ANALYTICAL CHEMISTRY DIVISION COMMISSION ON SOLUBILITY DATA

SOLUBILITY DATA SERIES

Volume 8

OXIDES OF NITROGEN

SOLUBILITY DATA SERIES

Volume	1	H. L. Clever, <i>Helium and Neon</i>
Volume	2	H. L. Clever, Krypton, Xenon and Radon
Volume	3	M. Salomon, Silver Azide, Cyanide, Cyanamides, Cyanate, Selenocyanate and Thiocyanate
Volume	4	H. L. Clever, Argon
Volume	5/6	C. L. Young, Hydrogen and Deuterium
Volume	7	R. Battino, Oxygen and Ozone
Volume	8	C. L. Young, Oxides of Nitrogen
Volume	11	B. Scrosati and C. A. Vincent, Alkali Metal, Alkaline-Earth Metal and Ammonium Halides. Amide Solvents
Volume	18	O. Popovych, Tetraphenylborates

Volumes in preparation

- C. L. Young, Oxides of Sulfur
- R. Battino, Nitrogen
- H. L. Clever and W. Gerrard, Hydrogen Halides in Non-Aqueous Solvents
- E. M. Woolley, Silver Halides
- Z. Galus and C. Guminski, Metals and Intermetallic Compounds in Mercury
- J. W. Lorimer, Alkaline-Earth Metal Sulfates
- A. L. Horvath and F. W. Getzen, *Halogenated Benzenes, Toluenes, Xylenes and Phenols with Water*
- H. L. Clever, D. M. Mason and C. L. Young, Carbon Dioxide
- W. Gerrard and C. L. Young, Hydrides and Methylamines
- H. L. Clever and C. L. Young, Methane
- W. Hayduk, Ethane

NOTICE TO READERS

Dear Reader

If your library is not already a standing-order customer or subscriber to the Solubility Data Series, may we recommend that you place a standing order or subscription order to receive immediately upon publication all new volumes published in this valuable series. Should you find that these volumes no longer serve your needs, your order can be cancelled at any time without notice.

Robert Maxwell Publisher at Pergamon Press



8515 .094

1981

NSRDS

SOLUBILITY DATA SERIES

Volume 8

OXIDES OF NITROGEN

Volume Editor

COLIN L. YOUNG University of Melbourne Parkville, Victoria Australia

Evaluators

RUBIN BATTINO Wright State University Dayton, Ohio, USA WILLIAM GERRARD Polytechnic of North London Holloway, London, UK

Compilers

H LAWRENCE CLEVER Emory University Atlanta, Georgia, USA

SUSAN A. JOHNSON Emory University Atlanta, Georgia, USA M. ELIZABETH DERRICK Valdosta State University Valdosta, Georgia, USA

ALAN S. VOSPER Portsmouth Polytechnic Portsmouth, UK



PERGAMON PRESS OXFORD · NEW YORK · TORONTO · SYDNEY · PARIS · FRANKFURT

U.K.	Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, England
U.S.A.	Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, New York 10523, U.S.A.
CANADA	Pergamon Press Canada Ltd., Suite 104, 150 Consumers Rd., Willowdale, Ontario M2J 1P9, Canada
AUSTRALIA	Pergamon Press (Aust.) Pty. Ltd., P.O. Box 544, Potts Point, N.S.W. 2011, Australia
FRANCE	Pergamon Press SARL, 24 rue des Ecoles, 75240 Paris, Cedex 05, France
FEDERAL REPUBLIC OF GERMANY	Pergamon Press GmbH, 6242 Kronberg-Taunus, Hammerweg 6, Federal Republic of Germany

Copyright © 1981 International Union of Pure and Applied Chemistry

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means: electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holders.

First edition 1981

British Library Cataloguing in Publication Data

Oxides of nitrogen. – (Solubility data series, ISSN 0191-5622; v. 8) 1. Nitrogen oxides 2. Solubility I. Young, Colin L. II. Series 546'.711'2 QD181.N1 ISBN 0-08-023924-2

In order to make this volume available as economically and as rapidly as possible the authors' typescripts have been reproduced in their original forms. This method unfortunately has its typographical limitations but it is hoped that they in no way distract the reader.

CONTENTS

Fore	word	7	vii
Prefa	ace		xi
Intro	ductior		xiii
1.	Nitro	us Oxide	1
	1.1	Water	1
	1.2	Seawater	23
	1.3	Electrolyte solutions (aqueous)	27
	1.4	Weak electrolyte and non-electrolyte solutions (aqueous)	116
	1.5	Colloids (aqueous)	145
	1.6	Organic compounds	160
	1.7	Biological fluids	226
	1.8	Miscellaneous fluids	256
2.	Nitric	Oxide	260
	2.1 2.2 2.3 2.4	Water Salt solutions Ferrous salts (aqueous) Ferrous salts (non-aqueous) Ferric salts Copper salts (aqueous) Copper salts (aqueous) Other salt solutions Organic compounds Inorganic compounds	260 265 268 306 311 314 319 328 336 351
Syst	em Inde	ex	353
Regi	stry Nu	mber Index	363
Auth	ior Inde	x	367

SOLUBILITY DATA SERIES

Editor-in-Chief

A. S. KERTES The Hebrew University Jerusalem, Israel

EDITORIAL BOARD

- H. Akaiwa (Japan)
- A. F. M. Barton (Australia)
- R. Battino (USA)
- A. Bylicki (Poland)
- H. L. Clever (USA)
- R. Cohen-Adad (France)
- W. Gerrard (UK)
- F. W. Getzen (USA)
- L. H. Gevantman (USA)
- A. L. Horvath (UK)
- C. Kalidas (India)
- J. W. Lorimer (Canada)

- A. Maczynski (Poland)
- J. D. Navratil (USA)
- M. Salomon (USA)
- P. W. Schindler (Switzerland)

.

- D. G. Shaw (USA)
- A. Szafranski (USA)
- E. Wilhelm (Austria)
- B. A. Wolf (FRG)
- E. M. Woolley (USA)
- S. H. Yalkowsky (USA)
- C. L. Young (Australia)

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

IUPAC Secretariat: Bank Court Chambers, 2-3 Pound Way, Cowley Centre, Oxford OX4 3YF, UK

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 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 critically-evaluated 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 succinct 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;

(i1) 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;

(11i) 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: (i) components - definition of the system - their names, formulas and Chemical Abstracts registry numbers;

(i1) 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 The scientific standards advocated here are necessary to we are seeking. 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 consolidation adopted by this program offers down-to-earth guidelines, concrete examples which are bound to make primary publication services more responsive 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 1981, cluttered with poorquality 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 guality as authors will increasingly realize that their work will not be suited for permanent retrievability unless it meets the standards adopted in this It should help to dispel confusion in the minds of many authors of project. 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

Users of this volume will find (1) the experimental solubility data of gaseous nitrous oxide and nitric oxide in liquids as reported in the scientific literature (2) tables of smoothed mole fraction solubility values for a limited number of systems which have been studied over a temperature range (3) critical evaluations of the experimental data and a limited number of tables of either tentative or recommended solubility data when two or more laboratories reported data over the same range of temperature and pressure for a system. The number of smoothed data values given is considerably less than in previous volumes on gas solubility (*i.e.*, Volumes 1, 2 and 4) since the number of systems for which two or more groups of workers have reported solubility data is very limited.

The present volume covers the literature up the end of 1979. Some 1980 papers are cited.

Some words of explanation are required with respect to units, corrections, smoothing equations, auxiliary data and data sources, nomenclature and other points. The experimental data are presented in the units found in the original paper. In addition, the original data are often converted to other units, especially mole fraction. Temperatures have been converted to Kelvin. In evaluations of solubility data, SI units are used where practical.

Only in the past 10 to 15 years have experimental methods for the determination of the solubility of gases in liquids developed to the point where 0.5 per cent or better accuracy is attained. Only a small fraction of the literature's gas solubility data is accurate to The corrections for non-ideal gas behaviour and for 0.5 per cent. expansion of the liquid phase on dissolution of the gas are small and usually well within the normal experimental error. Thus such corrections were not made for gas solubility data of the oxides of nitrogen at low pressure unless stated otherwise. In general, measurements of the solubility of the oxides of nitrogen are not of very high accuracy. Many of the measurements were undertaken over forty years ago and by present day standards are of low accuracy.

Indeed, the compilation, evaluation and editing of this volume was made particularly difficult by the fact that although fairly extensive data are available for the nitrous oxide and nitric oxide <u>solubilities</u> particularly in aqueous solution, the data have been presented in a manner which makes it difficult (a) to compare with other workers and (b) in some cases to be sure what the author intended. It must be appreciated that the compilers and to some slightly lesser extent the evaluators, are almost completely limited by the authors' presentation.

Most gas solubility measurements carried out near atmospheric conditions are measured at a total pressure near one atmosphere with the gas saturated with the solvent vapor. Usually the actual partial pressure of the gas is not known. In such experiments the Ostwald coefficient is the directly measured unit. The Bunsen coefficient and the mole fraction gas solubility at one atmosphere gas partial pressure are calculated from the Ostwald coefficient assuming that the Ostwald coefficient is independent of pressure.

Solvent density data were often required in making solubility unit conversions. The density data were not directly referenced. The main sources of density data are

Circular 461 of the U.S. National Bureau of Standards
American Petroleum Research Project 44 Publications
The International Critical Tables, Volume III (E. W. Washburn, Editor), McGraw-Hill Co., 1931
Smow Table, Pure and Applied Chemistry, 1976, 45, 1-9
Thermodynamic Properties of Aliphatic Alcohols, R. C. Wilholt and B. J. Zwolinski, J. Phys. Chem. Ref. Data, 1973, 2, Supplement No. 1
Organic Solvents, J. A. Riddick and W. B. Bunger (Technique of Chemistry, Volume II, A. Weissberger, Editor), Wiley-Interscience, New York, 1970, 3rd Ed.

Chemical Abstracts registry numbers were used throughout. Common names are cross referenced to Chemical Abstract recommended names in the Index. There is a Registry Number Index.

The Editor would appreciate users calling errors and omissions to his attention.

The Editor gratefully acknowledges the advice and comments of the IUPAC Commission on Solubility Data, the cooperation and hard work of the Evaluators and Compilers, the work of typists Joy Wall and Lesley Flanagan and the help of Kerri Hubbard in obtaining photocopies of papers. Acknowledgement is also made to the University of Melbourne for a travel grant which facilitated consultation with the evaluators.

Colin L. Young

Melbourne, Victoria January 1981

xii

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-liquid 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 colubility 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".

Introduction

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 the variable has been inserted by the compiler this has been noted.

PURITY OF MATERIALS

The purity of materials has been guoted 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, 4 (g)

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

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

here n is the number of moles of a substance (an ancone i 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)]

xiv

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_w

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) = $\frac{C_{w}^{-1}(1)}{1 + C_{w}^{M}(1)}$

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

 $r(1 \text{ atm}) = \frac{\alpha}{\alpha + \frac{273.15}{T} \frac{v^{0}(g)}{v^{0}(1)}}$

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

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

Real gases do not follow the ideal gas law and it is important to establish the real gas law used for calculating α 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,..., is related to the Ostwald coefficient by

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

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

The Absorption Coefficient,

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

= (1 - P(1))

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

"he Henry's Lew Contant

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

 $P(\alpha) = K^{H}$

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

 $P(\alpha) = K_2C(1)$

or

 $C(q) = K_{c}C(1)$

where K_2 and K_c are constants, C the concentration, and (1) and (a) 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 he 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.

'he Mole Patio, N

The mole ratio, N, is defined by

= n(q) / 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.

Introduction

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

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

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

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

where v is the molal volume of the gas in cm^3mol^{-1} at $0^{\circ}C$, + the density of the solvent at the temperature of the measurement, (soln)the density of the solution at the temperature of the measurement, and v_{\pm} gas the molal volume of the gas (cm³mol⁻¹) 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

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

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.

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

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

$$a_i = f_i S_i = f_i^{\circ} S_i^{\circ}$$
 and $f_i = f_i^{\circ} \frac{S_i^{\circ}}{S_i}$

where S, and S, ^O 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 $f_i/f_o = \log S_i/S_i = k_s C_s + k_i (S_i - S_i)$. When the

quantity (S₁ - S.^O) is small the second term is negligible even though k_s and k_i 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 eduation 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 of the salt concentration. Both molar (mol dm⁻³) and molal (mol kg⁻¹) are used for the salt concentration. The gas solubility ratio S_1 / S_1 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⁻³ and S_i^{0}/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. $\ln x = A + B / (T/100K) + C \ln (T/100K)$ 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 $\Delta \overline{C}^0$ 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 : ∆Gĩ = -RAT - 100 RB - RCT ln (T/100) ∆Sî -RA + RC ln (T/100) + RC $\Delta \overline{H}^{0}$ -100 RB + RCT = p1 = ۵Ĉ° RC In cases where there are solubilities at only a few temperatures it is convenient to use the simpler equations. ∆G° = - RT ln x = A + BT in which case $A = \Delta \overline{H}_{1}^{0}$ and $-B = \Delta \overline{S}_{1}^{0}$. REFERENCES Battino, R.; Clever, H.L. Chem. Rev. 1966, 66, 395.
 Clever, H.L.; Battino, R. in Solutions and Solubilities, Ed. M.R.J. Dack, J. Wiley & Sons, New York, 1975, Chapter 7. 3. Hildebrand, J. H.; Prausnitz, J.M.; Scott, R.L. Regular and Related Solutions, Van Nostrand Reinhold, New York, 1970, Chapter 8. Markham, A.E.; Kobe, K.A. Chem. Fev. 1941, 63,449.
 Wilhelm, E.; Battino, R. Chem. Fev. 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. 8. Long, F.A.; McDevit, W.F. Chem. Rev. 1952, 51, 119.

W	a	ter
---	---	-----

COMPONENTS:	EVALUATOR:
<pre>1. Nitrous oxide; N₂O; [10024-97-2] 2. Water; H₂O; [7732-18-5]</pre>	Rubin Battino, Department of Chemistry, Wright State University, Dayton, Ohio 45431, U.S.A.

CRITICAL EVALUATION:

The data used by eleven workers was considered to be of sufficient accuracy to use for the smoothing equation. In fitting the data, those points which were about two standard deviations greater than the smoothed data were rejected. In the data sheets which follow the points which were used are marked with asterisks. Twenty-three data points were used as follows (reference - number of data points used from that reference): 1-5, 2-1, 3-1, 4-1, 5-8, 6-1, 7-2, 8-1, 9-1, 10-1, 11-1. The fitting equation used was

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

Using T/100K as the variable gave coefficients of comparable magnitude. The best fit for the 23 points was

 $\ln x_1 = -60.7467 + 88.8280/(T/100K) + 21.2531 \ln (T/100K)$ (2)

where ω_1 is the mole fraction solubility of nitrous oxide at 101.325 kPa (1 atm) partial pressure of gas. The smoothing equation gave a fit in the mole fraction (one standard deviation) of 1.2%. Table 1 gives smoothed values of the mole fraction solubility at 101.325 kPa and the Ostwald coefficient at 5K intervals.

Table 1 also gives values of the thermodynamics functions ΔG_1° , ΔH_1° , ΔS_1° , and ΔC_1° for the transfer of the gas from the vapor phase at 101.325 kPa partial^p gas pressure to the (hypothetical) solution phase of unit mole fraction. These were calculated from the smoothing equation according to the following equations:

 $\Delta G_{1}^{\circ} = -RAT - 100RB - RCT \ln (T/100)$ (3)

 $\Delta S_1^{\circ} = RA + RC \ln (T/100) + RC$ (4)

 $\Delta H_1^{\circ} = -100RB + RCT \tag{5}$

$$\Delta C_{p_1}^{\circ} = RC \tag{6}$$

The heat capacity turns out to be independent of temperature since the three-constant fit was all that was needed for these data.

Several sets of data were rejected for purposes of fitting the smoothing equation. Roth's older data were consistently high by 6 to 8% (12). The chromatographically determined values of Jay $e^{-\frac{1}{2}}$, (13) were 7% high. The two values determined by the Van Slyke method by Christoforides and Hedley-White (14) were 4 to 6% high. Hikita $et = x^7$.'s single value was about 3% low (15). The Orcutt and Seevers value was lo% high (16).

Schwab and Berninger (17) reported data at 10K intervals from 293 to 353K, but their results for this gas and others are highly erratic and are rejected. Schröder (18) determined the solubility from 20 to 178 °C at a pressure of 40 atm. The results are given in graphical form and the author gives the equation

 $\ln \alpha = 3.925 - 5251/(T/K) + 1.109 \times 10^6/(T/K)$

where α is the Bunsen coefficient.

NOTE added by editor: Additional data are given on pages 12-14, 21, 22. The recent data of Weiss and Price (19) are believed to be accurate and are classified as tentative.

COMPONENTS:	EVALUATOR:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Rubin Battino, Department of Chemistry,
2. Water; H ₂ O; [7732-18-5]	Wright State University, Dayton, Ohio 45431, U.S.A.
CRITICAL EVALUATION:	
References	
1. Geffcken, G. Z. Physik. Chem. 190	<u>14</u> , <i>49</i> , 257-302.
 Knopp, W. 2. Physik. Chem. 1904, Findlay, A.; Creighton, H. J. M. 	<i>48</i> , 97-108. <i>J. Chem. Soc.</i> <u>1910</u> , <i>97</i> , 536-61.
4. Findlay, A.; Howell, O. R. J. C. 5. Kunerth, W. $Phys. Rev. 1922, 19,$ 6. Manchot, W.; Jahrstorfer, M.; Z	em. 50c. <u>1914</u> , 105, 291-8. 512-24. epter, H. Z. Ancrg. Allgem. Chem.
<u>1924</u> , <i>141</i> , 45-81. 7. Markham, A. E.; Kobe, K. A. ^J . A 8. Joosten, G. E. H.; Danckwerts, F	mer. Chem. Soc. 1941, 63, 449-54. • V. J. Chem. Eng. Data 1972, 17,
452-4. 9. Sada, E.; Kito, S.; Ito, Y. J. 10. Sada, E.; Kito, S.; Ito, Y. Inc 11. Sada, E.; Kumazawa, H.; Butt, M	Chem. Eng. Japan 1974, 7, 57-9. L. Eng. Chem. Fundam. 1975, 14, 232-7. L. A. J. Chem. Eng. Pata 1977, 22,
277-9. 12. Roth, W. ² . Physik. Chem. 1897, 2	4, 114-51.
 Jay, B. E.; Wilson, R. H.; Doty Anal. Chem. <u>1962</u>, 34, 414-8. 	, V.; Pingree, H.; Hargis, B.
14. Christoforides, C.; Hedley-White 29:A330.	, J. Federation Proceedings <u>1970</u> ,
15. Hikita, H.; Asai, S.; Ishikawa, <u>1974</u> , <i>19</i> , 89-92.	H.; Esaka, N. J. Chem. Eng. Pata
 Orcutt, F. S.; Seevers, M. H. J. Schwab, G. M.; Berninger, E. Z. Schwähn W. Chem. The Table 102 	<i>Biol. Chem.</i> <u>1937</u> , <i>117</i> , 501-7. <i>Physik. Chem.</i> <u>1928</u> , <i>A138</i> , 55.
 Schröder, W. Chem. Ing. Tech. 197 Weiss, R. F.; Price, B. A. Marin 	3, 45, 603. e Chem. 1980, 8, 347.
TABLE 1. Smoothed values of nitrou thermodynamic functions u kPa (1 atm) partial press	ns oxide solubility in water and using equation ^a (2) at 101.325 ure of gas.
T/K $x_1 \times 10^4$ b L c	$\Delta \overline{G}_1^{\circ} d \qquad \Delta \overline{H}_1^{\circ} d \qquad \Delta \overline{S}_1^{\circ} e$
273.15 10.378 1.292	15.60 -25.59 -150.8
2/8.15 8.505 1.078 283.15 7.067 0.912	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
288.15 5.948 0.780 293.15 5.068 0.676	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
298.15 4.367 0.592 303.15 3.805 0.523	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
308.15 3.348 0.467 313.15 2.975 0.421	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$
a. $\overline{C}_{p_1}^{\circ}$ was independent of temperat	ure and has the value 178 J K^{-1} mol ⁻¹ .
b. Mole fraction solubility at 101	.325 kPa partial pressure of gas.
c. Ostwald coefficient.	
d. Units are K J mol ⁻¹ , cal _{th} =	4.184 J.
e. Units are $J K^{-1} mol^{-1}$.	

Water

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Roth, W.		
2. Water; H ₂ O; [7732-18-5]	Z. Physik. Chem., <u>1897</u> , 24, 114-51.		
VARIABLES :	PREPARED BY:		
T/K: 278-298	R. Battino		
EXPERIMENTAL VALUES:			
T/K^a $x_1 \times 10^4$	\mathbf{L}^{c} α^{d}		
279.15 9.157 1			
	9826 0 9479		
	8330 0.7896		
293.15 5.355 0.	7141 0.6654		
298.15 4.635 0.	6279 0.5752		
a. Temperature reported to 0.01°C.			
b. Mole fraction colubility at 101 3	25 Ba (1 atm) partial prossure of		
gas. Calculated by compiler.	25 Pa (1 atm) partial pressure of		
c. Ostwald coefficient. Calculated	by compiler.		
d. Bunsen coefficient. Smoothed bes	t values given by author calculated		
from $\alpha = 1.3668 - 0.04870$ t + 0.000	$68145 t^2$ from measurements in the		
cemperature range 3.5 to 24./°C.			
AUXILIARY	INFORMATION		
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;		
The Ostwald apparatus as described	 Nitrous oxide - prepared from pure ammonium nitrate. 		
by Timofejew (1) was used.			
	2. Water - no comment by author.		
	ESTIMATED ERROR:		
	$\delta \alpha / \alpha = 0.01$ (compiler's estimate)		
	REFERENCES:		
1	1. TIMOTEJEW, W., Z. Physik. Chem., 1890, 6, 141.		
1			

COMPONENT	S :		ORIGINAL	MEASUREMENTS :			
				ORIGINAL MERSOREMENTS.			
1. Nitrous oxide; N ₂ O; [10024-97-2]				Geffcken, G.			
2. Wate	r; H ₂ O; []	732-18-5]	Z. Pl	ysik. Chem., <u>19</u>	904, 49, 257-302.		
			·				
VARIABLES	:		PREPAREI) BY:			
	m/2. 279	2-208		R Batt	200		
	1/1. 2/0	5-250		R. Dutt.			
EXPERIMEN	TAL VALUES:	- <u> </u>					
	т/к ^а	$x_{1} \times 10^{4}$	L ^C	No. Detns.	σ		
*	278.15	8.415	L.067	3	.0027		
*	283.15	7.054 0	0.9101	2	.0002		
*	288.15	5.932 0	0.7784	4	.0008		
*	293.15	5.066	0.6756	5	.0008		
*	298.15	4.386 0	.5942	6	.0013		
ga c. Os tio	 gas. Calculated by compiler. c. Ostwald coefficient. These are averages of the number of determinations listed in column 4 with standard deviations listed in column 5. 						
		AUXILIAR	INFORMAT	ION			
METHOD AP	PARATUS/PROC	EDURE :	SOURCE	AND PURITY OF MATE	RIALS:		
Used the basic Ostwald method. Solvent is degassed by boiling. Details and a drawing given in the paper.			1. Nitam am pap 2. Wat	 Nitrous oxide - prepared from pure ammonium nitrate. Details in paper. Water - distilled. 			
			ESTIMAT	ESTIMATED ERROR:			
			δ L/L =	$\delta L/L = 0.01$ (compiler's estimate)			
			REFEREN	CES:			
			1				

COMPONENTE	
CONFINENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O;	Knopp, W.
[10024-97-2]	2. Physik Chem., 1904, 48, 97-108
2. Water; H ₂ O; [7732-18-5]	2. Ingeok. Onem., 1904, 10, 9, 100.
VARIABLES	
	PREPARED BY:
	R. Battino
EXPEDIMENTAL MALINE	
SATTENTAL VALUES:	
T/K^{a} $x_{1} \times 10^{4}$	b L c α d
* 293.15 5.046	0.6729 0.6270
a. Temperature reported to 1°C.	
b. Molo fraction solubilate of 101	
gas. Calculated by compiler.	25 kPa (1 atm) partial pressure of
C. Ostwald coofficient Calculated	by compiler
d -	by comprise.
d. Bunsen coefficient.	
}	
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Used the Optional designation of	1 Nitrova avida - proparad from
modified by Braun (1).	pure ammonium nitrate.
	2 Water - no comment by author.
	[
	ESTIMATED ERROR:
	$\delta \alpha / \alpha = 0.01$ (compiler's estimate)
	REFERENCES :
	L. Braun, L., A. Physick, Chem.
	<u>1900</u> , <i>33</i> , 721.
1	

COMPONENTS:			ORIGINAL MEASUREMENTS:			
1. Ni	trous oxid	e; N ₂ O; [10	024-97-2]	Findlay,	A.; Creighton, H	.J.M.,
2 W a	tor. H O.	[7732-18-5]	-	I Chem	Soc 1910 97	536-61
2. Wa	$1001; n_20;$	[//32-18-5]		U. Chem.	<u>1910</u> , <i>37</i> ,	220-0T
VARTARI	FC.					
VARIABL	.2.3 :			PREPARED BY:		
					R. Battino	
EXPERIM	ENTAL VALUES	•				
P/m	mHa ^a	т. ^b	P/mmHa	т.	P/mmHa	т.
					I / Manig	
7	58	0.592	758	0.592	758	0.591
8	42	0.593	831	0.593	888	0.592
9	67	0.592	997	0.592	971	0.591
	41 05	0.593	1082	0.593	1091	0.592
	.60	0.592	1351	0.594	1281	0.593
	0 2	0.052	1991	0.372	1201	0.355
		т/к ^с	<i>x</i> ,	$x 10^4 d$	т. е	
					·	
		* 298.15	4	.370	0.592	
a. P	artial pre	ssure of nitr	ous oxide	. All measu	irements at 298.1	5 к.
р. 0 с. Т	stwald coe emperature	fficient. s reported to	0.1°C.			
d. M	ole fracti gas. Ca	on solubility lculated by o	v at 101.3	25 kPa (1 a	atm) partial pres	sure of
e. 0	stwald coe	fficient - me	an of val	ues at vary:	ing pressures cite	ed above.
			AUXILIARY	INFORMATION		
ME THOD	APPARATUS/PR	OCEDURE :		SOURCE AND PU	RITY OF MATERIALS;	
				1. Nitrous	oxide - prepared	by
Used	the Geffck	en (l) appara	atus.	heating	pure ammonium nit	trate.
Liqui	ds degasse	d by boiling.		2. Water -	distilled.	
				ESTIMATED ERR	OR:	
				57 /7 0 0		
1				(Authors')	estimate is 0.002	imate) 5).
				REFERENCES :		
						(71. a.m.
				1. Geffcker 1904, 49	, G., Z. Physik. , 257-302.	cnem.,

.

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitrous oxide; N_2O ; [100	024-97-2] Findlay, A.; Howell, O.R.,			
2. Water; H ₂ O; [7732-18-5]	J. Chem. Soc., <u>1914</u> , 105, 291-8.			
VARIABLES				
	PREPARED BY:			
	R. Battino			
EXPERIMENTAL VALUES:				
P/mmHg ^a L	b P/mmHg L			
282.5 0.58	85 272.8 0.585			
396.1 0.58	85 393.2 0.585			
562.9 0.58	84 548.6 0.585			
664.5 0.58	85 652.4 0.585			
789.3 0.58	85 751.0 0.585			
1027.5 0.58	85 1021.7 0.586			
a. Partial pressure of nit	rous oxide. All measurements at 298.15 K.			
b. Ostwald coefficient.				
т/к ^а	m, x 10 ⁴ ^b I, ^c			
~ 298.15	4.319 0.585			
a. Temperatures reported to	o 0.1°C.			
b. Mole fraction solubility at 101.325 kPa (1 atm) partial pressure of				
gas. Calculated by compiler.				
	AUXILIARY INFORMATION			
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The apparatus used was that earlier (1).	l. Nitrous oxide - prepared by heating carefully purified ammonium nitrate.			
	2. Water - distilled.			
	ESTIMATED ERROR:			
	$\delta L/L = 0.01$ (compiler's estimate)			
	= 0.0025 (author's estimate)			
	DEFEDENCES.			
	J. Chem. Soc., <u>1913</u> , 103, 636.			

Nitrous Oxide

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.
2. Water; H ₂ O; [7732-18-5]	Phys. Rev., <u>1922</u> , 19, 512-24.
VARIABLES:	PREPARED BY:
Т/К: 291-309	R. Battino
EXPERIMENTAL VALUES:	
T/K^{a} $x_{1} \times 10^{4}$	<i>b</i> L <i>c</i>
* 291.15 5.306	0.703
* 293.15 5.062	0.675
* 295.15 4.754	0.638
* 297.15 4.569	0.617
* 299.15 4.320	0.587
301.15 4.104	0.561
* 303.15 3.854	0.530
305.15 3.708	0.513
* 307.15 3.435	0.478
* 309.15 3.208	0.449
 b. Mole fraction solubility at 101,3 gas. Calculated by compiler. c. Ostwald coefficient. 	25 Pa (l atm) partial pressure of
AUXILIARY	INFORMATION
METHOD 'APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Apparatus is similar to that of McDaniel (1). It uses a 120 cm ³	 Nitrous oxide - from S.S. White Dental Company. 99.7% pure.
absorption pipet is 31.3 cm ³ and	2. Water - no comment by author.
connected to the gas buret via a glass capillary. The solvent is	
degassed by boiling under vacuum.	
absorption pipet the entire	
apparatus is mechanically shaken.	
paper.	ESTIMATED ERROR:
	$\delta L/L = 0.01$ (compiler's estimate)
	REFERENCES :
	1. McDaniel, A.S., J. Phys. Chem
	<u>1911</u> , 15, 587.
	1

VVdtei 5			
COMPONENTS: ORIGINAL MEASUREMENTS:			
<pre>1. Nitrous oxide; N₂0; [10024-97-2] 2. Water: H₂0, [7732-18-5]</pre>	Manchot, W.; Jahrstorter, M.; Zepter, H.		
	2. Anorg. Allgem. Chem., <u>1924</u> , 141, 45-81.		
VARIABLES:	PREPARED BY:		
	R. Battino		
EXPERIMENTAL VALUES.			
$T/K^{a} x_{1} \times 10^{4}$	b L ^c S ^d		
* 298.15 4.281	0.5800 53.3		
a. Temperature reported to ±1°C.			
b. Mole fraction solubility at 101,325 Pa (1 atm) partial pressure of gas. Calculated by compiler.			
c. Ostwald coefficient calculated by compiler.			
d. Solubility in units of cm ³ at 273 of water.	.15 K and 1 atm dissolved in 100 g		
AUXILIARY INFORMATION			
A PRACEDURE:	SOURCE AND PURITY OF MATERIALS;		
Determined in a gasometer. Details	 Nitrous oxide - chemically prepared and purified. 		
given in reference (1).	2. Water - no comment by authors.		
	ESTIMATED ERROR:		
	$\delta S/S = 0.03$ (estimated by compiler)		
	REFERENCES:		
	 Manchot, W., Z. Anorg. Allgem. Chem., <u>1924</u>, 141, 38-44. 		

COMPONENTS:	ORIGINAL MEASUREMENTS:
1 Nitroug ovider N 0 , [10024-97-2]	Markham A.F., Koho, K.A.
1. Nicrous Oxide; N_20 ; $[10024-97-2]$	Markham, A.E.; Kobe, K.A.,
2. Water; H_2O ; [7732-18-5]	J. Amer. Chem. Soc., <u>1941</u> , 63, 449-54.
VARIADLES:	PREPARED BY:
T/K: 273-313	R. Battino
EXPERIMENTAL VALUES:	
	c d Avg.
$\underline{T/K} x_1 \ge 10^{-1}$	α No. Detns. Devn.
* 273.35 10.415 1.2	980 1.2970 3 0.0001
* 298.15 4.345 0.5	886 0.5392 11 0.0012
313.15 2.898 0.4	103 0.3579 7 0.0010
a. Temperature reported to $\pm 0.1^{\circ}$ C.	
h Mala fraction colubility at 101	225 Da (1 atm) partial processing of
gas. Calculated by compiler.	525 Pa (I aum) partial pressure of
c. Ostwald coefficient. Calculated	by compiler.
d. Bunsen coefficient. Average of n	umber of determinations listed in
column 5. The average deviation	is listed in column 6.
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
Used the Ostwald method with	1. Nitrous oxide - from commercial
modifications. Absorption flask	cylinders. 99.7% pure.
top and bottom via three-way stop-	2. Water - distilled.
cocks. One bulb is double the volume of the other. Critical	
parts including the manometer and	
water bath. The gas is saturated	
before exposure to the degassed liquid. The bulks are mechanically	ESTIMATED ERROR:
agitated. Volumes are calibrated	$\delta \alpha / \alpha = 0.01$ (compiler's estimate)
a drawing are given in the original	
paper.	REFERENCES :

Water			
COMPONENTS :	ORIGINAL MEASUREMENTS:		
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>	Jay, B.E.; Wilson, R.H.; Doty, V.; Pingree, H.; Hargis, B.		
2. Water; H ₂ O; [7732-18-5]	Anal. Chem., <u>1962</u> , 34, 414-8 .		
VARIABLES:	PREPARED BY:		
	R. Battino		
EXPERIMENTAL VALUES:			
$\mathbf{T}/\mathbf{K} = \begin{bmatrix} \mathbf{a} \\ \mathbf{x}_1 & \mathbf{x}_1 \end{bmatrix}$	ь с 0" L		
200.15 2.0	36 0.425		
309.15 3.0	50 0.425		
a. Temperature reported to 1° C.			
 b. Mole fraction solubility at 101.325 kPa (1 atm) partial pressure of gas Calculated by compiler. 			
c. Ostwald coefficient. Average of 11 values with a standard			
AUXILIARY	INFORMATION		
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
A gas chromatographic method for determining solubility is described in the paper with illustrations.	 Nitrous oxide - from Matheson Gas Co. Stated to be "100% N₂O" - but not as a measure of purity (compiler). Water - no comment by authors. 		
	LETIMATED EDDAD.		
	$\frac{\text{ESTIMATED ERROR}}{\delta I / I. = 0.02 \text{ (estimated by})}$		
	compiler)		
	REFERENCES:		

COMPONENTS :	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sy, W.P.; Hasbrouck, J.D.	
2. Water; H ₂ O; [7732-18-5]	Anesthesiology, <u>1964</u> , 25, 59.	
VARIABLES :	DEDADED BY.	
	C.L. Young	
EXPERIMENTAL VALUES:		
T/K Partial pressure of nitrous oxide <i>F/mmHg</i>	e + Ostwald e coefficient, L	
37 699.8 699.2 699.2 694.7 694.9 695.2 695.2 695.3 695.8 695.8 695.8	0.367 0.370 0.367 0.372 0.365 0.366 0.369 0.361 0.367	
Mean Ostwald coefficient = Standard deviation =	0.367 0.003	
+ Calculated by subtracting vapor pressure of . water from total pressure.		
AUXILIARY INFORMATION		
METHOD APPARATUS/PROCEDURE	SOURCE AND PURITY OF MATERIALS.	
Nitrous oxide bubbled through water - allowed to stand for 15 minutes. Samples analysed in Van Slyke - Neill apparatus (1).	Water dıstilled, no other details gıven.	
	ESTIMATED FREOR:	
	$\delta T/K = +0.1; \delta^{-}/mmHg = +0.1$	
	REFERENCES: 1. Van Slyke, D.D.; Neill, J.M. 	

		VVa	iter	13
COMP	ONENTS:		ORTGINAL MEASUREMENT	×.
1.	Nitrous	Oxide; N ₂ O; [10024-97-2]	Borgstedt, H.H.: Gillies, A.J.	
2. Water, H O. (7722 10 5)		borgsteat, n.m., diffes, A.U.		
ĺ	nacci, i	120; [//32-18-5]	Anestnesiology,	1965, 26,675-8
WART				
VARI	ABLES:		PREPARED BY:	
	Tempe	erature, pressure	C.L.	Young
pressure				
EXPE	RIMENTAL VA	LUES:		· · · · · · · · · · · · · · · · · · ·
	m /		Number of	10 ⁴ Mole fraction ⁺
	TYK	Bunsen coefficient, α	Observations	$10^{4}x_{N_{2}O}$
	303			
	305.5	0.485 ± 0.0026 0.469 ± 0.0024	20	3.91
	310	0.429 ± 0.0028	40	3.46
	313	0.403 ± 0.0025	20	3.25
	318	0.365 ± 0.0017	20	2.94
	323	0.338 ± 0.0026	20	2.73
		+ calculated by	compiler	
		·····		
METL			I THIONERI ION	
,	IOD APPARATU	IS/PROCEDURE:	SOURCE AND PURITY OF	F MATERIALS;
A	jas chroma	tographic method in 'ich	Water stated to	be pure. No other
	sample of	water saturated with	details given.	
the	e Chromato	cted directly into		
was	absorbed	by molecular sieve type		
3A	and nitro	ous oxide detected with		
a t	chormal co	inductivity detector.		
Det	ector res	sponse compared with		
Dot	it of samp	les of known amount.		
	ails in s	source.		
			ESTIMATED ERROR:	
[5 / TF	
1			0T/K =	±0.1
1				
			REFERENCES	
1				
1				
1			1	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
 Nitrous oxide; N₂O; [10024-97-2] 	Saidman, L.J.; Eger, E.I.; Munson, E.S.; Severinghaus, J.W.	
2. Water; H ₂ O;[7732-18-5]	Anesthesiology, <u>1966</u> , 27, 180–184.	
VARIABLES:	PREPARED BY	
Temperature	C.L. Young	
EXPERIMENTAL VALUES:	Ostwald coefficient, L	
T/°C T/K No of sample	s Mean Standard deviation	
37 310.2 6 25 298.2 6 20 293.2 6	0.444 0.010 0.594 0.008 0.657 0.017	
AUXILIARY		
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MAILRIALS:	
Modified Scholander apparatus used. Known amount of water equilibrated with a known volume of gas and change in volume used to estimate Ostwald coefficient. Details in source and ref. (1).	l. No details given. 2. Degassed	
	<pre>ESTIMATED ERKOR:</pre>	

ORIGINAL MEASUREMENTS:

1. Nitrous ox:	ide; N ₂ O;	[10024-97-2]	Christofor	ides, C.; Hedley-White, J.
2. Water; H ₂ O; [7732-18-5]		J. Federation Proceedings, <u>1970</u> , 29: A330.		
VARIABLES:			PREPARED BY:	
T/1	K: 298-310			R. Battino
EXPERIMENTAL VAL	UES:		L	
	T/K ^a	$x_1 \times 10^4$ b	L ^C	α ^d
	298.15 310.15	4.520 3.405	0.6123 0.4780	0.561 0.421
a. Temperatures reported as 25° and 37°C.				
gas. Cal	lculated by	compiler.	325 KPA (1 A	(cm) partial pressure of
c. Ostwald o	coefficient.	Calculated	by compiler.	
d. Bunsen co	pefficient.			
I				
Million		AUXILIARY	INFORMATION	
METHOD APPARATUS	/PROCEDURE:		SOURCE AND PUR	ITY OF MATERIALS;
Determined by	y Van Slyke	manometry.	1. Nitrous authors.	oxide - no comment by
			2. Water -	no comment by authors.
			ESTIMATED ERRC	DR:
			$\delta \alpha / \alpha = 0.02$	(compiler's estimate)
1			REFERENCES:	
			{	

ĺ

COMPONENTS:

COMPONENTS :	ORIGINAL MEASUREMENTS:
1 Nitrous oxide: N 0: [10024-97-2]	Joosten, G.E.H.; Danckwerts, P.V.,
1. Nicious Oxide; N_20 ; [10024-57-2]	
2. Water; H_2O ; $[7732-18-5]$	J. Chem. Eng. Data, <u>1972</u> , 17, 452-4.
VARIABLES:	PREPARED BY:
	R. Battino
EVDEDIMENTAL VALUES.	
EXTERIOL VALUES.	
T/K^{a} $x_{1} \times 10^{+b}$	L^{c} $1/K_{\rm H} \times 10^{5}$
* 298 15 / 409	0 5973 2 44
·· 270.13 4.407	0.5575 2.44
a. Temperature reported as 25°C.	
b. Mole fraction solubility at 101,3 gas. Calculated by compiler.	25 kPa (l atm) partial pressure of
c. Ostwald coefficient. Calculated	by compiler.
d. Henry's law constant in units of	cm ³ atm mol ⁻¹ .
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
Used the apparatus and procedures of Markham and Kobe (1).	 Nitrous oxide - no comment by authors.
	2. Water - no comment by authors.
	ESTIMATED ERROR:
	$\delta K_{\rm H}^{\prime}/K_{\rm H}^{\prime} = 0.01$ (compiler's estimate)
	REFERENCES:
	1. Markham, A.E.; Kobe, K.A., J. Amer. Chem. Soc., <u>1941</u> , 63, 449-54.

