.851 0.822 0.789 0.736	
			AUXILIARY	INFORMAT	ION			
METHOD /API	PARATUS / PRO	CEDURE :				OF MATERIALS:		
Static H dead we: measured Samples by remov sample w solution	bomb. P ight test d with re of liqui ving carbo with pota	ressure mea er. Tempe sistance th d and gas a on dioxide ssium hydro en determin	rature ermometer. nalysed from xide	<ul> <li>(1) Ν</li> <li>(2) P</li> <li>g:</li> <li>g:</li> <li>δT/K =</li> <li>δx<sub>O<sub>2</sub>'</sub></li> </ul>	o details urified - iven. ED ERROR: = $\pm 0.2$ ; $\delta y_{O_2} = \pm$	given. no other de δP/MPa = ±0. 0.002 (estim	05;	
				REFEREN	CES:			

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Kaminishi, G.; Toriumi, T. <i>Kogyo Kagaku Zaashi</i> <u>1966</u> , 69, 175-8.		
(2) Carbon dioxide; CO <sub>2</sub> ; [124-38-9]	1,5 0.		
VARIABLES:	PREPARED BY:		
<b>Т/К = 233-298</b>	C. L. Y		
P/MPa = 4-13		Jung	
EXPERIMENTAL VALUES:	Male function o	£	
T/K P/MPa	Mole fraction o in liquid,	in gas,	
	<sup>x</sup> O <sub>2</sub>	<sup>у</sup> О2	
298.15 7.42	0.030	0.081	
7.87 8.05	0.042 0.049	0.088 0.088	
8.22	0.055	-	
288.15 6.45 7.42	0.062	0.132 0.196	
8.05	0.079	-	
8.84 9.22	0.102 0.117	0.228 0.236	
273.15 5.07	0.036	0.220	
7.42 9.63	0.096 0.166	0.371 0.411	
10.57	0.206	0.408	
10.85 11.01		0.405 0.404	
11.18	-	0.397	
253.15 3.70 5.27	0.036 0.072	0.383 0.516	
10.18	0.218 0.371	0.612 0.564	
12.74 233.15 5.27	0.092	0.722	
10.18	0.242	0.757	
AUXILIAR	Y INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MA	TERIALS :	
Static equilibrium cell with		_	
agitator. Pressure measured with	Better than 99.5 m	ole per cent.	
Bourdon gauge. After equilibrium			
established sample removed and			
analysed by volumetric and gravi-			
metric technique. Carbon dioxide			
absorbed in potassium hydroxide			
solution.	ESTIMATED ERROR:	······································	
	$\delta T/K = \pm 0.05;  \delta P/I$		
	$\delta x_{O_2}, \ \delta y_{O_2} = \pm 0.003$		
	REFERENCES :	compiler)	
	ADTERENCES:		

					, u		
COMPONENTS:				ORIGINAL MEASUREMENTS:			
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]			Fredenslund, A.; Sather, G. A. J. Chem. Eng. Data <u>1970</u> , 15, 17-22.				
(2) Carl	bon diox [124-3	ide; CO <sub>2</sub> ; 8-9]					
VARIABLES	:			PREPARED B	Y:		
	223-283 = 10-13			С. L. Yo	oung		
EXPERIMENT	TAL VALUES	: Mole fra	ation			Mole fra	action
m / 17	D /h a m	of oxy	gen	m / 17	D /h a sa	of oxy	/gen
Т/К	<i>P/</i> bar	<sup>x</sup> O <sub>2</sub>	<sup>y</sup> O₂	1/K	r/bar	in liquid, <sup>x</sup> O <sub>2</sub>	<sup>y</sup> O₂
223.15	10.1	0.008	0.312	233.15	121.6	0.334	0.780
	20.3 30.4	0.025 0.049	0.617 0.712	243.15	131.7 20.3	0.393 0.010	0.762 0.275
	40.5	0.071	0.761	243.13	30.4	0.031	0.463
	50.7 60.8	0.096 0.117	0.789 0.809		40.5 50.7	0.052 0.080	0.551 0.609
	70.9	0.150	0.814		60.8	0.104	0.644
	81.1 91.2	0.189 0.220	0.818 0.820		70.9 81.1	0.140 0.162	0.671 0.693
	101.3	0.267	0.819		91.2	0.191	0.689
	111.5 121.6	0.293 0.334	0.797 0.780		101.3 111.5	0.236 0.266	0.694 0.682
222.15	131.7	0.394	0.762	252 15	121.6	0.306	0.671
233.15	10.1 20.3	0.021	0.118 0.419	253.15	20.3 30.4	0.006 0.030	0.061 0.302
ļ	30.4	0.041	0.589		40.5	0.042	0.400
	40.5 50.7	0.064 0.087	0.651 0.695		50.7 60.8	0.062 0.092	0.500 0.540
	60.8	0.120	0.723		70.9	0.125	0.560
	70.9 81.1	0.141 0.167	0.741 0.757		81.1 91.2	0.141 0.170	0.574 0.601
	91.2	0.205	0.766		101.3		0.599
	101.3 111.5	0.248 0.274	0.767 0.760		111.5 121.6	0.255 0.300	0.601 0.570
			AUXILIARY	INFORMATION	1	(co	ont.)
METHOD /AI	PPARATUS,	/PROCEDURE:		SOURCE AND	PURITY O	F MATERIALS:	
		ecirculating	vapor				
flow app measured pressure	paratus. 1 with que measure		re meter; don gauge.	N	lo detai	ls given.	
				ESTIMATED		$R/har = \pm 0$	59, 5-
				$\delta Y_{O_2} = \pm$	:0.02; (e:	$SP/bar = \pm 0.$ stimated by	compiler).
				REFERENCES	3:		
				I			

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Fredenslund, A.; Sather, G. A. J. Chem. Eng. Data <u>1970</u> , 15, 17-22.
(2) Carbon dioxide; CO <sub>2</sub> ; [124-38-9]	

EXPERIMENTAL VALUES:

т/к	P/bar	Mole fra of oxy in liquid, <sup>x</sup> O <sub>2</sub>	gen	т/к	<i>P/</i> bar	Mole fra of oxy in liquid, <sup>x</sup> O <sub>2</sub>	gen
263.15	30.4 40.5 50.7 60.8 70.9 81.1 91.2 101.3 111.5 121.6 40.5 50.7	0.009 0.035 0.056 0.079 0.110 0.134 0.162 0.195 0.243 0.299 0.010 0.042	$\begin{array}{c} 0.096 \\ 0.263 \\ 0.346 \\ 0.417 \\ 0.463 \\ 0.493 \\ 0.495 \\ 0.500 \\ 0.498 \\ 0.446 \\ 0.099 \\ 0.214 \end{array}$	273.15 283.15	60.8 70.9 81.1 91.2 101.3 111.5 50.7 60.8 70.9 81.1 91.2 101.3	0.062 0.090 0.126 0.147 0.185 0.247 0.028 0.040 0.071 0.087 0.115 0.187	0.298 0.336 0.372 0.398 0.401 0.362 0.115 0.161 0.218 0.263 0.294 0.263

.