W	ater 1
COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitrous oxide; N2O; [10024-97-2] 2. Water; H2O; [7732-18-5]</pre>	Hikita, H.; Asai, S.; Ishıkawa, H.; Esaka, N., J. Chem. Eng. Data, <u>1974</u> , 19, 89-92.
VARIABLES:	PREPARED BY:
	R. Battino
EXPERIMENTAL VALUES.	
T/K^{a} $x, \times 10^{4}$	L ^C M ^d
298.15 4.255	0.02256
290.15 4.255	0.07.04 0.02300
b Mole 5	
gas. Calculated by compiler.	325 kPa (1 atm) partial pressure of
c. Ostwald coefficient. Calculated	by compiler.
d. Molarity in mol 1^{-1} at 1 atm part	tial gas pressure.
AUXILIARY	INFORMATION
MI THOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS.
Used the gas volumetric method of	1. Nitrous oxide - from a commercial
Markham and Kobe (1) in an apparatus similar to that used by	2 Water - distilled.
$\frac{1}{2} \frac{1}{2} \frac{1}$	
	ESTIMATED ERROR:
	$\delta M/M = 0.01$ (compiler's estimate)
	REFERENCES
	1. Markham, A.E.; Kobe, K.A., J. Amer. <i>Them. Soc.</i> , <u>1941</u> , <i>65</i> , 449.
	2. Onda, K.; Sada, E.; Kobayashi, T.; Kıto, S.; Ito, K., J. chem. Eng. Jajan, <u>1970</u> , 3, 18.

COMPONENTS :	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N_2O ; [10024-97-2]	Sada, E.; KITO, S.; ITO, Y.,	
2. Water; H_2O ; [7732-18-5]	J. Chem. Eng. Japan, <u>1974</u> , 7, 57-9.	
VARIADLES:	PREPARED BY:	
	R. Battino	
EXPERIMENTAL VALUES:		
T/K^{a} $x_{1} \times 10^{4}$	L ^C a ^d	
* 298 15 4.441	0 6016 0 5512	
290.13	0.0010 0.0012	
a. Temperature reported as 25°C.		
b. Mole fraction solubility at 101. gas. Calculated by compiler.	325 kPa (l atm) partial pressure of	
c. Ostwald coefficient. Calculated	by compiler.	
d. Bunsen coefficient.		
AUXILIARY	INFORMATION	
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
	1. Nitrous oxide - Showa Denko Co.	
Details are given in (1). A measured volume of gas is brought	Ltd., Tokyo. 99.8% pure.	
into contact with a quantity of	2. Water - distilled.	
magnetic stirrer. The gas volumes		
critical components are thermostatted		
in a water bath to $\pm 0.01^{\circ}$ C.		
	ESTIMATED ERROR:	
	$\delta \alpha / \alpha = 0.01$ (compiler's estimate)	
	REFERENCES :	
	1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. J. Cham Eng	
	Japan, <u>1970</u> , 3, 18-24.	

|--|

W	ater 1
COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sada, E.; Kito, S.; Ito, Y.,
2. Water; H ₂ O; [7732-18-5]	Ind. Eng. Chem. Fundam., <u>1975</u> , 14, 232-7.
VARIABLES:	PREPARED BY:
	R. Battino
EXPERIMENTAL VALUES:	
T/K^{a} $x_{1} \times 10^{4}$	L ^C H ^d
* 298.15 4.310	0.5839 2320.1
a. Temperature reported to ±0.01°C.	
b. Mole fraction solubility at 101, gas. Calculated by compiler.	325 Pa (1 atm) partial pressure of
c. Ostwald coefficient calculated by	y compiler.
d. Henry's law coefficient in atm.	1
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;
Details are given in reference (1) with a drawing. A measured volume of gas is brought into contact with a quantity of degassed liquid. Agitation is via a magnetic stirrer. The gas volumes are determined with	 Nitrous oxide - prepared by Showa Denka Co. Ltd. (Tokyo) and 99.8% pure. Water - "carefully distilled".
a gas buret. All critical components are in a water bath controlled to ±0.01°C.	
	ESTIMATED ERROR:
	$\delta H/H = 0.01$ (compiler's estimate)
	REFERENCES :
	<pre>1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K., J. Chem. Eng. Japan, <u>1970</u>, 3, 18-24.</pre>
COMPONENTS:	ORIGINAL MEASUREMENTS:
--	---
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>	Sada, E.; Kumazawa, H.; Butt, M.A.,
2. Water; H ₂ O; [7732-18-5]	J. Chem. Eng. Data, <u>1977</u> , 22, 277-9.
VARIABLES:	PREPARED BY:
	R. Battino
EXPERIMENTAL VALUES:	
$T/K^{a} \qquad x_{1} \times 10^{4} b$	
* 298.15 4.441	0.6016 0.5512
a. Temperature reported to ±0.01°C.	
b. Mole fraction solubility of gas a of gas. Calculated by compiler.	t 101,325 Pa (1 atm) partial pressure
c. Ostwald coefficient calculated by	compiler.
d. Bunsen coefficient.	•
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Details are given in reference (1). A measured volume of gas is brought	 Nitrous oxide - from commercial cylinder with minimum purity of
into contact with a quantity of decassed liquid Agitation is via a	99.8%.
magnetic stirrer. The gas volumes	2. Water - "carefully distilled".
critical components are	
±0.01°C.	
	ESTIMATED ERROR:
	$f_{\rm m}$ ($n = 0.01$ (compiler is estimate)
	Julya - 0.01 (compiler 5 escinate)
	REFERENCES:
	1. Onda, K.; Sada, E.; Kobayashi, T.;
	Kito, S.; Ito, K., J. Chem. Eng. Japan, <u>1970</u> , 3, 18-24.

۷	Va	a	te	:1

Coup	
COMPONENTS :	ORIGINAL MEASUREMENTS:
	Weiss, R.F.; Price, B.A.
1. Nitrous oxide; N_20 ; [10024-97-2]	Marine Chemistry, 1980, 8, 347-359,
2. water; H ₂ O; [7732-18-5]	, · · · · · · · · · · · · · · · · ·
VARIABLES:	PREDADED RV.
Temperature	C.L. Young
)
EXPERIMENTAL VALUES:	
1	
T/K Solubility, /mol dm ⁻³ at	K, Bunsen
	α
273.44 0.05870	1.3054
273.44 0.05858	1.3028 1.3054
273.44 0.05870	1.3054
	1.3028 0.8931
283.15 0.04017	0.8933
	0.8911
283.16 0.04013	0.8925
	0.8938
293.13 0.02880	0.6405
293.13 0.02873	0.6389
293.12 0.02878	0.6403
293.13 0.02875	0.6394
303.35 0.02156	0.4795
303.36 0.02155 303.36 0.02140	0.4793
505.50 0.02149	0.47/7
AUXILIARY	INFORMATION
THOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
The Scholander microgasometric	1. Matheson Ultra High purity sample,
(1), (2) was used. The equilib-	purity better than 99.99 mole per cent.
rium chamber was enlarged to contain	
The procedures for degassing the	2. Distilled.
Water and transferring the gas	
by gas chromatography. All volumes	
Were read on a micrometer which	
	FSTIMATED FREQR.
	$\delta T/K = \pm 0.01; \ \delta K_{\circ} = \pm 0.3$
	REFERENCES:
	J. Phys. Chem. <u>1964</u> , 68, 169 and
ļ	<u>1965</u> , <i>69</i> , 2608.
	2. Weiss, R.F. Marine Chem. <u>1974</u> , 2,
(203.

COMPONENTS:	ORIGINAL MEASUREMENTS:		
 Nitrous oxide; N₂O; [10024-97-2] 	Weiss, R.F.; Price, B.A.		
2. Water; H ₂ O; [7732-18-5]	Marine, Chemistry, <u>1980</u> , 8, 347-359.		
EXPERIMENTAL VALUES:			
T/K Solubility, ⁺ /mol dm ⁻³ atr	K _o Bunsen n ⁻¹ coefficient, α		
303.37 0.02151 313.23 0.01693 313.23 0.01692 313.24 0.01691 313.23 0.01696 313.24 0.01696 313.24 0.01696 313.24 0.01696	0.4784 0.3765 0.3763 0.3761 0.3772 0.3767		
+ defined as α/V where V is 273.15K and 101.325kPa (22	the molar volume at 2239 cm ³ mol ⁻¹)		

Seawater

COMPONENTS:	EVALUATOR:
 Nitrous oxide; N₂O; [10024-97-2] Seawater 	Colin L. Young, School of Chemistry, University of Melbourne, Parkville, Victoria 3052, Australia.
	August 1980

CRITICAL EVALUATION:

The only measurements of the solubility of nitrous oxide in seawater are those of Weiss and Price (1), who used the microgasometric technique as refined by Weiss (2), (3) in previous work. The method is of high precision and these workers made corrections for the deviations from ideality of nitrous oxide. The work of Weiss and coworkers on other gases, e.g., argon (4) has been compared in detail (5) with that of other workers and is thought to be reliable. Therefore in the absence of any evidence to the contrary, their data are classified as tentative. Weiss and Price reported various smoothing equations including one giving the volumetric solubility coefficient $K_o/mol dm^{-3} atm^{-1}$ as a function of temperature and salinity, S, in parts per thousand °/ ... K, is equal to the Bunsen coefficient/(molar volume of nitrous oxide at 273.15 K and 101.325 kPa).

 $\ln (K_{o}/mol dm^{-3} atm^{-1}) = -62.7062 + 97.3066 (100 T/K)$ + 24.1406 ln (T/100 K) + S[-0.058420 $+ 0.033193 (T/100 K) - 0.0051313 (T/100 K)^{2}]$

Values calculated from this equation are given below.

The volumetric solubility coefficient $(10^2 K_o/mol dm^{-3} atm^{-1})$ for nitrous oxide at various temperatures and salinities.

T/K			S	alinity (°∕∞)		
	0	10	20	30	35	38	40
272.14							
272.15			5.480	5.156	5.001	4.911	4.851
273.15	5.933	5.585	5.258	4.950	4.803	4.717	4.660
274.15	5.691	5.360	5.048	4.755	4.615	4.533	4.479
275.15	5.461	5.147	4.850	4.570	4.437	4.358	4.307
276.15	5.245	4.945	4.662	4.396	4.268	4.193	4.144
277.15	5.040	4.754	4.484	4.230	4.108	4.037	3.990
278.15	4.846	4.573	4.315	4.073	3.956	3.888	3.843
279.15	4.662	4.401	4.156	3.923	3.812	3.747	3.704
281.15	4.322	4.084	3.860	3.647	3.546	3.486	3.447
283.15	4.016	3.799	3.593	3.398	3.305	3.250	3.214
285.15	3.741	3.541	3.352	3.172	3.086	3.036	3.003
287.15	3.492	3.307	3.133	2.968	2.889	2.842	2.811
289.15	3.266	3.096	2.935	2.782	2.709	2.666	2.637
291.15	3.061	2.904	2.754	2.613	2.545	2.505	2.479
293.15	2.875	2.729	2.590	2.459	2.395	2.358	2.334
295.15	2.705	2.569	2.440	2.318	2.259	2.224	2.201
296.15	2.551	2.424	2.303	2.189	2.134	2.102	2.080
298.15	2.409	2.291	2.178	2.071	2.019	1.989	1.969
301.15	2.280	2.169	2.063	1.963	1.914	1.886	1.867
303.15	2.161	2.057	1.958	1.863	1.818	1.791	1.773
305.15	2.053	1.954	1.861	1.771	1.728	1.703	1.686
307.15	1.953	1.860	1.771	1.687	1.646	1.622	1.607
309,15	1.861	1.773	1.689	1.609	1.570	1.548	1.533
311.15	1.776	1.692	1.613	1.537	1.500	1.479	1.465
313.15	1.698	1.618	1.542	1.470	1.435	1.415	1.401
						(co	ont.)

COMPONENTS :	EVALUATOR:
 Nitrous oxide; N₂O; [10024-97-2] Seawater 	Colin L. Young, School of Chemistry, University of Melbourne, Parkville, Victoria 3052, Australia.
	August 1980
CRITICAL EVALUATION:	
References:	
l. Weiss, R. F.; Price, B. A. Mar	ine Chem. <u>1980</u> , 8, 347.
2. Weiss, R. F. ^J . Chem. Eng. Data	<u>1971</u> , <i>16</i> , 235.

- 3. Weiss, R. F. Marine Chem. <u>1974</u>, 2, 203.
- 4. Weiss, R. F. Deep-Sea Res. <u>1971</u>, 18, 225.
- Chen, C. T. in "Argon" Solubility Data Series Vol. 4, p.27. H. L. Clever, Ed. Pergamon <u>1980</u>.

Seawater

COMPONENTS :		ORIGINAL MEASUREMENTS:
1. Nitrous or	ide. N.O. [10024-97-2]	
	$100, N_20, [10024], 2]$	Weiss, R.F.; Price, B.A.
		Marine Chemistry, <u>1980</u> , 8, 347-359
2. Seawater		
VARIABLES:		PREDADED BY.
		I NET ARED BI:
Tempera	ture	C.L. Young
EXPERIMENTAL WALVE		
WALUE	.5 :	
T/K	Salinity/% Sol	ubility, ⁺ K. Bunsen
	/ 1	ol dm ⁻³ atm ⁻¹ coefficient,
	,	α
283.24	18,060	0.03629 0.8071
283.24		0.03610 0.8028
283.25		0.03614 0.8037
283.25		0.03615 0.8039
283.25		0.03612 0.8033
283.25		0.03606 0.8019
303.00		0.01985 0.4414
303.00		0.01987 0.4419
303.00		0.01982 0.4408
303.00		0.01984 0.4412
	26.120	0.01983 0.4410
273.45	36.130	
273.44		
273.44		
273.44		0.04716 1.0488
278.08		0.03943 0.8769
278.08		0.03938 0.8758
278.08		0.03940 0.8762
278.09		0.03947 0.8778
278.08		0.03941 0.8764
287.19		0.03273 0.7279
287.19		0.03282 0.7299
287.19		0.03280 0.7294
	AUXILIAR	(INFORMATION
METHOD APPARATUS/F	ROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The Scholander	microgasometric	1. Matheson Ultra high purity
technique as a	dapted by Douglas	sample, purity better than
⁽¹⁾ , (2) was u	sed. The equilib-	99.99 mole per cent.
rium chamber w	as enlarged to contair	
approximately	10 ml of solvent.	2. Surface seawater, poisoned
The procedures	for degassing the	with HgCl ₂ , filtered.
water and tran	sferring the gas were	
checked for ai	r contamination by	
gas chromatogr	aphy. All volumes	
were read on a	micrometer which	
-spraced merc	ury.	
		VETIMATED EDDOR
		ESTIMATED ERROR:
		$\delta T/K = \pm 0.01; \ \delta K_0 = \pm 0.3\%$
		δ salinity = ±0.004.
		1
		PEFFDENCES.
1		1. Douglas, E.
		J. Phys. Chem. 1964 , 68, 169 and
		<u>1965</u> , <i>09</i> , 2008.
		2. Weiss, R.F. Marine Chem. 1974, 2,
		203.

COMPONENTS:		ORIGINAL MEASURE	MENTS:
1. Nitrous oxide; N_2O ;	[10024-97-2]	Weiss, R.F.; Pr	ice, B.A.
2. Seawater.		Marine Chemistr	y, <u>1980</u> , <i>8</i> , 347-359
EXPERIMENTAL VALUES:			
T/K Salinit	ty/‰ Solubi /mol d	lity, ⁺ K. m ⁻³ atm ⁻¹ C	Bunsen oefficient, α
287.19 36.13 287.19 293.30 293.30 293.29 293.30 293.29 303.10 303.11 303.11 303.11 303.10 313.23 313.24 313.24 313.24 + defined as α/V wh 101.325 kPa (2223)	30 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3281 3276 2372 2372 2369 2366 2373 2374 1812 1813 1810 1428 1425 1421 1422 1425 olar volume at 27.	α 0.7297 0.7285 0.5275 0.5268 0.5262 0.5277 0.5280 0.4032 0.4025 0.4027 0.4025 0.3169 0.3160 0.3162 0.3169 3.15K and

COMPONENTS:	EVALUATOR:
 Nitrous oxide; N₂O; [10024-97-2] 	Colin L. Young,
 Water; H₂O; [7732-18-5] 	School of Chemistry, University of Melbourne,
3. Electrolyte	Parkville, Vıctoria 3052, Australia.
	February 1981

CRITICAL EVALUATION:

An Evaluation of the Solubility of Nitrous Oxide in Aqueous Electrolyte Solutions at a Nitrous oxide Partial Pressure of 101.325 kPa

There are few measurements of the solubility of nitrous oxide in any one aqueous electrolyte system over common ranges of concentration and temperature. Consequently it is not possible to recommend solubility values. Most of the available data are classified as tentative.

In order to have a common basis for comparison, the solubility data have been converted to Sechenow salt effect parameters in the form

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

where c is the electrolyte concentration in units of mol dm⁻³ and α° and α are the Bunsen coefficients in pure water and electrolyte solution, respectively. The Ostwald coefficient ratio, L°/L , will give the same value, but the salt effect parameter is symbolized, k_{scL} . Both ratios

are equivalent to a molar gas solubility ratio.

Another form of the salt effect parameter which will be found in the subsequent discussion is

$$k_{sm\alpha}/kg \text{ mol}^{-1} = (1/(m/mol kg^{-1})) \log (\alpha^{\circ}/\alpha)$$

where m is the electrolyte molality.

The salt effect parameter, k , is often assumed to be independent of electrolyte concentration. This $^{c\alpha}$ is only approximately true for most solutions. There are indications throughout the literature that the salt effect parameter values are larger in dilute solutions than at higher concentrations but there are no definitive studies on this point.

The effect of the electrolyte concentration on the salt effect parameter was checked by one of two ways. A graph was prepared either of log (α°/α) vs. c or of k vs. c. A linear log (α°/α) vs. c plot shows no concentration dependence to the salt effect parameter and the slope is k sca. A linear k vs. c plot of zero slope shows no concentration dependence of the salt effect parameter.

The solubility of nitrous oxide in water has been taken from the paper under evaluation for the calculation of the salt effect parameter. The reason for using the water solubility of the author, instead of the recommended solubility of nitrous oxide in water, is that systematic errors in a given author's work may cancel in the ratio α°/α . The use of a salt effect parameter of the Sechenow type should not be taken to mean that it is necessarily the best way to represent salt effect results. It is used here as a convenient parameter for the comparison of data from several authors.

The largest group of electrolyte solutions has been studied by Manchot $et \ al$. (1). In many cases only two concentrations of electrolyte were studied and the work was restricted to 298.15 K. Seidell attributes some work to Manchot $et \ al$. (1) which is not in numerical form in the original. The data are evaluated separately as the status of these results is not clear.

Nitrous oxide measurements have been reported for over forty aqueous electrolyte systems. Each system is discussed briefly on the following pages. Unless otherwise stated, the salt effect parameters are

COMPONENTS:	EVALUATOR:
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] Electrolyte 	Colin L. Young, School of Chemistry, University of Melbourne, Parkville, Victoria 3052, Australia.
	February 1981

CRITICAL EVALUATION:

for a concentration of one mol dm^{-3} solution at a nitrous oxide partial pressure of 0.101325 MPa. Tentative values of the salt effect parameters are given as calculated from the various papers. The systems are given in the order of the standard arrangement for electrolytes used in U.S. National Bureau of Standards publications.

1. Nitrous oxide + water + Hydrochloric Acid [7647-01-0]

This system has been studied by Geffcken (2) at 288.16 K and 298.16 K and the salt effect parameters, $k_{\rm SCL}$, are

 $k_{scL}/dm^3 mol^{-1} = 0.0281 - 0.0052 (c/mol dm^{-3})$

 $k_{scl}/dm^3 mol^{-1} = 0.0272 - 0.0060 (c/mol dm^{-3}),$

respectively. See also, the evaluation of Seidell's values following this evaluation.

2. Nitrous oxide + water + Sulfuric Acid [7664-93-9]

This system has also been studied by Geffcken (2) at 288.16 K and 298.16 K. The salt effect parameters, k_{scL} are not linear with concentration and are as given below.

		T/K = 288.16					
k _{scL} /dm ³	mol ⁻¹	0.1003	0.0970	0.0882	0.0897	0.0806	
conc/mol	dm ⁻³	0.2615	0.2630	0.5250	0.5252	1.0210	
k_{scL}/dm^3	mo1 ⁻¹	0.0812	0.0749	0.0749	0.0715	0.0704	
conc/mol	dm ⁻³	1.0235	1.4855	1.4815	1.9485	1.9865	

		T/K = 298.16				
k_{scL}/dm^3	mol ⁻¹	0.0843	0.0812	0.0715	0.0762	0.0664
conc/mol	dm ⁻³	0.2615	0.2630	0.5250	0.5252	1.0210
k_{scL}/dm^3	mol^{-1}	0.0659	0.0612	0.0614	0.0586	0.0571
conc/mol	dm ⁻³	1.0235	1.4855	1.4815	1.9485	1.9865

See also the evaluation of Seidell's values following this evaluation.

3. Nitrous oxide + water + Nitric acid [7697-37-2]

Geffcken (2) studied this system at 288.16 K and 298.16 K at six concentrations. The salt effect parameters, ${\rm k}_{\rm SCL},$ are small and the average values are

 $k_{scL}/dm^3 mol^{-1} = 0.001$ $k_{scL}/dm^3 mol^{-1} = -0.005$

at 288.16 K and 298.16 K, respectively. See also the evaluation of Seidell's values following this evaluation.

COMPONENTS:	EVALUATOR:				
 Nitrous oxide; N₂O; [10024-97-2] 	Colin L. Young,				
2. Water; H ₂ O; [7732-18-5]	School of Chemistry, University of Melbourne.				
3 Plants 1	Parkville, Victoria 3052,				
J. Liectrolyte	Australia.				
	February 1981				
CRITICAL EVALUATION:	L				
4. Nitrous oxide + water + Phosphoric	acid [7664-38-2]				
This system was studied by Roth tions over a range of temperature from parameters show very large scatter and as doubtful.	h (3) at twelve different concentra- m 277 K to 298 K. The salt effect d the data of Roth (3) are classified				
5. Nitrous oxide + water + Ammonium cl	hloride [12125-02-9]				
This system has been studied by K and by Manchot $et \ al$. (1) at 298.12 ment between the salt effect parameter Geffcken's data give	y Geffcken (2) at 288.15 K and 298.15 5 K. There is reasonable agree- rs calculated from these data,				
$k_{scL} = 0.052 \text{ dm}^3$	mol ⁻¹ at 288.15 K				
$k_{scL} = 0.050 \text{ dm}^3$	mol ⁻¹ at 298.15 K				
at a salt concentration of one mol dm increasing concentration, whereas the K give	³ and the value decreases with data of Manchot $et \ al$. (1) at 298.15				
$k_{scL} = 0.053 dm^3$	mol ⁻¹				
at a salt concentration of one mol dm increasing concentration.	⁻³ and again the value decreases with				
6. Nitrous oxide + water + Ammonium br	romide [12124-97-9]				
This system has been investigat concentrations at 298.15 K. The value	ted by Manchot $et \ al.$ (1) at three ue of k_{scL} decreases with increasing				
concentration and $k_{scL} = 0.0048 \text{ dm}^3 \text{ mo}$	cl^{-1} at a concentration of one mol dm^{-3} .				
7. Nitrous oxide + water + Ammonium su	ulfate [7783-20-2]				
This system has been investigated by Manchot $et \ al$. (1). The values of	ted at 298.15 K at two concentrations f k_{scL} at concentrations of 1.346 and				
2.18 .101 dm ⁻³ are 0.217 dm ³ mol ⁻¹ and	0.221 dm ³ mol ⁻¹ , respectively.				
8. Nitrous oxide + water + Ammonium nitrate [6484-52-2]					
This system has been investigat Sada $et \ al$. (4) at 298.15 K. There	ted by Manchot $et \ al$. (1) and by is a slight variation in k_{sca} (or k_{scL})				
between these two groups of workers. The average value of k_{sca} (or k_{scL}) is 0.032 ± 0.001 dm ³ mol ⁻¹ .					
9. Nitrous oxide + water + Zinc nitrat Cadmium nit Copper(II) Nickel(II) Iron(II) su Iron(II) su Iron(II) su Aluminium su Aluminium su	te [7779-88-6] trate [10325-94-7] nitrate [3251-23-8] sulfate [7786-81-4] sulfate [10124-43-3] ulfate [7720-78-7] sulfate [10028-22-5] II) sulfate [7785-87-7] II) sulfate [10101-53-8] sulfate [10043-01-3] nitrate [13473-90-0]				

COMPONENTS: **EVALUATOR:** 1. Nitrous oxide; N₂O; [10024-97-2] Colin L. Young, School of Chemistry, University of Melbourne, Parkville, Victoria 3052, 2. Water; H₂O; [7732-18-5] 3. Electrolyte Australia. February 1981 CRITICAL EVALUATION: These systems have all been investigated at two concentrations at 298.15 K by Manchot *et al*. (1). Values of $k_{SCL}/dm^3 mol^{-1}$ are given below. The numbers in parentheses are concentrations in mol dm⁻³. 0.151 (0.84) Zinc nitrate 0.156 (1.68) 0.232 (0.781) 0.188 (1.562) Cadmium nitrate Copper(II) nitrate Nickel(II) sulfate Cobalt(II) sulfate 0.252 (0.69) 0.357 (0.937) 0.204 (1.38) 0.312 (1.874) 0.312 (1.576) 0.363 (0.788) 0.269 (0.72) 0.272 (1.438) Iron(II) sulfate Iron(III) sulfate 0.473 (0.66) 0.461 (1.32) Manganese(II)sulfate0.255 (0.94)Chromium(III)sulfate0.391 (0.57) 0.256 (1.93) 0.391 (0.57) 0.726 (0.5166) 0.408 (1.14) 0.735 (0.8141) Aluminium sulfate Aluminium nitrate 0.350 (0.4795) 0.270 (0.959). 10. Nitrous oxide + water + Magnesium chloride [7786-30-3] This system has been studied by Sada $et \ al.$ (4) at four concentra-The salt effect parameters scatter considerably but appear to tions. decrease with increasing concentration and have an approximate value of 0.19 dm³ mol⁻¹ at a salt concentration of one mol dm⁻³. 11. Nitrous oxide + water + Magnesium sulfate [7487-88-9] This system has been investigated by three groups. The two con-centrations studied by Manchot *et al*. (1) lead to an average value of k of 0.289 dm³ mol⁻¹ at 298.15 K. The data of Markham and Kobe (5) give^{scL} salt effect parameters which show no definite concentration dependence. The average values are: T/K 273.15 298.15 313.15 $k_{sm\alpha}/kg mol^{-1}$ 0.336 0.289 0.271 k_{sca}/dm³ mol⁻¹ 0.339 0.292 0.274 Gordon (6) did not give values of the Bunsen coefficient for pure water at the same temperatures for which he studied the aqueous salt solutions but reported smoothed values for both water and the solutions at 278.15, 283.15, 288.15 and 293.15 K. The values of the salt effect parameters show some scatter but, in the case of magnesium sulfate solutions, exhibit no definite concentration dependence. The average values of k are given below. $s_{c\alpha}$ T/K 278.15 283.15 288.15 293.15 $k_{sc\alpha}/dm^3 mol^{-1}$ 0.285 0.277 0.281 0.314 The accuracy of Gordon values is probably no better than 0.02 and Markham and Kobe (5) and Manchot et al. (1) values are to be preferred and are classified as tentative. 12. Nitrous oxide + water + Magnesium nitrate [10377-60-3] This system has been investigated by Markham and Kobe (5) at 273.15, 298.15 and 313.15 K. The salt effect parameter decreases with increasing concentration and increasing temperature. The salt effect parameters are given by:

COMPONENTS:	EVALUATOR:
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] Electrolyte 	Colin L. Young, School of Chemistry, University of Melbourne, Parkville, Victoria 3052, Australia.
	February 1981
CRITICAL EVALUATION:	

 $k_{sm\alpha}/kg \text{ mol}^{-1} = 0.224 - 0.013 \text{ c}_3/\text{mol} \text{ kg}^{-1}$ at 273.15 K $k_{sm\alpha}/kg \text{ mol}^{-1} = 0.158 - 0.0075 \text{ c}_3/\text{mol} \text{ kg}^{-1}$ at 298.15 K $k_{sm\alpha}/kg \text{ mol}^{-1} = 0.1405 - 0.0065 \text{ c}_3/\text{mol} \text{ kg}^{-1}$ at 313.15 K

where c_3 is the concentration of salt. When values of $k_{sc\alpha}$ are calculated from the data of Markham and Kobe (5), it is found that the values are more or less independent of concentrations, the average values being 0.216, 0.157 and 0.140 dm³ mol⁻¹ at 273.15, 298.15 and 313.15 K, respectively.

The salt effect parameters, k_{SCL} , calculated from Manchot *et al.* (1) data at 298.15 K are 0.136 and 0.140 dm³ mol⁻¹ at concentrations of 0.97 and 1.93 mol dm⁻³, respectively. The data of Markham and Kobe (5) are classified as tentative and are to be preferred to those of Manchot *et al.* (1).

13. Nitrous oxide + water + Calcium chloride [10043-52-4]

This system has been investigated by Manchot *et al.* (1) at 298.15 K, by Gordon (6) at temperatures between 281.26 K to 295.46 K and by Sada *et al.* (4) at 298.15 K. The data of Manchot *et al.* (1) lead to a value of k_{scL} of 0.210 dm³ mol⁻¹ whereas the data of Sada *et al.* (4) lead to a value of $k_{sc\alpha}$ of 0.208 dm³ mol⁻¹ at the same temperature.

Gordon (6) did not give values of the Bunsen coefficient for pure water at the same temperatures as he studied the aqueous salt solutions but reported "smoothed" values for both water and the solutions at 278.15, 283.15, 288.15 and 293.15 K. The values of the salt effect parameters show some scatter ($\sim \pm 0.01-02$ dm³ mol⁻¹) but, in the case of calcium chloride solutions, exhibit no definite concentration dependence. The average values of k sca are given below.

T/K	278.15	283.15	288.15	293.15
k _{sco} /dm ³ mol ⁻¹	0.228	0.216	0.210	0.230

The data of Manchot $et \ al$. (1) and Sada $et \ al$. (4) are classified as tentative and are to be preferred to those of Gordon (6).

14. Nitrous oxide + water + Calcium nitrate [10124-37-5]

This system has been investigated at 298.15 K by Manchot $et \ al.$ (1) and the salt effect parameter

 $k_{SCL} = 0.160 \text{ dm}^3 \text{ mol}^{-1}$

does not show significant concentration dependence.

15. Nitrous oxide + water + Strontium chloride [10476-85-4]

This system has been studied by Gordon (6) who gave "smoothed" values of the Bunsen coefficient of water and aqueous solutions at 278.15, 283.15, 288.15 and 293.15 K. The salt effect parameters appear to decrease with increasing concentration. Values calculated from Gordon's (6) "smoothed" values are given below.

COMPONENTS:	EV.	ALUATOR:			
1. Nitrous oxide; N ₂ O; [10024-97-2	2]	Colin L. Young,			
2. Water; H ₂ O; [7732-18-5]	ļ	School of Chemistry, University of Melbourn	ne,		
3. Electrolyte		Australia.	J52 ,		
-		February 1981			
CRITICAL EVALUATION:		·- 2 · 2	<u></u>		
Values	of k sco	α /dm ³ mol ⁻¹			
T/K 278.15 28	83.15	288.15	293.15		
Concentration /wt-%					
3.309 (0.22) * 0.334	0.313	0.300	0.357		
5.732 (0.38) 0.291	0.297	0.279	0.259		
13.239 (0.94) 0.245	0.240	0.240	0.263		
* approximate cond	centrat:	ion/mol dm ⁻³			
16. Nitrous oxide + water + Barıum	n chlori	ide [10361-37-2]			
This system has also been is and the value of k_{scl}/dm^3 mol ⁻¹ at	investion a cond	gated at 298.15 K by Mar centration of one mol dm	nchot <i>et al</i> . n ⁻³ 1s 0.24.		
The value of $k_{scL}/dm^3 mol^{-1}$ appear tion.	s to de	ecrease with increasing	concentra-		
17. Nitrous oxide + water + Lithiu	um chloi	ride [7447-41-8]			
This system has been studie The results of Geffcken (2) give s	ed by Go salt ef:	ordon (6) and by Geffcke fect parameters, k _{scL} /dr	en (2). n ³ mol ⁻¹ of		
0.096 and 0.091 at 288.16 and 298. "smoothed" values of the Bunsen co at four temperatures. The salt ef increasing concentration. Values	16 K, 1 Defficie fect pa s of k	respectively. Gordon a ent of water and aqueous arameters appear to decr $c\alpha/dm^3$ mol ⁻¹ are given b	(6) gave s solutions cease with pelow.		
т/к 278.15 28	33.15	288.15	293.15		
Concentration					
1.346 (0.32) * 0.142	0.139	0.145	0.203		
3.853 (0.93) 0.103	0.100	0.100	0.118		
11.476 (2.9) 0.089	0.088	0.087	0.127		
* approximate concent	ration,	/mol dm ⁻³			
18. Nitrous oxide + water + Lithiu	ım sulfa	ate [10377-48-7]			
This system has been investigated by Gordon (6) who gave "smoothed" values of the Bunsen coefficient of water and aqueous solutions at four temperatures. The salt effect parameters appear to decrease with increasing concentration. Values of $k_{gco}/dm^3 mol^{-1}$ are given below.					
T/K 278.15 28	33.15	288.15	293.15		
Concentration /wt-%					
2.369 (0.22) * 0.314	0.297	0.297	0.381		
5.463 (0.52) 0.266 8.560 (0.84) 0.273	0.270	0.278	0.313		
0.500 (0.04) 0.2/3 *	0.202	U.204	U.204		
approximate concentration/mol dm ³					

.

Electrolyte Solutions (Aqueous)					33	
COMPONENTS :			EVALUATOR:		······································	
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] Electrolyte 			Colin L. School o Universi Parkvill Australi	Young, f Chemistry ty of Melbe e, Victoria a.	Y, Durne, a 3052,	
			February	1981		
CRITICAL EVALUATION	1:					
¹⁹ . Nitrous oxi	de + water + So	odium chl	oride [76	47-14-5]		
This system has been investigated by four groups. The least satis- factory measurements are those of Roth (3) which give rise to salt effect parameters which show considerable scatter. His data are classified as doubtful. The data of Manchot <i>et al.</i> (1) at 298.15 K give a salt effect parameter, k_{SCL}/dm^3 mol ⁻¹ of 0.117 which decreases to 0.113 at the highest concentration of 4.32 mol dm ⁻³ . The data of Markham and Kobe (5) lead to salt effect parameters as given below. The values of $k_{sm\alpha}$ decrease with increasing concentration and increasing temperature.						
T/K Conc./mol kg ⁻¹		273.15	5	298.15	313.15	
1.0		0.150		0.127	0.119	
3.0		0.144 0.136		0.116 0.111	0.108	
When values of	k _{sca} are calcul	lated fro	m the dat	a of Markha	am and Kobe (5)	
it is found tha concentration a	t the salt effe nd are given by	ect param /	neters are	less depe	ndent on salt	
k _{sca} /dm ³	$mol^{-1} = 0.15$	57 - 0.00	46 c ₃ /mol	dm ⁻³ at 2	73.15 К	
k _{sca} /dm ³	$mol^{-1} = 0.13$	34 - 0.00	54 c ₃ /mol	dm ⁻³ at 29	98.15 К	
and $k_{sc\alpha}/dm^3$	$mol^{-1} = 0.12$	21 - 0.00	36 c₃/mol	dm ⁻³ at 33	13.15 K.	
This system has of the Bunsen c tures. The sa concentration.	also been stud oefficient of v lt effect param Values of k	died by G water and meters ap $c\alpha^{/dm^3}$ mo	fordon (6) aqueous s pear to de 01^{-1} are g	who gave solutions a ecrease wi iven below	"smoothed" values at four tempera- th increasing	
T/K	278.15	283.15	i	288.15	293.15	
Conc./wt-%						
6.20 (1.1) [*] 8.88 (1.6) 12.78 (2.4)	0.123 0.115 0.099	0.117 0.113 0.099		0.112 0.115 0.100	0.119 0.125 0.106	
* a	pproximate conc	centratio	on/mol dm ⁻	3		
The concentration of the salt effect parameters is greater for values calculated from Gordon's (6) data than for values from Markham and Kobe's (5) data. The data of Markham and Kobe (5) are probably the most reliable and are classified as tentative.						
20. Nitrous oxide + water + Sodium bromide [7647-15-6]						
This system effect paramete: mol dm ⁻³ and 29 increasing conce	tem has been in r, k_{scL} , is 0.1 8.15 K. The p	nvestigat 109 dm ³ m parameter	ed by Mand ol ⁻¹ at a decreases	chot <i>et al</i> , salt conce s only marg	(1). The salt entration of one ginally with a salt concep-	
tration of 4 mol dm ⁻³ .						

²¹. Nitrous oxide + water + Sodium sulfate [7757-82-6]

This system has been investigated by three groups. Gordon (6) gave

COMPONENTS: EVALUATOR: 1. Nitrous oxide; N₂O; [10024-97-2] Colin L. Young, School of Chemistry, University of Melbourne, 2. Water; H₂O; [7732-18-5] Parkville, Victoria 3052, 3. Electrolyte Australia. February 1981 CRITICAL EVALUATION: "smoothed" values of the Bunsen coefficient of water and aqueous solutions at four temperatures. Although the scatter is fairly great the salt effect parameters appear to decrease with increasing concentration. Values of $k_{sca}/dm^3 mol^{-1}$ are given below. T/K 283.15 288.15 278.15 293.15 Conc./wt-% 5.77 (0.43) 8.53 (0.65) 12.44 (0.97) 0.307 0.311 0.293 0.339 0.315 0.285 0.322 0.278 0.306 0.341 0.299 0.297 approximate concentration/mol dm⁻³ The data of Manchot et al. (1) lead to a value of $k_{scL}/dm^3 mol^{-1}$ at 298.15 K of 0.338 at a concentration of one mol dm^{-3} and the parameter appears to decrease with increasing concentration. The salt effect parameters calculated from the data of Markham and Kobe (5) are given below. Values of k mol⁻¹ 298.15 т/к 313.15 Conc./mol kg⁻¹ 0.5 0.359 0.338 1.0 0.338 0.318 1.5 0.331 0.310 While these salt effect parameters decrease with increasing concentration the relationship between parameter and concentration is not linear. When values of $k_{sca}/dm^3 \text{ mol}^{-1}$ are calculated from Markham and Kobe's data (5) the salt effect parameters are less concentration-dependent than values of $k_{sm\alpha}/dm^3$ mol⁻¹ and are given below. Values of $k_{SC\alpha}/dm \mod^{-1}$ 298.15 T/K 313.15 Conc./mol kg⁻¹ 0.5 0.364 0.345 1.0 0.348 0.331 1.5 0.346 0.328 22. Nitrous oxide + water + Sodium sulfate [7757-82-6] + Sulfuric acid [7664-93-9] Kobe and Kenton (8) made measurements of the solubility of nitrous oxide in a mixture that contained $1.76 \text{ mol } \text{kg}^{-1}$ of Na₂SO₄ and 0.90 mol kg^{-1} of H_2SO_4 . Using the sum of the component molalities gives the salt effect parameter, k = 0.215. This value is slightly greater than would be expected if $sm\alpha$ $k_{sm\alpha}$ m(overall) = $\sum_{i=1}^{n} (k_{sm\alpha})_{i} m_{i}$. The value appears reasonable and is classified as tentative.