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Oxygen; O <sub>2</sub> ; [7782-44-7]	Fredenslund, A.; Mollerup, J.; Persson, O.		
(2) Carbon dioxide; CO <sub>2</sub> ; [124-38-9]	J. Chem. Eng. Data <u>1972</u> , 17, 440-3.		
VARIABLES:	PREPARED BY:		
T/K = 224 P/bar = 9-142	C. L. Young		
EXPERIMENTAL VALUES:			
	rgen gas, O <sub>2</sub>		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	61 53 01 71 37 70 08 13		
	INFORMATION		
METHOD /APPARATUS/PROCEDURE: Equilibrium established by re- circulating vapor by pump outside thermostat. Temperature measured with platinum resistance thermometer. Pressure measured with dead weight gauge. Samples of liquid and vapor analysed by gas chromatography. Details in source.	SOURCE AND PURITY OF MATERIALS: No details given.		
	ESTIMATED ERROR: $\delta T/K = \pm 0.01;  \delta P/bar = \pm 0.1;$ $\delta x_{O_2} = \delta y_{O_2} \approx \pm 2.5\%.$ REFERENCES:		

# OZONE SOLUBILITIES

COMPONENTS:	EVALUATOR:
(1) Ozone; O <sub>3</sub> ; [ 10028-15-6 ]	John A. Roth Department of Chemical Engineering
(2) Water; H <sub>2</sub> O; [ 7732-18-5 ]	Vanderbilt University Nashville, Tennessee 37235
(3) Buffer + $H_2SO_4$ or NaOH	Mashviile, lennessee 57255
	April 1981

CRITICAL EVALUATION:

Gases which react upon diffusing into the liquid phase present unique problems in establishing gas-liquid solubilities. Since ozone decomposes irreversibly in water, the overall mechanism in aqueous systems can be presented as 1 2

 $20_{3}(g) \xrightarrow{1}_{\neq} 20_{3}(\ell) \xrightarrow{2}_{\Rightarrow} 30_{2}$ 

The gas-liquid equilibrium involves step 1. Classical solubility measurements involving the equilibration of a fixed volume of gas with a measured mass of solvent cannot be used when step 2 is significant relative to the ozone transfer from the gas phase. Historically, investigators have generated ozone by passing an air or oxygen stream between electrodes across which an electrical discharge is generated. The exiting gas stream, typically 2 to 4% ozone by weight, is bubbled continuously through water. A steady state concentration is achieved as time increases. This approaches the ozone solubility only when the kinetic rate for step 2 is very slow compared to the gas to liquid mass transfer step. For the ozone water system, this occurs only in the low temperature and low pH regions. At higher relative reaction rates (step 2) however, the observed steady state concentration is not the thermodynamic equilibrium (i.e., solubility) concentration.

An experimental approach has been developed by Sullivan (1) and Roth and Sullivan (2) to determine the solubility of ozone in aqueous systems in which significant decomposition occurs. The experiment consists of sparging a high quality ozone demand-free water with an air-ozone or oxygenozone gas stream. The system is sampled during the unsteady state ozone uptake period until a steady state ozone concentration is achieved. The ozone stream is then stopped and the unsteady state batch decomposition is determined by taking concentration time measurements during decomposition. An unsteady state mass balance on ozone in the completely mixed system which describes the ozone uptake portion of the experiment is:

 $\begin{pmatrix} \text{rate of ozone trans-} \\ \text{ferred into the liquid} \end{pmatrix} = \begin{pmatrix} \text{rate of disappearance} \\ \text{by chemical reactor} \end{pmatrix} + \begin{pmatrix} \text{rate of ozone} \\ \text{accumulation in} \\ \text{the reactor} \end{pmatrix}$ (1)  $k_{L}a(C_{i} - C) V = (-r_{O_{3}})V + V \frac{dC}{dt}$ (2) where a = interfacial area, cm<sup>2</sup> C = concentration of the ozone in the bulk liquid, g mol<sup>-1</sup> C\_{i} = concentration of the ozone at the interface, g mol<sup>-1</sup> r\_{O\_{3}} = rate of ozone decomposition, mol l<sup>-1</sup> min<sup>-1</sup> k\_{L} = liquid film mass transfer coefficient, cm<sup>2</sup> min<sup>-1</sup> t = time, min. V = bulk liquid volume, l

The ozone decomposition can be represented adequately over the range of experimental data (Sullivan and Roth (3)) as first order. The interfacial ozone concentration is assumed to be liquid film controlling valid for high Henry's law constants (see, for example, Sherwood et al. (4)). The interfacial concentration,  $C_i$ , is then equal to C\*, the equilibrium solubility concentration.

Recognizing also that the accumulation term,  $dC/dt\,,$  is zero at stady state,

$$C^* = (1 + k/k_L^a) C_{ss}$$

(3)

continued on following page

COMPONENTS:	EVALUATOR:
<ol> <li>Ozone; O<sub>3</sub>: [10028-15-6]</li> <li>Water; H<sub>2</sub>O; [7732-18-5]</li> <li>Buffer + H<sub>2</sub>SO<sub>4</sub> or NaOH</li> </ol>	John A. Roth Department of Chemical Engineering Vanderbilt University Nashville, Tennessee 37235 April 1981

CRITICAL EVALUATION:

#### continued

where C is the steady state ozone concentration. Substituting C = C\* and eq. 3 in eq. 2, integrating and rearranging, the following equation is obtained

$$C = C_{ac} [1 - exv - (k_{r}a + k)t]$$
(4)

The rate constant, k, is determined from the ozone decomposition data. The value of  $k_L^a$ , specific for each experimental apparatus, is determined from the ozone uptake data using eq. 4 and the decomposition rate data. It is assumed further that the gaseous solution is ideal and Henry's law,

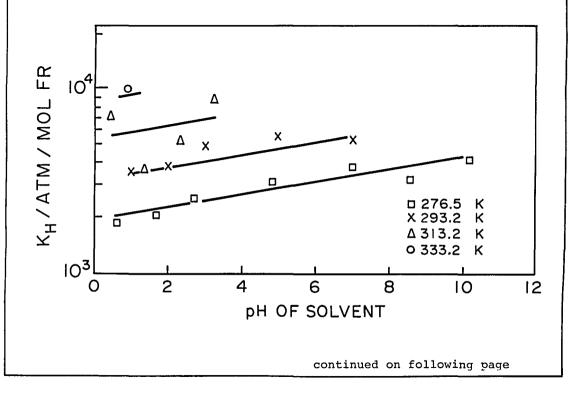
$$P(g) = K_{H}x$$
 (5)

is valid for the nondisassociating step. The analysis of the gas phase oxone concentration provides the corresponding gas phase partial pressure for eq. 5 and  $K_{\rm H}$  can be determined.

Roth and Sullivan (2) have determined the solubility of ozone in a buffered water system. Either  $H_2SO_4$  or NaOH was used to adjust the pH to the desired value. The Henry's law constants are shown in Figure 1. These are fit by the equation,

$$K_{\rm H} = 3.84 \times 10^{\prime} [OH^{-}][exp(-2428/(T/K))]$$
 (6)

where  $[0H^{-}] = hydroxide$  concentration, mole  $1^{-1}$ , and with an index of determination of 0.84 and standard error of estimate of 0.20. This equation is plotted in Figure 1 for comparison with the experimental data. These data are more consistent at the lower temperatures. At higher temperatures and pH's accurate measurements are much more difficult, and accordingly are less reliable.



COMPONENTS:	EVALUATOR:
<ol> <li>Ozone: O<sub>3</sub>; [10028-15-6]</li> <li>Water; H<sub>2</sub>O: [7732-18-5]</li> <li>Buffer + H<sub>2</sub>SO<sub>4</sub> or NaOH</li> </ol>	John A. Roth Department of Chemical Engineering Vanderbilt University Nashville, Tennessee 37235 April 1981

CRITICAL EVALUATION:

#### continued

Li (5) recognized the problem of determining the solubility of ozone in water. He estimated the solubility from his measurements in a buffered aqueous system, but did not fully account for the simultaneous decomposition. Sullivan (1) recalculated Li's data taking into account the domcomposition. These values, converted to Henry's law constants, are given in Table 1 and compared with Sullivan's results predicted by equation (6).

TABLE 1. Comparison of the Recalculated Henry's Law Constants of Li and Sullivan, 298 K

рH	Li (5) K <sub>H</sub> (range) atm/mole fr.	Li (5) K <sub>u</sub> (mean)atm/mole fr.	Sullivan (l) <sup>K</sup> H
	H	н	atm/mole fr.
220	6747-8442	7582	4296
410	7172-7251	7212	5007
615	7440-8274	7857	5906
710	7603-8644	8123	6376

Li's values are 29 to 44% higher than those of Sullivan, disregarding the 2.20 pH data of Li, which appear to be inconsistent. Li's data varied up to 25% at the same experimental conditions. The differences between the Sullivan and the Li data are. however, not fully resolved.

Some of the early reported solubility data for the ozone-water system were obtained by Carius (6). Schone (7) demonstrated that when an ozoneoxygen stream was passed through distilled water, a true equilibrium was not reached. Although the concentration of the dissolved ozone remained constant, the ozone in the gas decomposed to oxygen. Schone accordingly corrected Carius' results. Ingles (8) in 1903 correctly recognized that the measured ozone concentration in water was an "apparent solubility", depending on the gas flow rate. He performed experiments confirming Schone's results and concluded that it is impossible to study the molecular state of dissolved ozone using traditional solubility measurement techniques.

Mailfert (9) in 1894 obtained apparent solubilities for ozone in water from 273 to 333 K and in dilute  $H_2SO_4$  solutions over a range of 303 to 333 K. He presented his results as Ostwald coefficients. These water and low pH values were found to have small deviations at 293 to 298 K and substantial deviations for 303 to 330 K. The values obtained in distilled water were converted to Henry's law constants, reported in the International Critical Tables (10) and commonly reproduced in standard handbooks, disregarding the work of Ingles (8).

Luther-Leipsig (11) determined the apparent solubility at 273 K and 293 K. Rothmund (12) studied the solubility in  $H_2SO_4$  solution and 273 K in which the ozone was quite stable. He found the Ostwald coefficient, L, to be constant over a gas concentration of 20 to 100 mg/l, verifying Henry's law under these conditions. He operated under conditions for which the decomposition rate of ozone was negligible compared to the mass transfer rate. Fischer and Tropsch (13) presented a single Ostwald's coefficient at 291 K.

Kawamura (14) studied both a pure water system for which he determined Ostwald coefficients from 323 K to 333 K and in sulfuric acid solutions ranging from 0.11 N to 7.57 N at 293 K. He found decreasing values of L with increasing acid normality.

COMPONENTS :	EVALUATOR:
<ol> <li>Ozone; O<sub>3</sub>; [10028-15-6]</li> <li>Water; H<sub>2</sub>O; [7732-18-5]</li> <li>Buffer + H<sub>2</sub>SO<sub>4</sub> or NaOH</li> </ol>	John A. Roth Department of Chemical Engineering Vanderbilt University Nashville, Tennessee 37235 April 1981
CRITICAL EVALUATION:	continued

Briner and Perrottet (14) determined the Bunsen absorption coefficient,  $\alpha$ , in water at 276.6 K and 292 K. They also reported  $\alpha$  in solutions containing 35 mg NaCl/ $\ell$  (3.5% dissolved solids) at 236.6 K and 242.0 K. A significant reduction in the dissolved ozone concentration was observed.

Meddows-Taylor (16) references two Ostwald coefficients at 276 K and 293 K.

Hoather (17) noted that the saturation of water with ozone gas was impossible because of the simultaneous occurrence of self-decomposition. He also concluded that reasonably accurate determinations could be made when the mass transfer rate was much greater than the reaction rate. Using conditions where the half-life was about ten mintues, he reported the solubility at 288 K to 312.2 K.

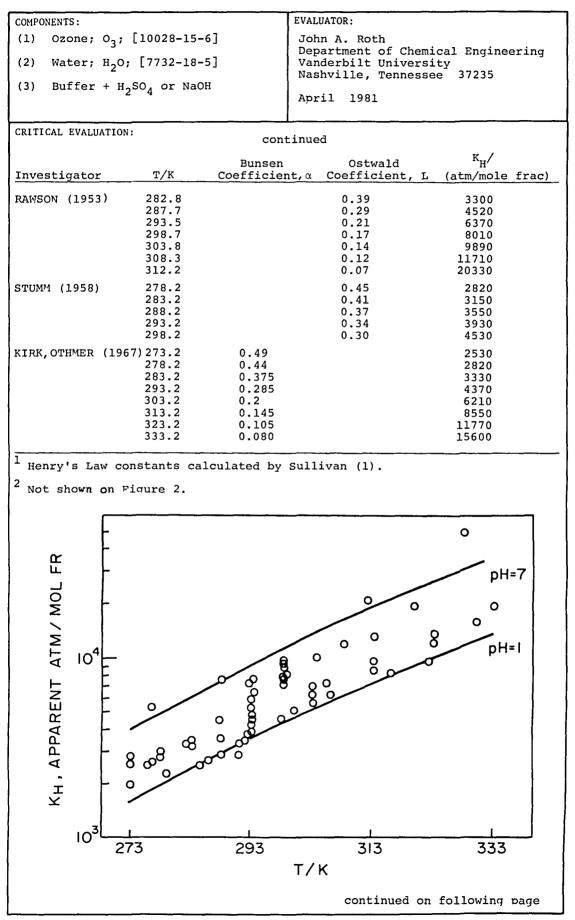
Stumm (19) reported the apparent solubility of ozone in water. Contrary to other investigators, he found the solubility independent of pH up to 8.5. His work was performed over a temperature range of 278 K to 298 K for solutions with an ionic strength of 0.05.