COMPONENTS: EVALUATOR: 1. Nitrous oxide; N₂O; [10024-97-2] Colin L. Young, School of Chemistry. 2. Water; H₂O; [7732-18-5] University of Melbourne, Parkville, Victoria 3052, 3. Electrolyte Australia. February 1981 CRITICAL EVALUATION: 23. Nitrous oxide + water + Sodium nitrate [7631-99-4] This system has been investigated by Knopp (7) at 293.15 K at four concentrations up to 1.12 mol dm⁻³. The salt effect parameter does not show significant concentration dependence and the average value of $k_{sc\alpha}/dm^3 \text{ mol}^{-1}$ is 0.094. Similarly the salt effect parameter calculate Similarly the salt effect parameter calculated from the data of Manchot *et al.* (1) at 298.15 K show no discernible con-centration dependence and has a value of $k_{scL}/dm^3 mol^{-1}$ of 0.093. 24. Nitrous oxide + water + Sodium phosphate [7601-54-9] + Sodium hydrogen phosphate [7558-79-4] These two systems have only been studied at one concentration at 298.15 K by Manchot *et al.* (1). The salt effect parameters, $k_{ecl}/dm^3 \text{ mol}^{-1}$ are 0.53 and 0.37 for sodium phosphate and sodium hydrogen phosphate, respectively. 25. Nitrous oxide + water + Sodium carbonate [497-19-8] + Sodium bicarbonate [144-55-8] In order to evaluate the data for this system it is convenient to Write $\log (\alpha^{\circ}/\alpha) = K_{s} \sum_{i}^{j} I_{i}$ where I_i is the ionic strength of ions of species i and K_s is the overall salt effect parameter. Values of K_{g} vary with R, the ratio of the concentration of bicarbonate ion to that of the carbonate and are given below. $T/K \approx 298.15$ R 0.2 1.0 2.0 5.0 K_s/dm³ g-ion⁻¹ 0.129 0.118 0.118 0.149 0.181 The data of Hikita et al. (9) appear to be reliable and were determined with an apparatus of proven design for moderate accuracy and are therefore classified as tentative. 26. Nitrous oxide + water + Potassium hydroxide [1310-58-3] This system has been studied by Geffcken (2) at 288.16 and 298.15 Κ. The salt effect parameters increase with increasing concentration and are given by $k_{col}/dm^3 mol^{-1} = 0.120 + 0.024$ (c/mol dm⁻³) at 288.16 K and $k_{ccl}/dm^3 mol^{-1} = 0.112 + 0.0206$ (c/mol dm⁻³) at 298.15 K. 27. Nitrous oxide + water + Potassium chloride [7447-40-7] This system has been investigated by four groups of workers. Gordon (6) gave "smoothed" values of the Bunsen coefficient of water and aqueous solutions at four temperatures. The salt effect parameters appear to decrease with increasing concentration but the scatter is too great to allow a meaningful equation to be derived. Values of k_{sca}/dm^3 mol⁻¹ are given below.

COMPONENTS:	EVALUATOR:					
<pre>l. Nitrous oxide; N₂O; [10024-97-2]</pre>	Colin L. Young,					
2. Water; H ₂ O; [7732-18-5]	University of Melbourne, Parkville, Victoria 3052.					
3. Electrolyte	Australia.					
	February 1981					
CRITICAL EVALUATION:						
m/m 270 15 203	15 299 15 293 15					
1/K 2/0.15 205.	15 200.15 295.15					
Conc./wt-%	120 0.122 0.140					
7.64(1.04) 0.139 0.139 0.139 0.139	$\begin{array}{cccccccccccccccccccccccccccccccccccc$					
14.58 (2.15) 0.104 0.	095 0.090 0.096					
22.08 (3.41) 0.089 0.	088 0.088 0.091					
<pre>* approximate concentrat</pre>	ion/mol dm ⁻³					
Geffcken's data lead to salt	effect parameters of $k_{ccL}/dm^3 mol^{-1}$					
of 0.102 and 0.098 at 288.16 K and 29	8.16 K, respectively, at a concentra-					
tion of one mol dm^{-3} . These paramet tration but the data are too limited tion-dependence of k_{scL} .	ers decrease with increasing concen- to allow evaluation of the concentra-					
Markham and Kobe's data (5)	yield values of k_{smlpha} which decrease					
with increasing concentration and val	ues of $k_{sm\alpha}^{}/kg \text{ mol}^{-1}$ are given by					
$k_{sm\alpha}/kg \text{ mol}^{-1} = 0.125 - 0.0075c_3/mol kg^{-1}$ at 273.15 K						
$k_{sin\alpha}/kg \text{ mol}^{-1} = 0.101 - 0.006c_3/mol kg^{-1}$ at 298.15 K						
$k_{sm\alpha}/kg \ mol^{-1} = 0.101 - 0$.0077c ₃ /mol kg ⁻¹ at 313.15 K					
where c_3 is the concentration of salt solution.						
When values of $k_{SC\alpha}/dm^3 \text{ mol}^-$ Kobe's data (5), the salt effect para dent than values of $k_{Sm\alpha}/kg \text{ mol}^{-1}$ and	¹ are calculated from Markham and meters are less concentration-depen- are given by					
$k_{sca}/dm^3 mol^{-1} = 0.1253 -$	$0.0045c_{3}$ /mol kg ⁻¹ at 273.15 K					
$k_{SC\alpha}/dm^3 mol^{-1} = 0.1018 -$	$0.0035c_{3}$ /mol kg ⁻¹ at 298.15 K					
and $k_{sca}/dm^3 mol^{-1} = 0.1033 -$	$0.0055c_3$ /mol kg ⁻¹ at 313.15 K.					
The data of Manchot $et \ al$. (1) lead t as given by	o values of the salt effect parameter					
$k_{SC\alpha}/dm^3 mol^{-1} = 0.092 -$	0.002c ₃ /mol dm ⁻³ .					
The salt effect parameters from the work of Geffcken (2), Manchot $et \ al$. (1) and Markham and Kobe (5) agree fairly well at 298.15 K and at a concentration of one mol dm ⁻³ . However, the data of Gordon (6) are considerably greater and are classified as doubtful.						
28. Nitrous oxide + water + Potassium	bromide [7758-02-3]					
This system has been studied by Geffcken (2) at 288.16 and 298.16 K. The salt effect parameter appears to decrease with increasing concentration but the scatter is too great for an accurate estimation of the concentration dependence. The values of k_{cor}/dm^3 mol ⁻¹ at a concentration						
of one mol dm ⁻³ are 0.093 and 0.087 a The parameters calculated from the da to decrease with increasing concentra also too large for an accurate estima The value of $k_{scL}/dm^3 mol^{-1}$ at 298.15	t 288.16 and 298.16 K, respectively. ta of Manchot <i>et al</i> . (1) also appear tion but the scatter in this case is tion of the concentration dependence. K is 0.083.					

Electrolyte Solutions (Aqueous)

COMPONENTS:			EVALUATOR:		
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>			Colin L. Young School of Cher	9, mistrv,	
2. Water; H_2O ;	[7732-18-5]		University of Parkville, Vio	Melbourne, ctoria 3052.	
3. Electrolyte			Australia.		
			February 1981		
CRITICAL EVALUATION	J:		<u> </u>		
29. Nitrous oxi	.de + water + Pota	ssium	iodide [7681-]	11-0]	
The sal (4) are given b and then increa	t effect paramete below. They appe use at the highest	r cal ar to conce	culated from th decrease with entration.	ne data of S increasing	ada <i>et al</i> . concentration
^k sca/dm ³ mol ⁻¹	0.0846	0.081	4 0.0787	0.0782	0.0807
conc./mol dm ⁻³	0.644	1.093	1.661	2.196	2.859
The salt effect values of k respectively.	dm³ mol ⁻¹ of 0.09	lated 1 and	from Geffcken 0.082 at 288.]	's data (2) 16 and 298.1	give average 6 K,
30. Nitrous oxi	.de + water + Pota	ssium	sulfate [7778-	-80-5]	
This sy limited extent. 298.15 K which (6) studied two from his smooth	vstem has been stur Manchot <i>et al.</i> gives a salt effer low concentration hed data are given	died ((1) s ct pas ns and below	by two groups h studied only or rameter of 0.29 d values of k so	but only to $concentral dm^3 mol^{-1}.ca$	a very tion at Gordon calculated
Т/К	278.15	283.	15 288.3	15 29	3.15
Conc./wt-%					
2.623 (0.15) 4.784 (0.29)	0.295 0.268	0.2 0.2	287 0.2 285 0.3	299 305	0.370 0.368
* a	pproximate concent	tratio	on/mol dm ⁻³		
Both sets of da	ta are classified	as do	oubtful.		
31. Nitrous oxi	de + water + Potas	ssium	nitrate [7757-	-79-1]	
Values of the salt effect parameters from the four studies of this System are given below. There is approximate agreement between the values of the parameters from the results of Manchot <i>et al.</i> (1), Sada <i>et al.</i> (4) and Knopp (7) near concentrations of one mol dm ⁻³ but the data of Markham and Kobe (5) give smaller values. The concentration dependence of k scL is moderately large for values calculated from the data of Markham and Kobe (5) and Manchot <i>et al.</i> (1) but insignificant when calcu-					
only over a sma to enable any s	data of Sada <i>et a</i> 11 range of concer tatement to be mad	1. (4) ntrati le of	The data of on and the val the concentrat	ues scatter ion depende	too greatly nce of k _{scα} .
Author	T/K Conc	c./mo]	. dm ⁻³ k _{sca} /d	lm ³ mol ⁻¹ k _{si}	$m\alpha/kg mol^{-1}$
Knopp	293.15	0.100 0.270 0.563 1.168	51 0 54 0 80 0 83 0	0.064 0.070 0.072 0.070	- - - -
Manchot et al.	298.15	1.02 2.15	0 0	0.073	-
Sada et al.	298.15	1.381	. 0	0.069	-
			· · · · ·		
				(cc	ont.)

38			Nitrous	s Oxide		
COMPO 1. N 2. V 3. F	NENTS: Nitrous oxid Nater; H ₂ O; Electrolyte	e; №20; [1 [7732-18-5	0024-97-2]]	EVALUATOR: Colin L. Young, School of Chemistry University of Melbo Parkville, Victoria Australia. February 1981	y, ourne, a 3052,	
CRITI	CAL EVALUATION	•		• · · · · · · · · · · · · · · · · · · ·		
Autł	nor	т/К	Conc./mol d	im ⁻³ k _{sca} /dm ³ mol ⁻¹	k _{smα} ∕kg mol ^{−1}	
Mark and	kham Kobe	273.35	0.2*	0.122 0.102	0.121 0.100	
		298.15	1.0*	0.093 0.059 0.054	0.056	
		323.15	3.0* 1.0* 2.0* 3.0	0.050 0.047 0.042 0.041	0.045 0.045 0.039 0.036	
		* concent:	ration/mol k	g ⁻¹		
32. auth	Nitrous oxi + Potassium Thıs sy or analysed	de + water bicarbonat stem has be their data	+ Potassium te [298-14-6 een studied a according	carbonate [584-08-7]] by Joosten and Danckwert to an equation which may	ts (10). This be written	
			log α _o /	$\alpha = KI$	•	
where K is the overall salt effect parameter and I is the ionic strength of the solution. The value of K was $0.105 \pm 0.001 \text{ dm}^3 \text{ g-ion}^{-1}$ for equal concentrations of carbonate and bicarbonate.						
33.	Nitrous oxi	de + water	+ Potassium	periodate [7790-21-8]		
This system has been studied at one concentration $(0.0164 \text{ mol } dm^{-3})$ by Manchot <i>et al.</i> (1). The small concentration and consequent slight change in Bunsen coefficient make an accurate estimation of the salt effect parameter impossible.						
34.	Nitrous oxi	de + water	+ Rubidium	chloride [7791-11-9]		
This system has been studied by Geffcken (2) at 288.16 and 298.16 K. The values of k_{scL} decrease with increase in concentration. The value of k_{scL} at a concentration of approximately one mol dm ⁻³ are 0.094 dm ³ mol ⁻¹						
and	0.089 dm ³ mo	ol ⁻¹ at 288	3.16 and 298	.16 K, respectively.		
35.	Nitrous oxio	de + water	+ Caesium c	hloride [7647-17-8]		
near	This system has been studied by Geffcken (2) at two concentrations near 0.5 mol dm ⁻³ . The values of the salt effect parameter $k_{ecL}/dm^3 mol^{-1}$					
were clas	0.081 and (sified as to).076 at 28 entative.	38.16 and 29	8.16 K, respectively.	The data are	
Refe	rences					
1.	Manchot, vo <u>1924</u> , 14	on W.; Jał 41, 45.	ırstorfer, M	.; Zepter, H. Z. Anorg.	Allg. Chem.	
2.	Geffcken, (G. Z. Phys.	Chem. <u>1904</u>	, 49, 257.		

COMPONENTS:	EVALUATOR:				
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] Electrolyte. 	Colin L. Young. School of Chemistry University of Melbourne, Parkville, Victoria 3052. AUSTRALIA:				
	February, 1981				
CRITICAL EVALUATION	4 · · · · · · · · · · · · · · · · · · ·				
3. Roth, W. Z. Phys. Chem. <u>1897</u> , 24, 114	1.				
 Sada, E.; Ando, N.; Kito, S. J. App <u>1972</u>, 22,1185. 	ol. Chem. Biotechnol.				
5. Markham, A.E.; Kobe, K.A. J. Amer.	Chem. Soc. <u>1941</u> ,63, 449.				
6. Gordon, V. Z. Phys. Chem. <u>1895</u> ,18,	1.				
7. Knopp, W. Z. Phys. Chem. <u>1904</u> ,48,97	7.				
8. Kobe, K.A.; Kenton, F.H. Ind.Eng.C	Chem. <u>1938</u> ,10,76				
 ⁹. Hikita, H.; Asai,S.; Ishikawa, H.; J. Chem. Engng. Data. <u>1974</u>, 19, 89 	Esaka, H.).				
10. Joosten, G.E.H.; Danckwerts, P.V. J	. Chem. Engng.Data. <u>1972</u> ,17, 452 .				
NOTE:					
Kreitus and co-workers (11,12) have recently investigated the solubility of nitrous oxides in concentrated salt solutions. The concentration dependence of the salt effect parameter for potassium chloride is in fair agreement with that of Markham and Kobe (5) whereas the salt effect parameters for lithium chloride is in marked disagreement with those obtain- ed from the data of Gordon (6) and also considerably smaller than that obtained from Geffcken's data (2). The salt effect parameter for cesium chloride is in reasonable agreement with that obtained from the data of Geffcken (2).					
The presentation of the data of Kreitus and co-workers (11,12) is such that less approximation is required to calculate $k_{sm\alpha}$ rather than $k_{sc\alpha}$. Values of $k_{sm\alpha}$ are given below.					
LiCl KCl	KF C _s Cl				
$k_{g}^{conc./mol} = k_{g}^{conc./mol} = k_{g}^{conc} = k_{g}^{co$	conc./mol k $conc./mol$ k				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.21 0.136 0.50 0.084 5.84 0.131 0.93 0.106 7.78 0.107 2.45 0.093 12.33 0.118 4.85 0.076 7.25 0.081				

Kreitus, I.; Gorbovitskalya, T.I. Latv.PRS.Zinat.Akad.Vestis.Khim.Ser. 1979, 664.

Kreitus, I.; Abramenkov, A. Latv. PRS.Zinat.Akad.Vestis.Khim.Ser. 1980,238

These measurements are classified as tentative.

11.

12.

COMPONENTS:	EVALUATOR:
Nitrous oxide; N ₂ O; [10024-97-2] Water; H ₂ O; [7732-18-5] Acids	Colin Young School of Chemistry University of Melbourne Parkville, AUSTRALIA
	March, 1981

In addition to data discussed in the preceding evaluation Seidell (1) quotes values of Bunsen coefficients for the solubility of nitrous oxide in aqueous solutions of acids at 25°C (298.2K). It is not clear whether the exact source was a private communication or a thesis but the numerical data do not appear in the reference given i.e. "Manchot Jahrstorfer and Zepter 1924" (2) although graphs in the original indicate the existence of experimental result for these systems. The data are reported below and Setschenow salt effect parameters have been calculated as in the preceding evaluation.

Conc. of acid /g dm ⁻³	Specific gravity before adsorption $d_{\frac{25}{4}}^{\frac{25}{4}}$	<pre>10² x Bunsen coefficient, 10² φ</pre>	k _{sca} /dm³ mol ⁻¹
	Nitric acid, HNO3;	[7697-37-2]	
69.32 142.42 229.38	1.0351 1.0731 1.1191	54.1 55.1 56.2	-0.007 -0.007 -0.007
	Hydrochloric acid;	HC1; [7647-01-0]	
39.387 77.318 167.03 237.06	1.0168 1.0335 1.0741 1.1050	51.2 50.1 49.9 52.1	0.018 0.013 0.007 0.001
	Periodic acid; HIO	4; [13444-71-8]	
204.21 470.23	1.1740 1.4066	38.7 23.8	0.132 0.143
	Sulfuric acid; H ₂ S	04; [7664-93-9]	
110.84 269.74 454.15 588.53	1.0680 1.1630 1.2687 1.3363	44.2 38.7 38.2 39.9	0.073 0.051 0.031 0.021
	Phosphoric acid; H	3PO4; [7664-38-2]	
114.73 186.31 495.20	1.0593 1.0964 1.2557	46.4 43.8 35.3	0.053 0.046 0.036

The values of k_{sca} from the present data agree with those of Geffcken (2) for nitric acid. However values of the salt effect parameter for sulfuric acid and hydrochloric acid do not agree with the values obtained from Geffcken's results. Although the values for both sets of results for both acid show a decrease for an increase in concentration.

REFERENCES:

- Seidell, A. Solubilities of Inorganic and Metal Organic Compounds, 3rd. edn. Vol. 1, <u>1953</u>, p.1136.
- 2. Geffcken, G. Z. Phys. Chem. 1904, 49, 271.

Electrolyte Solutions (Aqueous)

-

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Geffcken, G.
1. Nitrous oxide; N_2O ; $[10024-97-2]$	Z. Phys. Chem. <u>1904</u> , 49, 257-302.
2. Water; H ₂ O; [7732-18-5]	
<pre>3. Sulfuric acid; H₂SO₄; [7664-93-9]</pre>	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard
EXPERIMENTAL VALUES:	n. I.e
T/K Conc of acid	<pre>/ mol dm³ Ostwald coefficient, L</pre>
288.16 0.26	0.7328
0.26	30 0.7340 50 0.6997
0.52	52 0.6984
1.02	10 0.6440
1.48	55 0.6024
1.48	15 0.6030 95 0.5648
1.98	65 0.5640
298.16 0.26	15 0.5648 30 0.5657
0.52	50 0.5426
0.52	152 0.5419 10 0.5083
1.02	35 0.5087
1.48	15 0.4819 15 0.4820
1.94	85 0.4569
1.96	
AUXILIAR	Y INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of gas absorbed by the aqueous solution. Detailed description and diagram given in source.	1. Self prepared and attested.
	ESTIMATED ERROR:
	1
	REFERENCES.

COMPONENTS	
COM ONENIS:	ORIGINAL MEASUREMENTS:
	Cofferen C ⁷ Phys. Cham 1904
1. Nitrous oxide; N ₂ O; [10024-97-2]	Gericken, G. D. 1ngs. chem. 1904,
2. Water, H.O. [7732-18-51.	49, 257-302.
$\frac{1}{3}$ Nitria (1) We (7/32-10-5);	
$[3. \text{ NITER acid; HNO}_3; [7697-37-2]]$	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard/C L. Young
EXPERIMENTAL VALUES.	
A ALLENTAL VALUES:	
T/K Conc. of acid/mol dm ⁻³	(soln.) Ostwald coefficient, L
288.16 0.610	0.7770
0.614	0.7766
1.253	0.7767
	0.7767
2.405	0.7737
298.16 0.610	0.5969
0.614	0.5980
1.253	0.6045
2.405	0.6156
2.435	0.6149
AUX1LJARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of N ₂ O absorbed by the aqueous solution. Detailed description and diagram given in source.	 Nitrous oxide self prepared and attested.
	ESTIMATED ERROR:
	REFERENCES:

40470			
COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O: [10024-97-2]	Roth, W.		
2 Water: $H_{0}O$: $[7732-18-5]$.	Z. Phys. Chem. <u>1897</u> , 24, 114-151.		
3 Phosphoric acid: HaPO.			
[7664-38-2]			
VARIABLES:	PREPARED BY:		
Temperature, concentration	W. Gerrard		
EXPERIMENTAL VALUES: $t = T/K - 273.16$;	density = d ; α = Bunsen coefficient.		
,			
Concn. of phosphoric acid, %: 3.098	0000076061 0 0000051074+2		
Change of a with t: $a = 1.01779 - 0.0000000000000000000000000000000000$	$15000276962 - 0.00000513742^{-1}$		
т/к 298.24 293.16 288.1	13 283.14 278.51		
α 0.5428 0.6188 0.73	1.0395		
Concn. of phosphoric acid, %: 3.659	_		
Change of d with t: $d = 1.02099 - 0.0$	$000028273t - 0.0000052916t^{2}$		
m/v = 200 27 = 203 31 = 200 7	22051 + 0.00055551		
$\alpha 0.5392 0.6304 0.749$	57 0.8725 1.0744		
Conce of phosphoric acid %. 4 465			
Change of d with t: $d = 1.02570 - 0.000000000000000000000000000000000$	$000042813t - 0.0000050554t^2$		
Change of α with t: $\alpha = 1.2123 - 0.04$	41104t + 0.00055483t ²		
T/K 298.04 293.13 288.2 α 0.5331 0.6139 0.71	25 283.60 278.19 34 0.8501 1.0196		
Concn. of phosphoric acid, %: 4.569 Change of d with t: $d = 1.02630 - 0.000$	$000044265t - 0.0000050466t^{2}$		
Change of α with t: $\alpha = 1.2668 - 0.04$	$4376t + 0.00058643t^2$		
Т/К 298.31 292.97 288.3	30 283.17 277.90 27 0.8723 1.0726		
a 0.5572 0.0294 0.75	57 0.8725 1.0720		
	(continued)		
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE :	SOURCE AND PURITY OF MAJERIALS.		
Octuald method using and hurst and	1 N.O. was solf propared and		
pipet. Measurement of volume of	purified.		
gas before and after absorption.	3 Phoenhorie and use analyzed by		
determined by a Sprengel pyknometer.	an appropriate method.		
Vapour pressure of water, adjusted			
for.			
	ESTIMATED ERROR:		
	KEFERENCES:		

Electrolyte Solutions (Aqueous)

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous ovider N. C. Licente et al	Roth, W.
2. Water: $H_{2}O_{2}$ [10024-97-2]	2. Phys. Chem. <u>1897</u> , 24, 114-151.
3. Phosphoric acid; H_3PO_4 ;	
[7664-38-2]	
EXPERIMENTAL VALUES: t = T/K - 273.16	; density = d; α = Bunsen coefficient.
Concn. of phosphoric acid, %: 5.137 Change of d with t: $d = 1.02971 - 0.00$ Change of α with t: $\alpha = 1.2285 - 0.043$	0048262t - 0.000005142t ² 59t + 0.00062256t ²
¹ /K 298.32 293.54 288.08 α 0.5259 0.6003 0.7168	283.39277.800.84171.0397
Concn. of phosphoric acid, %: 8.702 Change of d with t: $d = 1.05048 - 0.00$ Change of α with t: $\alpha = 1.1765 = 0.039$	009855t - 0.000004480t ² 698t + 0.00053963t ²
T/K 298.06 293.15 288.14 α 0.5226 0.6012 0.7029	283.20278.220.82790.9894
Concn. of phosphoric acid, %: 8.855 Change of d with t: $d = 1.05139 - 0.00$ Change of α with t: $\alpha = 1.1836 - 0.040$	010293t - 0.000004388t ² 624t + 0.0005469t ²
T/K 298.05 293.14 288.31 α 0.5113 0.5952 0.6937	282.90278.210.83860.9924
Concn. of phosphoric acid, %: 8.963 Change of d with t: $d = 1.05192 - 0.00$ Change of α with t: $\alpha = 1.1614 - 0.039$	010204t - 0.0000044433t ² 037t + 0.0005219t ²
T/K 298.05 292.97 288.00 α 0.5129 0.5961 0.6970	283.29 277.61 0.8117 0.9980
Concn. of phosphoric acid, %: 9.775 Change of d with t: $d = 1.05707 - 0.00$ Change of α with t: $\alpha = 1.1601 - 0.039$	012724t - 0.000003938t ² 735t + 0.00054612t ²
T/K 298.12 293.06 288.17 α 0.5085 0.5885 υ.6867	283.42 277.99 0.7994 0.9809
Concn. of phosphoric acid, %: 10.001 Change of d with t: $d = 1.05836 - 0.00$ Change of α with t: $\alpha = 1.1256 - 0.037$	012525t - 0.0000040003t ² 196t + 0.0004913t [°]
⁻¹ /K 298.14 293.14 288.17 α 0.5031 0.5780 0.6780	283.28278.110.79980.9535
Concn. of phosphoric acid, %: 13.260 Change of d with t: $d = 1.7852 - 0.000$ Change of α with t: $\alpha = 1.0921 - 0.037$	15737t - 0.0000039225t ² 90t + 0.00054374t ²
$ \begin{array}{cccccc} T/K & 297.84 & 293.23 & 288.03 \\ \alpha & 0.4879 & 0.5555 & 0.6487 \end{array} $	283.30278.830.76470.8946
Concn. of phosphoric acid, %: 13.438 Change of d with t: $d = 1.07950 - 0.00$ Change of α with t: $\alpha = 1.0852 - 0.035$	016617t - 0.000003869t ² 824t + 0.00047667t ²
T/K 298.08 293.06 288.10 α 0.4885 0.5632 0.6564	283.10 277.97 0.7756 0.9239

COMPONENTS :	ORIGINAL MEASUREMENTS:		
	Geffcken, G. Z. Phys. Chem. 1904,		
 Nitrous oxide; N₂O; [10024-97-2] 	49, 257-302.		
2. Water; H ₂ O; [7732-18-5];			
3. Ammonium chloride; NH4Cl;			
[12125-02-9]			
VARIABLES:	PREPARED BY:		
Temperature, concentration	W. Gerrard/C. L. Young		
FYDERIMENTAL VALUES.			
LA LATILITAL VALUES.			
T/K Conc. of salt/mol dm ⁻³	(soln.) Ostwald coefficient, L		
288.15 0.598	0.7203		
0.600	0.7185		
1.158	0.6800		
298.15 0.598	0.5532		
0.600	0.5504		
1.166	0.5200		
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Measurement of volume of N ₂ O absorbed by the aqueous solution. Detailed description and diagram given in source.	 Nitrous oxide self prepared and attested. 		
	LETIMATED EDDOD.		
	ESTIMATED ERROR:		
	ESTIMATED ERROR: REFERENCES.		
	ESTIMATED ERROR:		
	ESTIMATED ERROR: REFERENCLS.		
	ESTIMATED ERROR: REFERENCES.		

Electrolyte Solutions (Aqueous)

COMPONENTS: 1. Nitrous oxide; N ₂ O; [10024-97-2] 2. Water; H ₂ O; [7732-18-5] 3. Ammonium chloride; NH ₄ Cl; [12125-02-9] VARIABLES: Concentration EXPERIMENTAL VALUES:		ORIGINAL MEASUREMENTS: Manchot, von W.; Jahrstorfer, M.; Zepter, M. Z. Anorg. Allg. Chem. <u>1924</u> , 141, 45-81. PREPARED BY: C. L. Young				
T/K	Density, d ²⁵ of salt soln.	Conc. of /10 ³ mol (solm	salt m ³	Conc. of salt /mol kg ⁻¹ (water)	S ₁ /cm ³	S₂ /cm³
298.15	1.0146 1.0312 1.0594	1.07 2.25 4.30		1.1177 2.4703 5.1848	46.6 41.1 34.7	45.9 39.9 32.7
salt solution $$Both\ S_1$ and\ S_2$ were reduced to conditions of 273.15 K and 101.3 kPa$						
		AUXILIARY	INFORM	ATION		
METHOD/APP/ Measuremen by means o Volume abs independen Density of determined	MATUS/PROCEDURE: t of volume of gas f gas buret and pi orbed appears to b t of pressure. (1) the aqueous solut by Sprengel pykno	absorbed pet. e taken as ion meter.	SOURCE 1. Pr nitra then 2. Re	AND PURITY OF MATER repared by heating ate, frozen in lic distilled. ecrystallized.	IALS: 9 ammoni Juid air	um and
			ESTIM	ATED ERROR:		
			REFERI 1. Ma 1924	ENCES: anchot, W. Z.Anorg ,141,38.	g.Chem.	

COMPONENTS			ODT CT VAL AND A SUPPORT		
COMPONENTS:		ORIGINAL MEASUREMENTS:			
		Manchot, von W.; Jahrstorfer, M.;			
1. Nitrous oxide; N_20 ; $[10024-97-2]$		Zepter, H.			
3. Ammoni	um bromide; NH Br;		Z. Anora, Alla, Ch	em. 1924.	141.
[1	2124-97-9]		45 01	····· <u></u> ,	,
VADIADIEC.			45-81.		
VARIABLES.	Concontration		PREPARED BY:		
	concentration		C. D. 100119		
EVDEDINENTAL	NALUEC.			<u> </u>	
CAFERINENIAL	VALUES:				i
	Density d ²⁵ Conc	of sa	alt Conc of salt	s.	5.
Т/К	of salt soln. /10 ³	mol m	$\frac{1}{3}$ /mol kg ⁻¹	$/\mathrm{cm}^3$	$/\mathrm{cm}^3$
		(soln.)	(water)	/ CIII	/ C//
			,		
298.15	1.0535	1.04	1.1598	47.4	45.0
	1.2122	4.15	4.9922	35.8	29.6
		· · · · · · · ·			
	$S_1 - volume of$	nitrous	s oxide absorbed per	100 cm	
				1.0.0	
	S ₂ - volume of of salt so	nitrous	s oxide absorbed per	100 g	
Both S	, and S. were reduced	to con	ditions of 273 15 K	and 101 3	kPa
	i and by were reduced	20 201		una 101.5	λια
<u> </u>					
	A(
METHOD/AP	PARATUS/PROCEDURE:	sorbed	SOURCE AND PURITY OF MA	TERIALS;	ium
by means o	of gas buret and pipet	•.	nitrate, frozen in	liquid ai	r and
Volume abs	orbed appears to be tandent of pressure. (1)	aken	then distilled.		
Density of	the aqueous solution	•	2. Recrystallized.		
determined	by Sprengel pyknometo	er.			
1					
			LETIMATED EDDODA		
			ESTIMATED ERROR:		
			REFERENCES :		
			1924, 41, 38.	org.Chem.	

COMPONENTS:	ORIGINAL MEASUREMENTS:		
	Manchot, von W.; Jahrstorfer, M.;		
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>			
2. Water; H_2O ; [7732-18-5]	Zepter, H.		
[7783-20-2]	Z. Anorg. Allg. Chem. 1924, 141,		
VADTAD	45-81.		
VARIABLES:	PREPARED BY:		
Concentration	C. L. Young		
EXDEDIMENTAL			
AARENIMENTAL VALUES:			
Density, d_{4}^{25} Conc. of satisfy T/K of satt solp (10^3 mol m)	alt Conc. of salt S_1 S_2		
(soln.)	(water) /cm ³ /cm ³		
298.15 1.0896 1.246			
1.1393 2.18	2.5610 17.5 15.4		
S2 - volume of nitrous oxide absorbed per 100 g of salt solution Both S1 and S2 were reduced to conditions of 273.15 K and 101.3 kPa			
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MALERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.		
}	ESTIMATED ERROR:		
	REFERENCES: 1. Manchot, W. Z.Anorg.Chem. <u>1924</u> ,14:,38.		

50	Nitrous	Oxide		
COMPONENTS: 1. Nitrous oxide; N ₂ O; [10024-97-2] 2. Water; H ₂ O; [7732-18-5] 3. Ammonium nitrate; NH ₄ NO ₃ ; [6484-52-2] VARIABLES:		ORIGINAL MEASUREMENTS: Manchot, von W.; Jahrstorfer, M.; Zepter, H. Z. Anorg. Allg. Chem. <u>1924</u> , 141, 45-81. PREPARED BY:		
	Concentration	C. L. Young		
EXPERIMENTAL	VALUES:			
т/к	Density, d ²⁵ ₄ Conc. of s of salt soln. /10 ³ mol m (soln.)	llt Conc. of salt S ₁ S ₂ /mol kg ¹ /cm ³ /cm ³ (water) /cm ³		
298.15	1.02490.891.05271.851.10403.631.21167.40	0.933349.848.62.045146.444.14.462740.937.111.95030.825.4		
Both S	of salt solution S ₂ - volume of nitrous of salt solution and S ₂ were reduced to cond	s oxide absorbed per 100 g . itions of 273.15 K and 101.3 kPa		
	AUXILIARY	INFORMATION		
METHOD/AP Measuremen by means of Volume abs as indepen Density of determined	PPARATUS/PROCEDURE: nt of volume of gas absorbed of gas buret and pipet. sorbed appears to be taken ndent of pressure (1). f the aqueous solution d by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.		
		REFERENCIS:		
		<u>1924</u> , 141, 38.		

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Sada E. Ando N. Kito, S.
1. Nitrous oxide; N ₂ O; [10024-97-2]	Suddy St., Ando, N., KILO, St.
2. Water; H ₂ O; [7732-18-5];	J. Appl. Chem. Biotechnol. <u>1972</u> , 22,
3. Ammonium nitrate; NH4NO3;	1185-1193.
[6484-52-2]	
VARIABLES:	PREPARED BY:
T/K: 298.15 P/kPa: 101.325 (1 atm)	W. Gerrard/C. L. Young
Molarity of salt: mol 1 ⁻¹	
EXPERIMENTAL VALUES:	
T/K Concn. of salt/mol 1 ⁻¹	Bunsen coefficient, α
	0.5512 (pure water) 0.5009
3.049	0.4381
4.484	0.3098*
* This appears to be a tupographi	and any on the supervise from the
the graph given in the original	paper that the value should be 0.3908
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between 2	1 From commercial culinder, 99 8
measured volume of gas and a measured	per cent, as attested by gas
amount of gas-free liquid in a cell	chromatography.
Details in source and ref. 1.	2. Distilled water was used.
	2 Solt was of reagent grade
	S. Sait was of reagent grade.
	ESTIMATED FREOR
	$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by
	compiler).
	REFERENCES:
	l. Onda, K.; Sada, E.; Kobayashi, T.;
	Kito, S.; Ito, K. J. Chem. Engng.
	Japan <u>1970</u> , 3, 18; 137.

COMPONFNTS :	ORIGINAL MEASUREMENTS:			
	Manchot, von W.; Jahrstorfer, M.;			
1. Nitrous oxide; N ₂ O; [10024-97-2				
2. Water; H ₂ O; [7732-18-5]	Zepter, H.			
3. Zinc sulfate; ZnSO ₄ ;	Z. Anorg. Allg. Chem. <u>1924</u> , 141,			
[7733-02-0]	45-81.			
VARIABLES :	PREPARED BY.			
Concentration	C. L. Young			
FXPERIMENTAL VALUES:				
Density d^{25} Conc. o	f salt Conc of salt S, Sa			
T/K of salt soln. /10 ³ mo	1 m^{-3} /mol kg ⁻¹ /cm ³ /cm ³			
(sol	n.) (water) / Cm / Cm			
298.15 1.1403 0.9	5 0.9626 29.9 26.2			
1.2099 1.0	4 1.0714 10.9 13.5			
$S_1 - $ volume of nit	rous oxide absorbed per 100 cm ³			
of salt solut	1011			
S_2 - volume of nit	rous oxide absorbed per 100 g			
of sait solut				
Both S_1 and S_2 were reduced to	conditions of 273.15 K and 101.3 kPa			
AUXIL	IARY INFORMATION			
METHOD/APPARATUS/PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
Measurement of volume of gas absorb	ed []. Prepared by heating ammonium			
Volume absorbed appears to be taken	then distilled.			
as independent of pressure. (1)	2. Recrystallized			
determined by Sprengel pyknometer.	2. Acceystatillea.			
	ESTIMATED ERROR:			
	DEFEDENCUC.			
	1. Manchot, W. Z.Anorg.Chem.			
	<u>1924</u> , <i>141</i> , 38.			

.

<pre>COMPONENTS: 1. Nitrous oxide; N₂O; [10024-97-2] 2. Water; H₂O; [7732-18-5] 3. Zinc nitrate; Zn(NO₃)₂; [7779-88-6] VARIABLES: Concentration</pre>	ORIGINAL MEASUREMENTS: Manchot, von W.; Jahrstorfer, M.; Zepter, H. Z. Anorg. Allg. Chem. <u>1924</u> , 141, 45-81. PREPARED BY: C. L. Young					
EXPERIMENTAL VALUES.						
Density, d_4^{25} Conc. of salt soln. /10 ³ mol m (soln.)	alt Conc. of salt S_1 S_2 /mol kg ⁻¹ /cm ³ /cm ³ (water)					
^{298.15} 1.1223 0.84 1.2433 1.68	0.8721 39.7 35.4 1.8160 29.1 23.4					
of salt solution S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa						
AUXILIARY	INFORMATION					
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.					
	ESTIMATED ERROR:					
	REFERENCES: 1. Manchot, W. Z. Anorg.Chem. <u>1924</u> , 141, 38.					

ORIGINAL MEASUREMENTS:						
Manchot, von W.; Jahrstorfer, M.;						
Zepter, H.						
2. Anorg. Allg. Chem. <u>1924</u> , 141,						
45-81.						
C. L. Young						
EXPERIMENTAL VALUES:						
alt Conc. of salt S_1 S_2 -3 /mol kg ⁻¹ /cm ³ /cm ³ (water)						
0.8145 35.0 30.6 1.7014 27.0 21.0						
S ₁ - volume of nitrous oxide absorbed per 100 cm ³ of salt solution S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa						
INFORMATION						
SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.						
ESTIMATED ERROR:						
REFERENCES: 1. Manchot, W. Z.Anorg.Chem. <u>1924</u> , 141, 38.						

COMPONENTS:	OMPONENTS: ORIGINAL MEASUREMENTS:						
1. Nitrous oxide: N.O. [10024-07-2]		Manchot, von W.; Jahrstorfer, M.;					
2. Water: H ₂ O	2. Water: $H_{2}O$: [7732-18-5]			Zepter, H.			
3. Copper(II) nitrate; Cu(NO ₃) ₂ ; [3251-23-8]		• :	Z. Anorg. Allg. Chem. 1924, 141,				
		45-81.					
VARIABLES:		- <u></u>	PREPARED BY:		<u> </u>		
	Concentration		C. L. Young				
EXPERIMENTAL VALUES:							
Dens T/K of s	ity, d ²⁵ Con alt soln. /10	c. of sa ³ mol m (soln.)	alt Conc. of salt /mol kg ⁻¹ (water)	S ₁ /cm ³	S 2 /cm ³		
298.15	1.1028 1.2049	0.69 1.38	0.7089 1.4587	35.6 27.8	32.3 23.1		
S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa							
	A	UXILIARY	INFORMATION				
*ETHOD (APPAPATUS)			SOURCE AND PURITY OF MAT				
Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.		 Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. Recrystallized. 					
		•	ESTIMATED ERROR:				
			REFERENCES: 1. Manchot, W. Z.Ar 1924, 141, 38.	norg.Chem			
COMPONENTS: 1. Nitrous oxide; N ₂ O; [10024- 2. Water; H ₂ O; [7732-18-5] 3. Nickel(II) sulfate; NiSO ₄ ; [7786-81-4] VARIABLES: Concentration EXPERIMENTAL VALUES:	-97-2]	RIGINAL MEASUREMENTS: Manchot, von W.; Ja Zepter, H. Z. Anorg. Allg. Chem 45-81. REPARED BY: C. L. Young	hrstorfer . <u>1924</u> , <i>1</i>	, M.; 41,			
---	--	--	---------------------------------------	------------------------------------			
Density, d ²⁵ Cor T/K of salt soln. /10	nc. of salt) ³ mol m ⁻³ (soln.)	t Conc. of salt /mol kg ⁻¹ (water)	S ₁ /cm ³	S ₂ /cm ³			
298.15 1.1355 1.2642	0.937 1.874	0.946 1.9236	24.6 13.8	21.7 10.9			
S ₁ - volume of of salt so S ₂ - volume of of salt so Both S ₁ and S ₂ were reduced	nitrous of nitrous of olution d to condi-	xide absorbed per 100 xide absorbed per 100 tions of 273.15 K and	g 101.3 kP	a			
	AUXILIARY IN	NFORMATION					
NETHOD/APPARATUS/PROCEDURE: Measurement of volume of gas a by means of gas buret and pipe Volume absorbed appears to be as independent of pressure. (1 Density of the aqueous solution determined by Sprengel pyknome	bsorbed 1 t. t taken t). n 2 ter.	OURCE AND PURITY OF MATER 1. Prepared by heatinnitrate, frozen in lichen distilled. 2. Recrystallized.	NALS: g ammonium quid air a	n and			
		EFERENCES: Manchot, W. Z.Ano: 924,141,38.	rg.Chem.				

			•		
COMPONENTS:			ORIGINAL MEASUREMENTS	5:	
1. Nitrous oxide: N ₂ O: [10024-97-2]		Manchot, von W.; Jahrstorfer, M.;			
2. Water;	H ₂ O; [7732-18	-5]	Zepter, H.		
3. Cobalt	(II) sulfate; Co	SO ₄ ;	Z. Anorg. Allg.	Chem. <u>1924</u> , 14	1,
[10124	-43-3]		45-81.		
VARIABLES:		<u></u>	PREPARED BY:		
	Concentration		С. L.	Young	
		<u></u>			
EXPERIMENTAL	L VALUES:				
	D			1.5	C
T/K	of salt soln.	$/10^3$ mol m	$\frac{111}{3}$ /mol kg ⁻¹	$1t S_1$	52 /cm ³
		(soln.)	(water)	/ Chi	/ Cill
		· ····			
298.15	1.1131	0.788	0.7952	27.5	24.7
	1.2218	1.576	1.6123	1/.1	14.0
		.		100	
· ·	$S_1 - volum of sa$	e of nitrous lt solution	oxide absorbed pe	r 100 cm-	
[S₂ - volum	e of nitrous	oxide absorbed per	r 100 g	
	of sa	lt solution	±	5	
Both S	Both S $_1$ and S $_2$ were reduced to conditions of 273.15 K and 101.3 kPa				
	·····	AUXILIARY	INFORMATION	·····	
METHOD / APT	ADATUS / PROCEDURE .		SOURCE AND PURITY OF	MATERIALS	
Measuremen	it of volume of g	as absorbed	1. Prepared by he	ating ammonium	1
Volume abs	of gas buret and sorbed appears to	pipet. be taken	then distilled	n liquid air a	ina
as indepen	dent of pressure	(1).	2 Recrystallized		
determined	by Sprengel pyk	nometer.		•	
			ESTIMATED ERROR:		
			REFERENCES :		
			1. Manchot, W. Z.A 1924, 141, 38.	anorg.Chem.	

57

COMPONENTS :	ORIGINAL MEASUREMENTS:	
	Manchot, von W.; Jahrstorfer, M.;	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Zenter H	
2. Water; H_2O ; [7732-18-5]		
<pre>3. Iron(II) sulfate; FeSO₄;</pre>	2. Anorg. Allg. Chem. <u>1924</u> , 141,	
[7720-76 7]	45-81.	
VARIABLES:	PREPARED BY:	
Concentration	C. L. Young	
EXPERIMENTAL VALUES:		
Density, d_4^{25} Conc. of sat Soln. /10 ³ mol m (soln.)	alt Conc. of salt S_1 S_2 /mol kg ⁻¹ /cm ³ /cm ³ (water) /cm ³	
298.15 1.1017 0.72 1.2011 1.438	0.7256 34.0 30.9	
1.2011 1.436	1.4034 21.0 10.0	
S ₁ - volume of nitrous oxide absorbed in 100 cm ³ of salt solution S ₂ - volume of nitrous oxide absorbed in 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa		
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.	
	ESTIMATED ERROR:	
	REFERENCES: 1. Manchot, W. Z.Anorg.Chem. <u>1924</u> ,141,38.	

<pre>COMPONENTS: 1. Nitrous oxide; N₂O; [10024-97-2 2. Water; H₂O; [7732-18-5] 3. Iron(III) sulfate; Fe₂(SO₄)₃; [10028-22-5] VARIABLES: Concentration</pre>	ORIGINAL MEASUREMENTS: Manchot, von W.; Jahrstorfer, M.; Zepter, H. 2. Anorg. Allg. Chem. <u>1924</u> , 141, 45-81. PREPARED BY:	
T/K Density, d ²⁵ of salt soln. /10 ³ mo. (soly)	f salt Conc. of salt S_1 S_2 l m ⁻³ /mol kg ⁻¹ /cm ³ /cm ³ n.) (water)	
298.15 1.2240 0.66 1.4319 1.32	0.6874 25.9 21.2 1.460 13.1 9.2	
S ₁ - volume of nitrous oxide absorbed per 100 cm ³ of salt solution S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa		
AUXILI	ARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorb by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure.(1). Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.	
	ESTIMATED ERROR:	
	REFERENCES: 1. Manchot, W. Z.Anorg, Chem. <u>1924</u> ,141,38.	

00		Mittous	Oxide		
COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Nitrou	s oxide; N ₂ O; [1	0024-97-2]	Manchot, von W.; Jahrstorfer, M.;		
2. Water: $H_{2}O$: $[7732-18-5]$		Zepter, H.			
3. Mangan	ese(II) sulfate;	MnSO ₄ ;	Z. Anorg. Allg. Cher	m. <u>1924</u> ,	141,
[7785-	-87-7]		45-81.		
VARIABLES:			PREPARED BY:		
			a t Vauna		
	Concentratio	on	C. L. Young		• · · · • • • • • •
EXPERIMENTA	L VALUES:				
т/к	Density, d ²⁵ of salt soln.	Conc. of sa /10 ³ mol m ⁻ (soln.)	lt Conc. of salt /mol kg ⁻¹ (water)	S ₁ /cm ³	S ₂ /cm ³
, 298.15	1.1226 1.2460	0.94 1.93	0.9585 2.0219	30.6 17.0	27.3 13.6
			•		
		AUXILIARY	INFORMATION		
METHOD/AP Measureme by means Volume ab as indepe Density o determine	PARATUS/PROCEDURE: nt of volume of o of gas buret and sorbed appears to ndent of pressure f the aqueous so d by Sprengel py	gas absorbed pipet. b be taken . (1). lution knometer.	SOURCE AND PURITY OF MAD 1. Prepared by heat: nitrate, frozen in then distilled. 2. Recrystallized.	'ERIALS: ing ammon liquid an	nium r and
			ESTIMATED ERROR:		
			REFERENCES: 1. Manchot, W. Z./ 1924, 77,38.	inorg.Che	` <i>m</i> .

COMPONENTS :		OPICINAL MEACUDEMENTS -		
		ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [1002	24-97-2]	Manchot, von W.; Jah	rstorfer	, M.;
2. Water; H ₂ O; [7732-18-5]		Zepter, H.		
3. Chromium(III) sulfate; Cr	2 (SO4) 3;	Z. Anorg. Allg. Chem.	<u>1924</u> , 1	41,
[10101-53-8]		45-81		
VARIABLES:		PREPARED BY		······································
Concentration		O I Voung		
		C. L. Young		
EXPERIMENTAL VALUES:		I		
Density, d ₄ ²⁵ C T/K of salt soln. /	onc. of sa 10 ³ mol m ⁻ (soln.)	lt Conc. of salt ³ /mol kg ⁻¹ (water)	S_1 /cm ³	S_2 /cm ³
298.15 1.1657 1.3280	0.57 1.14	0.605 1.294	31.8 18.2	27.2 13.7
S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa			Pa	
	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas by means of gas buret and pip Volume absorbed appears to be as independent of pressure. Densit/ of the aqueous solut: determined by Sprengel pyknor	absorbed pet. = taken (1). ion meter.	SOURCE AND PURITY OF MATERI 1. Prepared by heating nitrate, frozen in liqu then distilled. 2. Recrystallized.	ALS: ammoniur id air a	n and
		ESTIMATED ERROR: REFERENCES: 1. Manchot, W. Z.Anorg 1924,141,38.	c.Chem.	

COMPONENTS -	ORT CINAL ARE CURRENTS
COMPONENTS:	Manchot, von W.: Jahrstorfer, M.
1. Nitrous oxide; N ₂ O; [10024-97-2]	
2. Water; H ₂ O; [7732-18-5]	Zepter, n.
3. Aluminium sulfate; Al ₂ (SO ₄) ₃ ;	Z. Anorg. Allg. Chem. <u>1924</u> , 141,
[10043-01-3]	45-81.
VARIABLES:	PREPARED BY:
Concentration	C. L. Young
EXPERIMENTAL VALUES:	
T/K Density, d_4^{25} Conc. of salt soln. /10 ³ mol m (soln.)	alt Conc. of salt S_1 S_2 /mol kg ⁻¹ /cm ³ /cm ³ (water) /cm ³
298.15 1.1558 0.5166 1.2381 0.8141	0.5277 22.4 19.4 0.8486 13.4 10.8
S ₁ - volume of nitrous of salt solution S ₂ - volume of nitrous of salt solution Both S ₁ and S ₂ were reduced to cond: AUXILIARY	oxide absorbed per 100 cm ³ oxide absorbed per 100 g itions of 273.15 K and 101.3 kPa INFORMATION
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1).	SOURCE AND PURITY OF MATERIALS; 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled.
Density of the aqueous solution determined by Sprengel pyknometer.	2. Recrystallized.
	ESTIMATED ERROR:
	REFERENCES: 1. Manchot, W. Z.Anorg.Chem. <u>1924</u> ,147,38.

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide: N.O: [10024-97-2]	Manchot, von W.; Jahrstorfer, M.;		
2. Water: H.O. (7732-18-5)	Zepter, H.		
3. Aluminium nitrate; Al(NO ₃) ₃ ;	Z. Anorg. Allg. Chem. 1924, 141,		
[13473-90-0]	45-81		
VARIABLES:	PREPARED BY:		
Concentration	C. L. Young		
EXPERIMENTAL VALUES:			
Density, d ²⁵ ₄ Conc. of sa T/K of salt soln. /10 ³ mol m (soln.)	alt Conc. of salt S_1 S_2 /mol kg ⁻¹ /cm ³ /cm ³ (water)		
298.15 1.0703 0.4795 1.1414 0.959	0.4953 36.1 33.7 1.0235 29.3 25.7		
of salt solution S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S ₁ and S ₂ were reduced to conditions of 273.15 K and 101.3 kPa			
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.		
	ESTIMATED ERROR:		
	REFERENCES: 1. Manchot, W. Z.Anorg.Chem. 1924,141,38.		

	1
COMPONENTS:	ORIGINAL MEASUREMENTS:
	Sada, E.; Ando, N.; Kito, S.
1. Nitrous oxide; N_2O ; $[10024-97-2]$	J. Annl. Chem. Biotechnol. 1972. 22.
2. Water; H_2O ; [7732-18-5];	<u> </u>
3. Magnesium chloride; MgCl ₂ ;	1185-1193.
[7786-30-3]	
VARIABLES:	PREPARED BY:
T/K: 298.15 P/kPa: 101.325 (1 atm)	W. Gerrard/C. L. Young
Molarity of salt: mol 1^{-1}	
EXPERIMENTAL VALUES:	
T/K Concn. of salt/mol 1 ⁻¹	Bunsen coefficient, α
200.15	
298.15 0	0.5512 (pure water) 0.4513
0.582	0.4254
0.851	0.3375*
1.451	0.2919
* not used in calculating salt ef	fect parameter
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between a measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer.	 From commercial cylinder; 99.8 per cent, as attested by gas chromatography.
Details in source and ref. 1.	2. Distilled water was used.
	3. Salt was of reagent grade.
	ESTIMATED ERROR: $\delta T/K = \pm 0.2; \delta \alpha = \pm 2\%$ (estimated by compiler). REFERENCES. 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. d. Chem. Engry. Japan <u>1970</u> , 3, 18; 137.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Manchot, von W.; Jahrstorfer, M.;
2. Water; H ₂ O; [7732-18-5]	Zepter, H.
 Magnesium sulfate; MgSO₄; 	Z. Anorg. Allg. Chem. <u>1924</u> , 141,
[7487-88-9]	45-81.
VARIABLES:	PREPARED BY:
Concentration	C. L. Young
EXPERIMENTAL VALUES:	
Density, d ₄ ²⁵ Conc. of T/K of salt soln. /10 ³ mol mol (soln.	salt Conc. of salt S_1 S_2 m^{-3} /mol kg ⁻¹ /cm ³ /cm ³ (water)
^{298.15} 1.0992 0.90 1.1925 1.78	0.9083 29.5 26.8 1.8197 15.9 13.3
Both S ₁ and S ₂ were reduced to co	A INFORMATION
THOD / ADD AD AT US / DDOCE DUDE -	
Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1) Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.
	ESTIMATED ERROR: REFERENCES: 1. Manchot, W. Z.Anorg.Chem. 1924, 1-1, 38.

COMPONENTS	OPICINAL MEASUDEMENTS -		
COM UNENTS.	ORIGINAL MEASUREMENTS:		
 Nitrous oxide; N₂O; [10024-97-2] 	Gordon, V. Z. Phus. Chem. 1895. 18.		
2. Water; H ₂ O; [7732-18-5];	<u>2010</u> ,		
3. Magnesium sulfate; MgSO ₄ ;	1-16.		
[7487-88-9]			
VARIABLES:	PREPARED BY:		
Temperature, concentration	W. Gerrard		
EXPERIMENTAL VALUES:			
Conc. of Bunsen	Conc. of Bunsen		
T/K salt Density, Coefficient	, T/K salt Density, Coefficient, Weight-%		
295.46 5.9009 1.05836 0.43448	284.16 7.6585 1.07755 0.55515		
291.76 1.05945 0.50647	281.26 1.0781 0.62931		
288.26 1.06028 0.55857 284.16 1.0612 0.63936	295.46 10.7765 1.109 0.31431 291.76 1.1101 0.364375		
281.26 1.06184 0.70626	288.26 1.1112 0.41560		
295.46 7.6585 1.0753 0.38733	284.16 1.11236 0.46870		
291.76 288.26 1.0768 0.44329	201.20 I.II333 0.32033		
Smoothi	ng Equations		
(t = T)	/K - 273.15)		
For 5.9009 wt-% solution: $\alpha =$	0.91034 - 0.0274t + 0.000272t ²		
For 7.6585 wt- δ solution: $\alpha =$	$0.853488 - 0.03154t + 0.000477t^2$		
For 10.7765 wt-8 solution: $\alpha = 0.649261 - 0.0164252t + 0.000063t^2$			
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Massurement of volume of das by	1 N.O. Self prepared and purified		
means of Ostwald type apparatus,	Attested by combustion with		
gas buret and pipet.	hydrogen.		
by Sprengel pyknometer.			
	ESTIMATED ERROR:		
	REFERENCES :		
)		
1			

000		
COMPONENTS :	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Markham, A. E.; Kobe, K. A.	
2. Water; H ₂ O; [7732-18-5];	J. Amer. Chem. Soc. <u>1941</u> , 63,	
3. Magnesium sulfate; MgSO ₄ ; [7487-88-9]	449-54.	
VARIABLES:	PREPARED BY:	
T/K: 273.35-313.15 Salt molality/mol kg ⁻¹ : 0.1-8 Partial pressure of gas/atm: 1	P. L. Long	
EXPERIMENTAL VALUES:		
T/K* Salt molality/mol kg ⁻¹ * Co	Bunsen 'Solubility efficient, α* Coefficient', S* ^a	
273.15 0 0.5 1	1.2970 0.8778 0.6019 1.2971 0.8777 0.6039	
298.15 0.5 1	0.2771 0.2820 0.5392 0.5408 0.3840 0.3858 0.2790 0.2816	
313.15 0.5	0.1442 0.3579 0.2612 0.1945 0.1969	
2	0.1018 0.1049	
^a The 'solubility coefficient', "refers to the volume of gas, reduced to standard conditions which is dissolved by the quantity of solution containing one gram of water".		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
An Ostwald method was used. A known volume of gas was placed in contact with a known volume of gas- free liquid. After equilibrium	 99.7 per cent pure, no source. Water was freshly boiled, distilled. 	
was established by agitation, the volume of the remaining gas was measured from which the amount of gas dissolved was found. Solutions were prepared by weight, and verified by density measurements Compared with the literature	3. Analytical grade.	
an absorption flask with two bulbs,	ESTIMATED ERROR:	
One twice the volume of the other, Which was connected by a capillary tube to a gas buret and a	$\delta T/K = \pm 0.1 (273.35 \text{ K}); \pm 0.03$ (above 273.35 K); $\delta \alpha / \alpha = \pm 0.02.$	
manometer system.	REFERENCES :	

COMPONENTS :		ORIGINAL MEASUREMENTS:		
		Manchot, von W.; Ja	ahrstorf	er, M.;
1. Nitrous	s oxide; N ₂ O; [10024-97-2]	Contor U		
2. Water;	H ₂ O; [7732-18-5]	Zepter, n.		
3. Magnes:	ium nitrate; $Mg(NO_3)_2$;	Z. Anorg. Allg. Cher	n. <u>1924</u> ,	141,
[105//	-00-31	45-81.		
VARIABLES:		PREPARED BY:		
	Concentration	C. L. Young		
			.	
EXPERIMENTAL	VALUES:			
	Density, d ²⁵ ₄ Conc. of sa	alt Conc. of salt	S ₁	S ₂
T/K	of salt soln. /10 ³ mol m (soln.)	/mol kg ⁻¹ (water)	/cm ³	/cm³
	(50111)			
200 15	1 0935 0 97	1 0215	39.2	35.8
250.15	1.1846 1.93	2.1485	28.5	24.1
				<u> </u>
	S_1 - volume of nitrou	s oxide absorbed per	100 cm ³	
	of sale solution			
	S ₂ - volume of nitrou of salt solution	s oxide absorbed per .	100 g	
Eoth S	$_1$ and S $_2$ were reduced to cond	litions of 273.15 K ar	nd 101.3	kPa
		,		
	AUXILIARY	INFORMATION		
METHOD/APP	ARATUS/PROCEDURE:	SOURCE AND PURITY OF MAT	ERIALS:	ium
by means c	of gas buret and pipet.	nitrate, frozen in 1	iquid ai	r and
Volume abs	orbed appears to be taken	then distilled.		
Density of	the aqueous solution	2. Recrystallized.		
determined	by Sprengel pyknometer.			
		ESTIMATED ERROR:		
		REFERENCES: 1. Manchot, W. Z.Ano	rg,Chem.	
		<u>1924</u> , <i>141</i> , 38.		
L				

COMPONENTS	ODTOTIVAT AND A CONTRACTOR
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Markham, A. E.; Kobe, K. A.
2. Water; H ₂ O; [7732-18-5];	J. Amer. Chem. Soc. <u>1941</u> , 63,
3. Magnesium nitrate; Mg(NO ₃) ₂ ; [10377-60-3]	449-54.
VARIABLES:	PREPARED BY
T/K: 273.35-313.15 Salt molality/mol kg ⁻¹ : 0.1-8 Partial pressure of gas/atm: 1	P. L. Long
EXPERIMENTAL VALUES:	
T/K* Salt molality/mol kg ⁻¹ *	Bunsen 'Solubility Coefficient, α* Coefficient', S*
27.0	
2/3.35 0	
1	0.7921 0.8215
2	0.5238 0.5664
3	0.3618 0.4079
298.15 0	0.5392 0.5408
	0.3850 0.4023
2	0.2785 0.3042
3	0.2104 0.2403
313.15 0	0.3579 0.3607
U.5 1	0.3061 0.3150
2	0.1989 0.2188
3	0.1556 0.1793
^a The 'solubility coefficient' reduced to standard condition the quantity of solution com	, "refers to the volume of gas, ns which is dissolved by taining one gram of water".
,	
AUXILIAR	Y INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An Ostwald method was used. A	1. 99.7 per cent pure, no source.
Contact with a known volume of gas- free liquid. After equilibrium	 Water was freshly boiled, distilled.
Volume of the remaining gas was	3. Analytical grade.
measured from which the amount of gas dissolved was found. Solutions	
Were prepared by weight, and Verified by density measurements	
Compared with the literature	
an absorption flask with two hulbs.	ESTIMATED ERROR:
one twice the volume of the other,	$\delta T/K = \pm 0.1 (273.35 \text{ K}); \pm 0.03$
Which was connected by a capillary	(above 273.35 K): $\delta \alpha / \alpha = \pm 0.02$.
Manometor sustant	
	REFERENCES
	I ALLERANCES :
1	

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Gordon, V. Z. Phys. Chem. <u>1895</u> , 18,
1. Nitrous Oxide; N ₂ O; [10024-97-2]	1-16.
2. Water; H ₂ O; [7732-18-5];	
<pre>3. Calcium chloride; CaCl₂; [10043-52-4]</pre>	
VARIABLES:	PREPARED BY:
Temperature concentration	W Corrard
	W. Gellalu
EXPERIMENTAL VALUES:	
Conc.of Bunsen T/K salt Density, Coefficient	Conc.of Bunsen
Weight-% p a	Weight-% p a
295.46 5.7898 1.04695 0.46447	284.16 9.856 1.0864 0.56462
291.76 1.04784 0.52416	281.26 1.0873 0.61709 205.46 12.007 1.1200 0.20676
288.26 1.04902 0.58870	295.46 13.987 1.1209 0.30676 291.76 1.1221 0.33760
281.26 1.05043 0.74106	288.26 1.1234 0.37919
295.46 9.856 1.0830 0.39256	284.16 1.1247 0.42001 281.26 1.1257 0.46642
288.26 1.0842 0.44409 288.26 1.0852 0.50743	281.20 1.1250 0.40042
Smoothi	ng Equations
(t = 1	/K - 273.16)
For 5.7898 wt- $%$ solution: $\alpha =$	$0.958202 - 0.029356t + 0.0003236t^2$
For 9.856 wt-8 solution: $\alpha =$	$0.754096 = 0.01757t + 0.000081t^{2}$
For 13.987 wt-% solution: $\alpha =$	0.58801 - 0.01638t + 0.000169t ²
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of gas by	1. NoO: Self prepared and purified
means of Ostwald type apparatus,	Attested by combustion with
gas buret and pipet (ref. 1).	hydrogen.
by Sprengel pyknometer.	
	ESTIMATED ERROR:
	NETERENCES:
	1. Timofejew, W. Z. Phys. Chem.
	1890, 6, 141.
	1

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Manchot, von W.: Jahrstorfer, M.:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Zontor H
2. Water; H_2O ; [7732-18-5]	
$\begin{bmatrix} 3. Calcium chloride; CaCl_2; \\ [10043-52-4] \end{bmatrix}$	2. Anorg. Allg. Chem. <u>1924</u> , 141,
VADIADIDO	45-81.
VARIABLES:	PREPARED BY:
Concentration	C. L. Young
EXPERIMENTAL VALUES:	
Density, d ²⁵ ₄ Conc. of T/K of salt soln. /10 ³ mol soln.	salt Conc. of salt S_1 S_2 . m ⁻³ /mol kg ⁻¹ /cm ³ /cm ³) (water)
298.15 1.0786 0.93 1.1665 1.99	0.9535 33.9 31.4 2.1044 20.2 17.3
S ₁ - volume of nitr salt solution	rous oxide absorbed per 100 cm³ of
S ₂ - volume of nitr salt solution	ous oxide absorbed per 100 g of
Both S_1 and S_2 were reduced to c	onditions of 273.15 K and 101.3 kPa
AUXILIA	ARY INFORMATION
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorb by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.	SOURCE AND PURITY OF MATERIALS: ed 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.
	ESTIMATED ERROR: REFERENCES: 1. Manchot, W. Z.Anorg.Chem. 1924, 141,38.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sada, E.; Ando, N.; Kito, S.
2. Water; H ₂ O; [7732-18-5];	J. Appl. Chem. Biotechnol. <u>1972</u> , 22,
<pre>3. Calcium chloride; CaCl₂; [10043-52-4]</pre>	1185-1193.
VARIABLES:	PREPARED BY:
Concentration	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of salt/mol 1 ⁻¹ Bu	nsen coefficient, α
298.15 0	0.5512 (pure water)
0.323	0.4705
1.088	0.3275
1.451	0.2760
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MAIERIALS:
Equilibrium established between a measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Details in source and ref. 1.	 From commercial cylinder; 99.8 per cent, as attested by gas chromatography. Distilled water was used. Salt was of reagent grade.
	ESTIMATED ERROR: T/K = 0.2; = 2% (estimated by compiler).
	<pre>REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. J. Chem. Enging. Japan 1970, 3, 18; 137.</pre>

COMPONENTS		ODTOTIVIT NO		
SAL ONENIS:		ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N2O; [10024	-97-2]	Manchot, von W.;	Jahrstori	er, M.;
2. Water; H ₂ O; [7732-18-5]	_	Zepter, H.		
3. Calcium nitrate: Ca(NO ₂).		Z. Anorg. Allg. Cl	nem. <u>1924</u> ,	141,
[10124-37-5]	:	45-81		
VARIARIES		43-01.		
CHARABLES:		PREPARED BY:		
Concentration		C. L. Young		
Dupper				
EXPERIMENTAL VALUES:				
T/K Density, d ²⁵ ₄ Cor T/K of salt soln. /10	nc. of sa) mol m (soln.)	alt Conc. of salt /mol kg ⁻¹ (water)	S_1 /cm ³	S 2 / cm ³
298.15 1.1503 1.2927	1.365 2.73	1.474 3.232	32.2 19.4	28.0 15.0
S_1 - volume of of salt s S_2 - volume of of salt s Both S_1 and S_2 were reduced	f nitrous solution f nitrous solution l to cond	s oxide absorbed per s oxide absorbed per litions of 273.15 K a	100 cm ³ 100 g and 101.3	kPa
	AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: easurement of volume of gas all by means of gas buret and pipe Volume absorbed appears to be as independent of pressure. (1 Density of the aqueous solution determined by Sprengel pyknome	bsorbed t. taken). n ter.	SOURCE AND PURITY OF MA' 1. Prepared by heat nitrate, frozen in then distilled. 2. Recrystallized.	TERIALS: ing ammon liquid ai:	ium r and
		ESTIMATED ERROR:		
		<pre>REFERENCES: 1. Manchot, W. 2.And 1924, 147, 38.</pre>	org.Chem.	

COMPONENTS :	ORIGINAL MEASUREMENTS:
	Cordon V 7 Phus Cham 1895 18
1. Nitrous oxide; N ₂ O; [10024-97-2]	Gordon, V. 2. Phys. Chem. <u>1095</u> , 10,
2. Water; H ₂ O; [7732-18-5];	1-16.
3. Strontium chloride; SrCl ₂ ; [10476-85-4]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard
EXPERIMENTAL VALUES:	
Conc.of Bunsen T/K salt Density, Coefficient Weight-% ρ α	Conc.of Bunsen , T/K salt Density, Coefficient, Weight-% ρ α
295.46 3.309 1.0283 0.54357 291.76 1.029 0.60269 288.26 1.0297 0.66902 284.16 1.0304 0.76665	284.16 5.7315 1.0528 0.68591 281.26 1.0537 0.75729 295.46 13.239 1.1226 0.36143 291.76 1.1238 0.41191
281.26 1.0309 0.83808 291.76 5.7315 1.0506 0.56234 288.26 1.0515 0.60944	288.26 1.1251 0.44876 284.16 1.1265 0.52249 281.26 1.1273 0.58233
Smoothi	ng Equations
(t = T,	/K - 273.15)
For 3.309 wt-% solution: $\alpha = 1$.091696 - 0.03515t + 0.000474t ²
For 5.7315 wt-% solution: $\alpha = 1$	$.02683 - 0.0397t + 0.000793t^{2}$
For 13 239 wt- β solution: $\alpha = 0$	$75313 - 0.0230955 + 0.0002485^{2}$
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of gas by means of Ostwald type apparatus, gas buret and pipet. Density of the solution determined by Sprengel pyknometer.	 N₂O: Self prepared and purified. Attested by combustion with hydrogen.
	ESTIMATED ERROR:
	REFERENCES:

COMPONENTS	OPICINAL VERSUES
	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Manchot, von W.; Jahrstorfer, M.;
2. Water; H ₂ O; [7732-18-5]	Zepter, H.
3. Barium chloride; BaCl ₂ ;	Z. Anorg. Allg. Chem. <u>1924</u> , 141,
[10361-37-2]	45-81.
VARIABLES:	PREPARED BY:
Concentration	C. L. Young
EXPERIMENTAL VALUES:	
25	
Density, d_{4}° Conc. of sat T/K of salt soln. $/10^{3}$ mol m	alt Conc. of salt S_1 S_2 $\sqrt{mol kg^{-1}}$ $\sqrt{3}$ $\sqrt{mol kg^{-1}}$
(soln.)	(water) /cm ² /cm ²
298.15 1.1090 0.620 1.2200 1.212	0.6327 37.4 33.8
1.2290 1.315	
$S_1 - $ volume of nitrous	s oxide absorbed per 100 cm 3
of salt solution	
S ₂ - volume of nitrous of salt solution	s oxide absorbed per 100 g
Both S1 and S2 were reduced to con	ditions of 273.15 K and 101.3 kPa
AUXILIARY	INFORMATION
HETHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
by means of gas buret and pipet.	nitrate, frozen in liquid air and
Volume absorbed appears to be taken as independent of pressure. (1).	then distilled.
Density of the aqueous solution	2. Recrystallized.
determined by Sprengel pyknometer.	
	ESTIMATED ERFOR:
	REFERENCES: 1. Manchot, W. 2. Anorg. Chem.
	<u>1924</u> , <i>141</i> ,38.

COMPONENTS :	ORIGINAL MEASUREMENTS:
	Gordon V 7 Phus Cham 1895 18
1. Nitrous oxide; N ₂ O; [10024-97-2]	<u> </u>
2. Water; H ₂ O; [7732-18-5];	1-16.
3. Lithium chloride: LiCl:	
[7447-41-8]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard
EXPERIMENTAL VALUES:	
Conc.of Bunsen T/K salt Density, Coefficient Weight-% ρ α	Conc.of Bunsen , T/K salt Density, Coefficient, Weight-% ρ α
295.46 1.346 0.0058 0.5559	295.46 3.853 1.0211 0.5005
0.5523	291.76 1.0221 0.5643 288.26 1.0227 0.6268
0.6224	284.16 1.0237 0.7090
	281.26 1.0242 0.7917 295.46 11.476 1.065 0.3632
284.16 1.0081 0.7959	291.76 1.0658 0.3874
0.7820	288.26 1.0666 0.4351 284.16 1.0675 0.4916
201120 110003 010000	281.26 1.0682 0.5452
Smoothi	ng Equations
(† = T	/K = 273.16
For 1.345 wt-8 solution: $\alpha = 1$	$.1658234 - 0.038488t + 0.0004958t^{\circ}$
For 3.853 wt-% solution: $\alpha = 1$	$.0343228 - 0.0333846t + 0.0004236t^2$
For 11.476 wt-% solution: $\alpha = 0$.720982 - 0.0249286t + 0.0003984t ²
	IND AND ION
METHOL/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS
Measurement of volume of gas by means of Ostwald type apparatus, gas buret and pipet (ref. 1.). Density of the solution determined by Sprengel pyknometer.	 N₂O: Self prepared and purified. Attested by combustion with hydrogen.
	FSTIMATED FRAUK:
	DESEDENCIO.
	REFLERENCES:
	1. TIMOTEJEW, W. Z. Chiel, Chiel.
	<u>1890</u> , <i>c</i> , 141.

.

COMPONENTS	OPICINAL NEACURENEWER
	ORIGINAL MEASUREMENTS:
	Geffcken, G. Z. Phys. Chem. 1904,
2. Nitrous oxide; N_2O ; $[10024-97-2]$	49, 257-302.
2. water; H_20 ; [/732-18-5];	
5. Lithium chloride; LiCl; [7447-41-8]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	I
T/K Conc. of salt/mol dm ⁻³	(soln.) Ostwald coefficient, L
288.16 0.558	0.6884
0.561	0,6877 0,6163
1.059	0.6146
0.558	0.5276
1.057	0.4760
AUXILIARY	INFORMATION
^{ME THOD} /APPARATUS/PROCEDURE:	SOU'KO'E AND PU'RITY OF MATERIALS.
Measurement of volume of N ₂ O absorbed by the aqueous solution. Detailed description and diagram given in source.	 Nitrous oxide self prepared and attested.
	ESTIMATED ERROR:
	PEEPENCING .
	MATERENCES:

COMPONENTS :		ORIGINAL MEASUREM	ENTS:
1. Nitrous	oxide; N ₂ O; [10024-97-2]	Kreitus, I.;	Gorbovitskalya, T. I.
2 Water H	$1_{0} \cdot [7732 - 18 - 5]$	Laty PRS Zin	at. Akad. Vestis
3 Lithium	chloride: LiCl:	Khim Son	
		1070 664-666	
[/44/-4]	L-8]	<u>1979</u> , 884-886).
VARIABLES:		PREPARED BY:	
			C I Young
Cor	icentration of salt		C. L. Foung
EXPERIMENTAL	VALUES:	I	
	Conc. of salt	Bunsen	Absorption [†]
T/K	$/mol kg^{-1}$	coefficient,	coefficient,
	(water)	α	S
208 15	0.0	0.55	0.55
290.19	0.97	0.47	0.48
	2.66	0.36	0.38
	5.44	0.21	0.23
	9.10	0.12	0.15
	15.5	0.042	0.059
	18.7	0.03	0.044
	19.8	0.026	0.039
	AUXILIARY	INFORMATION	
METHOD ADDADA	TUS /PROCEDURE ·	SOURCE AND DURITS	OF MAIL DIALC
HE THOD AFT ANA	105/FROCEDORE.	SOURCE AND PURITS	OF MATERIALS,
Aqueous so	lution saturated at 0.1013	1. Medical o	grade sample.
MPa and 1 o	cm ³ sample analyzed by gas	2. Twice dis	stilled.
chromatogra	aphy. Column contained	3. Twice rec	crystallised from
molecular	sieves and was operated	laborator	reagent grade
i cothermal	lu at 250 °C using bolium		j reagene graat
isothermar.	ry at 250°C using herium	sampie.	
as carrier	gas. Thermal conduc-		
tivity dete	ector used.		
		PORTMARUD PDDOD.	
		ESTIMATED ERROR:	
		$\delta T/K = \pm 0.1;$	$\delta \alpha / \alpha = \pm 0.1$
		REFERENCES:	
]			
		l	

|--|

COMPONENTS	OPICINAL MEASUREMENTS .		
STA ONDALD.	ORIGINAL MEASUREMENTS:		
	Gordon, V. Z. Phys. Chem. <u>1895</u> , 18,		
2. Nitrous oxide; N_20 ; [10024-9/-2]	1-16.		
2. Water; H_2O ; [7732-18-5];	1 10.		
3. Lithium sulfate; Li ₂ SO ₄ ; [10377-48-7]			
VARIARIES			
IntroLES:	PREPARED BY:		
Temperature, concentration	W. Gerrard		
EXPERIMENTAL VALUES:			
Cong. of Buncon	Cong of Bungon		
T/K Conc. of Bunsen T/K salt Density, Coefficient Weight-% ρ α	, T/K salt Density, Coefficient, Weight-% ρ α		
295 46 2 2699 1 01973 0 52972	284 16 5 462 1 0518 0 64055		
291.76 1.01954 0.52975	284.16 5.465 1.0518 $0.64055281.26$ 1.0525 0.71145		
288.26 1.02024 0.66775	295.46 8.5596 1.0732 0.3912		
284.16 1.02094 0.76423	291.76 1.07412 0.43526		
281.26 1.02156 0.84337	288.26 1.0751 0.47611		
295.46 5.463 1.04917 0.44372	284.16 1.07626 0.52889		
288.26 1.050 0.49822 0.55552 0.55552	201.20 1.07084 0.38708		
$\frac{\text{Smoothing Equations}}{(t = T/K - 273.15)}$ For 2.3689 wt-% solution: $\alpha = 1.09758 - 0.03476t + 0.0004168t^2$ For 5.463 wt-% solution: $\alpha = 0.950112 - 0.033325 + 0.000476t^2$ For 8.5596 wt-% solution: $\alpha = 0.752485 - 0.022711t + 0.00029193t^2$			
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATIRIALS.		
Measurement of volume of gas by means of Ostwald type apparatus, gas buret and pipet. Density of the solution determined by Sprengel pyknometer.	1. N ₂ O: Self prepared and purified. Attested by combustion with hydrogen.		
	ESTIMATED ERROR:		
	REFERENCES :		
	1		

COMPONENTS:	ORIGINAL MEASUREMENTS:	
	Gordon, V. Z. Phys. Chem. <u>1895</u> , 18,	
1. Nitrous oxide; N ₂ O; [10024-97-2]	1-16.	
2. Water; H ₂ O; [7732-18-5];		
3. Sodium chloride; NaCl; [7647-14-5]		
VARIABLES:	PREPARED BY:	
Temperature, concentration	W. Gerrard	
EXPERIMENTAL VALUES:		
Conc.of Bunsen T/K salt Density, Coefficient Weight-% ρ α	Conc.of Bunsen t, T/K salt Density, Coefficient, Weight-% ρ α	
295.46 8.88 1.0608 0.4091 0.4013	295.46 6.196 1.04255 0.48086 291.76 1.0436 0.5262	
291.76 1.0622 0.4577	288.26 1.0447 0.58368	
288.26 1.0641 0.5046	284.16 1.0457 0.66302 281.26 1.04646 0.72482	
0.5112 284.16 1.0654 0.5790	295.46 12.782 1.0915 0.3626 291.76 1.0930 0.3994	
0.5790	288.26 1.0943 0.4480	
281.26 1.0666 0.6412 0.6437	284.16 1.0958 0.5118 281.26 1.0969 0.5687	
$(t = T/K - 273.16)$ For 8.88 wt-% solution: $\alpha = 0.84069 - 0.027303t + 0.0003486t^2$ For 6.196 wt-% solution: $\alpha = 0.93959 - 0.029923t + 0.00042072t^2$ For 12.782 wt-% solution: $\alpha = 0.75472 - 0.026034t + 0.00037894t^2$		
METHOD /ADDADATUS /DDOCEDURE ·	SOURCE AND PURITY OF MATERIALS.	
Measurement of volume of gas by means of Ostwald type apparatus, gas buret and pipet (ref. 1). Density of the solution determined by Sprengel pyknometer.	1. N ₂ O: Self prepared and purified. Attested by combustion with hydrogen.	
	ESTIMATED ERROR:	
	REFERENCES :	
	1. Timofejew, W. Z. Phys. Chem.	
	<u>1890</u> , <i>6</i> , 141.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
	Roth, W.	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Z. Phus. Chem. 1897, 24, 114-151.	
<pre>2. Water; H₂O; [7732-18-5]; 3. Soldium ablantial. N= 21</pre>	<u></u> ,, <u></u>	
[7647-14-5]		
VADA		
VARIABLES:	PREPARED BY:	
Temperature, concentration	W. Gerrard	
FYDEDINGNAME WITTER		
t = T/K - 273.16;	density = d ; α = Bunsen coefficient.	
Concn. of sodium chloride, %: 0.9475		
Change of d with t: $d = 1.00750 - 0.0$	$00001729t - 0.000005159t^{2}$	
т/к 298.17 293.28 288.1	11 282.93 278.12	
α 0.5332 0.6210 0.73	50 0.8880 1.0649	
Concn. of sodium chloride, %: 1.033		
Change of d with t: $d = 1.00812 - 0.0000000000000000000000000000000000$	$00002546t - 0.0000049403t^{2}$ $45682t + 0.0006573t^{2}$	
т/к 298.00 293.24 288.	11 283.16 278.32	
α 0.5412 0.6226 0.73	44 0.8746 1.0522	
Concn. of sodium chloride, %: 1.754	$0.0004550t = 0.000004672t^{2}$	
Change of α with t: $\alpha = 1.1990 - 0.04$	$4191t + 0.00059064t^2$	
T/K 298.16 293.21 288.	11 283.00 278.10	
	45 0.8380 1.0005	
Concn. of sodium chloride, %: 1.862 Change of d with t: $d = 1.0145 + 0.0162$	0005068t - 0.000004778t ²	
Change of α with t: $\alpha = 1.1956 - 0.04$	41595t + 0.00057893t ²	
T/K 298.06 293.16 288.1 α 0.5188 0.5992 0.70	13 283.04 278.10 26 0.8297 1.0042	
	(continued)	
	(concinaca)	
AUXILIARY	INFORMATION	
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Ostwald method using gas buret and	1. NoO was self prepared and	
pipet. Measurement of volume of	purified.	
Specific gravity of solution was	3. Sodium chloride was analysed	
determined by a Sprengel pyknometer.	by an appropriate method.	
by assuming Raoult's law, was allowed		
-01.		
	ESTIMATED ERROR.	
-	REFERENCES:	

Nitrous Oxide

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Roth, W.
1. Nitrous oxide; N ₂ O; [10024-97-2]	
2. Water; H ₂ O; [7732-18-5];	Z. Phys. Chem. <u>1897</u> , 24, 114-151.
3. Sodium chloride; NaCl;	
[7647-14-5]	
	l
EXPERIMENTAL VALUES: t = T/K - 273 16	density = $d \cdot \alpha$ = Bunsen coefficient
L = 1/R = 2/5.10,	density - a, a - bansen coefficient.
Conce of sodium chloride, \$, 3,718	
Change of d with t: $d = 1.02864 - 0$.	00010466t - 0.0000041586t ²
Change of α with t: $\alpha = 1.0678 - 0.0$	$35518t + 0.0004774t^2$
T/K 298.34 293.24 287.	70 283.17 278.03
a 0.4781 0.5508 0.65	23 0.7558 0.5005
Concn. of sodium chloride, %: 4.054	
Change of d with t: $d = 1.03152 - 0$.	$00009209t - 0.000004826t^{2}$
m/r = 208 + 18 = 203 + 20 = 388	33321 ± 0.000438351
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	61 0.7764 0.9297
Concn. of sodium chloride, %: 5.705	0.001515 0.00000005+2
Change of α with t: $\alpha = 1.04393 - 0.0$ Change of α with t: $\alpha = 1.0025 - 0.0$	$3409t + 0.0004606t^2$
т/к 298.21 293.24 288.	30 283.30 278.29
α 0.4375 0.5053 0.59	19 0.7031 0.8397
Comment and in the share do the C 024	
Conch. of sodium chiefide, $%: 6.024$ Change of d with t: $d = 1.04647 - 0$.	$00017481t - 0.00003314t^2$
Change of α with t: α 0.9956 - 0.0	32925t + 0.00043854t ²
Т/К 298.25 292.87 288.	34 283.18 278.39
α 0.4456 0.5222 0.59	68 U./U8/ U.8354

COMPANY		1		
COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Nitrous oxido: N.O. [10024-97-2]		Manchot, von W.; Jahrstorfer, M.;		
2. Water: H ₂	[10024-97-2]	Zepter, H.		
3. Sodium chl	oride; NaCl;	Z. Anorg. Allg. Cher	m. 1924, 141,	
[7647-	L4-5]	45-91		
VARIARIES	n	45-61.		
TARIABLES:		PREPARED BY:		
	Concentration	C. L. Young		
EXPERIMENTAL VALU	ES:	4		
Der T/K of	nsity, d ²⁵ Conc. of sa salt soln. /10 ³ mol m (soln.)	alt Conc. of salt /mol kg ⁻¹ (water)	S ₁ S ₂ /cm ³ /cm ³	
298.15	1 0438 1 15	1 1776	39.0 37.4	
	1.0874 2.31	2.4256	28.5 26.2	
	1.1600 4.32	4.7606	17.2 14.8	
	S ₁ - volume of nitrous oxide absorbed per 100 cm ³ of salt solution			
	salt solution	s oxide absorbed per .	IUU G OI	
Both S1 and	S ₂ were reduced to cond	litions of 273.15 K an	nd 101.3 kPa	
	AUXILIARY	INFORMATION		
METHOD/APPARATU: Measurement of by means of ga Volume absorbe as independent Density of the determined by	S/PROCEDURE: volume of gas absorbed s buret and pipet. d appears to be taken of pressure. (1). aqueous solution Sprengel pyknometer.	SOURCE AND PURITY OF MAT 1. Prepared by heatinitrate, frozen in 1 then distilled. 2. Recrystallized.	ERIALS: ing ammonium Liquid air and	
		ESTIMATED ERROR:		
		REFERENCES: 1. Manchot, W. Z.And 1924, 141, 38.	org.Chem.	