Kirk and Othmer (20) reported Bunsen absorption coefficients from 273 K to 333 K. The original source of these data is not indicated.

The data of these investigators were converted to Henry's law constants, and are given in Table 2. The apparent Henry's law constants for the pure water determinations are shown in Figure 1. Sullivan converted the steady state concentrations to apparent Henry's law constants for comparison with the literature values. These were found to be a function of pH and temperature. Lines are shown in Figure 2 for pH 2 and 7. Values reported in Table 2 fall almost entirely between these two lines. These values are not recommended for use for the following reasons.

- 1. Solubilities were obtained by static techniques neglecting the effect of reaction or by bubbling a continuous oxygen stream through water. These latter experiments are dependent on the mass transfer characteristics, which differ for different experimental apparati and are affected by the reaction.
- 2. Even when extreme care is taken to prepare high purity-ozone demand free water (see Sullivan (1)), the pH will drop during ozonation. Most previous investigators did not monitor the pH during their experiments. Sullivan (1) chose to buffer his experiments thereby maintaining constant pH, but adding dissolved solids.
- 3. Analysis of the unstable ozone species in water is difficult and is usually based on the reaction of free ozone with the reagents used in analysis. Sullivan et al. (20) review the state of the art in ozone analysis. Some investigators clearly used analyses which gave total oxidants rather than ozone specific results. Although better precision can be obtained using spectrometric methods of analysis, these methods are still based on calibrations using iodometric methods.
- 4. Ozone-water chemistry is not well established. A number of mechanisms have been postulated (Peleg (21) and Sullivan (1)) but existing kinetic data are not sufficient to distinguish between the hypothesized kinetic mechanisms.

COMPONENTS :			EVALUATOR:	
<pre>(1) Ozone; O<sub>3</sub>; [ 10028-15-6 ] (2) Water; H<sub>2</sub>O; [ 7732-18-5 ]</pre>		John A. Roth Department of Chemical Engineering		
			Vanderbilt Universi Nashville, Tennesse	
(3) Buffer + $H_2$ SC	$D_4$ or NaO	H	April 1981.	
CRITICAL EVALUATION:				
		contin		
TABLE 2. Appare		ility of Ozc ecommended f	ne in Aqueous Soluti or Use)	.on
Investigator	т/к	Bunsen Coefficien	Ostwald t,α Coefficient, L	K <sub>H</sub> / (atm/mole frac)
SCHÖNE (1873)	291.4	0.366		3400
MAILFERT (1894)	273.2		0.641	1940
	279.2		0.562	2260
	285.0		0.500	2600
	286.2 288.2	2	0.482 0.456	2710 2880
	292.2		0.381	3500
	300.2		0.270	5070
	305.2		0.195	7130
	313.2		0.112	12750
	320.2		0.077	18960
	328.2		0.031	48260
MAILFERT <sup>2</sup> (1894)	333.2 303.2		0.000 0.240	∞ 5760
	303.2		0.224	6230
	315.9		0.174	8280
2-4	322.2		0.156	9410
	330.2		0.096	15680
LUTHER (1905)	273.2		0.44	2830
ROTHMUND (1912)	293.2 273.2		0.23 0.487	5810 2560
FISCHER AND	291.2		0.460	2890
TROPSCH (1917)				
KAWAMURA (1932)	278.2		0.44	2880
	283.2 293.2		0.38 0.29	3400 4610
	303.2		0.20	6910
	313.2		0.15	9520
	323.2		0.11	13390
	333.2		0.08	18980
$\operatorname{KAWAMURA}^{2}(1932)$	202 2		0.18	7420
7.57N $H_2SO_4$ 2.02N $H_2SO_4$	293.2 293.2		0.23	5810
1.01N HISOI	293.2		0.25	5350
$0.18N H_2^2 SO_4^4$	293.2		0.28	4770
0.11N $H_2^2$ SO <sup>4</sup>	293.2		0.28	4770
BRINER AND PERROTTET (1939)	276.7 293.0	0.480 0.323		2590 3860
				5190
BRINÈR AND <sub>2</sub> PERROTTET <sup>2</sup> (1939) 35 g/l NaCL	276.7 293.0	0.24 0.17		7320
MEDDOWS- TAYLOR (1948)	276.2 293.2		0.49 0.34	2570 3930
HOATHER (1948)	288.2		0.173	7590
			continued on follo	wing page



COMPONENTS :	EVALUATOR:		
(1) Ozone; $O_3$ ; [10028-15-6] (2) Water; $H_2O$ ; [7732-18-5] (3) Buffer + $H_2SO_4$ or NaOH	John A. Roth Department of Chemical Engineering Vanderbilt University Nashville, Tennessee 37235 April 1981		
CRITICAL EVALUATION:			
Because of the above problems, none of these data are recommended for use. Ozone-water solubility data are of lesser quality than those obtained on stable gas-liquid systems. The reactivity of the ozone, a very strong oxidizer, results in experimental problems as discussed above. The only data available which considers the problems of the simultaneous decomposi- tion reaction are those of Roth and Sullivan (2) and Li (as recalculated by Sullivan (1)). While these values are empirically correlated with the Henry's law constant as a function of pH, careful investigations of ionic strength, dissolved solids, and perhaps the specific ionic species are still needed. The entire question of ozone aqueous chemistry also needs further clarification. Accordingly, the Roth and Sullivan data			
are recommended recognizing the limit. References	ations and assumptions of these data.		
<ol> <li>Sullivan, D. E., Ph. D. Dissertat. Tennessee, 1979.</li> <li>Roth, J. A.; Sullivan, D. E. (in)</li> <li>Sullivan, D. E.; Roth, J. A. AIC</li> <li>Sherwood, T. K.; Pigford, R. L.; V Hill; New York, 1975, pp. 178-83</li> </ol>	HE Symp. Ser. <u>1980</u> , 76, 142-9. Nilke, C. R. Mass Transfer, McGraw- 2. ississippi State University, <u>1977</u> . 5, 520-6. 6, 1224-9. rans. (Lond.) <u>1903</u> , 83T, 1010-4. 119, 951-3. 1st Ed., Vol. III, McGraw-Hill: New m. <u>1905</u> , 11, 832-5. t," <u>1912</u> , p. 391-4. m. Ges. <u>1917</u> , 50, 765-6. Oure Chem. Sect. <u>1932</u> , 53, 783-7. Chem. Acta. <u>1939</u> , <u>397</u> -404. 3. <u>1947</u> , 2, <u>187</u> -201. <u>1948</u> , 4, 358-68. <u>953</u> , <u>1958</u> , 45, 68-79. nical Technology," 2nd Ed., Vol. 14, abrosi, J.; Roth, J. A. Ozone Science		