COMPONENTS :		ORIGINAL MEASUREMENTS:	
		Markham, A. E.: Ko	obe, K. A.
1. Nitrous oxide; N ₂ O; [10024-97-2]		Markhan, A. D., Kobe, K. A.	
2. Water;	H ₂ O; [7732-18-5];	J. Amer. Chem. Soc	c. <u>1941</u> , 63,
3. Sodium	n chloride; NaCl;	449-54.	
[76	547-14-5]		
VARTABLES	· · · · · · · · · · · · · · · · · · ·	DEDADED DV.	
T/K: 273.	.35 - 313.15	r KEFARED DI:	•
Salt mola	ality/mol kg ⁻ : 0.1-8 pressure of gas/atm: 1	P. L. Long	Ð
		·····	
EXPERIMENTAL	. VALUES:	Durana	
T/K*	Salt molality/mol kg ⁻¹ *	Coefficient, α *	Coefficient', S * ^a
			·
272 25	0	1 2970	1 2971
273.35	1	0.9178	0.9327
	2	0.6675	0.6902
298.15	3	0.5392	0.5330
	ĩ	0.4026	0.4127
	2	0.3166	0.3299
313.15	0	0.3579	0.3607
	1	0.2719	0.2707
	2 3	0.2181	0.2288
· ·			
Ĩ	From the original data.		
a		Puefere to the malu	
The 'solubility coefficient', "refers to the volume of gas, reduced to standard conditions which is dissolved by		olved by	
t	the quantity of solution cont	aining one gram of w	water".
	AUXILIARY	INFORMATION	
ATTEND ADD		COURCE AND DUDITE OF Y	
METHOD/APPF	ARATUS/PROCEDURE:	SOURCE AND PURITY OF MA	VIERIALS:
An Ostwa	ald method was used. A	1. 99.7 per cent p	pure, no source.
contact	with a known volume of gas-	2. Water was fresh	nlv boiled,
free lic	quid. After equilibrium	distilled.	· ·
was esta	ablished by agitation, the	3. Analytical grad	-le
measured	d from which the amount of	St imargerour gra	
gas diss	solved was found. Solutions		
fied by	density measurements com-		
pared wi	ith the literature values.		
Apparatu	as consisted of an absorp-	ESTIMATED ERROR	
the volu	me of the other, which was	$\delta T / K = +0.1 (273)$	35 K) + 1 03
connecte	ed by a capillary tube to a	(above 272 25 v)	$\delta_{\alpha}/\alpha = \pm 0.00$
yas bure	er and a manometer system.	(abuve 2/3.35 K);	οα/α - ±0.02.
		REFERENCES :	
1			
1			
1			
L			

COMPONENTS	•			······································	
CONFORENTS:		ORIGINAL MEASUREMENTS:			
1. Nitrous oxide: No.0: [10024-97-2]		Manchot, von W.; Jahrstorfer, M.;			
2. Water, H_{0} , $[7722, 18-5]$		Zepter, H.			
3. Sodiu	m hyperide: NaDra		Z. Anorg. Allg. Ch	em. 1924,	141,
	7647-15-61	;			•
			45-81.		
VARIABLES:	·····	<u></u>	PREPARED BY:		
	Concentrati	on	C. L. Young		
EXPERIMENT	AL VALUES:				
	Density d ²⁵	Conc. of s	alt Cong of salt	S .	C.
T/K	of salt soln.	$/10^{\circ}$ mol m	$\frac{11}{3}$ /mol kg ⁻¹	51	52
		(soln.)	(water)	/cm '	/cm '
		<u></u>	······································	·	
298 15	1 0040	1 105	1 1000	40.1	27.0
	1.1645	2.17	2.3057	40.1 30.9	37.0
	1.3338	4.46	5.0983	17.8	13.3
Both S1	$S_1 - voluof sS_2 - voluof sand S_2 were redu$	ume of nitrous alt solution ume of nitrous alt solution uced to condi	s oxide absorbed per s oxide absorbed per tions of 273.15 K an	100 cm³ 100 g d 101.3 k	Pa
		AUXILIARY	INFORMATION		
NETHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure. (1). Density of the aqueous solution determined by Sprengel pyknometer.		SOURCE AND PURITY OF MA 1. Prepared by heat nitrate, frozen in then distilled. 2. Recrystallized.	TERIALS: ing ammon liquid ai	ium r and	
			ESTIMATED ERROR:		
			REFERENCES: 1. Manchot, W. 2.A: 1924,141,38.	iorg.Chem	

COMPONENTS .		
CONFONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Gordon, V. Z. Phys. Chem. 1895, 18,	
2. Water; H ₂ O; [7732-18-5];		
3. Sodium sulfate; Na ₂ SO ₄ ;	1-10.	
[//5/-82-6]		
VARIABLES		
	FREPARED DI:	
Temperature, concentration	W. Gerrard	
	l <u></u>	
Conc. of Burger	Conc. of Burger	
T/K salt Density, Coefficient	, T/K salt Density, Coefficient,	
weight-% ρ α	weight-s p a	
295.46 5.765 1.0514 0.4675	288.26 8.533 1.0770 0.48033	
291.76 1.0525 0.5083	284.16 1.0785 0.54547	
288.26 284.16 1.0548 0.57065 0.67153	281.26 295.46 12.439 1 1138 0 33739	
281.26 1.0555 0.72345	291.76 1.1152 0.37911	
295.46 8.533 1.0747 0.3940 1.0758 0.43089	288.26 1.1166 0.41606 284.16 1.1181 0.47152	
	204.10 1.1101 0.47152	
	2	
Smoothing	g Equations	
(t = T/K	- 273.16)	
For 5.765 wt-% solution: $\alpha = 0.1$	96489 - 0.034086t + 0.00052831t ²	
For 8 533 wt-8 solution: $\alpha = 0$	$836072 = 0.0313934 \pm 0.000518794^2$	
$\int \int \int \partial f \partial $		
For 12.439 wt-% solution: $\alpha = 0.1$	637428 - 0.016216t + 0.00010304t ²	
AUXILIARY	INFORMATION	
METHOD /APPARATUS/PROCEDURE:	CONDER AND PHOTTY OF MATERIALS.	
	SOURCE AND FURITI OF MATERIALS;	
Measurement of volume of gas by means of Ostwald type apparatus.	1. N ₂ O: Self prepared and purified.	
gas buret and pipet (ref. 1).	hydrogen.	
Density of the solution determined		
by sprenger pyknometer.		
	ESTIMATED ERROR:	
	REFERENCES :	
	1. Timofojew, W. J. M. S. M. S.	
	<u>1890</u> , 0, 141.	

COMPONENTS:		ORIGINAL MEASUREMENTS:		······
		Manchot, von W.; 3	Jahrstorfe	er, M.;
1. Nitrous oxide; N_2O ; [10024]	-97-2]	Zepter, H.		
2. water; $H_2O; [7/32-18-5]$		7 Amono 1110 Ch		1 4 7
3. Sodium sulfate; Na ₂ SO ₄ ; [7757-82-6]		4. Anorg. Allg. Che	em. <u>1924</u> ,	141,
VADIAN		45-81.		
VARIABLES :		PREPARED BY:		
Concentration		C. L. Young		
EXPERIMENTAL VALUES:	I			
Density, d ²⁵ Cor T/K of salt soln. /10	nc. of sa) ³ mol m	lt Conc. of salt ³ /mol kg ⁻¹ (water)	S ₁ /cm ³	S 2 / cm ³
298.15 1.0550 1.1141	0.4646 0.977	0.4698 1.0017	36.5 24.8	34.6 22.2
Both S_1 and S_2 were redu	ced to co	onditions of 273.15 H	< and 101	.3 kPa
	AUXILIARY	INFORMATION		
Measurement of volume of gas a by means of gas buret and pipe Volume absorbed appears to be as independent of pressure. (1 Density of the aqueous solution determined by Sprengel pyknome	bsorbed t. taken). n ter.	SOURCE AND PURITY OF MAT 1. Prepared by heat: nitrate, frozen in 3 then distilled. 2. Recrystallized.	ERIALS: ing ammon. liquid ai:	ium r and
		LSTIMATED ERROR:		
		REFERENCES: 1. Manchot, W. Z.Ar 1924, 141, 38.	norg.Chem	

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Markham, A. E.: Kobe, K. A.
1. Nitrous oxide; N ₂ O; [10024-97-2]	
2. Water; H ₂ O; [7732-18-5];	J. Amer. Chem. Soc. <u>1941</u> , 63,
 Sodium sulfate; Na₂SO₄; 	449-54.
[7757-82-6]	
VARIABLES:	PREPARED BY:
1/К: 273.35-313.15	
Salt molality/mol kg ': 0.1-8 Partial pressure of gas/atm: 1	P. L. Long
EXPERIMENTAL VALUES:	
T/K* Salt molality/mol kg ⁻¹ * Co	efficient, α* Coefficient', S * ^a
208.15	0 5202 0 5408
0.5	0.3565 0.3612
1	0.2476 0.2547
	0.1/21 0.1/9/
0.5	0.2425 0.2472
1	0.1722 0.1791
1.5	0.1220
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An Ostwald method was used. A	1. 99.7 per cent pure, no source.
known volume of gas was placed in	2. Water upp freshly heiled
free liquid. After equilibrium	distilled.
was established by agitation, the	2 Analytical grado
measured from which the amount of	5. Analytical glade.
gas dissolved was found. Solutions	
verified by density measurements	
compared with the literature	
an absorption flask with two bulbs.	ESTIMATED ERROR:
one twice the volume of the other,	$\delta T/K = \pm 0.1 (273.35 \text{ K}); \pm 0.03$
which was connected by a capillary tube to a gas buret and a manometer	(above 273.35 K); $\delta \alpha / \alpha = \pm 0.02$.
system.	
	REFERENCES:

001		
COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kobe, K. A.; Kenton, F. H.	
2. Water; H ₂ O; [7732-18-5]	Ind. Eng. Chem., Anal. Ed.	
3. Sodium sulfate; Na ₂ SO ₄ ; [7757-82-6]	<u>1938</u> , 10, 76-77.	
4. Sulfuric acid; H ₂ SO ₄ ; [7664-93-9]		
VARIABLES:	PREPARED BY:	
T/K: 298.15	C. L. Young	
N ₂ O P/kPa: 101.325 (760 mmHg)		
EXPERIMENTAL VALUES:	L	
Temperature		
Volume Abso	ume Bunsen Ostwald rbed Coefficient Coefficient	
t/°C T/K cm ³ cm	3 α <i>L</i>	
25 200 15 40 54 7.0	0 150 0 146	
	8 0.159 0.146	
49.54 7.9	0	
The solvent was a mixture of	800 g H ₂ O	
	200 g Na₂SO₄ (anhydrous)	
	40 ml H_2SO_4 (conc., 36 N)	
Thus the molality of the solu	tion was	
^m Na ₂ SO ₄ /mol kg ¹	= 1.76	
(
m _{H2} SO4 ^{mol kg}	= 0.90.	
AUXILIARY	INFORMATION	
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
	1. Nitrous oxide source not given.	
ine apparatus was described in detail	Purity stated to be 99+ per cent.	
In an earlier paper (1). The appa-	2. Water: distilled.	
ratus consists of a gas buret, a	3, 4. Sodium sulfate and sulfuric	
pressure compensator, and a 200 cm ³	acid: sources not given.	
absorption bulb and mercury leveling	Analytical grades.	
bulb. The absorption bulb is		
attached to a shaking mechanism.		
The solvent and the gas are placed	ESTIMATED ERROR:	
in the absorption bulb. The bulb	$5\pi/cm^3 = \pm 0.001$	
was shaken until equilibrium was	00/Cm0.001	
reached. The remaining gas was	REFEDENCES -	
returned to the buret. The dif-	I Keho K h . Williams I C	
ference in final and initial volumes	1. NODE, K. A.; WIIIIams, J. S.	
was taken as the gas absorbed.	ina. Eng. Chem., Anal. Ea.	
	<u>1935</u> , 7, 37.	
1		

COMPONENTS :		ORIGINAL MEASUREMENTS:						
		Knopp, W.						
1. Nitrous oxide; 1	N ₂ O; [10024-97-2]	7. Phus. Chem. 1904.48. 97-108						
2. Water: H,O: [77]	32-18-5]	2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.						
3 Sodium niturt	NaNO	1						
17631-99-41	NanO ₃ ;							
VARIABLES:		PREPARED BY:						
Concenti	ration	W. Gerrard						
EXPERIMENTAL VALUES: Pressure assumed to be 101.325 kPa.								
T/K Woight	t of salt Conc o	f salt Density of	Bunsen					
in 10	00 g of /mol dm	³ (soln) solution	absorption					
solu	ution	• • • • •	coefficient,					
			α					
<u> </u>								
293.15 1.3	124 0.1	336 1.00590	0.6089					
2.5	531 0.3	1.01537	0.5876					
5.0	0.6		0.5465					
8.	/0T T'T	200 I.05834	0.4920					
		Water	0.6270					
1								
1								
	<u> </u>							
	AUXILIARY	INFORMATION						
METHOD: /APPARATUS/PI	ROCEDURE:	SOURCE AND PURITY OF MATERIALS:						
An absortion pipet	and gas buret	1. Nitrous oxide was n	1. Nitrous oxide was prepared by					
were used to measu:	re the volume	heating pure ammonium	nitrate at 513-					
of nitrous oxide al	bsorbed.	523 K. It was passed through aqueous						
Densition wore date	ermined by a	hydroxide, and concer-	trated sulfuric					
Sprengel pyknomete:	r.	acid.						
		2. Appeared to be of s	satisiactory					
		purity.						
		ESTIMATED ERROR:						
(l						
		DEEEDENCEC						
		ALTERENCES:						
1		1						

.

COMPONENTS			lonte					
ONENIS:			ORIC	ORIGINAL MEASUREMENTS:				
1. Nitrous oxide: N ₂ O; [10024-97-2]			Manchot, von W.; Jahrstorfer, M.;					
2. Wator: U_{0} , $(7722-19-51)$			Zepter, H.					
3. Sodium	$n_20; [7,32-10]$	-01						
[7631-99-4]			2. Anorg. Ally. chem. <u>1524</u> , 141,					
VADTAD			45-81.					
VARIABLES:			PREPARED BY:					
	Concentrati	on		C. L. Young				
EXPERIMENTAL VALUES:								
	25	0			~			
T/K	Density, d ₄ of salt soln.	$/10^3$ mol m		/mol kg ⁻¹	S_1	S ₂		
]	·	(soln.)		(water)	/cm ^s	/cm ³		
299.15	1 0500	1 00		1 1001	40.0	40.3		
238.15	1.0677	1.08		1.3698	42.3	40.1 37.7		
	1.1141	2.17		2.3343	33.5	30.1		
{	1.1543	3.01		3.3504	27.7	24.0		
	·····			<u> </u>				
		c		a	100			
	$S_1 - voluof s$	me of nitrous alt solution	s oxi	de absorbed per	100 Cm ²			
	a			de checked non	100 -	ļ		
	$S_2 - VOIUof s$	me or nitrous alt solution	i oxi	de absorbed per	100 g			
Both S,	and S, were red	uced to condi	tion	ns of 273.15 K au	nd 101.3 }	۲Pa		
				MATION				
METHOD/API	PARATUS/PROCEDURE:	the shearhad	SOUR	CE AND PURITY OF MA	TERIALS:	ium		
by means of	of gas buret and	pipet.	nit	nitrate. frozen in liquid air and				
Volume ab:	sorbed appears to	be taken	the	n distilled.	-			
Density of	ndent of pressure f the aqueous sol	e (1). Intion	2 Becrustallized					
determined by Sprengel pyknometer.								
}								
						1		
			ESTI	MATED ERROR:	<u></u>			
						}		
			REFE	RENCES :				
			192	Manchot, W. Z.An 4.141. 38.	org.Chem.			
			2.92	<u>-</u> ,141, 50,				
COMPONENTS		TCTNAL MEASUDEMENTS .						
--	---------------------	---	--------------------------	----------------				
COM ONENTS.		Manchot von W	nrstorfer	. M. :				
1. Nitrous oxide; N ₂ O; [10024-97-2]		Manchot, von w., ou		,,				
2. Water; H_2O ; [7732-18-5]	-	Zepter, H.						
[3. Sodium phosphate; Na_3PO_4 ; [7601-54-9] or		Z. Anorg. Allg. Chem	. <u>1924</u> , <i>1</i>	41,				
Disodium hydrogen phosphate	;	45-81.						
Na2HPOL; [7558-79-4]	PR	EPARED BY:						
VARTABLES.								
Concentration		C. L. Young						
EXPERIMENTAL VALUES:								
				İ				
Density, d_4^2 Conc	c. of sal	t Conc. of salt	S ₁	S ₂				
T/K OF Salt Soln. /10	(soln.)	(water)	/cm ³	/cm ³				
	Coduum nh	ocnhate						
	soarum ph	ospirace	_					
298.15 1.0348	0.22	0.2203	40.7	39.3				
Disodi	Lum hydro	gen phosphate						
298.15 1.0470	0.3985	0.4024	38.0	39.6				
$S_1 - volume of not salt so$	nitrous o lution	xide in 100 cm³						
or sait solution								
S_2 - volume of nitrous oxide in 100 g								
AU	XILIARY IN	FORMATION						
METHOD/APPARATUS/PROCEDURE ;	Isc	DURCE AND PURITY OF MATERI	ALS:					
Measurement of volume of gas abs	sorbed 1	Prepared by heating	ammonium	,				
Volume absorbed appears to be ta	aken ti	itrate, frozen in lig nen distilled.	uid air ai	na				
as independent of pressure. (1).								
determined by Sprengel pyknometer	er. 2	. Recrystallized.		1				
	ES	STIMATED ERROR:						
		Manchot, W. Z.Anorg	g.Chem.					
	19	24, 141, 38.						
	Į			1				

Electrolyte Solutions (Aqueous)

COMPONENTS	OPICINAL MEACUPENERMER		
<pre>1. Nitrous oxide; N₂O; [10024-97-2] 2. Water; H₂O; [7732-18-5] 3. Sodium carbonate; Na₂CO₃; [497-19-8] or Sodium bicarbonate; NaHCO₃; [144-55-8]</pre>	ORIGINAL MEASUREMENTS: Hikita, H.; Asai, S.; Ishikawa, H.; Esaka, H. J. Chem. Engng. Data, <u>1974</u> , 19, 89-92.		
	PREPARED BY:		
VARIABLES:			
Concentration	C. L. Young		
EXPERIMENTAL VALUES:			
$\begin{array}{c ccccc} Conc. of & Conc.\\ T/K & sodium carbonate & sodium bic \\ & /g l^{-1} & (soln.) & /g l^{-1} & (soln.) \end{array}$	of arbonate Ionic strength Solubility, S soln.) /g-ion l ⁻¹ /mol l ⁻¹ (soln.)		
298.15 0 0	0 2 356		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
Pressure = 1	$a \pm mosphere = 1.01325$ bar		
riessure – 1 atmosphere = 1.01525 bar.			
AUXILIAR	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Gas volumetric method similar to that used by Onda <i>et al.</i> (ref. 1). Chemi- cal compositions of absorbing solu- tions determined by chemical method of Danckwerts and Kennedy (ref. 2).	 Commercial sample, purity better than 99.8 mole per cent. Distilled and boiled. Analytical grade reagent. Analytical grade reagent. 		
ļ	ESTIMATED ERROR:		
	$\delta T/K = \pm 0.1; \delta S/mol \ 1^{-1} = \pm 1.0\%$		
	(estimated by compiler).		
	 REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T T.; Kito, S.; Ito, K.; J. Chem. Eng. Japan, <u>1970</u>, 3, 18. 2. Dankwerts, P. V.; Kennedy, A. M.; Chem. Eng. Sci., 1958, 8. 201. 		

CONDONENTE -	
COMPONENTS:	ORIGINAL MEASUREMENTS:
	Geffcken, G. Z. Phys. Chem. 1904,
1. Nitrous oxide; N_2O ; $[10024-97-2]$	49, 257-302.
2. Water; H_2O ; [7732-18-5];	
[1310-58-3]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	La
T/K Conc. of hydroxide/mol dm	⁻³ (soln.) Ostwald coefficient, L
288.16 0.541	0.6591
0.542	0.6595
1.082	0.5392
298.15 0.541 0.542	0.5087 0.5093
1.074	0.4252
1.082	0.4221
	·
AUNTE LARY	INFORMATION
METHOD / APPARATUS / PROCEDURE:	SOURCE AND SOURCE NATURALS
Measurement of volume of N ₂ O absorbed by the aqueous solution. Detailed description and diagram given in source.	 Nitrous oxide self prepared and attested.
	FSTIMATED TREER.
	REFERENCES :

COMPONENTS:	ORIGINAL MEASUREMENTS:		
l.Nitrous oxide; N ₂ O; [10024-97-2]	Kreitus, I.; Abramenkov, A.		
2. Water; H_2O ; [7732-18-5]	Latv. PRS Zinat. Akad. Vestis		
3. Potassium flucride; KF;	Khim. Ser.		
[7789-23-3]	1980, 238.		
VARIABLES:	PREPARED BY:		
Concentration of salt	C. L. Young		
EXPERIMENTAL VALUES:			
T/K Conc. of salt/mol kg ⁻¹	(solvent) Bunsen coefficient, α		
^{298.15} 0	0.54		
5.84	0.093		
7.78	0.079		
12.33	0.019		
·			
	INFORMATION		
METHOD APPARATUS/PROCEDURE ·	SOURCE AND PURITY OF MATERIALS:		
Aguague extension actionated at 0 1012	l Modical grade gample		
MD 3 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1. Medical grade Sampie.		
MPa and 1 cm ³ sample analyzed by gas			
chromatography. Column contained	2. Twice distilled.		
molecular sieves and was operated			
isothermally at 250 °C using helium			
as carrier gas. Thermal conduc-	3. Pure.		
tivity detector used.	3. Pure.		
	3. Pure.		
Details in ref (1)	3. Pure.		
Details in ref. (1).	3. Pure. LSTIMATED ERROR: $\delta T/K = \pm 0.1$, $\delta \alpha / \alpha = \pm 0.06$		
Details in ref. (1).	3. Pure. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$		
Details in ref. (1).	3. Pure. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$		
Details in ref. (1).	3. Pure. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$ REFERENCES:		
Details in ref. (1).	3. Pure. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$ REFERENCES:		
Details in ref. (1).	3. Pure. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$ REFERENCES: 1. Kreitus, I.; Gorbovitskalya,		
Details in ref. (l).	3. Pure. ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$ REFERENCES: 1. Kreitus, I.; Gorbovitskalya, T. I.		
Details in ref. (l).	<pre>3. Pure. 4. STIMATED ERROR:</pre>		
Details in ref. (l).	3. Pure. LSTIMATED ERROR: $\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$ REFERENCES: 1. Kreitus, I.; Gorbovitskalya, T. I. Latv. PRS Zinat. Akad. Vestis Khim. Ser.		

COMPONENTS :	ORIGINAL MEASUREMENTS:		
	Cordon W 7 Phys. Cham 1895 18		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Gordon, V. 2. 1498. onem. <u>1855</u> , 10,		
2. Water; H ₂ O; [7732-18-5];	1-16.		
3. Potassium chloride; KCl;			
[/44/-40-/]	DEDADED DV.		
	rkeraked di:		
Temperature, concentration	W. Gerrard		
EXPERIMENTAL VALUES:			
Conc.of Bunsen T/K salt Density, Coefficient Weight-% ρ α	Conc.of Bunsen , T/K salt Density, Coefficient, Weight-% ρ α		
295.46 4.899 1.029 0.5091 291.76 1.0302 0.5700	295.46 14.582 1.0939 0.4004 291.76 1.0954 0.4521		
288.26 1.0309 0.6351	288.26 1.0965 0.4983		
284.16 1.0318 0.7243 281.26 1.0324 0.7999	284.16 1.0977 0.5611 281.26 1.0987 0.6042		
295.46 7.640 1.0461 0.4513	295.46 22.083 1.1487 0.3208		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	291.76 1.1502 0.3570 288.26 1.1516 0.3888		
284.16 1.0503 0.6661	284.16 1.1533 0.4606		
281.26 1.0533 0.7329	281.26 1.1543 0.4892		
Smoothing Equations			
(t = 1	/K = 2/3.16)		
For 4.899 wt-% solution: $\alpha = 1.02649 - 0.0315t + 0.000397t^2$			
For 7.640 wt-% solution: $\alpha = 0.91032 - 0.0227t + 0.0000949t^2$			
For 14.582 wt-% solution: $\alpha = 0.73968 - 0.017583t + 0.0001058t^2$			
For 22.083 wt-% solution: $\alpha = 0.647561 - 0.0223445t + 0.0003449t^2$			
AUXILI/ RY	1NFORMATION		
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS		
Measurement of volume of gas by	1. N_2O : Self prepared and purified.		
means of Ostwald type apparatus, gas buret and pipet (ref. 1). Density of the solution determined by Sprengel pyknometer.	Attested by combustion with hydrogen.		
	LS FIMATED ERROR:		
	RI FERENCES :		
)	1. Timofejew, W. 2. Phys. Chem.		
	1890 6 141		
	1070, 0, 141.		

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide: N ₂ O: [10024-97-2]	Geffcken, G. Z. Phys. Chem. <u>1904</u> ,
2. Water: H_0O : [7732-18-5]:	49, 257-302.
3. Potassium chloride: KCl.	
[7447-40-7]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of salt/mol dm ⁻³	(soln.) Ostwald coefficient, L
288,16 0.558	0 6782
0.559	0.6787
1.070	0.6046 0.6020
298.16 0.558	0.5218
0.559	0.5217 0.4673
1.102	0.4639
AUXILIARY	INFORMATION
METHOMAPPARATUS/PROCEDURE:	SOURCE AND PURITY OF MAILRIALS:
Measurement of volume of N_2O absorbed by the aqueous solution. Diagram and detailed description given in original paper.	 Nitrous oxide self prepared and attested.
	ESTIMATED LREOR:
	REFEDENCES
	IGT LICENCES :

COMPONENTS:			ORIGINAL MEASUREMENTS:		
			Manchot, von W.; Jahrstorfer, M.;		
1. Nitrous oxide; N_2O ; [10024-97-2] 2. Water; H_2O ; [7732-18-5]		Zepter, M.			
		·5]	7. Anona Alla Cha	m 1924.	141.
3. FOLASS [7	447-40-7]	. 1 ,	2. Anorg. Acty. one	<u> </u>	1 7 7 7
WARTARI DO			45-81.		
VARIABLES:			PREPARED BY:		
	Concentratio	on	C. L. Young		
EXPERIMENTA	L VALUES:			·	
т/к	Density, d ²⁵ of salt soln.	Conc. of sa /10' mol m (soln.)	lt Conc. of salt ³ /mol kg ⁻¹ (water)	S_1 /cm ³	S 2 /cm ³
209 15	1 0334	0 78	0 7998	45 3	43.8
290.15	1.0540	1.25	1.3010	41.0	38.9
	1.0850 1.1385	1.98 3.21	2.1123 3.5700	35.5 28.1	32.7
	1.1734	4.04	4.6321	24.0	20.4
		AUXILIARY	INFORMATION		
ME THOD/AP	PARATUS/PROCEDURE :		SOURCE AND PURITY OF MAI	ERIALS:	
Measurements (nt of volume of gas buret and g	as absorbed pipet.	1. Prepared by heatinitrate, frozen in 1	ng ammon. iquid aı	ium r and then
Volume ab	sorbed appears to ndent of pressure	be taken	distilled.		
Density o	f the aqueous sol	ution	2. Recrystallized.		
determine	d by Sprengel pyk	nometer.			
		ļ	ESTIMATED ERROR:	-u, - · · · · · · - <u>-</u>	
			REFERENCES :		
			1. Manchot. W. Z.And	rg.Chem.	
			1924,141, 38.		

001			
COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxido, N.O. [10024-07-2]	Markham, A. E.; Kobe, K. A.		
2. Water: H_{0} (7732-18-5).	J. Amer. Chem. Soc. <u>1941</u> , 63,		
3. Potassium chloride: KCl:	449-54		
[7447-40-7]			
VARIABLES:	PDEDADEN BV.		
T/K: 273.35-313.15	I REFARED DI ;		
Salt molality/mol kg ⁻¹ : 0.1-8	P. L. Long		
EXPERIMENTAL VALUES.	I		
T/K* Salt molality/mol kg ⁻¹ * Co	Bunsen 'Solubility Defficient, α* Coefficient', S* ^a		
272.25			
	0.9880 1.0140		
2	0.7784 0.8212 0.6349 0.6893		
298.15 0	0.5392 0.5408		
	0.4329 0.4466 0.3580 0.3803		
312.15	0.3030 0.3315		
1	0.3579 0.3607 0.2885 0.2993		
2	0.2416 0.2613		
reduced to standard condition the quantity of solution cont	is which is dissolved by		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
An Ostwald method was used. A	1. 99.7 per cent pure, no source.		
Known volume of gas was placed in Contact with a known volume of gas- free liquid. After equilibrium	2. Water was freshly boiled, distilled.		
Was established by agitation, the Volume of the remaining gas was	3. Analytical grade.		
measured from which the amount of			
Were prepared by weight, and			
Verified by density measurements			
Values. Apparatus consisted of	ESTIMATED EREOR.		
One twice the volume of the other,	$\lambda \pi / \kappa = \pm 0.1$ (273.35 K) + 0.03		
which was connected by a capillary	$(above 273.35 K): \delta \alpha / \alpha = +0.02$		
system.			
	REFERENCES:		

COMPONENTS :	······································	ORIGINAL MEASUREMENT	S:
 Nitrous Water; Potassi 	s oxide; N ₂ O; [10024-97-2] H ₂ O; [7732-18-5] ium chloride; KCl;	Kreitus, I.; G Latv. PRS Zinat Khim. Ser.	orbovitskalya, T. I. . Akad. Vestis
[7447-4	40-7]	1979, 664-666.	
VARIABLES:		PREPARED BY:	
c c	Concentration of salt	C. L. Young	
EXPERIMENTAL	VALUES:	L	
т/к	Conc. of salt /mol kg ⁻¹ (solvent)	Bunsen coefficient, a	Absorption [†] coefficient, S
298.15	0.0 0.51 1.03 2.13 2.70 3.61 4.63	0.55 0.49 0.44 0.37 0.33 0.29 0.25	0.55 0.50 0.46 0.39 0.35 0.32 0.29
	AUXILIARY	INFORMATION	
METHOD APPAR	RATUS/PROCEDURE:	SOURCE AND PURITY OF	MATIRIALS.
Aqueous s MPa and l chromatog molecular isotherma	olution saturated at 0.1013 cm ³ sample analyzed by gas raphy. Column contained sieves and was operated lly at 250 °C using helium	 Medical grade Twice distil Chemically pr 	e sample. led. ure grade.
as carrie tivity de	r gas. Thermal conduc- tector used.		
		ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta d$	$\alpha/\alpha = \pm 0.1$
		REFERENCES.	
		l	

COMPONENTS	:		ORIGINAL MEASUREMENTS:	<u> </u>	
<pre>1. Nitrous oxide; N₂O; [10024-97-2] 2. Water; H₂O; [7732-18-5] 3. Potassium bromide; KBr; [7758-02-3]</pre>		Manchot, von W.; Jahrstorfer, M.; Zepter, H. Z. Anorg. Allg. Chem. <u>1924</u> , 141, 45-81.			
VARIABLES:			PREDADED BY.		
	Concentrati	.on	C. L. Young		
EXPERIMENT	AL VALUES:				
т/к	Density, d ²⁵ of salt soln.	Conc. of sa /10 ³ mol m (soln.)	lt Conc. of salt /mol kg 1 (water)	S ₁ /cm ³	S 2 /cm ³
298.15	1.0891 1.1752 1.3380	1.11 2.15 4.19	1.1598 2.3387 4.9922	43.0 35.1 24.7	39.5 29.9 18.5
		AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed 1 by means of gas buret and pipet. n Volume absorbed appears to be taken as independent of pressure (1). Density of the aqueous solution 2 determined by Sprengel pyknometer.		SOURCE AND PURITY OF MA 1. Prepared by heat nitrate, frozen in then distilled. 2. Recrystallized.	FERIALS: ing ammon liquid a:	nium ir and	
			ESTIMATED ERROR:		
			REFERENCES: 1. Manchot, W. Z.An 1924, 141, 38.	org.Chem.	

COMPONENTS :	ORIGINAL MEASUREMENTS:		
	Geffcken, G. Z. Phys. Chem. 1904.		
1. Nitrous oxide; N ₂ O; [10024-97-2]	<i>49.</i> 257-302.		
<pre>2. Water; H₂O; [7732-18-5];</pre>			
3. Potassium bromide; KBr;			
[7758-02-3]			
VARIABLES:	PREPARED BY:		
Temperature, concentration	w. Gerrard/C. L. roung		
T/K Conc. of salt/mol dm ⁻³	(soln.) Ostwald coefficient, L		
288.16 0.546	0.6877		
0.550	0.6892		
0.959	0.6334		
298.16 0.546	0.5306		
0.937	0.4908		
0.959	0.4899		
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Measurement of volume of N ₂ O absorbed by the aqueous solution. Detailed description and diagram given in source.	 Nitrous oxide self prepared and attested. 		
	LATIMATED ERFOR		
	ESTIMATED ERROR.		
	REFERENCES:		
1	l		
1	1		

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Geffcken, G. 2. Phys. Chem. <u>1904</u> , 49, 257-302.
2. Water; H ₂ O; [7732-18-5];	
3. Potassium iodide; KI; [7681-11-0]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of salt/mol dm ⁻³	(soln.) Ostwald coefficient, L
288.16 0.550 0.557 0.886	0.6950 0.6916
0.913	0.6442
0.550	0.5367 0.5344
0.886	0.5025
0.915	0.3012
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of N ₂ O absorbed by the aqueous solution. Detailed description and diagram given in source.	 Nitrous oxide self prepared and attested.
	ESTIMATED ERROR:
	REFERENCES :

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Sada, E.; Ando, N.; Kito, S.
1. Nitrous oxide; N_2O ; [10024-97-2]	J. Appl. Chem. biotechnol. 1972. 22.
2. Water; H_2O ; [7732-18-5];	
3. Potassium iodide; KI;	1185-1193.
VARIABLES:	PREPARED BY:
T/K: 298.15 P/kPa: 101.325 (atm)	
Molarity of salt: mol 1 ⁻¹	W. Gerrard/C. L. Young
EVDEDTMENTAL UALIES.	l
EXPERIMENTAL VALUES:	
T/K Concn. of salt/mol 1 ⁻¹	Bunsen coefficient, α
298.15 0	0.5512 (pure water)
0.644	0.4862
	0.4491
2.196	0.3712
2.859	0.3241
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Faullibrum established between a	Ly From commercial cylinder: 99.8
measured volume of gas and a measured	per cent, as attested by gas
amount of gas-free liquid in a cell	chromatography.
fitted with a magnetic stirrer.	2 Distilled water was used
becarry in source and rer. r.	2. Distilled water was abea.
	3. Salt was of reagent grade.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2\%$ (estimated by
	compiler)
	compiler).
	REFERENCES :
	l Onda, K. Sada F. Kobayachi T.
	Kito Cl. The K I dhaw B
	KITO, SI; ITO, K. J. Chem. Engng.
	Japan <u>1970</u> , 3, 18; 137.

Electrolyte Solutions (Aqueous)

Composition							<u> </u>
COMPONENTS:				ORIGINAL 1	MEASUREMENTS	:	
<pre>l. Nitrous oxide; N₂O; [10024-97-2]</pre>		Gordon,	v. 2. Ph	ys. Chem.	<u>1895</u> , 18,		
2. Water;	H₂O;	[7732-18-	5];	1-16.			
3. Potassiu [7778-80	um sul: D-5]	Eate; K ₂ SO	47				
VARIABLES:			<u> </u>	PREPARED	BY:		
Temperature	e. cond	entration		W Gerrard			
EXPERIMENTAL V	ALUES:			L.,	<u> </u>		
Con	nc.of		Bunsen		Conc. of		Bunsen
T/K s Wei	salt ght-%	Density, ρ	Coefficient, a	, Т/К	salt Weight-%	Density, ρ	Coefficient, α
295.46 2.	623	1.0194	0.55560	295.46	4.784	1.0369	0.50827
291.76 288.26		1.0198	0.63128 0.69827	291.76		1.0378	0.56699 0.63497
284.16		1.0218	0.79579	284.16		1.0395	0.73157
201.20		1.01222	0.88724	281.26		1.0403	0.81797
			Smoothed	l Equatio	ons		
			(+ _ m	/v _ 272	15)		
			((1)	K 275.	13)		3
For 2.	623 wt	-% solution	on: = 1.1	L66991 -	0.03864t	+ 0.00050	28t ²
For 4.	784 wt	-% soluti	on: = 1.1	L033557 -	0.040109	t + 0.000	602t ²
			AUXILIARY	INFORMATIC)N		
METHOD / APPAR	ATUS/F	ROCEDURE :		SOURCE AN	D PURITY OF	MATERIALS:	
Measurement of Ostwald and pipet. Density of by Sprengel	of vo type a the so pykno	lume of ga apparatus, plution de- meter.	as by means gas buret termined	l. N ₂ O Att hyd	: Self p ested by d rogen.	repared a combustio	nd purified. n with
				ESTIMATED	ERROR:		
				l			
				1			
				REFERENCE	: :		
				1			
				ł			
				1			

CONTONENTE	ODTOTULT ATLANDAUTO		
COMPONENTS:	ORIGINAL MEASUREMENTS:		
1 Nitrova evides N.O. (10024.07.2)	Manchot, von W.; Jahrstorfer, M.;		
2 Water: $H_{2}O$; $[7732-18-5]$	Zepter, H.		
2. Mater, n_20 , $(7,52,10,5)$	Z. Anorg. Allg. Chem. 1924, 141,		
[7778-80-5]	45 91		
VARIABIES ·	45-81.		
Concentration	C. L. Young		
EXDEDIMENTAL VALUES.			
LA DRIENAL VALUE.			
Density, d^{25} Conc. of so	alt Conc. of salt S_1 S_2		
T/K of salt soln. /10 mol m	$\frac{1}{3}$ /mol kg ⁻¹ /cm ³ /cm ³		
(soin.)	(water)		
298.15 1.0762 0.5991	0.6165 35.5 33.0		
S_1 - volume of nitrous	s oxide absorbed per 100 $ ext{cm}^2$		
or salt solution			
S_2 - volume of nitrous	s oxide absorbed per 100 g		
Both S. and S. Wore reduced to cond	1 ± 1005 of 273 15 K and 101 3 kpa		
both by and by were reduced to cond			
AUXILIARY	INFORMATION		
	COURCE AND BUDITY OF MATERIALS.		
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed	1. Prepared by heating ammonium		
by means of gas buret and pipet.	nitrate, frozen in liquid air and		
as independent of pressure. (1).	then distilled.		
Density of the aqueous solution	2. Recrystallized.		
determined by sprenger pyknometer.			
	ESTIMATED ERROR:		
	REFERENCES: 1. Manchot, W.Z. Anorg, Chem.		
	<u>1924</u> , 141, 38.		

COMPONENTS:	ORIGINAL MEASUREMENTS:	
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] Potassium nitrate; KNO₃; 	Knopp, W. Z. Phys. Chem. <u>1904</u> ,48, 97-108.	
[7757-79-1]		
VARIABLES:	PREPARED BY:	
Concentration	W. Gerrard	
EXPERIMENTAL VALUES: Pressure assumed	d to be 101.325 kPa.	
T/K Weight of salt Conc of in 100 g of /mol dm solution	salt Density of Bunsen (soln) solution absorption coefficient, a	
293.15 1.063 0.10 2.720 0.2' 5.389 0.5' 10.577 1.10	0611.00490.61737641.015340.60025301.032310.57135831.066440.5196	
	Water 0.6270	
AUXILLARY INFORMATION		
METHOD: /APPARATUS/PROCEDURE: An absorption pipet and gas buret were used to measure the volume of nitrous Oxide absorbed. Densities were determined by Sprengel pyknometer.	SOURCE AND FURITY OF MATERIALS: (1) Nitrous oxide was prepared by heating pure ammonium nitrate at 523- 513 K. It was passed through aqueous ferrous sulfate, aqueous sodium hydr- oxide, and concentrated sulfuric acid. (2) Appeared to be of satisfactory	
	purity.	
	ESTIMATED ERROR:	
	RL FERENCES :	

COMPONENTS .				
COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]		Manchot, von W.; Janrstorfer, M.;		
2. Water; H ₂ O; [7732-18-5]			1004 141	
3. Potassium [7757-79-1	nitrate; KNO ₃ ; 1	Z. Anorg. Allg. Che	em. <u>1924</u> , 141,	
	·	45-81.		
VARIABLES:		PREPARED BY:		
	Concentration	C. L. Young		
EXPERIMENTAL VALU	IES:	I		
Den T/K of	sity, d ²⁵ salt soln. /10 mol m (soln.)	alt Conc. of salt /mol kg ⁻¹ (water)	S ₁ S ₂ /cm ³ /cm ³	
298.15	1.0586 1.02 1.1231 2.15	1.0675 2.3738	44.8 42.4 38.3 34.1	
S ₁ - volume of nitrous oxide absorbed per 100 cm ³ of salt solution S ₂ - volume of nitrous oxide absorbed per 100 g of salt solution Both S and S were reduced to conditions of 273.15 K and 101.3 kPa				
	AUXIIIARY	INFORMATION		
Measurement of by means of ga Volume absorbe as independent Density of the determined by	<pre>NOCLINGN . volume of gas absorbed s buret and pipet. d appears to be taken of pressure. (1). aqueous solution Sprengel pyknometer.</pre>	 Prepared by heatinitrate, frozen in l then distilled. Recrystallized. 	ing ammonium Liquid air and	
		RIFIRINCIS, 1. Manchot, W. C.Ar 1924, 38.	long. Them.	

COMPONENTE			
COMPONENTS;		ORIGINAL MEASUREMENTS	•
l. Nitr	cous oxide; N ₂ O; [10024-97-2]	Markham, A. E.;	Kobe, K. A.
2. Water; H ₂ O; [7732-18-5];		J. Amer. Chem. Soc. <u>1941</u> , 63,	
3. Pota	ssium nitrate; KNO3;	449-54.	
[775	57-79-1]		
VARIABLES:		PREPARED BY:	
T/K: 27	73.35-313.15		
Salt mc Partial	plality/mol kg ⁻¹ : 0.1-8 pressure of gas/atm: 1	P.L.Lor	ıg
EXPERIMENTA	L VALUES:		<u></u>
T/K*	Salt molality/mol kg ⁻¹ * C	Bunsen Coefficient, α*	'Solubilıty Coefficient', S* ^a
272.25		1 2020	1 2071
2/3.35	0.2	1.2970	1.2971
{	0.5	1.1355	1.1556
	1	1.0174	1.0545
298.15	0	0.5392	0.5408
1	1	0.3961	0.4749
	3	0.3524	0.3978
313.15	0	0.3579	0.3607
	1	0.3100	0.3254
	2	0.2/61	0.3018
^a The 'solubility coefficient', "refers to the volume of gas, reduced to standard conditions which is dissolved by the quantity of solution containing one gram of water".			blume of gas, solved by water".
	AUXILIARY	INFORMATION	
METHOD / APP	PARATUS / PROCEDURE .	SOURCE AND PUBLITY OF	MATEDIALS
	and mathed use used	1 99'7 por cont	
known v	volume of gas was placed in	1. 99.7 per cent	pure, no source.
contact free li	with a known volume of gas- quid. After equilibrium	2. Water was fre distilled.	shly boiled,
was est	ablished by agitation, the		
volume measure	of the remaining gas was of from which the amount of	5. Analytical gr	ade.
qas dis	solved was found. Solutions		
were pr	epared by weight, and		
verifie	d by density measurements		
values	Apparatus consisted of		
an abso	orption flask with two bulbs,	ESTIMATED ERROR:	
one twi	ce the volume of the other,	$\delta T/K = \pm 0.1$ (273)	.35 K); ±0.03
which w tube to	as connected by a capillary a gas buret and a manometer	(above 273.35 K)	; $\delta \alpha / \alpha = \pm 0.02$.
system.			
		REFERENCES:	
1			
1			
		}	
1		1	

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sada, E.; Ando, N.; Kito, S.
2. Water: H ₂ O: [7732-18-5]:	J. Appl. Chem. biotechnol. 1972, 22,
3. Potassium nitrate; KNO ₃ ;	1185-1193.
[7757-79-1]	
VARIABLES:	PREPARED BY
T/K: 298.15 P/kPa: 101.325 (1 atm)	W Corrard/C I Young
Molarity of salt: mol 1^{-1}	w. Gerrard/C. L. roung
EVDEDIMENTAL VALUES.	
EXTERIMENTAL VALUES.	
T/K Conch. of salt/mol 1	Bunsen coefficient, α
298.15 0	0.5512 (pure water)
2.645	0.3626
AUXIIIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PORITY OF MATERIALS:
Equilibrium established between a	1. From commercial cylinder; 99.8
amount of gas-free liguid in a cell	per cent, as attested by gas chromatography.
fitted with a magnetic stirrer.	
betails in source and ref. 1.	2. Distilled water was used.
	3. Salt was of reagent grade.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by
	compiler).
	REFERENCES:
	l. Onda, K. Sada, F. Kohavashi, T.
	Kito, S + Ito, K. J. Cham Huana
	Janan 1970. 3 18. 137
	- apan <u>- 17,0</u> , 0, 10, 10,

COMPONENTS:			ORIGINAL MEASUREMENTS:			
1. Nitrous oxide; N ₂ O; [10024-97-2]		024-97-2]	Manchot, von W.; Jahrstorfer, M.;			
2. Water; H ₂ O; [7732-18-5]		-5]	Zepter, H.			
3. Potas	sium periodate; KI	[O ₄ ;	Z. Anorg. Allg. Chem. 1924, 141,			
[7790	9-21-8]		45-81.			
VARIABLES:			PREPARED BY:			
	Concentration	1	C. L. Young			
EXPERIMENT	AL VALUES:		J			
T/K	Density, d ²⁵ of acid soln.	Conc. of sa /10 ³ mol m (soln.)	$ \begin{array}{cccc} \text{salt} & \text{Conc. of salt} & \text{S}_1 & \text{S}_2 \\ n^{-3} & /\text{mol } kg^{-1} & /\text{cm}^3 & /\text{cm} \\ & & (water) & /\text{cm}^3 & /\text{cm} \end{array} $			
298.15	1.0008	0.0164	0.0164 52.1 52.1			
Both S	of sal 1 and S ₂ were redu	ced to cond:	itions of 273.15 K and 101.3 kPa			
		AUXILIARY	INFORMATION			
METHOD/AP Measureme by means Volume ab as indepe Density c determine	PARATUS/PROCEDURE: ent of volume of ga of gas buret and p poorbed appears to endent of pressure of the aqueous solu ed by Sprengel pykr	as absorbed pipet. be taken (1). ation nometer.	SOURCE AND PURITY OF MATERIALS: 1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. Recrystallized.			
			ESTIMATED ERROR:			
			REFERENCES: 1. Manchot, W. Z. Anorg. Chem. <u>1924</u> , 141, 38.			

00N - 1

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Joosten, G. E. H.; Danckwerts, P.V.
2. Water; H_2O ; [7732-18-5]	J. Chem. Engng. Data
3. Potassium carbonate; K_2CO_3 ;	1972, 17, 452-454.
[584-08-7] 4. Potassium bicarbonate; KHCO ₃ ;	
[298-14-6]	
VARIABLES :	PREPARED BY:
Concentration	C. L. Young
EXPERIMENTAL VALUES:	1
T/K = 2	98.15
Concentration of $K_2CO_3 = C$	oncentration of KHCO3
Concentration of $K_2CO_3/mol dm^{-3}$	Solubility, $S \times 10^2$ /mol dm ³ atm ⁻¹
0.000	2.44
0.095	2.21
0.165	2.06
0.30	1.82
0.60	1.37
0.89	1.00
1.00	0.93
1.25	0.75
AUXILIARY	INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Apparatus and procedure similar to	
that of Markham and Kobe (1).	
Few details given.	No details given.
	_
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.02; \delta S/S = \pm 0.015.$
	REFERENCES :
	1. Markham, A. E.; Kobe, K. A.
	d. 1mer. Chem. Soc.
	1941, 63, 449.

COMPONENTS	OBJ CTW
CONFONENTS:	ORIGINAL MEASUREMENTS:
	Geffcken, G. Z. Phys. Chem. 1904,
1. Nitrous oxide; N ₂ O; [10024-97-2]	49, 257-302.
2. Water; H ₂ O; [7732-18-5];	
3. Rubidium chloride; RbCl;	
[7791-11-9]	
VARIABLES:	PREPARED BY:
Temporature concentration	M Company (C. I. Voung
-emperature, concentration	w. Gerraru/C. L. roung
EXPERIMENTAL VALUES:	
T/K Conc. of salt/mol dm ⁻³	(soln.) Ostwald coefficient, L
288.16 0.439	0.7050
0.444	0.7053
0.977	0.6306
298.16 0.439	0.5399
0.444	0.5386
0.977	0.4873
AUXILIARY	INFORMATION
MI THOY APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of N=0 absorbed	1 Nitrous ocide self prepared and
by the aqueous solution. Detailed	attested.
description and diagram given in	
source.	
	LSTIMATED ERROR:
	REFERENCES:

ORIGINAL MEASUREMENTS:
Geffcken, G. Z. Phys. Chem. <u>1904</u> , 49, 257-302.
PREPARED BY:
W. Gerrard/C. L. Young
soln.) Ostwald coefficient, L
0.7074
0.7036
0.5428
INFORMATION
SOURCE AND PURITY OF MATERIALS:
 Nitrous oxide self prepared and attested.
ESTIMATED ERROR:
REFERENCLS:

COMPONENTS:	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024-47-2] Water; H₂O; [7732-18-5] Cesium chloride; CsCl; [7647-17-8] 	Kreitus, I.; Abramenkov, A. Latv. PRS Zinat. Akad. Vestis Khim. Ser. <u>1980</u> , 238.
VARIABLES:	PREPARED BY:
Concentration of salt	C. L. Young
EXPERIMENTAL VALUES:	K
T/K Conc. of salt/mol kg ⁻¹	(water) Bunsen coefficient, α
298.15 0.50 0.93 2.45 4.85 7.25	0.54 0.49 0.43 0.32 0.23 0.14
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Aqueous solution saturated at 0.1013 MPa and 1 cm ³ sample analyzed by gas	1. Medical grade sample.
molecular sieves and was operated isothermally at 250 °C using helium	2. Twice distilled.
as carrier gas. Thermal conduc- tivity detector used.	
Details in ref. (1).	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \delta \alpha / \alpha = \pm 0.06$
	REFERENCES: 1. Kreitus, I.; Gorbovitskalya, T. I. Latv. PRS Zinat. Akad. Vestis Khim. Ser. 1979, 004-000.

COMPONENTS:	EVALUATOR:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Colin L. Young, School of Chemistry,
2. Water; H ₂ O; [7732-18-5]	University of Melbourne,
	Parkville, Victoria 3052,
3. Weak electrolytes and	Australia.
Nonelectrolytes	February 1981

CRITICAL EVALUATION:

The most extensive studies of these systems has been undertaken by Sada and coworker (1), (2), (3), (4) and (5). Comparison with data of other workers for different systems indicates that Sada's data are fairly reliable, hence all data given in references (1) to (5) are classified as tentative. Roth's data (6) on oxalic acid, glycerol and urea are of fairly low precision and are classified as doubtful. Roth's data on electrolyte solution also studied by other workers indicate that the data are not as reliable as most other more recent data (see Electrolyte solution evaluation).

The data of Knopp (7) appear to be of fairly good accuracy. The data for solubility in propanoic acid are consistent with Sada $et \ al$. data (3). Therefore Knopp's data are classified as tentative.

In general it is not possible to fit the solubility data for nonelectrolyte or weak electrolyte solutions with equations of the Sechenow type. Markham and Kobe (8) suggested an alternative equation:

$$\frac{\alpha}{\alpha_{o}} = ac + \frac{1}{1 + bc}$$

where c is the molarity and a and b are constants for electrolyte solutions.

Values of a and b calculated from the measurements of Sada et 21. (3) are given below.

	a/dm ³ mol ⁻¹	b/dm ³ mol ⁻¹
Formic acid	0.0716	0.0776
Acetic acid	0.1231	0.1298
Propanoic acid	0.1529	0.1523
Oxalic acid	0.0335	0.0683

References

1.	Sada, E.;	Kito, S.;	Ito,	Y. Ind	. Eng.	Chem.	Fundam.	<u>1975</u> , 14,	232.
2.	Sada, E.;	Kumazawa,	Н.;	Butt, M	. A. J	. Chem	. Engng.	Data <u>1977</u>	, 22,
	277.								

- 3. Sada, E.; Kito, S.; Ito, Y.; J. Chem. Eng. Japan <u>1974</u>, 7, 57.
- 4. Sada, E.; Kito, S. Kagaku Kogaku 1972, 36, 218.
- Sada, E.; Kumazawa, H.; Butt, M. A. J. Chem. Engng. Data <u>1978</u>, 23, 161.
- 6. Roth, W. 2. Phys. Chem. <u>1897</u>, 24, 114.
- 7. Knopp, W. Z. Phys. Chem. 1904, 48, 97.
- 8. Markham, A. E.; Kobe, K. A. J. Am. Chem. Soc. 1941, 63, 449.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrogen oxide (Nitrous oxide);	Sada, E.; Kito, S.; Ito, Y.
$N_20; [10024-97-2];$	Ind. Eng. Chem. Fundam. <u>1975</u> , 14,
2. Water; H_2O ; $[//32-18-5]$;	232-237.
$[5. Methanol; CH_3OH; [67-56-1]]$	
VARIABLES:	PREPARED BY:
Mole fraction of the alcohol	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES: Henry's	Henry's
Mole law	Mole law
T/K of alcohol atm * ^x N	$_{2}$ ^o of alcohol arm * x N ₂ O [†]
298.16 0.0 2320.1 0.00	0431 0.398 921.6 0.001085
0.022 2208.7 0.00	0453 0.408 892.8 0.00112
0.048 2106.7 0.00	0.475 0.435 827.1 0.00121
0.054 2090.7 0.00 0.060 2062.1 0.00	0.595 0.595 515.7 $0.001940.485$ 0.670 420.8 0.00238
0.077 2025.7 0.00	0494 0.690 401.1 0.00249
0.095 1980.2 0.00	0505 0.770 327.7 0.00305
	0551 0.826 295.6 0.00338 0600 0.870 255.2 0.00392
0.175 1724.3 0.00	0580 0.928 222.1 0.00450
0.197 1631.6 0.00	0613 0.932 219.6 0.00455
	0.00525 0.00525
0.208 (1991.1)# 0.00	, <u>, , , , , , , , , , , , , , , , , , </u>
 * This Henry's law constant appears to observed, but unspecified, pressure x_{N₂O} for that pressure. ⁺ Calculated by the compiler by: 1/(1) refers to 1 atm (101.325 kPa). [#] Appears to be in error. 	b have been derived by dividing the of N_2O in atm, by the mole fraction Henry's law constant). The value
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between a measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. The densities of the mixed liquids were determined by an Ostwald-type pyknometer.	 Nitrous oxide was used from a commercial cylinder (Japan), and stated to be of a purity better than 99.8%, as attested by gas- chromatography. The water was carefully distilled. The purity of the alcohol was stated to be satisfactory (ref. 2).
	ESTIMATED ERROR:
	DEPEDENCUS.
	<pre>kipekendes: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. J. Chem. Eng. Japan 1970, 3, 18; 137.</pre>
	2. Sada, E.; Kito, S.; Ito, Y. J. Chem. Eng. Japan <u>1974</u> , 7, 57.

COMPONENTS :				ORIC	INAL MEAS	UREMENT	S:	
 Nitroge N₂O; Water; 	n oxide () [10024- H ₂ O; [7	Nitrous oxid 97-2]; 732-18-5];	de);	Sa 17 21	ada, E.; 1d. Eng. 32-237.	Kito, Chem.	, S.; Ito, Fundam. <u>19</u>	Y. 75, 14,
3. Ethanol	; C ₂ H ₆ O;	[64-17-5]						
VARIABLES:				PREI	PARED BY:		<u>_</u>	
Mole fract	ion of the	e alcohol		W	. Gerrar	d/C.L.	. Y oung	
EXPERIMENTAL	VALUES:							· · · · · · · · · · · · · · · · · · ·
	Mole	Henry's law			М	ole	Henry's law	
m /17 -	fraction	constant	<i>x</i> ,,	^ [†]	fra	ction	constant	$x_{\rm N}$ $^+$
	I ALCONOL	atm *	N	20				N 20
298.16	0.0	2320.1	0.00	0431	. 0	.442	539.1	0.00185
	0.023	2201.8	0.00	0454		.537	437.8	0.00228
	0.058	2102.3	0.00	0476	5 0	.731	256.6	0.00390
	0.077	2083.1	0.00	0480) 0	.783	216.5	0.00462
	0.192	1889.7	0.00	0529 0666	0 5 0	. 797	218.5	0.00458
	0.197	1458.6	0.00	0686	i 0	.868	189.6	0.00527
	0.251	1127.7	0.00	0887	7 O	.978	151.1	0.00662
refers t	o 1 atm ()	101.325 kPa).		.,			
		AL)XILIARY	INFO	RMATION			
METHOD /APPA	RATUS/PRO	CEDURE :		sou	RCE AND P	URITY OF	MATERIALS:	
A gas volu used. Th of liquids Ostwald-ty establishe of gas and free liqui magnetic s	metric me e densitic were dete pe pyknome d between a measure d in a ce tirrer.	thod (ref.) es of the mi ermined by a eter. Equil a measured ed amount of 11 fitted wi	l) was 1xture an librium volume f gas- ith a	1. 2. 3.	Nitrous commerc stated than 99 chromat The wat The pur stated	oxide ial cyl to be c .8%, as ography er was ity of to be s	was used f inder (Jap of a purity s attested carefully the alcoho satisfactor	rom a an), and better by gas- distilled. l was y (ref. 2).
				EST	IMATED ER	ROR:		
				L				
				REF	ERENCES: Onda, K Kito, S Japan <u>1</u>	.; Sada .; Ito, <u>970</u> , <i>3</i> ,	а, Е.; Коba К. J. Che 18; 137.	yashı, T.; m. Eng.
				2.	Sada, E J. Chem	.; Kitc . Eng.	, S.; Ito, Japan <u>1974</u>	Y. , 7, 57.

COMPONENTS:	ORIGINAL MEASUREMENTS:			
 Nitrogen oxide (Nitrous oxide); N₂O; [10024-97-2]; Water; H₂O; [7732-18-5]; I-Propanol; C₃H₈O; [71-23-8] 	Sada, E.; Kito, S.; Ito, Y.; Ind. Eng. Chem. Fundam. <u>1975</u> , 14, 232-237.			
VARIABLES:	PREPARED BY:			
Mole fraction of the alcohol	W. Gerrard/C. L. Young			
EXPERIMENTAL VALUES:				
Henry's Mole law fraction constant T/K of alcohol atm * ^x N	Henry's Mole law fraction constant 20 ¹ of alcohol atm * ^x N ₂ O [†]			
298.16 0.0 2320.1 0.00 0.040 2131.6 0.00 0.085 1809.6 0.00 0.167 1053.5 0.00 0.267 636.5 0.00	04310.517302.10.0033104690.655224.60.0044505530.707204.50.0048909490.852160.40.006231571.0125.80.00795			
This Henry's law constant appears to have been derived by dividing the observed, but unspecified, pressure of N ₂ O in atm, by the mole fraction, $x_{\rm N_2O}$ for that pressure. ⁺ Calculated by the compiler by: 1/(Henry's law constant). The value refers to 1 atm (101.325 kPa).				
AUXILIARY	INFORMATION			
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
A gas volumetric method (ref. 1) was used. The densities of the mixture of liquids were determined by an Ostwald-type pyknometer. Equilibrium established between a measured volume of gas and a measured amount of gas- free liquid in a cell fitted with a magnetic stirrer.	 Nitrous oxide was used from a commercial cylinder (Japan), and stated to be of a purity better than 99.8%, as attested by gas- chromatography. The water was carefully distilled. The purity of the alcohol was stated to be satisfactory (ref. 2). 			
	ESTIMATED ERROR:			
	 REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. J. Chem. Eng. Japan <u>1970</u>, 3, 18; 137. 2. Sada, E.; Kito, S.; Ito, Y. J. Chem. Eng. Japan <u>1974</u>, 7, 57. 			

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Laddha, S. S.; Diaz, J. M.;
2. Water: H ₂ O: [7732-18-5]	Danckwerts, P. V.
$3 1 = Propapol \cdot C_{2}H_{2}O \cdot [71 = 23 = 8]$	Chem. Eng. Sci.
5. 1 110pano1, C3ngo, [/1 25 0]	1981 36 228-220
	<u>1901</u> , 007 220-229.
VARIABLES:	PREPARED BY
Composition of liquid	C. L. Young
EXPERIMENTAL VALUES:	
Mole fraction	10^{10} Solubility. S
component	$\frac{1}{3} \qquad
298.2 0.02	2.00
0.04	1.68
0.06	1.53
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MAILERIALS:
Apparatus consisted of two vessels	
Apparatus consisted of two vessels	
of about out em capacity. Each	
Vessei fiffed with gas at a pressure	No dotoile givon
"somewhat less than atmospheric".	No details given.
A measured volume of water admitted	
to one vessel and an equal amount of	
mixture added to other vessel.	
Liquids stirred and pressure dif-	+STIMATED ERROR:
ference between flasks measured.	$\delta T/K = +0.1; \delta S_{} = \pm 3*$
From this measurement and a know-	N_2O
ledge of the absolute pressures and	(estimated by compiler).
exact volume of each vessel, it was	REFERENCES.
possible to establish the solubility.	
Corrections were made for partial	
pressure of liquid.	
	1

COMPONENTS	ODI CINAL ME CONTROLOGI			
COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitrogen oxide (Nitrous oxide);	Sada, E.; Kıto, S.; Ito, Y.			
$N_2O; [10024-97-2];$	Ind. Eng. Chem. Fundam. <u>1975</u> , 14,			
2. water; H_20 ; $[//32-18-5]$;	232-237.			
5. 2-Propanol; $C_{3}H_{8}O; [67-63-0]$				
VARIABLES:	PREPARED BY:			
Mole fraction of the alcohol	W. Gerrard/ C. L. Young			
EXPERIMENTAL VALUES: Henry's	Henry's			
T/r fraction constant,	t fraction constant, t			
of alcohol atm * "N	$_{2}$ O of alcohol atm * $^{x}N_{2}$ O			
200 1 4				
298.16 0.0 2320.1 0.00 0.008 2273.3 0.00	0431 0.338 524.4 0.00191 0440 0.433 382.0 0.00262			
0.028 2230.0 0.00	0448 0.572 266.3 0.00376			
	0447 0.708 201.0 0.00498 0452 0.760 182.9 0.00547			
0.076 2096.6 0.00	0477 0.865 148.5 0.00673			
0.140 1471.3 0.00	0680 1.0 125.8 0.00795			
0.267 718.1 0.00	139			
^T Calculated by the compiler by: 1/(Ho refers to 1 atm (101.325 kPa).	enry's law constant). The value			
AUXIIIARY	INFORMATION			
MFTHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
A gas volumetric method (ref. 1) was used. The densities of the mixture of liquids were determined by an Ostwald-type pyknometer. Equilibrium established between a measured volume of gas and a measured amount of gas- free liquid in a cell fitted with a magnetic stirrer.	 Nitrous oxide was used from a commercial cylinder (Japan), and stated to be of a purity better than 99.8%, as attested by gas- chromatography. The water was carefully distilled. The purity of the alcohol was stated to be satisfactory (ref. 2). 			
	ESTIMATED ERROR:			
	REFERENCES			
	<pre>Linda, K.; Sada, E.; Kobayashi, T. Kito, S.; Ito, K. J. Chem. Eng. Japan <u>1970</u>, 3, 18; 137.</pre>			
	2. Sada, E.; Kito, S.; Ito, Y. J. Chem. Eng. Japan <u>1974</u> , 7, 57.			

COMPONENTS:	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] 1,2-Ethanediol; C₂H₆O₂; [107-21-1] 	Laddha, S. S.; Diaz, J. M.; Danckwerts, P. V. Chem. Eng. Sci. <u>1981</u> , 36, 228-229.
VARIABLES:	PREPARED BY:
Composition of liquid	C. L. Young
EXPERIMENTAL VALUES:	
T/K Mole fraction component	n of 10 ¹⁰ Solubility, S 3 /mol cm ⁻³ Pa ⁻¹
298.2 0.02 0.04 0.06	2.29 2.22 2.13
AUXILIARY	INFORMATION
METHOD APPARATUS / PROCEDURE	
Apparatus consisted of two vessels of about 600 cm ³ capacity. Each vessel filled with gas at a pressure "somewhat less than atmospheric". A measured volume of water admitted to one vessel and an equal amount of mixture added to other vessel. Liquids stirred and pressure dif- ference between flasks measured. From this measurement and a know- ledge of the absolute pressures and exact volume of each vessel, it was possible to establish the solubility. Corrections were made for partial	No details given. ISTIMATED LEROR: $\delta T/K = \pm 0.1; \delta S_{N_2O} = \pm 3\%$ (estimated by compiler). REFERENCES.

.

CONTRACTOR			
COMPONENTS :	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Laddha, S. S.; Diaz, J. M.		
2. Water: H_{0} (7732-18-5)	Danckwarts P V		
	Dallerweits, P. V.		
$1, 2, 3$ -Propanetriol; $C_3H_8O_3$;	Chem. Eng. Sci.		
[56-81-5]	<u>1981</u> , <i>36</i> , 228-229.		
VARIABLES:	PREPARED BY:		
Composition of liquid			
	C. L. Young		
Pumpan			
EXPERIMENTAL VALUES:			
T/K Mole fraction	n of 10 ¹⁰ Solubility, S		
component	$\frac{1}{2}$ (mol cm ⁻³ Pa ⁻¹		
298.2	2.30		
0.02	2.18		
0.06	1.88		
AUALLANI			
METHOD APPARATUS/PROCEDURF	SOURCE AND PURITY OF MAILRIALS.		
Apparatus consisted of two vessels			
of about 600 cm ³ capacity Fach			
Vessel falled with man at a management			
"			
"Somewhat less than atmospheric".	No details given.		
A measured volume of water admitted			
to one vessel and an equal amount of			
mixture added to other vessel.			
Liquids stirred and pressure dif-	ESTIMATED ERROR:		
ference between flacks measured	$\delta T/K = \pm 0.1 \cdot \delta S = \pm 3.8$		
Des 11	$N_2O = 1000$		
from this measurement and a know-	(estimated by compiler).		
Ledge of the absolute pressures and	REFERENCES		
exact volume of each vessel, it was	NEI CAERCES,		
possible to establish the solubility.			
Corrections were made for partial			
programe of liquid			
Pressure of figura.			

COMPONENTS :	ORIGINAL MEASUREMENTS:
<pre>1. Nitrogen oxide (Nitrous oxide); N₂O: [10024-97-2]</pre>	Roth, W.
2. Water; H_2O ; $[7732-18-5]$;	Z. Phys. Chem. <u>1897</u> , 24, 114-151.
3. 1,2,3-Propanetriol (Glycerol);	
$(CH_2OH)_2CHOH; [56-81-5]$	
VARIABLES :	PREPARED BY:
Temperature, concentration	W. Gerrard
EXPERIMENTAL VALUES: $t = T/K - 273.16$; c	lensity = d ; α = Bunsen coefficient.
Concn. of glycerol, %: 3.376	0000070404 0.00000544742
Change of α with t: $\alpha = 1.00858 - 0.0000000000000000000000000000000000$	$45803t + 0.0006068t^2$
т/к 298.29 293.23 288	283.47 278.51
α 0.5527 0.6451 0.7	719 0.9041 1.0928
Concn. of glycerol, $\&$: 3.544 Change of u with t: $u = 1.00895 - 0$	$000004004t - 0.000005582t^{2}$
Change of α with t: $\alpha = 1.2906 - 0.0$	$43676t + 0.0005731t^2$
Т/К 298.26 293.37 288	.31 283.27 278.19 .604 0.8984 1.0854
··· 0.5555 0.6425 0.7	004 0.0504 1.0054
Concn. of glycerol, %: 6.338 Change of d with t: $d = 1.01611 - 0$.	$00003711t - 0.0000052202t^2$
Change of α with t: $\alpha = 1.2709 - 0.0$	$4242t + 0.00053176t^2$
T/K 298.40 293.24 288 0.5390 0.6347 0.7	2.31 283.23 278.19 2503 0.8932 1.0710
Conce of diversi %. 7 114	
Change of i with t: $d = 1.01810 - 0$.	$000046138t - 0.0000050224t^2$
Change of α with t: $\alpha = 1.2285 - 0.0$	$440685t + 0.00052632t^{-}$
$1 \times 0.5415 0.6242 0.7$	354 0.8661 1.0396
	(continued)
AUXITARY	INFURNATION
· · · · · · · · · / APPARATUS/PROCEDURE :	A AND PERITY OF MATERIALS.
Ostwald method, using gas buret and	1. N_2O was self prepared and
pipet. Measurement of volume of gas before and after absorption.	purified.
Specific gravity of solution was	2. Glycerol was analysed by an
Vapour pressure of water, adjusted by	appropriate method.
assuming Raoult's law, was allowed	
	ISTIMATED ERKOR.
	REFERENCES
	и теклисеа;

COMPONENTS: ORIGINAL MEASUREMENTS: 1. Nitrogen oxide (Nitrous oxide); Roth, W. N₂O; [10024-97-2]; Z. Phys. Chem. 1897, 24, 114-151. 2. Water; H₂O; [7732-18-5]; 3. 1,2,3-Propanetriol (Glycerol); (CH₂OH)₂CHOH; [56-81-5] EXPERIMENTAL VALUES: t = T/K - 273.16; density = d; α = Bunsen coefficient. Concn. of glycerol, %: 11.483 Change of d with t: $d = 1.02926 - 0.000084093t - 0.0000047447t^2$ Change of a with t: $\alpha = 1.1837 - 0.04000t + 0.00054926t^2$ Т/К 298.04 293.14 288.23 283.18 277.90 α 0.5285 0.6029 0,7056 0.8336 1.0064 Concn. of glycerol, %: 12.756 Change of d with t: $d = 1.03259 - 0.000094282t - 0.0000047244t^2$ Change of a with t: $\alpha = 1.1833 - 0.03911t + 0.00051373t^2$ T/K 298.24 293.24 288.17 282.83 278.06 0.5255 1.0040 α 0.6056 0.7120 0.8493 Concn. of glycerol, %: 16.175 Change of d with t: $d = 1.04145 - 0.00012475t - 0.000004543t^2$ Change of α with t: $\alpha = 1.1375 - 0.036345t + 0.00044917t^2$ T/K 298.14 293.24 283.00 288.13 277.98 0.5099 0.5916 0.6941 0.8199 0.9728 α Concn. of glycerol, %: 16.313 Change of d with t: $d = 1.04192 - 0.0001389t - 0.000004059t^2$ Change of α with t: $\alpha = 1.1243 - 0.037362t + 0.0005068t^{-1}$ T/K 298.14 293.16 288.31 283.30 277.81 α 0.5073 0.5768 0.6746 0.7953 0.9615

COMPONENTS	ODICINAL MEASUREMENTS.		
Nitrova evider N.O. [10024.07.2]	I Ledebe C. C. Dies I. M.		
1. Nicrous Oxide; N_20 ; [10024-97-2]	Laddha, S. S.; Diaz, J. M.;		
2. water; H_20 ; $[7/32-18-5]$	Danckwerts, P. V.		
3. 2,2'-Oxybisethanol (Diethylene	Chem. Eng. Sci.		
$glycol$; $C_4H_{10}O_3$; $[111-46-6]$	1981, 36, 228-229.		
VARIABLES:	PREPARED BY:		
Composition of liquid	C. L. Young		
EXPERIMENTAL VALUES:			
T/K Mole fracti	ion of 10 ¹⁰ Solubility, S		
component	: 3 /mol cm ⁻³ Pa ⁻¹		
298.2 0.02	2.27		
0.04	2.18		
AUXILIA	ARY INFORMATION		
METHOD APPARATUS/PROCEDURF ·	SOURCE AND PURITY OF MATERIALS.		
Apparatus consisted of two vessels			
of about 600 cm ³ capacity. Each			
vessel filled with gas at a pressur	ie -		
"somewhat less than atmospheric".	No details given.		
A measured volume of water admitted	t l		
to one vessel and an equal amount c	of		
mixture added to other vessel.			
Liquids stirred and pressure dif-			
ference between flasks measured.	LSTIMATED ERROR:		
From this measurement and a know-	$\delta T/K = \pm 0.1; \delta S = \pm 3\%$		
ledge of the absolute pressures and	1 (estimated by compiler).		
exact volume of each vessel, it was	(obtinuted by compile).		
possible to establish the solubilit	Y. REFERENCES.		
Corrections were made for partial			
pressure of liquid.			