COMPONENTS :	ORIGINAL MEASUREMENTS:		
<pre>(1) Ozone; O<sub>3</sub>; [10028-15-6] (2) Water; H<sub>2</sub>O; [7732-18-5]</pre>	Matrozov, V.E.; Kashtanov, S.A.; Stepanov, A.M.; Tregubov, B.A. Zh. Prikl. Khim. (Leningrad) 1975, 48 (8), 1838-41.		
VARIABLES:	PREPARED BY:		
T/K = 294 - 333	R. Battino		
EXPERIMENTAL VALUES:	I		
т <sup>а</sup> /к 10 <sup>5</sup> /(т/к) <sup>b</sup>	log <sub>10</sub> H <sup>b,c</sup> 10 <sup>-4</sup> H <sup>a</sup>		
333.3       300         322.6       310         312.5       320         303.0       330         294.1       340         298.5d	5.45       28.2         5.33       21.4         5.20       15.8         5.08       12.0         4.90       7.94         4.98a       9.46d		
<sup>a</sup> Calculated by compi <sup>b</sup> Values read from gr			
a	onstant in units of atm cm <sup>3</sup> mol <sup>-3</sup> . reported in paper over a ge.		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The ozone concentrations in the liquid and gas phases were deter- mined with the aid of neutral 1% KI solution with phosphate buffer (1). Constancy of ozone concentration at the saturation column exit was determined spectrophotometrically at 254 nm. Special precautions were taken to minimize errors due to ozone decomposition in the liquid and gas phases.	<ul><li>(1) From a LGO-15 ozonizer 3.</li><li>(2) Distilled.</li></ul>		
	ESTIMATED ERROR: $\delta H/H = \pm 0.03$ , compiler's estimate.		

COMPONENTS :		ORIGIN	AL MEAS	SUREMENTS:
(1) Ozone; O <sub>3</sub> ; [10028-15-6	;1	Sull	ivan,	D.E.
÷		Ph.D. thesis, Vanderbilt University,		
(2) Water; H <sub>2</sub> O; [7732-18-5]		<u>1979</u> . Roth, J.A.; Sullivan, D.E. Ind. Eng. Chem. Fundamentals (in press for May 1981).		
VARIABLES:		PREPAR	RED BY:	
Т/К = 277-333 рН		ſ	R. Bat	tino
EXPERIMENTAL VALUES:				······································
t/°C	т <sup>а</sup> /к	1	рН	10 <sup>-5</sup> H <sup>b</sup> / (atm/mol fraction)
3.50 3.50 3.50 3.50 3.50 3.50 3.50 20.00 20.00 20.00 20.00 20.00	276.65 276.65 276.65 276.65 276.65 276.65 293.15 293.15 293.15 293.15	1 2 4 7 8 10 1 2 3	.65 .70 .75 .85 .00 .60 .20 .00 .00 .00	1.829 2.025 2.502 3.070 3.771 3.195 4.186 3.524 3.755 4.795 5.497
20.00 20.00 40.00 40.00 40.00 40.00 60.00	293.15 293.15 313.15 313.15 313.15 313.15 313.15 333.15	7 0 1 2 3	.00 .45 .40 .35 .30 .95	5.497 5.304 7.145 3.590 5.112 8.834 9.671
<sup>a</sup> Calculated by compiler <sup>b</sup> Henry coefficient in uni <sup>c</sup> The authors presented th	e following	g smoo	othing	
	AUXILIARY			
METHOD/APPARATUS/PROCEDURE:		SOURCE	AND P	URITY OF MATERIALS:
A modified iodimetric tech which arsenious acid, a pr standard, was substituted thiosulfate. This permitte analytical procedure to be in a neutral medium. The also studied the kinetics self-decomposition of ozon corrected their results to equilibrium solubilities. was maintained with a phos buffer using H <sub>2</sub> SO <sub>4</sub> or NaOH	imary for sodium ed the performed authors of the e and true The pH phate	(2)	in a gener Deion an al	ized, then distilled from kaline permangate solution. was "ozone demand-free"
attain the desíred pH. De are given in the thesis (1)	tails	δТ/	$K = \pm$	
		REFER	ENCES:	
				van, D.E. Ph.D. thesis, rbilt University, <u>1979</u> .
· · · · · · · · · · · · · · · · · · ·				

COMPONENTS:	EVALUATOR:
(1) Ozone; O <sub>3</sub> ; [10028-15-6]	Sullivan, D.E. Ph.D. thesis, Vanderbilt University,
(2) Water; H <sub>2</sub> O; [7732-18-5]	1979.
2 -	Roth, J.A.; Sullivan, D.E.
	Roth, J.A.; Sullivan, D.E. Ind. Eng. Chem. Fundamentals (in press for May 1981).

CRITICAL EVALUATION:

continued H =  $3.842 \times 10^7 e^{-2.428 \times 10^3/(T/K)}$  [OH<sup>-</sup>] 0.035.

This fits the data with an average deviation of about  $\pm 10$  per cent. [OH<sup>-</sup>] denotes a molar concentration.

COMPONENTS :	ORIGINAL MEASUREMENTS:		
(1) Ozone; O <sub>3</sub> ; [10028-15-6]	Boer, H.; Sixma, F.L.J.		
<ul><li>(2) Trichloromethane (Chloroform);</li></ul>			
CHCl <sub>3</sub> ; [67-66-3]	Rec. Trav. Chim. <u>1951</u> , 70, 997-1004.		
VARIABLES:	PREPARED BY:		
T/K = 234 - 248	R. Battino		
EXPERIMENTAL VALUES: t/°C T <sup>2</sup>	K L <sup>b</sup>		
	~		
	18.2 6.5 <sup>C</sup> 18.2 7.0 <sup>C</sup>		
-25.0 24	18.2 6.5		
	15.2 6.8 <sup>C</sup> 15.2 6.8 <sup>C</sup>		
-28.0 24	15.2 6.8 <sup>C</sup>		
	12.7 7.8 12.7 8.0		
-30.5 24	8.1		
	12.7 8.0 12.0 8.3 <sup>C</sup>		
	12.0 8.2 <sup>C</sup>		
	12.0 7.8 <sup>C</sup> 38.0 9.5 <sup>C</sup>		
	38.0 9.5 <sup>C</sup> 34.0 10.9		
	34.0 10.9 34.0 11.7		
<sup>a</sup> Calculated by compiler	· · · · · · · · · · · · · · · · · · ·		
b Ostwald coefficient.			
c Solubilities determine	d by titration. Other		
	ed from measured concentra-		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;		
The ozone was generated electro-	(1) Generated electrolytically.		
lytically to give a mixture of oxygen and ozone that was 12% ozone	(2) No details given.		
by weight. In the indirect method			
the solubility was determined from the composition of the oxygen/ozone			
mixture entering and leaving the			
saturated solution. In the direct method an aliquot of the saturated			
solution is taken, weighed, neutral potassium iodide solution added,			
acidified with sulfuric acid, and			
the iodine formed titrated with sodium thiosulphate.	ESTIMATED ERROR:		
	$\delta T/K = \pm 0.04$		
	$\delta L/L = \pm 0.04$ , compiler's estimate		
	REFERENCES :		