COMPONENTS				
<pre>LOMPONENTS: 1. Nitrous oxide; N₂O; [10024-97-2] 2. Water; H₂O; [7732-18-5] 3. 1,5-Pentanediol; C₅H₁₂O₂; [111-29-5]</pre>	ORIGINAL MEASUREMENTS: Laddha, S. S.; Diaz, J. M.; Danckwerts, P. C. Chem. Eng. Sci. <u>1981</u> , 36, 228-229.			
VARIABLES:	PREPARED BY:			
Composition of liquid	C. L. Young			
EXPERIMENTAL VALUES:				
T/K Mole fraction component 3	n of 10 ¹⁰ Solubility, S 3 /mol cm ⁻³ Pa ⁻¹			
298.2 0.02 0.04 0.06	2.32 2.26 2.21			
AUXILIARY INFORMATION				
METHOD ADDADATUS (DDOCEDUDE)	CONDUCT AND DUDITY OF MALL PLATE			
Apparatus consisted of two vessels of about 600 cm ³ capacity. Each vessel filled with gas at a pressure "somewhat less than atmospheric". A measured volume of water admitted to one vessel and an equal amount of mixture added to other vessel. Liquids stirred and pressure dif-	No details given.			
ference between flasks measured. From this measurement and a know- ledge of the absolute pressures and exact volume of each vessel, it was possible to establish the solubility. Corrections were made for partial pressure of liquid.	ESTIMATED ERROR: $\delta T/K = \pm 0.1; \delta S_{N_2O} = \pm 3\%$ (estimated by compiler). REFERENCES:			
COMPONENTS :		ORIGINAL	MEASUREMENTS:	
---	--	---	--	--
1. Nitrogen oxide (Nitrou N_2O ; [10024-97-2];	 Nitrogen oxide (Nitrous oxide); N₂O: {10024-97-21; 		E.; Kito, S.; Ito	, Y.
2. Water; H ₂ O; [7732-18-5];		J. Che	em. Eng. Japan <u>1974</u>	, 7, 57-59.
3. Formic acid; CH_2O_2 ; [64-18-6]				
VARIABLES:		PREPARED	BY:	
T/K: 298.15 P/kPa: 101.32	15 (1 atm)	W. Ger	rard/C. L. Young	
Molarity of acid: mol 1^{-1}				
EXPERIMENTAL VALUES:	· · · · · ·		·····	
	Pressure	= 101.3	25 kPa	
Molarity of acid	Bunsen		Molarity of acid	Bunsen
T/K mol 1-1	Coefficient	т/к	mol 1^{-1}	Coefficient
298.15 0	0.5512	298.15	5 0	0.5512
0.6234	0.5481		2.4451	0.5579
1.3125	0.5542		2.8999	0.5653
 			·····	
		TNEODMAT	TON .	
	AL XILIARI			
METHOD / APPARATUS / PROCEDURE :		SOURCE A	ND PURITY OF MATLRIALS,	
Equilibrium established be measured volume of gas and amount of gas-free liquid fitted with a magnetic sti Concentration of the organ determined by a volumetric with sodium hydroxide to a phthalein end-point. Det apparatus and procedure in	tween a a measured in a cell trrer. nc acid was titration a phenol- cails of ref. l.	1. Hig use Ltc cer 2. Dis giv 3. Rea giv	gh purity nitrous ox ed; supplied by Sho 1; attested to be nt by gas chromatogr stilled and degassed ren. ugent grade was used ren.	aide was wa Denko Co. 99.8 per caphy. ; <i>d</i> and <i>n</i> _D ; <i>d</i> and <i>n</i> _D
		STIMATH δT/K = compile	ED ERROR: $\pm 0.2; \delta \alpha = \pm 2$ % (eser).	timated by
		REFERENC 1. Ond T.; J. 137	CES: la, K.; Sada, E.; Kito, S.; Ito, K. Chem. Eng. Japan <u>1</u> 7.	Kobayashi, <u>970</u> , <i>3</i> , 18;

Weak Electrolyte and Non-Electrolyte Solutions (Aqueous)

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitrogen oxide (Nitrous oxide); N₂O; [10024-97-2]</pre>	Roth, W.
2. Water; H ₂ O; [7732-18-5]	Z. Phys. Chem. <u>1897</u> , 24, 114-151.
3. Ethanedioic acid (Oxalic acid);	
(COOH) ₂ ; [144-62-7]	
VARIABLES:	PREPARED BY:
Temperature, concentration	W. Gerrard
EXPERIMENTAL VALUES: $t = T/K - 273.16;$	density = d ; α = Bunsen coefficient.
Concn. of oxalic acid, %: 0.7746	
Change of α with t: $\alpha = 1.00440 - 0.04$ Change of α with t: $\alpha = 1.3667 - 0.04$	$100001414t - 0.000005449t^{2}$ $18565t + 0.0006894t^{2}$
T/K 298.33 293.26 288.2	29 283.28 278.29
	0.9465 1.1357
Concn. of oxalic acid, %: 0.8497 Change of d with t: $d = 1.00453 + 0.0000000000000000000000000000000000$	00003186t - 0.0000064535t ² 48714t + 0.00066483t ²
т/к 298.04 293.33 288.2	21 283.10 278.10
$\alpha 0.5754 0.6719 0.79$	33 0.9509 1.1514
Concn. of oxalic acid, %: 3.326 Change of d with t: $d = 1.01754 - 0.0000000000000000000000000000000000$	000047524t - 0.000005253t ² 46596t + 0.0006572t ²
Т/К 298.27 293.21 288.2	25 283.28 278.73
α 0.5621 0.6482 0.764	12 0.9130 1.0787
Concn. of oxalic acid, %: 3.640 Change of d with t: $d = 1.01911 - 0.00$ Change of α with t: $\alpha = 1.3338 - 0.04$	000056536t - 0.0000050445t ² 46913t + 0.0006380t ²
T/K 298.25 293.37 288.4 α 0.5584 0.6493 0.766	1 283.29 278.17 58 0.9309 1.1148
	(continued)
AUXILIARY	INFORMATION
" Hoe /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MAIFRIALS;
Ostwald method, using gas buret and	1. N_2O was self prepared and
Pipet. Measurement of volume of gas before and after absorption.	purified.
Specific gravity of solution was	2. Oxalic acid was analysed by an
Vapour pressure of water, adjusted	appropriate method.
by assuming Raoult's law, was allowed for.	
1	LSTIMATED ERROR:
1	
1	
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
 Nitrogen oxide (Nitrous oxide); N₂O; [10024-97-2] Water; H₂O; [7732-18-5] Ethanedioic acid (Oxalic acid); (COOH)₂; [144-62-7] 	Roth, W. Z. Phys. Chem. <u>1897</u> , 24, 114-151.
CXPERIMENTAL VALUES:	
t = T/K - 273.16; defined to the second se	ensity = d ; α = Bunsen coefficient.
Concn. of oxalic acid, %: 4.130Change of d with t: $d = 1.02164 - 0.00$ Change of α with t: $\alpha = 1.3189 - 0.04$ T/K 298.21293.30 α 0.56850.66150.780	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$

Weak Electrolyte and Non-Electrolyte Solutions (Aqueous)

·		······································	
COMPONENTS:		ORIGINAL MEASUREMENTS:	
<pre>1. Nitrogen oxide (Nitrous oxide); N₂O; [10024-97-2]; 2. Water: H₂O: [7732-18-5]:</pre>		Sada, E.; Kito, S.; Ito, Y.	
		J. Chem. Eng. Japan <u>1974</u> , 7, 57-59.	
3. Ethanedioic as	cid (Oxalic acid):		
C ₂ H ₂ O ₄ ;	[144-62-7]		
VARIABLES:		PDEDADED BV.	
T/K: 298.15 P/kPa: 101.325 (1 atm)		W Gerrard/C L Young	
Molarity of acid	$mol l^{-1}$	w. Gerrard/C. L. roung	
EXPERIMENTAL VALUES:		L	
	Pressure	e = 101.325 kPa	
	T/K Molarity of mol 1	acid Bunsen Coefficient α	
	298.15 0 0.209	0.5512	
	0.243	3 0.5468	
	0.522	4 0.5380	
	0.856	7 0.5353	
	<u></u>		
	AUXILIARY	INFORMATION	
METHOD/APPARATUS/	PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Equilibrium estal	olished between a	1. High purity nitrous oxide was	
amount of gas-fre	e liquid in a cell	Ltd.; attested to be 99.8 per	
fitted with a mag	metic stirrer.	cent by gas chromatography.	
determined by a	volumetric titration	2. Distilled and degassed; d and $n_{\rm D}$	
With sodium hydro Phthalein end-po:	oxide to a phenol- int. Details of	3. Reagent grade was used; d and $n_{\rm p}$	
apparatus and pro	ocedure in ref. 1.	given.	
[ESTIMATED ERROR:	
		$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by compiler).	
		REFERENCES:	
		1. Onda, K.; Sada, E.; Kobayashi,	
		T.; Kito, S.; Ito, K. J. Chem. Eng. Japan 1970. 3. 18:	
		137.	
1			

COMPONENTS :			ORIGINAL ME	ASUREMENTS:	
1. Nitrogen o	xide (Nitro	us oxide);	Sada, E.	; Kito, S.; It	о, Ү.
N ₂ O; [10024-97-2]		J. Chem.	Eng. Japan 197	4, 7, 57-59.
2. Water; H_2	0; [7732-1	8-5]			_
3. Acetic aci	d; $C_2H_4O_2$;	[64-19-7]			
VARIABLES:			PREPARED BY	:	
т/к: 298.15 Р	/kPa: 101.3	25 (1 atm)	W. Gerra	rd/C. L. Young	
Molarity of aci	d: mol 1^{-1}			,	
EXPERIMENTAL VALUES	3:		· · ·		
		Pressu	re=101.325	kPa	
Malar	the of soid	Bungan		Molarity of aci	d Buncon
T/K MOIAR	110011^{-1}	Coefficient	T/K	mol 1 ⁻¹	Coefficient
		α			α
298.15 0		0.5512	298.15	0	0.5512
0	.3096	0.5476	270.13	2.2750	0.5815
0	.5012	0.5472		2.6174	0.5897
Ő	.6188	0.5472		3.2019	0.6071
1	.1204	0.5610		3.5392	0.6193
2	.2123	0.5814		31,000	0.022,
		······			
			INFORMATION		
METHOD (ADDADATU			SOURCE AND	DUDITY OF MATERIALS	•
Equilabrium og	5/PROCEDURE	:	I Wigh	purity nitrous of	, vido uno
measured volum	e of gas and	d a measured	used;	supplied by Sh	owa Denko Co.
amount of gas-	free liquid	in a cell	Ltd.;	attested to be	99.8 mole
Concentration	of the organ	nic acid	per c	llod and dogasso	d.
was determined	by a volum	etric	$\frac{2}{n_{\rm D}}$ gi	ven.	u; d and
phenolphthale:	soaium nya: n end-point	Details	3. Reage	ent grade was use	d; d and
of apparatus a	nd procedure	e in ref. l.	ⁿ D ^{g1}	ven.	
			FETIMATED F	2000.	
			$\delta T/K = +$	$0 2 \cdot \delta \alpha = +2 \%$ (estimated
			by compi	ler).	
			REFERENCES	· · · · · · · · · · · · · · · · · · ·	
			l. Onda	, K.; Sada, E.;	Kobayashı,
			Т.; J. C	Kito, S.; Ito, 'hem. Ena. Janan	к. 1970 <i>. 3.</i>
			18;	137.	<u>, </u>

COMPONENTS .	OPICINAL MEASUREMENTS -
1. Nitrogen oxide: (Nitrous oxide):	MIGHNEL MEASUREMENTS:
$N_2O;$ [10024-97-2]	Knopp, W.
 Water; H₂O; [7732-18-5] 	2. Phys. Chem. <u>1904</u> , 48,97-108
3. Propanoic acid (Propionic acid); C ₃ H ₆ O ₂ ; [79-09-4]	
VARIABLES:	PREPARED BY:
	C.L. Young
EXPERIMENTAL VALUES:	$\frac{1}{10000000000000000000000000000000000$
T/K Weight of acid Conc of	salt Density of Bunsen
in 100 g of /mol dm solution.	³ (soln) solution absorption coefficient, α
293.16 1.492 0.2	045 0.99964 0.6323
	16 1.00349 0.6369 40 1.01061 0.6504
15.011 2.3	85 1.01190 0.6534
25.589 4.6	45 1.01933 0.7219
	Water 0.6270
Calculated by compiler: Mole frac 0.000506. Mole fraction of N2O in 4.645 moles of propionic acid in 1	tion, x_1 , of N ₂ O in water: the solution containing dm ³ of solution : 0.000768.
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An absorption pipet and gas buret were used to measure the volume of gas absorbed. Densities were determined by a Sprengel pyknometer.	 Nitrous oxide was prepared by heating pure ammonium nitrate at 513-523K. It was passed through aqueous ferrous sulfate, aqueous sodium hydroxide, and concentrated sulfuric acid. Analytically attested.
	ESTIMATED ERROR:
	REFERENCES:

ORIGINAL MEASUREMENTS:	
Sada, E.; Kito, S.; Ito, Y.	
J. Chem. Eng. Japan <u>1974</u> , 7, 57-59.	
PREPARED BY:	
W. Gerrard/C. L. Young	
re = 101.325 kPa	
ıd Bunsen Coefficient α	
0.5512	
0.5612	
0.5985	
0.6481	
SOURCE AND PURITY OF MATERIALS:	
1. High purity nitrous oxide was	
Ltd.; attested to be 99.8 mole	
per cent by gas chromatography.	
2. Distilled and degassed; d and	
$n_{\rm D}$ given.	
3. Reagent grade was used; d and $n_{\rm p}$ given.	
3. Reagent grade was used; d and $n_{\rm D}$ given.	
"D given." a and	
ESTIMATED ERROR:	
5. Reagent grade was used; <i>d</i> and n_D given. ESTIMATED ERROR: $\delta T/K = \pm 0.2; \delta \alpha = \pm 2$ % (estimated by	
ESTIMATED ERROR: $\delta T/K = \pm 0.2; \delta \alpha = \pm 2$ % (estimated by compiler).	
5. Reagent grade was used; <i>d</i> and n_D given. ESTIMATED ERROR: $\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by compiler).	
3. Reagent grade was used; <i>d</i> and n_D given. ESTIMATED ERROR: $\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by compiler). REFERENCES: b Order K = Cada Free Kehrmachi	
<pre>S. Reagent grade was used; a and n_D given. ESTIMATED ERROR: δT/K = ±0.2; δα = ±2% (estimated by compiler). REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K.</pre>	
 Reagent grade was used; a and n_D given. ESTIMATED ERROR: δT/K = ±0.2; δα = ±2% (estimated by compiler). REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. d. Chem. Eng. Japan 1970, 3, 18; 127 	
S. Reagent grade was used; <i>a</i> and n_D given. ESTIMATED ERROR: $\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by compiler). REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. <i>d. Chem. Eng. Japan</i> <u>1970</u> , <i>3</i> , 18; 137.	

Weak Electrolyte and Non-Electrolyte Solutions (Aqueous)

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitrogen oxide (Nitrous oxide); N₂O: [10024-97-21;</pre>	Roth, W.
2. Water: H_2O ; [7732-18-5];	Z. Phys. Chem. <u>1897</u> , 24, 114–151.
3. Urea; $CO(NH_2)_2$; [57-13-6]	
VARIABLES	
	PREPARED BY:
Temperature, concentration	W. Gerrard
EVDEDIMENTAL MALVES, to m/W 272 10. 3	
$C_{K} = T/K - 2/3.16;$ a	ensity = a ; α = Bunsen coefficient.
Concn. of urea, %: 3.288 Change of d with t: $d = 1.01013 - 0.0000000000000000000000000000000000$	000058765t - 0.0000045803t ² 46462t + 0.0006493t ²
т/к 297.56 293.17 287.	75 282.81 280.78 278.10
α 0.5781 0.6591 0.78	55 0.9369 1.0092 1.1114
Concn. of urea, 8: 3.336	000070071 0 00000745.2
Change of α with t: $\alpha = 1.01059 - 0.0000000000000000000000000000000000$	$4637t + 0.00066066t^2$
т/к 297.52 293.20 287.	70 282.70 278.40
α 0.5765 0.6501 0.78	06 0.9276 1.0892
Concn. of urea, $\$ = 4.670$	20011976+ 0.000002246+ ²
Change of α with t: $\alpha = 1.01458 - 0.01458$	$4236t + 0.0005399t^2$
т/к 298.04 287.84 277.	81
α 0.5721 0.7864 1.10	66
Concn. of urea, $\$ = 4.963$	200020004 0.00000001142
Change of α with t: $\alpha = 1.01513 - 0.04$ Change of α with t: $\alpha = 1.2927 - 0.04$	$4387t + 0.00057684t^2$
т/к 297.64 293.20 287.	82 282.83 278.84
α 0.5643 0.6516 0.77	34 0.9177 1.0621
	(continued)
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Ostwald method using gas buret and	1. N=0 was self prepared and
pipet. Measurement of volume of gas	purified.
before and after absorption. Specific gravity of solution was	3. Urea was analysed by an
determined by a Sprengel pyknometer.	appropriate method.
by assuming Raoult's law, was allowed	
for.	
	ESTIMATED ERROR:
	REFERENCES :

COMPONENTS: ORIGINAL MEASUREMENTS: 1. Nitrogen oxide (Nitrous oxide); Roth, W. N₂O; [10024-97-2]; Z. Phys. Chem. 1897, 24, 114-151. 2. Water; H₂O; [7732-18-5]; 3. Urea; $CO(NH_2)_2$; [57-13-6] EXPERIMENTAL VALUES: t = T/K - 273.16; density = d; α = Bunsen coefficient. <u>Concn. of urea</u>, %: 5.288 Change of d with t: d = 1.01640 - 0.00007353t - 0.000004942t²Change of α with t: $\alpha = 1.3217 - 0.046054t + 0.0006497t^{2}$ T/K 297.75 293.14 287.80 282.69 278.69 276.70 0.5846 0.6699 0.7867 0.9350 1.0788 1.1668 α Concn. of urea, %: 6.249 Change of d with t: $d = 1.01931 - 0.0001160t - 0.000003861t^2$ Change of α with t: $\alpha = 1.3063 - 0.045862t + 0.00063275t$ T/K 297.21 292.19 287.53 283.61 0.5693 0.6627 0.7811 0.8962 α Concn. of urea, %: 6.483 Change of d with t: $d = 1.01964 - 0.00010387t - 0.0000042285t^2$ Change of a with t: $\alpha = 1.2917 - 0.04482t + 0.0006258t^2$ 297.04 283.70 279.01 T/K 292.14 287.50 274.70 0.7777 0.5734 0.6712 0.8868 1.0451 1,2242 α Concn. of urea, %: 7.262 Change of d with t: $d = 1.02214 - 0.0001099t - 0.000004543t^2$ Change of α with t: $\alpha = 1.3393 - 0.04750t + 0.0006866t^2$ T/K 297.63 292.46 287.67 283.63 280.79 0.5881 0.6830 0.7946 0.9191 1.0169 α Concn. of urea, %: 7.330 Change of *d* with t: $d = 1.02200 - 0.00007845t - 0.000005349t^2$ Change of α with t: $\alpha = 1.2872 - 0.043684t + 0.00058266t^2$ 297.54 292.34 287.63 283.72 280.86 T/K α 0.5685 0.6691 0.7771 0.8924 0.9854 <u>Concn. of urea</u>, %: 9.931 Change of d with t: $d = 1.03007 - 0.00015102t - 0.000004114t^2$ Change of α with t: $\alpha = 1.2528 - 0.040516t + 0.0005196t^2$ 283.50 297.66 292.49 287.78 T/K 278.31 0.5721 0.6635 0.7715 0.8915 α 1.0578 Concn. of urea, %: 10.000 Change of d with t: $d = 1.03029 - 0.00014818t - 0.000004305t^2$ Change of α with t: $\alpha = 1.2772 - 0.04381t + 0.00062565t^2$ 287.69 T/K 297.28 292.36 283.77 279.83 276.90 275.91 0.5844 α 0.6758 0.7727 0.8819 1.0054 1.1165 1.1615

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Manchot, von W.; Jahrstorfer, M.;
2. Water: H_O: [7732-18-5]	Zepter, H.
	Z. Anorg. Allg. Chem.
5. UIEA; CH4NO; [57-13-6]	<u>1924</u> , <i>141</i> , 45.
VARIABLES:	PREPARED BY:
Concentration	C. L. Young
EXPERIMENTAL VALUES:	-I
T/K Density, d_4^{25} of soln.	Conc. of soln. Bunsen coefficient, /mol dm ⁻³ α
298.15 1.0134	0.97 51.0
1.0287	1.95 49.2
1.0619	4.05 46.3
1.0905	5.89 44.5
AUXILIAR	Y INFORMATION
Measurement of volume of gas absorbed by means of gas buret and pipet. Volume absorbed appears to be taken as independent of pressure (1). Density of the aqueous solution determined by Sprengel pykometer.	<pre>1. Prepared by heating ammonium nitrate, frozen in liquid air and then distilled. 2. No details given. ESTIMATED ERROR: δα = ±0.1. REFERENCES: 1. Manchot, W. 2. Anorg. Chem. 1924, 141, 38.</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sada, E.; Kito, S.
 Water; H₂O; [7732-18-5] 2-Aminoethanol, (monoethanol- amine); C₂H₇NO; [141-43-5] 	kagaku kogaku, <u>1972</u> , 36, 218-20.
VARIABLES:	PREPARED BY:
Temperature, concentration	W.Gerrard / C.L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of monoeth. /mol l ⁻¹ (anolamine Bunsen soln) coefficient,
288.15 0 1.0783 1.6839 2.4272 2.4420 3.1821 4.4639 5.2185 0 1.0853 2.0571 2.8975 4.1214 4.8359 5.8611	0.7500 0.7435 0.7344 0.7219 0.7176 0.6991 0.6541 0.6315 0.5512 0.5490 0.5406 0.5340 0.5111 0.4977 0.4762
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE: Equilibrium established between measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentration of amine determined by titration. Details in source and ref. (1).	<pre>SOURCE AND CURLIN OF MALRIANS 1. Commercial sample, purity 99.8 mole per cent. 2/3 Of satisfactory purity. FSTIMATED ERROR</pre>

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sada, E.; Kumazawa, H.; Butt, M.A.
 Water; H₂O; [7732-18-5]; 	277-278
3. 1,2-Ethanediamine (Ethylene-	277-270.
diamine); C ₂ H ₈ N ₂ ; [107-15-3]	
VARIABLES:	PREPARED BY:
Composition	C. L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of amine/mol 1 ⁻¹ Bur	sen coefficient, α
298.15 0.0	0.5512
0.805	0.5276
1.4/3	0.5106
2.267	0.4728
2.371	0.4687
2.738	0.4415
Pressure = 1 atmosphere = 1.01325	• × 10° Pa.
	INFORMATION
M_THOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between	1. Commercial sample, minimum
measured volume of gas and a measured	purity 99.8 mole per cent.
fitted with a magnetic stirrer.	2. Distilled and degassed.
Amount of gas absorbed estimated from	2 Persont grade of guaranteed
tion of amine determined by titration.	guality.
Details in source and ref. 1.	
	LSTIMATED ERROR.
	$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated
	by compiler).
	REFERENCES
	NGI DILINGED;
	l. Onda, K.; Sada, E.; Kobayashi,
	T.; Kito, S.; Ito, K.
	J. Chem. Engng. Japan <u>1970</u> , 3,
	18.

140

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Sada, E.; Kumazawa, H.; Butt, M. A. J. Chem. Engng. Data 1978, 23,
2. Water; H ₂ O; [7732-18-5]	161-163.
3. 1-Amino-2-propanol, (iso- propanolamine); C ₃ H ₃ NO; [78-96-6]	
VARIABLES:	PREPARED BY:
Temperature, composition	C. L. Young
EXPERIMENTAL VALUES:	
T/K Conc/mol 1 ⁻¹ Bunsen Coeffi	cient, α
Pressure = 1 atmosphere = 1.01325 × 1	.0 ⁵ Pa.
	ΤΝΕ(ΙΡΜΑΤΙΙ)λ
Equilibrium established between measured volume of gas and measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentration of amine determined by titration. Details in source and refs. 1 and 2.	 Commercial sample, minimum purity 99.8 mole per cent. Distilled and degassed. Reagent grade of guaranteed quality.

COMPONENTS:	ORIGINAL MEASUREMENTS
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] 2,2⁻-Iminobisethanol, (diethanol- amine) C₄H₁₁NO₂; [111-42-2] 	Sada, E.; Kumazawa, H.; Butt, M. A.; J. Chem. Engng. Data <u>1977</u> , 22, 277- 278.
VARIABLES:	PREPARED BY:
Composition	C. L. Young
EXPERIMENTAL VALUES:	L
T/K Conc. of amine/mol 1 ⁻¹ Bur	nsen coefficient, α
298.15 0.0 0.449 0.996 2.026 2.313 3.081	0.5512 0.5480 0.5406 0.5205 0.5114 0.4918
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Equilibrium established between a measured volume of gas and a measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentra- tion of amine determined by titration. Details in source and ref. 1.	 Commercial sample, minimum purity 99.8 mole per cent. Distilled and degassed. Reagent grade of guaranteed quality.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2$ % (estimated by compiler).
	REFERENCES: 1. Onda, K.; Sada, E.; Kobayashi, T.; Kito, S.; Ito, K. J. Chem. Engng. Japan <u>1970</u> , 3, 18.

COMPONENTS :	ORIGINAL MEASUREMENTS:		
 Nitrous oxide; N₂O; [10024-97-2] Water; H₂O; [7732-18-5] 1,1'-Iminobis-2-propanol, (Diisopropanolamine); C₆H₁₅NO₂; [110-97-4] 	ORIGINAL MEASUREMENTS: Sada, E.; Kumazawa, H.; Butt, M. A. J. Chem. Engng. Data <u>1978</u> , 23, 161-163.		
VARIABLES:	PREPARED BY:		
Temperature, composition	C. L. Young		
EXPERIMENTAL VALUES: Amine			
T/K Conc/mol 1 ⁻¹ Bunsen Coeffi	cient, α		
298.15 0.0 0.255 0.486 0.486 0.915 0.915 0.5145 1.356 0.4968 1.584 0.4775 1.950 0.4512 2.379 0.4144 2.528 0.4091 2.619 0.3883 2.918 0.2947 Pressure = 1 atmosphere = 1.01325	× 10 ⁵ Pa.		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Equilibrium established between measured volume of gas and measured amount of gas-free liquid in a cell fitted with a magnetic stirrer. Amount of gas absorbed estimated from change in volume of gas. Concentration of amine determined by titration. Details in source and	 Commercial sample, minimum purity 99.8 mole per cent. Distilled and degassed. Reagent grade of guaranteed quality. 		
refs. 1 and 2.	<pre>ESTIMATED ERROR: δη = ±2% (estimated</pre>		

,

.

COMPONENTS -	ORIGINAL MEASUREMENTS .
ONENID,	WANTAT LEADORFLENIS:
	Sada, E.: Kumazawa, H.: Butt, M. A.:
1. Nitrous oxide; N ₂ O; [10024-97-2]	$L = \frac{1}{2} $
[2. Water; H_2O ; [7732-18-5]	J. Chem. Engng. Data <u>1977</u> , 22, 277-
(Triethanolamine): CoH, NO.	278.
[102-71-6]	
VARIABLES:	PREPARED BY:
Composition	C. L. Young
EXPERIMENTAL VALUES:	
T/K Conc. of amine/mol 1 ⁻¹ Buns	en coefficient a
	ien oberricient, a
298.15 0.0	0.5512
0.628	0.4997
0.874	0.4774
1.293	0.4327
2.100	0.3170
Pressure = 1 atmosphere = 1.01325	5 × 10 ⁵ Pa.
	ΙΝΕΩΡΜΑΤΙΩΝ
AUXILIANI	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
⁴ quilibrium established between a	1. Commercial sample, minimum
amount of gas-free liquid in a cell	pulley 55.8 more per cent.
fitted with a magnetic stirrer.	2. Distilled and degassed.
Amount of gas absorbed estimated from	-
change in volume of gas. Concentra-	3. Reagent grade of guaranteed
Details in source and rof	quality.
sectaris in source and rer. r.	
}	ESTIMATED ERROR:
	$\delta T/K = \pm 0.2$; $\delta \alpha = \pm 2\%$ (estimated
	by compiler).
	REFERENCES:
	1. Onda, K.; Sada, E.; Kobayashi.
	1.; KILO, 5.; ILO, K.
	J. Chem. Engng. Japan <u>1970</u> , 3,
	18.

COMPONENTS:		ORIGINAL MEASUREMENTS:					
Nitrous oxide: N ₂ O; [10024-97-2]			Knopp, W.				
<pre>2. Water; H₂O; [7732-18-5] 3. 2,2,2-Trichloro-1,1-ethanedio1, (Chloral hydrate); C₂H₃Cl₃O₂; [302-17-0]</pre>			2. Phys. Chem. <u>1904</u> , 48, 97-108				
VARIABI	LES:			DEPADED BY.			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Congo	ntwation			W Corra	rd	
	Conce				W. Gerra		
EXPERIM	ENTAL VA	LUES:			· · · · · · · · · · · · · · · · · · ·		
	T/K	Weight of	Conc. of c	hloral	Density	Bunsen	
		chloral bydrate in	hydrate/mo (soln).	1 dm ⁻	or solution	coefficient,	
		100 g of	(501)		$/ \text{kg} \text{dm}^{-3}$	α	
		solution					
29	3.15	2.947	0.184		1.01124	0.6182	
		6.848	0.445		1.02907	0.6128	
		13.48	0.942		1.06110	0.5960	
		19.60	1.474		1.09224	0.5793	
		24.02	1.911		1.11602	0.5675	
					Water	0.6270	
Ca	alculate	d by compiler:	: Mole frac	tion, x_1	, of N ₂ O in w	ater = 0.000506	
			AUXILIARY	INFORMATIC)N		
ME THOD	APPARATU	S/PROCEDURE:		SOURCE AN	D PURITY OF MAI	! RI ALS	
An absorption pipet and a gas buret were used to measure the volume of		 Nitrous oxide was prepared by heating pure ammonium nitrate at 513-523 K. 					
				It was passed in order through			
The densities of the solutions were determined by a Sprengel pyknometer.		aqueous ferrous sulfate, sodium hydroxide, and concentrated sulfuric acid.					
		2 Attocted analytically					
		S. Attested analytically.					
		ESTIMATED FREOR:					
1							
		REFERENCES.					
						i	

COMPONENTS:		ORIGINAL MEASUREMENTS:
1. Nitrous oxide: N.O:	[10024-97-2]	Geffcken, G.; Z. Phys. Chem. <u>1904</u> ,
 Water: H₂O: [7732-] 	3-51	10,257-502
3. Colloids:	1	
VARIABLES:		PREPARED BY:
		W. Gerrard
EXPERIMENTAL VALUES:		
Т	= 298.15 K Pre	ssure = 101.325 kPa.
Colloid	Conc.of colloi /g dm ⁻³	d Ostwald coefficient
Arsenious sulfide;		
$As_2S_3; [1303-33-9]$	39.6 42.4	0.5819 0.5833
Ferric hydroxide;		
Fe(OH) ₃ ; [1309-33-7]	47.7 47.9	0.5799 0.5787
		Water alone 0.5942
	<u></u>	
	AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE		SOURCE AND PURITY OF MATERIALS:
Volume of nitrous oxide Was measured by means of buret and absorption pi	absorbed of a gas net based	 Nitrous oxide was self prepared and attested.
On the technique of Ost Detailed description an Were given.	wald. d diagram	2,3. Of satisfactory purity.
		LSTIMATED ERROR:
		REFERENCES

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Findlay, A.; Creighton, H.J.M.		
2. Water; H ₂ O; [7732-18-5]	<u></u> , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
3. Ferric hydroxide ; Fe(OH) 3 ; [1309-33-7]			
VARIABLES:	PREPARED BY:		
Pressure, concentration	W. Gerrard		
EXPERIMENTAL VALUES:			
Solubility, S, expressed as concentra	tion of the gas in the liquid phase tion of the gas in the gaseous phase		
T/K =	298.16		
Weight of colloid in Density of 100 cm ³ of solution,g. solution	f Pressure of Solubility, gas/kPa S		
0.625 1.001	101.0570.590112.7890.586124.5210.584134.6530.588149.4520.588184.3820.588		
1.49 1.008	97.8570.586110.3890.579124.6540.577143.7190.581161.9840.585190.9140.586		
4.061 1.029	100.523 0.578 111.322 0.573 117.722 0.571 153.719 0.574 161.051 0.579 181.049 0.580		
AUXILIARY	INFORMATION		
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;		
Gas buret and absorption pipet similar to that of Geffcken (1), except that the manometer tube was longer to give the higher pressures. Concentration of the colloid was determined by precipitation with ammonium sulfate.	 Self prepared and purified; not attested. & 3. The colloid was self prep- ared from ammonium carbonate and ferric chloride in water. The product was dialysed. 		
	ESTIMATED ERROR:		
	Stated to be 7 0.25%		
	REFERENCES :		
	1. Geffcken, G. Z. Phys. Chem. <u>1904</u> , 49, 257.		

S
0.591
0.580
0.580
0.584
0.584
0.574
0.568
0.579
(2).
as (3),
Chem. M. <u>1905</u> ,

COMPONENTS :	ORIGINAL MEASUREMENTS:
	Findlay, A.; Creighton, H.J.M.
1. Nitrous oxide; N ₂ O; [10024-97	-2] J. Chem. Soc. <u>1910</u> , 97,536-561.
2. Water; H ₂ O; [7732-18-5]	
3. Arsenious sulfide; As ₂ S ₃ , (colloidal); [1303-33-9]	
VARIABLES:	PREPARED BY:
Pressure, concentration	W. Gerrard.
EXPERIMENTAL VALUES:	
Solubility, S, expressed as conc	entration of the gas in the liquid phase entration of the gas in the gaseous phase
т/	K = 298.16
Weight of colloid Density o in 100 cm ³ of solution solution, g.	f Pressure of Solubility,S. gas /kPa
1.85 1.004	99.4570.591109.3220.590123.1880.590140.6530.592159.4510.593179.4490.593
2.29 1.007	99.457 0.590 113.322 0.586 134.120 0.588 147.985 0.589 161.184 0.589 173.316 0.590
AUXIL	.IARY INFORMATION
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Gas buret and absorption pipet similar to that of Geffcken (1), except that the manometer tube w longer to give the higher pressu Concentration of the colloid was determined by precipitation with hydrochloric acid, drying and weighing.	 1. Self prepared and purified; not attested. 2. & 3. Self made by the action of hydrogen sulfide on the purest arsenious oxide in water. The excess of hydrogen sulfide was removed by a stream of hydrogen, and the product filtered.
	ESTIMATED ERROR:
	Stated to be \neq 0.25%
	REFERENCES
	L Cofferen C & Thus Show 1001
	1. Gericken, G. 2. Phys. Chem. 1904,
	49,257.
1	

Colloids (Aqueous)

COMPONENTS:	ORIGINAL MEASUREMENTS .
1. Nitrous oxide; N ₂ O; [10024-97-2]	Findlay, A.; Creighton, H.J.M.
2. Water: $H_{*}O = [7732 - 18 - 5]$	J. Chem. Soc. <u>1910</u> , 97,536-561.
Water, M20, [//52-10-5]	
3. Silica, SiO ₂ ; (in suspension); [7631-86-9]	
VARIABLES:	PREPARED BY:
Pressure	W. Gerrard.
EXPERIMENTAL VALUES.	
Solubility, S, expressed as concentr	ation of the gas in the liquid phase
concentr	action of the gas in the gaseous phase
T/K =	298.16
100 cm° of liquid contained 0.30 g c	or silica, SiO_2 : density, 1.000
Pressure of	Solubility, S
N207KF4	
97.324	0.592
112.789	0.593
127.987	0.59
163.184	0.597
181.982	0.600
197.447	0.802
AUXILIARY	INFORMATION
METHOD APPARATUS (PROCEDURE .	SOURCE AND PURTTY OF MATERIALS.
- THOD ALLARATUS/I ROCEDURE.	SOURCE AND FURITI OF PATERIALS,
Gas buret and absorption pipet	1. Self prepared and purified;
similar to that of Geffcken (1),	not attested.
longer to give the higher pressure.	3. Used Kahlbaum's pure silica.
	ESTIMATED ERROR:
	Stated to be + 0.25%
	REFERENCES :
	1. Geffcken, G.; Z. Phys. Chem.
	<u>1904</u> , 49,257.
1	

COMPONENTS:	ORIGINAL MEASUREMENTS:			
	Findlay A Creighton, H. J. M.			
1. Nitrous oxide; N ₂ O; [10024-97-2]	J. Chem. Soc. 1910, 97, 536-561.			
2. Water; H_2O ; [7732-18-5];				
3. Silicic acid (as SiO ₂); [1342-98-2]				
VARIABLES:	PREPARED BY:			
Pressure, concentration	W. Gerrard			
EXPERIMENTAL VALUES: T/K 29	98.16			
concentra	ation of the gas in the liquid phase			
Solubility, s, expressed as concentra	rion of the gas in the gaseous phase			
Conc. of colloid Density of $10^2 \pi$ (Gio) π^{-3}	Pressure of Solubility,			
(soln.)	kPa			
1.87 1.001	99.723 0.596			
	109.989 0.598 122.788 0.598			
	139.453 0.600			
	179.849 0.604			
3.63 1.005	98.790 0.601 113.055 0.602			
	132.520 0.605			
	162.250 0.608			
	185.848 0.609			
AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Gas buret and absorption pipet similar	 Nitrous oxide self prepared and purified, not attested. 			
that the manometer tube was longer to	3. Kahlbaum's pure silica was dis-			
give the higher pressures.	solved in aqueous potassium			
	was poured into hydrochloric acid and the product was dialysed.			
	ESTIMATED ERROR:			
	Stated to be +0.25%			
	Stated to be 10.25%.			
	REFERENCES :			
	<pre>1. Geffcken, G. Z. Phys. Chem. 1904, 49, 257.</pre>			

.

COMPONENTS :				ORIGINAL MEA	SUREMENTS		
Cont ONENTS .		ONIGINAL MEASUREMENTS:					
1. Nitrous oxide: NoO: [10024-97-2]		Findlay, F	A.; How	ell, O. I	۶.		
2. Water: H_{10} . [7732-18-5].		J. Chem. S	Soc. <u>191</u>	4, 105, 2	291-8.		
3. Silicic a	cid (colloi	dal):					
[1343-98-	•2]						
VARIABLES:				PREPARED BY:			
Pressure, co	oncentration	r		W. Gerrard	1		
EXPERIMENTAL V	ALUES: Tempe	erature no	t state	ed: presum	ably 29	8.16 T/K	
	-						
Solubility	, s, given	as concer	itratio	on of the g	as in t	ne liquic ne gaseou	s phase
Conc. of colloid	Density of	^P N₂O [†]	ទ	^P N ₂ O [†]	S	$P_{N_2O^+}$	ទ
10^{2}g cm^{-3}	solution	kDo		kDo		kDo	
(SOIN.)		кра				кра	
1.62	1.000	33.893	0.590	49.208	0.587	71.566	0.589
		88.524 34.010	0.589	49.382	0.588	71.673	0.592
3.5	1.004	90.124 33.357	0.588	102.043	0.588	136.733	0.591 0.594
	1.001	91.658	0.593	101.150	0.594	137.813	0.598
{		33.343 87.138	0.596	50.208 101.003	0.595 0.595	74.286 133.853	0.593
	, <u>_</u> , <u>, , , , , , , , , , , , , , , , , </u>	AU	XILIARY	INFORMATION		<u> </u>	
METHOD /APPAR	ATUS/PROCED	URE:		SOURCE AND P	URITY OF	MATERIALS:	
Measurement buret and p	of volume ipet (ref.	of N₂O by 1).	gas	l. Nitro purif	us oxid ied, se	e self pr e ref. 2.	epared and
			!	3. Pure aqueo the c into produ	silica us pota lear so hydroch ct was	was disso ssium hyd lution wa loric, an dialysed.	lved in roxide; s poured d the
			-				
1				ESTIMATED ER	RROR:		
ļ							
ļ				REFERENCES:			
				1. Findl J. Ch	ay, A.; em. Soc	William . <u>1913</u> , 1	s, T. 03, 636.
				2. Findl J. Ch	ay, A.; em. Soc	Creight . <u>1910</u> , <i>9</i>	on, H. J. M. 7, 536.
l							

COMPONENTS:	ORIGINAL MEASUREMENTS			
	URIGINAL MEASUREMENTS:			
<pre>1. Nitrous oxide; N₂O; [10024-97-2] 2. Water; H₂O; [7732-18-5];</pre>	Findlay, S.; Creighton, H. J. M. J. Chem. Soc. <u>1910</u> , 97, 536-561.			
3. Gelatin (colloidal)				
VARIABLES:	PREPARED BY:			
Pressure, concentration	W. Gerrard			
EXPERIMENTAL VALUES: T/K 2	98.16			
Solubility, s, expressed as concentration	ation of the gas in the liquid phase ation of the gas in the gaseous phase			
Conc. of colloid Density of 10 ² g cm ⁻³ (soln.) solution	Pressure of Solubility, gas s kPa			
1.31 0.999	97.457 0.589 113.189 0.590			
3.09 1.003	$\begin{array}{cccccccccccccccccccccccccccccccccccc$			
6.06 1.008	163.984 0.588 183.048 0.588 97.324 0.560 113.322 0.563 128.121 0.566 146.252 0.568 166.250 0.570 183.848 0.571			
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Gas buret and absorption pipet similar to that of Geffcken (ref. 1), except that the manometer tube was longer to give the higher pressures.	 Nitrous oxide self prepared and purified, not attested. French sheet gelatin, free from salts, was used. 			
}	ESTIMATED ERROR:			
	Stated to be ±0.25%.			
	REFERENCES: 1. Geffcken, G. Z. Phys. Chem. <u>1904</u> , 49, 257.			