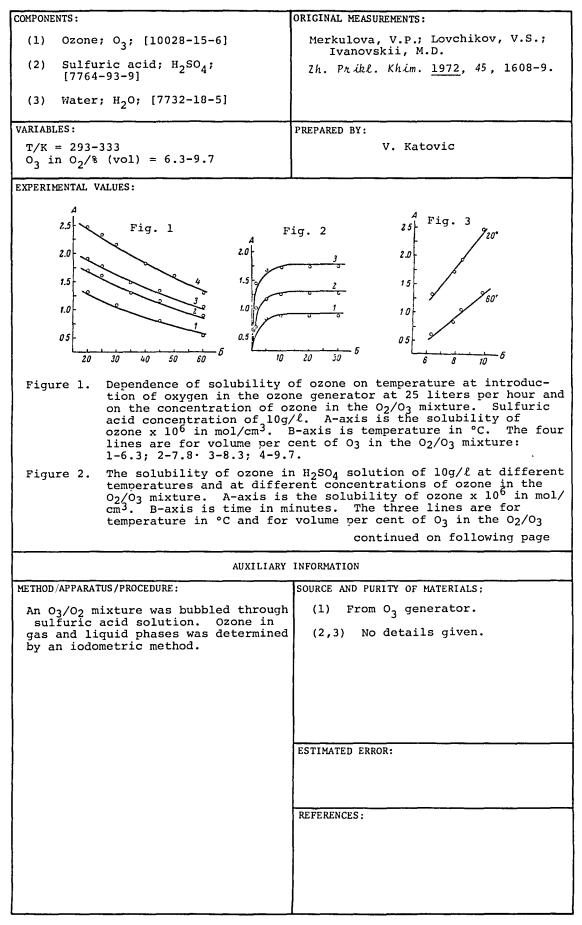
		020110 0	Jubillies		
COMPONENTS:			ORIGINAL MEASUREMENTS:		
(1) Ozone; O <sub>3</sub> ; [10028-15-6]		Mahieux, F.			
<pre>(2) Trichlorofluoromethane; CCl<sub>3</sub>F; [75-69-4]</pre>		Bull. Soc. Chim. France <u>1961</u> , 2275 - 2276.			
***					
VARIABLES: T/K: 293.15 $p_1/kPa$ : 16.2 - 60.8 (0.16 - 0.60 atm)		PREPARED BY: H. L. Clever			
EXPERIMENTAL VALUE	:S:				
T/K	Ozone Mo	ol Fraction	Absorption	Henry's	
	Pressure p <sub>1</sub> /atm	$x_1 \times 10^3$	Coefficient β/cm <sup>3</sup> (STP) cm <sup>-3</sup>	Constant <sup>1</sup>	
202 15	0 16	2 E	0.60	3.7	
293.15	0.16	2.5 2.6	0.64	2.9	
	0.40	6.5	1.58	3.9	
	0.45	7.1	1.72	3.8	
	0.55	7.4	1.8	3.3	
	0.56	7.8	1.9	3.4	
	0.59	7.8 6.9	1.91 1.68	3.2 2.8	
	0.60	0.9			
	[1.0	14.1	3.4	$3.4 \pm 0.5]^2$	
<del></del>	. <u> </u>	AUXILIARY	INFORMATION		
METHOD/APPARATUS/F	ROCEDURE :		SOURCE AND PURITY OF	F MATERIALS:	
Solubility equ		attained	(1) Ozone. No in	nformation.	
between the or	zone and the	trichloro-			
fluoromethane in a special cell. The total pressure is measured. The ozone saturated liquid phase is removed, and the ozone is absorbed		(2) Trichlorofly information			
in a potassium liberated iodi standard metho	n iodide solu Ine is titrat	tion. The ed by			
also analyzed	for ozone by	absorption			
in potassium iodide and titration of the iodine released.			ESTIMATED ERROR:		
			δΚ'/Κ	$' = \pm 0.15$	
			REFERENCES:		
			REFERENCES :		
			REFERENCES :		
			REFERENCES:		
			REFERENCES:		

COMPONENTS:	ORIGINAL MEASUREMENTS:		
(1) Ozone; O <sub>3</sub> ; [10028-15-6]	Briner, E.; Perrottet, E.		
-	Helv. Chim. Acta, <u>1939</u> , 22, 585-7.		
<pre>(2) Tetrachloromethane; CCl<sub>4</sub>; [56-23-5]</pre>	$\frac{1939}{1939}, 22, 303-7.$		
VARIABLES:			
T/K = 261-273	PREPARED BY: V. Katovic		
1/1 - 201-2/3			
EXPERIMENTAL VALUES:	J		
Ozone Concn. <sup>a</sup> <sub>a</sub> b,c	<sub>α</sub> b,d		
8.2 2.8			
8.6 3.1 9.0	4.5		
9.4 10.0 2.5	4.9		
10.0 2.3	4.4		
AUXILIARY	INFORMATION		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Solubility of ozone was determined by an apparatus described in reference (1). The amount of ozone in the CCl <sub>4</sub> and the gas phase was determined by an iodometric technique.			
	ESTIMATED ERROR:		
	REFERENCES :		
	1. Briner, E.; Perrottet, E. Helv. Chim. Acta <u>1939</u> , 22, 397-404.		

			020118 30			+C
COMPONENTS:				ORIGINAL MEASUREMENTS:		
(1)	5			Stolyare	nko, T.E.; S	tolyarenko, G.S
(2)	[56-23-5]			Izv. Vys.	sh. Uchebn.	Zaved. Khim.
(3)	5			Kn Am.	Ternn. <u>1976</u>	, (19) 1613-4.
(4)	Water; H <sub>2</sub> O; [77	32-18-5]				
VARIABL	.ES :	<u></u>	··	PREPARED BY:		
	= 263-303 centration				V. Katovic	:
EXPERIM	ENTAL VALUES:			L		
	CCl <sub>4</sub> solution					
l	saturated with	t/°C	10 <sup>2</sup> c <sup>a</sup>	αb	10 <sup>5</sup> /(т/к)	Log10 <sup>ab</sup>
	-	-10.0	7.0848		380.23	0.7604
1		0.0 18.0	5.1783 3.4071		366.30 343.64	0.6243 0.4425
		30.0	2.5769			0.3212
	H <sub>2</sub> O	-10.0	6.7404	5.480	380.23	0.7388
	4	0.0	6.3591	5.170		0.7135
		18.0 30.0	4.5387 2.5510			0.5670 0.4040
	HNO3	-8.0	6.7486			0.6866
	39.7376%	0.0	6.0960	4.390	366.30	0.6425
		19.5	4.1380		341.88	0.4742
	60.2341%	30.0 -9.5	3.1105 7.3140		330.03 379.50	0.3502 0.6920
	00.23410	0.0	5.9423	4.306	366.30	0.6343
		19.5	4.0434	2,930	341.88	0.4669
		30.0			330.03	0.3365
	68.5889%	-8.0 0.0	6.7896 6.2376			0.6920 0.6551
		18.4			343.64	0.4955
		30.0				0.3541
	85.8646%	-12.0	8.8064			0.7505
		0.0 18.0	7.3048 5.2557			0.6693 0.5262
		30.0	3.8949		343.64 330.03	0.3962
						following page
			UXILIARY	INFORMATION		
METHOD/	APPARATUS / PROCEDURE :			SOURCE AND P	URITY OF MATER	IALS:
	ein gas and liqu			(1) 0.2	2 - 5% O <sub>3</sub> in	oxygen produced
	rmined by a spec	trophoto	netric	by	an ozone'gen	erator.
meth	lod.					
				ESTIMATED ER	ROR:	
				REFERENCES:		
			- <u></u>			

COMPONENTS :			ENALMATOR .				
		28-15-61		EVALUATOR:			
(1)	<pre>(1) Ozone; O<sub>3</sub>; [10028-15-6] (2) Tetrachloromethane; CCl<sub>4</sub>;</pre>		Stolyarenko, T.E.; Stolyarenko, G.S.			1	
(2)	[56-23-5]	une, eer	4′	Izv. Vyssh. Uchebn. Zaved. Khim. Khim. Tekhn. <u>1976</u> , (19), 1613-		613-4	
(3)		•	7-37-2]				
(4)	Water, H <sub>2</sub> O; [77]	32-18-5]					
EXPE	RIMENTAL VALUES:		conti	nued		****	
	CCL <sub>4</sub> solution saturated with	t/°C	10 <sup>2</sup> C <sup>a</sup>	α <sup>b</sup>	10 <sup>5</sup> /(T/K)	Log <sub>10</sub> ab	
	100.00%	-10.0 -1.0 18.0	10.3863 9.7340 6.3413	6.223 4.054	380.23 367.65 343.64	0.8222 0.7940 0.6079	
		30.0	5.1931	3.320	330.03	0.5211	_
1	a Concentratio	on of ozo	one in lig	uid phase	in moles per	liter.	
	b Solubility o						
j							
1							
1							
1							

COMPONENTS :	ORIGINAL MEASUREMENTS:
(1) Ozone; O <sub>3</sub> ; [10029-15-6]	Chretien, A.; Servigne, M.; Mahieux, F.
(2) Six halocarbons (freons) - see below	Bull. Soc. Chim. France <u>1960</u> , 49-54.
VARIABLES:	PREPARED BY:
T/K = 163-250	V. Katovic
EXPERIMENTAL VALUES:	
t/°C T <sup>a</sup> /K CCl <sub>3</sub> F CCl <sub>2</sub> F <sub>2</sub> CCl (Freon-11) (Freon-12) (Freon	$F_3$ CHClF <sub>2</sub> CCl <sub>2</sub> FCClF <sub>2</sub> CClF <sub>2</sub> -CClF <sub>2</sub> -13) (Freon-22) (Freon-113) (Freon-114)
$\alpha^{b}/cm^{3}$ (STP)	$cm^{-3} atm^{-1}$
-110 163 1610 2090 2180 - 90 179 132 136	3490
- 63 210 25.4 - 23 250 6.6	35 9.4
<sup>a</sup> Calculated by compiler.	
<sup>b</sup> Bunsen coefficient calculated by the 1 atm (101.325 kPa) partial pressure	
C Methane, trichlorofluoro (Freon-11);	CC1 <sub>2</sub> F; [75-69-4].
Methane, dichlorodifluoro (Freon-12)	5
Methane, chlorotrifluoro (Freon-13);	CC1F <sub>3</sub> ; [75-72-9].
Methane, chlorodifluoro (Freon-22);	—
1,1,2-Trichloro-1,2,2-trifluoroethar [76-13-1].	<pre>he (Freon-113); CCl<sub>2</sub>FCClF<sub>2</sub>;</pre>
1,2-Dichloro-1,1,2,2-tetrafluoroetha [76-14-2].	ane (Freon-114); CClF <sub>2</sub> CClF <sub>2</sub> ;
	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Solubility of ozone was determined by an apparatus described in the paper.	(1) No details given.
The amount of ozone in the gas phase and in the liquid phase were determined by an iodometric method.	(2) Freons (99%) were distilled through a column containing silica gel, molecular sieves 5A
	and $P_4O_{10}$ .
	ESTIMATED ERROR:
	$\delta \alpha / \alpha = \pm 0.04$ , authors' estimate $\delta T/K = \pm 1$ , authors' estimate
	REFERENCES :
1	



<ul> <li>(1) Ozoner O<sub>3</sub>; (10028-15-6)</li> <li>(2) Sulfuric acid; H<sub>2</sub>SO<sub>4</sub>; (17664-93-9)</li> <li>(3) Water; H<sub>2</sub>O; (7732-18-5)</li> <li>FXFERIMENTAL VALUES: continued mixture: 1-60°C, 7.8%; 2-20°C, 6.3%; 3-20°C, 7.8%.</li> <li>Figure 3. The dependence of ozone solubility in H<sub>2</sub>SO<sub>4</sub> solution (10g/I) on the concentration of ozope in the O<sub>2</sub>/O<sub>3</sub> mixture. A-axis is the solubility of Ozone 10<sup>5</sup> in mol/cm<sup>2</sup>.</li> </ul>	COMPONENTS:		EVALUATOR:
<pre>(2) Sulfuric acid; H<sub>2</sub>SO<sub>4</sub>: [7664-93-9] (3) Water; H<sub>2</sub>O; [7732-18-5] FXPERIMENTAL VALUES: continued mixture: 1-60°C, 7.8%; 2-20°C, 6.3%: 3-20°C, 7.8%. Figure 3. The dependence of ozone solubility in H<sub>2</sub>SO<sub>4</sub> solution (l0g/l) on the concentration of ozone in the O<sub>2</sub>/O<sub>3</sub> mixture. A-axis is the solubility of ozone x 10° in mol/cm<sup>3</sup>. B-axis is the volume</pre>	(1) Ozone	; 0 <sub>3</sub> ; [10028-15-6]	Merkulova, V.P.; Lovchikov, V.S.;
<pre>FXPERIMENTAL VALUES: continued mixture: 1-60°C, 7.8%; 2-20°C, 6.3%: 3-20°C, 7.8%. Figure 3. The dependence of ozone solubility in H<sub>2</sub>SO<sub>4</sub> solution (l0g//) on the concentration of ozone in the O<sub>2</sub>/O<sub>3</sub> mixture. A-axis is the solubility of ozone x 10° in mol/cm<sup>3</sup>. B-axis is the volume</pre>	(2) Sulfu [7664	ric acid; H <sub>2</sub> SO <sub>4</sub> ; -93-9]	
<pre>mixture: 1-60°C, 7.8%; 2-20°C, 6.3%: 3-20°C, 7.8%. Figure 3. The dependence of ozone solubility in H<sub>2</sub>SO<sub>4</sub> solution (l0g/l) on the concentration of ozone in the O<sub>2</sub>/O<sub>3</sub> mixture. A-axis is the solubility of ozone x 10<sup>6</sup> in mol/cm<sup>3</sup>. B-axis is the volume</pre>	(3) Water	; H <sub>2</sub> O; [7732-18-5]	
Figure 3. The dependence of ozone solubility in $H_2SO_4$ solution $(l0g/l)$ on the concentration of ozone in the $O_2/O_3$ mixture. A-axis is the solubility of ozone x $10^6$ in mol/cm <sup>3</sup> . B-axis is the volume	EXPERIMENTAL	VALUES: cont	Linued
Figure 3. The dependence of ozone solubility in H <sub>2</sub> SQ solution (10g//) on the concentration of ozone in the O <sub>2</sub> /O <sub>2</sub> mixture. A-axis is the solubility of ozone x 10° in mol/cm <sup>3</sup> . B-axis is the volume per cent of O <sub>3</sub> in the O <sub>2</sub> /O <sub>3</sub> mixture.		mixture: 1-60°C, 7.8%; 2-	-20°C, 6.3%: 3-20°C, 7.8%.
	Figure 3.	The dependence of ozone so the concentration of ozone solubility of ozone x $10^6$ per cent of O <sub>3</sub> in the O <sub>2</sub> /O	plubility in $H_2SO_4$ solution ( $l0g/l$ ) on a in the $O_2/O_3$ mixture. A-axis is the in mol/cm <sup>3</sup> . B-axis is the volume $O_3$ mixture.

COMPONENTS :	ORIGINAL MEASUREMENTS:
	ORIGINAL MERSOREMIS:
(1) Ozone; O <sub>3</sub> ; [10028-15-6]	Aleksandrou, Yu.A.; Tarunin, B.I.; Perepletchikov, M.L.
(2) Various solvents (see below)	
	Zh. Obshch. Khim. <u>1976</u> , 46, 3-5.
VARIABLES:	
	PREPARED BY:
T/K = 298	R. Battino
EXPERIMENTAL VALUES:	Ъ
Solvent <sup>a</sup>	L <sup>b</sup>
25°C	(298K)
Tetrachloromethane; CCl <sub>4</sub> ;	[56-23-5] 1.96
Acetic acid; $C_2H_4O_2$ ; [64-1]	
Acetic anhydride; $C_4H_6O_3$ ;	
1,1,2,2-Tetrachloroethane:	C <sub>2</sub> H <sub>2</sub> Cl <sub>4</sub> ;
[25322-20-7]	1.77
Trifluoroacetic acid; C <sub>2</sub> HO	
Trichloromethane; CHCl <sub>3</sub> ; [	1
Methyl acetate; C <sub>3</sub> H <sub>6</sub> O <sub>2</sub> ; [7]	
1,2-Dichloroethane; C <sub>2</sub> H <sub>4</sub> Cl	
1,1,2-Trifluoro-1,2,2-tric C <sub>2</sub> C1 <sub>3</sub> F <sub>3</sub> ; [76-13-1]	2.06
$CC1_4$ +CHCl <sub>2</sub> CHCl <sub>2</sub> (14%)	2.01
$CCl_4 + CHCl_2 CHCl_2 (33\%)$	1.99
$CCl_4^4 + CHCl_2^2 CHCl_2^2$ (55%)	2.08
сн <sub>3</sub> соон+с <sub>2</sub> н <sub>5</sub> соон (62%)	1.93
Propionic acid; C <sub>3</sub> H <sub>6</sub> O <sub>2</sub> ; [7]	9-09-4] 1.95
	continued on following page
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The oxygen/ozone mixture was bubbled	
through the solvent being investi-	ozonizer from carefully dried
gated. The ozone content was deter- mined spectrophotometrically at	oxygen.
254nm in a flow cell. Extinction	(2) Solvents were "chemically pure"
coefficients are given in the origin- al paper. Henry's law was found to	grade and purified further by distillation.
hold in all cases.	
	ESTIMATED ERROR:
	$\delta L/L = \pm 0.03$ , compiler's estimate.
	our - 10.03, compiler 5 escimale.
	REFERENCES :

COMPONENTS:	EVALUATOR:		
<ul> <li>(1) Ozone; O<sub>3</sub>; [10028-15-6]</li> <li>(2) Various solvents (see below)</li> </ul>	Aleksandrou, Yu.A.; Tarunin, B.I.; Perepletchikov, M.L. Zh. Obshch. Kh <i>i</i> m. <u>1976</u> ,46, 3-5.		
CRITICAL EVALUATION: CONT	tinued		
Solvent	Lp		
H <sub>2</sub> O+C <sub>2</sub> H <sub>5</sub> COOH (95%)	1.56		
н <sub>2</sub> 0+С <sub>2</sub> н <sub>5</sub> СООН (90%)	1.28		
н <sub>2</sub> 0+С <sub>2</sub> н <sub>5</sub> СООН (80%)	0.89		
н <sub>2</sub> 0+С <sub>2</sub> н <sub>5</sub> СООН (60%)	0.56		
н <sub>2</sub> 0+С <sub>2</sub> н <sub>5</sub> СООН (50%)	0.32		
н <sub>2</sub> 0+С <sub>2</sub> н <sub>5</sub> СООН (30%)	0.24		
Water; H <sub>2</sub> O; [7732-18-5]	0.20		

<sup>a</sup> Composition probably in mol per cent.

b Ostwald coefficient. Ratio of concentration of ozone in solution to its concentration in the gas phase.

## SYSTEM INDEX

Underlined page numbers refer to evaluation text and those not underlined to compiled tables. All compounds are listed as in Chemical Abstracts. For example, toluene is listed as benzene, methyl- and dimethylsulfoxide is listed as methane, sulfinylbis-. For the sake of brevity the oxygen is assumed to be the dissolving gas and is not explicitly stated as a component. On the other hand when ozone is the dissolving gas, it is explicitly stated as a component.

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