Colloids (Aqueous)

Composition	
COMPONENTS:	ORIGINAL MEASUREMENTS:
	Findlay, A.; Howell, O. R.;
1. Nitrous oxide; N ₂ O; [10024-97-2]	J. Chem. Soc. 1914, 105, 291-8.
2. Water; H ₂ O; [7732-18-5];	
3. Gelatin (colloidal)	
VARIABLES:	PREPARED BY:
Pressure, concentration	W. Gerrard
EVERDING HALVER	
Temperature not sta	ted: presumably 298.16 T/K
Solubility a given as concentrat	ion of the gas in the liquid phase
concentrat:	ion of the gas in the gaseous phase
Conc. of Density $P_{\rm N}$ of	$P_{N,o}^{\dagger}$ $P_{N,o}^{\dagger}$
colloid of N ₂ O s	N ₂ O s N ₂ O s
(soln.) kPa	kPa kPa
$\begin{bmatrix} 1.45 \\ 1.000 \\ 83 \\ 178 \\ 0.57 \end{bmatrix}$	2 49.622 0.581 70.726 0.577 5 100.657 0.579 134.600 0.581
3.12 1.004 33.930 0.57	7 48.968 0.576 70.700 0.568
	9 100.083 0.572 133.320 0.576 1 50.582 0.582 72.326 0.575
86.191 0.57	7 101.776 0.579 137.600 0.579
3.16 1.004 38.369 0.57	7 55.261 0.574 75.886 0.570
6.10 1.008 34.357 0.55	6 50.795 0.556 72.846 0.548
84.978 0.54	6 101.710 0.550 137.306 0.557
85.298 0.55	6 50.742 0.555 72.859 0.548 6 101.270 0.550 - -
[†] P_{N_2O} is the pressure of N_2O	over the solution.
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS.
Measurement of volume of N ₂ O by gas buret and pipet (ref. 1).	1. Nitrous oxide self prepared and purified, see ref. 2.
	3. French gelatin, free from salts.
	was used.
	FETTMATED EDDOD.
	ESTIMATED ERROR.
	REFERENCES :
	1. Findlay, A.; Williams, T.
	J. Chem. Soc. <u>1913</u> , 103, 636.
	2 Findlay A. Craighton H I M
	2. Findidy, A.; Crergnoon, H. J. M.
	J. Chem. Soc. <u>1910</u> , 97, 536.

COMPONENTS :	ORIGINAL MEASUREMENTS.	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Shkol'hikova, R. 1	· ·
2. Water: H ₂ O: [7732-18-5]	Оспенуе Харівкі Це	eningraa. Gosuaart
3 Celatin (colloidal)	1959, No. 18, Part	272, 64-86.
VARIABLES:	PREPARED BY:	
Temperature, concentration of colloid	W. Ger	rard
	Ĺ	
EXPERIMENTAL VALUES:		
T/K Conc. of colloid/%	α	L
283.15 1	0.5340	0.5535
288.15	0.4890	0.5159
293.15	0.4370	0.4530
303.15	0.3950	0.4384
308.15	0.3200	0.3610
283.15 5	0.4852	0.5030
288.15	0.4321	0.4482
298.15	0.3614	0.3945
303.15	0.3430	0.3807
313.15	0.2410	0.2763
α = the Bunsen absorption coeffi	cient.	
$L = \alpha \times T/K/273$, but defined as	the ratio of the con	centration of
the gas in the liquid phase to t	hat in the gas phase	÷.
Partial pressure of gas was take	n to be 760 mmHg.	
760 mmHg = 1 atm = 101.325 kPa.		
		(cont.)
AUXILIARY	INFORMATION	
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MA	TERIALS ·
The volume of N_2O absorbed was	1. Purity of nitro	ous oxide stated
measured by the use of a gas buret	N ₂ , $0.4-0.3$ %.	*; contained
and pipet.	2. Water may be ta	ken as of
	satisfactory pu	rity.
	3. The gelatin sol	ution was
	dialized.	
	Denne den statist	atod to be
	Reproducibility st	ated to be
	within ±0.2%.	
	REFERENCES :	
	}	

Colloids (Aqueous)

COMPONENTS: 1. Nitrous oxide; 2. Water; H ₂ O; [3. Gelatin (colloi	N₂O; [10024-97-2] 7732-18-5] dal)	ORIGINAL MEASUREMENTS: Shkol'nikova, R. I. Uchenye Zapiski Leningrad. Gosudart <u>1959</u> , No. 18, Part 272, 64-86.		
EXPERIMENTAL VALUE	s:	· · · · · · · · · · · · · · · · · · ·		
T/K Con	c. of colloid/%	α	L	
283.15 288.15 293.15 298.15 303.15 308.15 313.15	10	0.4300 0.3850 0.3366 0.3194 0.3030 0.2710 0.2280	0.4458 0.4060 0.3613 0.3486 0.3363 0.3057 0.2614	
Conc. of colliod/%	A/cal	mol ⁻¹	B/cal mol ⁻¹	
0 (water) 1 5 10	576 470 409 373	0 0 0 0	5161 4100 3520 3140	
Where A and B	are defined by th	e equations:		
<u>d</u>	$\frac{\ln \alpha}{dT} = -\frac{A}{RT^2}$			
<u>d</u>	$\frac{\ln L}{dT} = -\frac{B}{RT^2}$			

COMPONENTS :				ORIGINAL MEASUREMENTS:			
			M 07 0'	Findlay, A.; Creighton, H.J.M.			
1. Nitrous oxide; N ₂ O; [10024-97-2]			4-97-2	J. Chem. Soc. <u>1910</u> , 97, 536-561.			
2. Water; H_2C	; [7732-1	8-5]					
3. Starch, (c	olloidal)						
VARIABLES:				PREPARED BY:			
Pressure	, concent	ration	1	W. Gerrard			
	·····			<u></u>			
EXPERIMENTAL VALUE	2S:	con	centrat	ion of the gas in the liquid phase			
Solubility e	xpressed	as cor	centrat	ion of the gas in the gaseous phase S			
P_{N_2O} is the	pressure	of N₂C) over t	he solution. Temperature = 298.16 K.			
Conc. of soln. /10 ⁻² g cm ⁻³	Density of Solution						
2.50	1.009	₽ _{N₂O} ∕kPa	98.923	116.122 135.986 155.451 171.183 192.114			
		S	0.580	0.576 0.575 0.578 0.581 0.582			
6.89	1.021	P _{N₂O} ∕kPa	98.923	113.055 123.854 139.453 168.117 184.115			
		S	0.561	0.554 0.553 0.554 0.562 0.567			
10.00	1.030	P _{N₂O} ∕kPa	98.923	114.655 126.387 142.786 165.183 179.982			
		S	0.550	0.544 0.545 0.545 0.553 0.555			
13.73	1.040	P _{N₂O} ∕kPa	98.523	111.456 130.920 151.452 166.917 184.915			
		S	0.537	0.532 0.530 0.535 0.536 0.538			
			AUXILIA	RY INFORMATION			
METHOD: /APPARAT	US/PROCED	URE:		SOURCE AND PURITY OF MATERIALS.			
Gas buret and of Geffcken (] manometer tube the higher pre	pipet sim), except was long essures.	llar t that er to	that the give	 Self prepared and purified: not attested. 			
				 Used Kahlbaum's pure soluble starch. 			
				ESTIMATED ERROR:			
				$\delta S, S$ Stated to be $\overline{+}$ 0.25%.			
				REFERENCES:			
				1. Geffcken, G. Z. Phys. Clem. <u>1904</u> , 49,257.			

0.11.1.1. (A

		C	colloids (Aqueous)			1!
COMPONENTS:				ORIGINAL MEAS	UREMENTS		
 Nitrou Water; Starch 	s oxide; N ₂ O; H ₂ O; [7732 (colloidal)	[10024-9 ⁻ -18-5];	7-2]	Findlay, J. Chem.	А.; но <i>Soc</i> . <u>19</u>	owell, O. 014, 105,	R. 291-8.
VARIABLES:				PREPARED BY:	·		
Pressure,	concentratio	n		W. Gerrar	đ		
EXPERIMENTAL	VALUES:	rature not	t state	d: presuma			· · · · · · · · · · · · · · · · · · ·
Solubi	lity, s, give	n as <u>con</u>	ncentra centra	ation of the tion of the	gas in gas in	the lique the gase	uid phase ous phase
Conc. of colloid	Density of	N 2 0 [†]	ទ	N20 [†]	8	N₂0 [†]	S
(soln.)	solution	kPa		kPa		kPa	
6.76 6.70	1.023	38.023 87.658 35.143	0.565	5 55.328 102.696 5 49.395	0.563 0.553 0.563	75.552 140.519 69.953	0.560 0.550 0.561
9.58	1.030	86.205 35.676	0.558	3 100.070 49.822	0.554 0.551	132.987 67.230	0.550 0.549
9.40	1.029	83.685 38.729	0.546	5 99.603 55.528	0.541 0.550	136.520 76.899	0.539 0.548
13.62	1.039	87.858 37.903	0.543	3 103.430 55.781	0.540	133.800	0.537
13.60		93.751 35.170 83.192	0.532 0.541 0.534	2 112.389 50.475 100.670	0.528 0.539 0.530	66.247 129.787	0.536
+	† P _{N₂O} is the pressure of N ₂ O over the solution.						
		AUX	ILIARY	INFORMATION			
METHOD /APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:							
Measurement buret and	nt of volume pipet (ref.	of N₂O by 1).	gas	 Nitrous purifie Starch: 	oxide d, see Kahlb	self prep ref. 2. aum's pur	e soluble.
}				ESTIMATED ERR	OR:		······
				REFERENCES:		····	<u></u> .
				l. Findlay J. Chem	, A.; . Soc.	Williams, <u>1913</u> , <i>103</i>	т. , 636.
				2. Findlay J. Chem	, A.; . Soc.	Creighton <u>1910</u> , <i>97</i> ,	, Н. J. M. 536.

COMPONENTS:	ORIGINAL MEASUREMENTS:			
 Nitrous oxide; N₂O; [10024-97-2] 	Findlay, A.; Creighton, H.J.M.			
2. Water; H ₂ O; [7732-18-5]	J. Chem. 308. 1910, 97, 536-561			
3. Charcoal in suspension.				
VARIABLES:	PREPARED BY:			
Pressure	W. Gerrard			
EXPERIMENTAL VALUES:				
Solubility, S , expressed as concentration of the gas in the liquid phase concentration of the gas in the gaseous phase				
T/K =	298.16			
100 cm 3 of liquid contained 0.227 g	of charcoal; density = 1.000.			
Pressure of N ₂ O/kPa : 97.190 109.856 124.	788 137.853 167.183 180.782			
Solubility, <i>S</i> : 0.596 0.600 0.	618 0.635 0.648 0.674			
AUXILIARY	INFORMATION			
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATLRIALS:			
Gas buret and absorption pipet similar to that of Geffcken (1),	 Self prepared and purified; not attested. 			
except that the manometer tube was longer to give the higher pressures.	 Used Kahlbaum's well powdered bone charcoal. 			
	ESTIMATED ERROR:			
	Stated to be $\overline{+}$ 0.25%			
	REFERENCES:			
	 Geffcken, G.Z. Phys. Chem. 1904, 49, 257. 			

COMPONENTS:	·	ORIGINAL MEAS	UREMENTS:		
		Findlay, A.	.; Howel	1, O.R.	
1. Nitrous oxide; N ₂ O; [1002-	4-97-2]	J. Chem. Sc	<i>oc.</i> <u>1914</u>	, 105,291-8	3
2. Water; H ₂ O; [7732-18-5]					
3. Charcoal suspension,					
VARIABLES:		PREPARED BY:			
Pressure		۵ ټ	V. Gerra	rd	
EXPERIMENTAL VALUES:		e of the gas	in the	liquid ob	
Solubility, S, given as conc	entratio	n of the gas	s in the	gaseous p	ase hase
Temperature not stated: pres	umably 2	98.16 T/K		j	
3.0 α of charges 1 p α 0^+	C	PN 0+	C	p N o^+	C
in 100 cm ³ water /kPa	3	/kPa	5	/kPa	G
		, KE G			
33.677	0.580	48.902	0.586	70.353	0.587
83.538	0.588	99.963	0.588	131.920	0.609
85.191	0.591	101.363	0.588	133.493	0.588
	AUXILIARY	INFORMATION			
METHOD /APPARATUS/PROCEDURE:		SOURCE AND PU	JRITY OF M	MATERIALS:	
Measurement of volume of N ₂ O	by gas	1. Self pre	pared a	nd purified	1 (2).
buret and pipet (1).		 Finely powdered animal charcoal was boiled with water, dried at 373.16 K, and then heated in a vacuum almost to redness. 			
		ESTIMATED ERF	ROR:		
		REFERENCES: 1. Findla J. Che. 2. Findla J. Che.	y, A.; V m. Soc. y, A.; (m. Soc.	Villiams. <u>1913</u> , 103, Creighton, 1910, 97.5	636. H.J.M.
		<i>v. cne</i>			

159

COMPONENTS:	EVALUATOR:
<pre>1. Nitrous oxide; N₂O; [10024-97-2] 2. Organic liquids</pre>	Colin Young School of Chemistry University of Melbourne, Victoria, Australia: 3052. March 1980.

Most solubility data on this gas are at temperatures in the range 273K to 323K and near atmospheric pressure. Nitrous oxide has a boiling point at 1 atmosphere pressure of 184.67K and a critical temperature of 309.6K. At 273K the vapor pressure of nitrous oxide is approximately 31.5 atm or 3.2 MPa.

The main sources of data for non-aqueous solvents are those of Kunerth (1), Horiuti (2), Yen and McKetta (3), Hsu and Campbell (4). Makranczy *et al* (5), and Sada *et al* (6). In general terms the data of ref. (2), (3), (5) and (6) appear to be reliable. The data of ref. (4) are usually in agreement with other data on the same system but not always. The extensive data of Kunerth (1) appears to have an unusual temperature dependence the solubility appears to decrease slightly too rapidly with increasing temperature.

ALKANES:

<u>Pentane:</u> There is reasonable agreement between the data of Hsu and Campbell (4) and Makranczy *et al* (5) for this system and both are classified as tentative.

<u>Heptane</u>: The solubility in this alkane has been studied by Yen and McKetta (3) and Makranczy *et al* (5) There is good agreement between the two sets of data at 298K but at 313K the Makranczy *et al* (5) data indicates the solubility is higher than reported by Yen and McKetta (3). It appears likely that the data of Makranczy *et al* (5) might be slighly in error at the higher temperature. The other data in the Makranczy *et al* (5) paper are also slightly suspect when comparison is made for systems on which there is more extensive data, see Helium and alkane evaluation (7). The data of Yen and McKetta (3) are classified as tentative.

2,2,4-Trimethylpentane: Yen and McKetta (3) data are classified as tentative since there are no other data with which to compare their data and their data on other systems appears reliable.

<u>Other alkanes:</u> The data of Makranczy *et al* (5) are classified as tentative however the comments under heptane regarding these workers data are brought to the users attention. Probably the data at 298K is more reliable than that at 313K.

Benzene: The data of Horiuti (2) and Yen and McKetta (3) are in good agreement and are classified as tentative.

ALCOHOLS

<u>Methanol</u>: The data of Kunerth (1) Hsu and Campbell (4) and Sada *et al*. (6) are in fair agreement. Only Kunerth (1) values are over a range of temperature and the temperature dependence of his results is unusual. All three sets of data are classified as tentative. The mole fraction solubility of Makranczy *et al*. (8) is considerably greater than that of the other three studies and is classified as doubtful. Ethanol: This system has been studied by five groups. The data of $\overline{Kunerth}$ (1) has an unusual temperature dependence and the mole fraction data, interpolated to 298.15 K, are considerably lower than that of any other worker. They are therefore classified as doubtful. The mole fraction solubility at 298.15 K calculated from the results of Makranczy $et \ al$. (8) Hsu and Campbell (4) and Carius (9) agree within experimental error and are classified as tentative. The results of Carius (9) are over 120 years old and the agreement with recent data is surprising. (Weiss (10) also remarked on the surprising agreement between Carius' results and recent data for the system nitrous oxide and water). The mole fraction solubility calculated from the results of Sada $et \ al$. are about 8-10% lower than the values from references (4) (8) and (9). Such a large discrepancy is greater than can be accounted for by the estimated experimental error.

2-Propanone (Acetone)

The solubility of nitrous oxide in 2-propanone has been studied by Horiuti (1), Hsu and Campbell (4) and Kunerth (1). The Hsu and Campbell isolated value is in reasonable agreement with the other two sets of data. There is fair agreement between Kunerth's and Horiuti's datum at 298K but Kunerth's data have an unusual temperature dependence and there is a fairly wide discrepancy between the two sets of data at lower temperatures. The data of Horiuti (1) and Hsu and Campbell (4) are classified as tentative whereas that of Kunerth (1) is less reliable.

Acetic acid and Pentyl ester

There is good agreement between the data of Kunerth (1) and the isolated value at 294.3 K of Hsu and Campbell (4) for acetic acid. Therefore both workers values are classified as tentative. Similarly the results of both these workers are in good agreement for the pentylester.

Halogenated hydrocarbons.

Tetrachloromethane (Carbon tetrachloride). The data of Horiuti (2) and Yen and McKetta (3) are in good agreement whereas the isolated Value of Hsu and Campbell (4) is widely different. The values of Horiuti (2) and Yen and McKetta (3) are therefore classified as tentative whereas that of Hsu and Campbell is classified as doubtful.

Trichloromethane (Chloroform). The temperature dependence of values of Kunerth (1) is unusual but the isolated value of Hsu and Campbell (4) is in agreement with Kunerth's data and therefore both sets of data are classified as tentative.

<u>l,2-Dibromoethane</u>. There is good agreement between the values of Kunerth (1) and that of Hsu and Campbell (4) on this system and therefore both sets of data are classified as tentative.

REFI	ERENCES:
1.	Kunerth, W. Phys. Rev. <u>1922</u> , 19, 512.
2.	Horiuti, J. Sci. Pap. Inst. Phys. Chem. Res. (Japan), <u>1931-2</u> , 17, 125.
3.	Yen, L.C.; McKetta, J.J.Jr. J. Chem. Eng. Data. <u>1962</u> , 7, 288.
4.	Hsu, H.; Campbell, D. Aerosol Age. <u>1964</u> , December, 34.
5.	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4, (2), 269.
<i>.</i>	Sada, E.; Kito, S.; Ito, Y. Eng. Chem. Fundam. <u>1975</u> , 14, 232.
7.	Helium and Neon Gas Solubilities, Solubility Data Series, Vol. 1. ed. H.L. Clever, Pergamon, Oxford. <u>1979</u>
8.	Makranczy, J.; Rusz, L.; Balog-Megyery, K. Hung. J. Ind. Chem. 1979, 7, 41.
9.	Carius, L. Annalen, <u>1855</u> , 94, 129.
10.	Weiss, R.F.; Price, B.A. Marine Chem. <u>1980</u> , 8, 347.

* * *

COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Hsu, H.; Campbell, D.	
2. Pentane; C ₅ H ₁₂ ; [109-66-0]	Aerosol Age, <u>1964</u> , December, 34.	
VARIABLES:	PREPARED BY:	
	W Corrard / C L Young	
	". Gerrard / C.H. Toung	
EXPERIMENTAL VALUES:		
T/K Ostwald coeffi L	cient, Mole fraction [*] of nitrous oxide in liquid, x _{N2} O	
294.3 4.13	0.0194	
 * calculated by compi pressure of gas of volume of gas at 29 based on the densit 101.325 kPa and 273 	ler as for a partial 101.325 kPa. Molar 4.24K taken as 23967 cm^3 y (1) 1.9775 g dm ⁻³ at .15K.	
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS	
Copper equilibrium cell fitted with Bourdon gauge and thermometer. Total amount of gas needed to attain given, but not stated, pressure measure. Ostwald coeffic- ient calculated from knowledge of volume of liquid and container.	No details given.	
	<pre>ESTIMATED ERROR:</pre>	
COMPONENTS :	ORIGINAL MEASUREMENTS:	
---	---	--
 Nitrous oxide; N₂O; [10024-97-2] Pentane; C₅H₁₂; [109-66-0] 	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4(2),	
	269-280.	
VARIABLES:	PREPARED BY:	
T/K: 298.15 - 313.15	S. A. Johnson	
P/kPa: 101.325 (1 atm)		
EXPERIMENTAL VALUES:		
T/K Mole fraction Bu ^x N ₂ O	nsen coefficient Ostwald Coefficient α L	
200.15 0.01000		
	3.750 4.093	
513.13 0.01082	5.217 5.000	
Mole fractions and Bunsen coefficients were calculated by the compiler.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:		
Volumetric method, described in detail in reference (1).	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	ESTIMATED ERROR:	
	$\delta x_{N_2O} / x_{N_2O} = \pm 0.03.$	
	REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszprémi Vegyipari Egyetem Kösleményei <u>1957</u> , 1, 55; CA 55, 3175h.	

Organic Compounds

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitrous oxide; N₂O; [10024-97-2] 2. Hexane; C₆H₁₄; [110-54-3]</pre>	Makranczy, J.; Megyery-Balog, K.; Rusz, L; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4(2), 269-280.
VADT	
VARIABLES:	PREPARED BY:
T/K: 298.15 - 313.15	S. A. Johnson
P/kPa: 101.325 (1 atm)	
EXPERIMENTAL VALUES:	
T/K Mole fraction Bunsen coef ^x N ₂ Ο α	ficient Ostwald coefficient L
298.15 0.01022 2.100	2 471
313 15 0 01610 2 744	3.471
2.744	5.140
AUXILIARY INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Volumetric method, described in detail in reference (1).	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.
	ESTIMATED ERROR:
	$\delta x_{N_2O} / x_{N_2O} = \pm 0.03.$
	<pre>REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszprémi Vegyipari Egyetem Kösleményei 1957, 1, 55; CA 55, 3175h.</pre>

COMPONENTS	OPICINAL MEACUDEMENTS.	
COMPONENTS.	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Patyi, L.; Furmer, I. E.; Makranczy, J.; Sadilenko, A. S.; Stepanova, Z. G.; Berengarten, M. G.	
2. Hexane; C ₆ H ₁₄ ; [110-54-3]	<i>Zh. Prikl. Khim.</i> <u>1978</u> , <i>51</i> , 1296–1300.	
VARIABLES:	PREPARED BY:	
	C. L. Young	
EXPERIMENTAL VALUES:		
T/K α Mole fraction of nitrous oxide at a partial pressure of 101.325 kPa		
298.15 3.19	3.19 0.01851	
AUXILIAR	INFORMATION	
METHOD 'APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Volumetric method. Pressure	Purity better than 99 mole per	
measured when known amounts of	cent as determined by gas	
gas were added, in increments, to	chromatography.	
a known amount of liquid in a		
vessel of known dimensions.		
partial pressure of solvent.		
Details in ref. (1).		
	ESTIMATED ERROR:	
	or/K = ± 0.1 ; $\alpha = \pm 4\pi$ or less.	
	REFERENCES :	
	1. Bodor, E.; Bor, G. J.; Mohai,	
	B.; Sipos, G.	
	Veszpremi. Vegyip. Egy. Kozl. <u>1957</u> , 1, 55.	

l

	· · · · · · · · · · · · · · · · · · ·	
COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Yen, L. C.; Mcketta, J. J., Jr.	
2 Hoptoport C H = [142-92-5]	J. Chem. Eng. Data <u>1962</u> , 7, 288-289.	
2. neptane; $C_{7}n_{16}$; $[142-82-5]$		
VARIABLES:	PREPARED BY:	
Temperature	W. Gerrard/C. L. Young	
EXPERIMENTAL VALUES:	· · · · · · · · · · · · · · · · · · ·	
T/K Bunsen coefficient	Mole fraction of nitrous oxide.	
	^x N ₂ O	
273.16 4.136	0.02589	
293.16 3.042	0.01963	
$\begin{bmatrix} 303.16 & 2.564 \\ 313.16 & 2.244 \end{bmatrix}$	0.01681	
	0.01172	
The partial pressure of	f the gas was 101.325 kPa.	
Smoothed Data		
$\Delta G^{\circ} = -RT \ln x_{N \circ O} = (-9928)$	$3 + 66.655 \times T/K) J mol^{-1}$	
(Std. deviation	$n = 22 \text{ J mol}^{-1}$	
T/K Mole fraction of n	trous oxide. x	
	N_2O	
273.16	12612	
283.16 0.0	02238	
293.16 0.01938		
313.16 0.0	1494	
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Measurement of volume of gas absorbed	1. Gas of 98 per cent purity was	
at a partial pressure of 101.325 kPa.	spectrograph then showed purity	
The vapor pressure of the liquid was	of 99.5 per cent.	
tion pipet. Modified form of	2. Phillips Petroleum pure grade	
apparatus and technique used by Markham and Kobe (1)	sample freshly fractionated.	
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.1; \delta x_{N_2O} = \pm 2\%$ (estimated)	
	by compiler).	
	REFERENCES :	
	(1) Markham, A. E.; Kobe, K. A.;	
	J. Am. Chem. Soc. <u>1941</u> , 63, 449.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide: N ₂ O: [10024-97-2]	Makranczy, J.: Megvery-Balog, K.:	
	Rusz, L.: Patvi, L.	
	Hung J Ind Cham $1976 A(2)$	
2. Heptane; C_7H_{16} ; [142-82-5]	1370, 4127, 160, 170, 17700, 1770, 17700, 1770, 1770, 1770, 1770, 1770	
• • • • • • • • •	269-280.	
VARTABLES	DEEDADED DV.	
π/κ , 208 15 - 313 15	FREFARED DI:	
P(hDat = 101, 225, (1, atm))	S. A. Johnson	
P/RPa: 101.325 (1 atm)		
EXPERIMENTAL VALUES:		
T/K Mole fraction Bunsen coef	ficient Ostwald coefficient	
^x N ₂ Ο α	L	
-		
	2 024	
298.15 0.01/96 2.780	3.034	
313.15 0.01561 2.366	2.712	
Mole fractions and Bunsen coefficient	s were calculated by the compiler.	
AUXILIARY	INFORMATION	
METHOD /ADDADATUS /DEOCEDURE	COURCE AND BUDITY OF MATERIALC.	
METHOD / AFFARATOS/ FROCEDORE:	SOURCE AND PURITY OF MATERIALS:	
volumetric method, described in	Analytical grade reagents of	
detail in reference (1).	Hungarian and foreign origin were	
	used (both liquids and gases).	
	No further information.	
	ESTIMATED ERROR:	
	$\delta x_{11} = \sqrt{x_{11}} = \pm 0.03.$	
	N ₂ O′ N ₂ O	
	REFERENCES :	
	1. Bodor, E.; Bor, Gy.; Mohai, B.;	
	Sipos, G. Vesenrémi Vequinari	
	Faustan Vanlamaria 1957 1 EE	
l	Dyyetem Kostemenyet 1957, 1, 55;	
	CA 55, 31/5h.	
	1	

•

CONTRACT	
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Megyery-Balog, K.;
	Rusz, L.; Patyi, L.
2. Octane: $C_{8}H_{18}$: [111-65-9]	Hung. J. Ind. Chem. <u>1976</u> , 4(2),
	269-280.
VARIABLES:	PREPARED BY:
Т/К: 298.15 - 313.15	
P/kPa: 101.325 (1 atm)	S. A. Johnson
EXPERIMENTAL VALUES.	I
	ficiant Octuald coefficient
$x_{u} = \alpha$	L
N ₂ O	
200 15 0 01701 0 500	0.700
	2.729
	2.415
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:	
Volumetric method described in	Analytical grade reagents of
detail is as farmer (1)	Analytical glade leagents of
de call in reference (1).	hungarian and foreign origin were
	used (both liquids and gases).
	No further information.
	ESTIMATED ERROR:
	$\delta x_{N_2O} / x_{N_2O} = \pm 0.03.$
	REFERENCES
	1. Bodor, E.; Bor, Gy.; Mohai, B.;
	Sipos, G. Veszpremi Vegyipari
	Egyetem Kosleményei <u>1957</u> , 1, 55;
	CA 55, 3175h.

COMPONENTS:	ORIGINAL MEASUREMENTS:	
 Nitrous oxide; N₂O; [10024-97-2] 2,2,4-Trimethylpentane; C_{&}H₁₈; [540-84-1] 	Yen, L. C.; McKetta, J. J., Jr. J. Chem. Eng. Data <u>1962</u> , 7, 288-289.	
VARIABLES:	PREPARED BY:	
Temperature	W. Gerrard/C. L. Young	
EXPERIMENTAL VALUES:		
T/K Bunsen coefficient	Mole fraction of nitrous oxide, ${}^{x}N_{2}O$	
273.16 4.587 283.16 3.786 293.16 3.155 303.16 2.679 313.16 2.273 The partial pressu	0.03217 0.02701 0.02287 0.01972 0.01698 ure of the gas was 101.325 kPa.	
$\frac{\text{Smoothed Data}}{\Delta G^{\circ} = -RT \ln x_{N_2O}} = (-11346 + 70.101 \times T/K) \text{ J mol}^{-1}$ (Std. deviation = 6.3 J mol ⁻¹)		
273.16 0.03220 283.16 0.02700 293.16 0.02290 303.16 0.01964 313.16 0.01701		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE: Measurement of volume of gas absorbed by a known volume of degassed liquid at a partial pressure of 101.325 kPa. The vapor pressure of the liquid was allowed for. Gas buret and absorp- tion pipet. Modified form of apparatus and technique used by Markham and Kobe (1).	<pre>SOURCE AND PURITY OF MATERIALS: 1. Gas of 98 per cent purity was purified at 193.16 K. Mass spectrograph then showed purity of 99.5 per cent. 2. Phillips Petroleum pure grade sample, freshly fractionated. ESTIMATED ERROR:</pre>	

•

Organic Compounds

COMPONENTS:	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024- 	-97-2] Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
2. Nonane; C _{9H20} ; [111-84-2] Hung. J. Ind. Chem. <u>1976</u> , 4(2), 269-280.
VARIABLES:	PREPARED BY:
T/K: 298.15 - 313.15	S. A. Johnson
<pre>P/kPa: 101.325 (1 atm)</pre>	
EXPERIMENTAL VALUES:	
T/K Mole fraction Buns ^x N ₂ O	en coefficient Ostwald coefficient α L
298.15 0.01788	2 270 2 478
313.15 0.01507	1.878 2.153
Mole fractions and Bunsen coef:	ficients were calculated by the compiler.
AU	XILIARY INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric method, described in	Analytical grade reagents of
detail in reference (1).	Hungarian and foreign origin were
	used (both liquids and gases).
	No further information.
	ESTIMATED ERROR:
	$\delta x_{N_2O} / x_{N_2O} = \pm 0.03.$
	REFERENCES:
	 Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszprémi Vegyipari Egyetem kösleményei <u>1957</u>, 1, 55; CA 55, 3175h.

172 11100	
COMPONENTS :	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024-97-2] Decane; C₁₀H₂₂: [124-18-5] 	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4(2),
	269-280.
VARIABLES:	PREPARED BY:
T/K: 298.15 - 313.15 P/kPa: 101 325 (1 atm)	S. A. Johnson
EXPERIMENTAL VALUES:	L
T/K Mole fraction Bunsen co ^x N ₂ O	oefficient Ostwald coefficient α L
	2 270
313.15 0.01490 1.	703 1.95 2
AUXII.IARY	
METHOD /ADDADATUS /DDOCEDURE .	INFORMATION
Volumetric method, described in detail in reference (1).	INFORMATION SOURCE AND PURITY OF MAILRIALS: Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.

Organic Compounds

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.
2. Undecane; C ₁₁ H ₂₄ ; [1120-21-4]	hung. J. Ind. Chem. <u>1976</u> , 4(2), 269-280.
VARIABLES:	PREPARED BY:
T/K: 298.15 - 313.15 P/kPa: 101.325 (1 atm)	S. A. Johnson
EXPERIMENTAL VALUES:	
T/K Mole fraction Bunsen coe ^x N ₂ Ο α	efficient Ostwald coefficient L
298.15 0.01758 1.8	90 2.063
313.15 0.01489 1.5	73 1.803
AUXILIARY INFORMATION	
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric method, described in detail in reference (1).	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.
	ESTIMATED ERROR: $\delta x_{N_2O} / x_{N_2O} = \pm 0.03.$ REFERENCES:
	 Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszprémi Vegyipari Egyetem Kösleményei <u>1957</u>, 1, 55; CA 55, 3175h.

Nitrous	Oxide
---------	-------

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Megyery-Balog, K.;
	Rusz, L.; Patyi, L.
2. Dodecane; $C_{12}H_{26}$; [112-40-3]	Hung. J. Ind. Chem. <u>1976</u> , 4(2),
	269-280.
VARIABLES:	PREPARED BY:
T/K: 298.15 - 313.15	C) Johnson
P/kPa: 101.325 (1 atm)	S. A. Johnson
EXPERIMENTAL VALUES.	
LA BARBAINE VALUES.	
T/K Mole fraction Bunsen of	coefficient Ostwald coefficient
<i>x</i> _{N₂O}	α L
298.15 0.01723 1.7	1.877
313.15 0.01472 1.4	44 1.655
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric method described in	Analytical grade reagents of
detail in reference (1)	Analytical grade reagents of
detail in reference (1).	Hungarian and foreign origin were
	used (both liquids and gases).
	No further information.
	ESTIMATED ERROR:
	$\delta \mathcal{J}_{N \circ O} / \mathcal{I}_{N \circ O} = \pm 0.03.$
	DEFEDENCES .
	REFERENCES:
	1. Bodor, E.; Bor, Gy.; Mohai, B.;
	Sipos, G. Veszprémi Vegyipari
	Egyetem Kösleményei <u>1957</u> , 1, 55;
	CA 55, 3175h.

COMPONENTS:	ORIGINAL MEASUREMENTS .	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.	
2. Tridecane, C13H28; [629-50-5]	hung. J. Ind. Chem. <u>1976</u> , 4(2), 269–280.	
VARIABLES:	PREPARED BY:	
Т/К: 298.15 - 313.15		
P/kPa: 101.325 (1 atm)	S. A. Jonnson	
EXPERIMENTAL VALUES.		
- I ENIMENTAL VALUES:		
T/K Mole fraction Bunsen c ^x N ₂ O	coefficient Ostwald coefficient L	
200 15		
	1.779	
313.15 0.01456 1.3	1.528	
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS.	
	Source and Forrit of Millares.	
dotail a control described in	Analytical grade reagents of	
detall in reference (1).	Hungarian and foreign origin were	
	No further information	
	No fullmer information.	
	ESTIMATED ERROR:	
	$\delta x_{\rm NLO} / x_{\rm NLO} = \pm 0.03.$	
	M20 M20	
	REFERENCES	
	1 Bodor, E : Bor, Gy : Mohai B	
	Sipos, G. Vesznrémi Vequinari	
1	Equetem Kösleményei 1957, 1 55.	
	CA 55, 3175h.	

00N - M

Nitrous Oxide

	OPTOTNAL MEACUDEMENTE.	
 Nitrous oxide; N₂O; [10024-97-2] Tetradecane, CivHao; [629-59-4] 	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L. Hung. J. Ind. Chem. <u>1976</u> , 4(2),	
	269-280.	
VARIABLES:	PREPARED BY:	
T/K: 298.15 - 313.15	S. A. Johnson	
P/kPa: 101.325 (1 atm)	S. A. Johnson	
EXPERIMENTAL VALUES:		
T/K Mole fraction Bunsen of ^x N ₂ O	coefficient Ostwald coefficient L	
298.15 0.01718 1.5	500 1.637	
	1.421	
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Volumetric method, described in		
detail in reference (1)	Analytical grade reagents of	
	Analytical grade reagents of Hungarian and foreign origin were	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases).	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information.	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O} / x_{N_2O} = \pm 0.03$	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O}/x_{N_2O} = \pm 0.03$	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O}/x_{N_2O} = \pm 0.03$ REFERENCES:	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O}/x_{N_2O} = \pm 0.03$ REFERENCES: L Bodor, E.: Bor Gy : Mobai B :	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O}/x_{N_2O} = \pm 0.03$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sinos, G. Vasantári Vaguingri	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O}/x_{N_2O} = \pm 0.03$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Vessprémi Vegyipari Equatem Kösleméryei 1957 1 55:	
	Analytical grade reagents of Hungarian and foreign origin were used (both liquids and gases). No further information. ESTIMATED ERROR: $\delta x_{N_2O}/x_{N_2O} = \pm 0.03$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszprémi Vegyipari Egyetem Kösleményei <u>1957</u> , 1, 55; CA 55, 3175b.	

COMPONENTS		
SOMPONENTS:	ORIGINAL MEASUREMENTS:	
 Nitrous oxide; N₂O; [10024-97-2] 	Makranczy, J.; Megyery-Balog, K.; Rusz, L.; Patyi, L.	
2. Pentadecane; C ₁₅ H ₃₂ ; [629-62-9]	Hung. J. Ind. Chem. <u>1976</u> , 4(2), 269–280.	
VARIABLES: PREDARED BY		
Т/К: 298.15 - 313.15		
^P /kPa: 101.325 (1 atm)	S. A. Johnson	
EXPERIMENTAL VALUES:		
T/K Mole fraction Bunsen c ^x N ₂ O	coefficient Ostwald coefficient L	
298.15 0.01729 1.4	120 1.550	
313.15 0.01429	54 1.323	
	.53 1015	
AUXILIARY	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Vol		
det in	Analytical grade reagents of	
detail in reference (1).	Hungarian and foreign origin were	
	used (both liquid and gases).	
	No further information.	
	ESTIMATED ERROR:	
	$\delta x_{N_2O} / x_{N_2O} = \pm 0.03.$	
	DEFEDENCES ·	
	1. Bodor, E.; Bor, Gv.: Mohai. B.	
	Sipos, G. Veszprémi Vequinani	
	Equetem Kösleményei 1957 1 55.	
	CA 55, 3175h.	

COMPONENTS:	ORIGINAL MEASUREMENTS:	
 Nitrous oxide; N₂O; [10024-97-2] 	Makranczy, J.; Megyery-Balog, K.;	
	Rusz, L.; Patyi, L.	
2. Hexadecane: $C_{16}H_{34}$: [544-76-3]	Hung. J. Ind. Chem. <u>1976</u> , 4(2),	
	269-280.	
VARTABLES -	DEDADED DV.	
T/K: 298.15 - 313.15	S A Johnson	
P/kPa: 101.325 (1 atm)	S. A. Johnson	
EXPERIMENTAL VALUES:		
T/K Mole fraction Bunsen of a state with the second state of the s	coefficient Ostwald coefficient L	
298.15 0.01753 1.1		
313.15 0.01435 1.0	1.255	
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
Volumetric method, described in	Analytical grade reagents of	
detail in reference (1).	Hungarian and foreign origin were	
	used (both liquids and gases).	
	No further information.	
	ESTIMATED ERROR.	
	$\delta a / a = \pm 0.02$	
	$^{\circ}N_{2}O'^{\circ}N_{2}O$ $^{-1}U.03$.	
	REFERENCES :	
	1. Bodor, E.; Bor, Gy.; Mohai, B.;	
	Equatam Közleményei 1957 1 55.	
	CA 55. 3175h.	
]		

Organic Compounds

Organie	
COMPONENTS:	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024-97-2] Cyclohexane; C₆H₁₂; [110-82-7] 	Patyi, L.; Furmer; I. E.; Makranczy, J.; Sadilenko, A. S.; Stepanova, Z. G.; Berengarten, M. G. Zh. Prikl. Khim. 1978, 51, 1296-1300.
VARIABLES:	PREPARED BY:
	C. L. Young
	l
EXPERIMENTAL VALUES:	
T/K α Mole	fraction of nitrous oxide at a tial pressure of 101.325 kPa
298.15 1.78	0.00853
METHOD (100)	
APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric method. Pressure measured when known amounts of gas were added, in increments, to a known amount of liquid in a vessel of known dimensions. Corrections were made for the Partial pressure of solvent.	Purity better than 99 mole per cent as determined by gas chromatography.
Details in ref. (1).	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \delta \alpha = \pm 4$ % or less.
	REFERENCES: 1. Bodor, E.; Bor, G. J.; Mohai, B.; Sipos, G. Vesspremi. Vegyip. Egy. Kozl. 1957, 1, 55.

180	Nitrou	s Oxide	
<pre>COMPONENTS: 1. Nitrous oxide; 2. Benzene; C₆H₆;</pre>	N ₂ O; [10024-97-2] [71-43-2]	ORIGINAL MEASUREME Horiuti, J. Sci. Pap. Inst (Japan) [†] 1931/	NTS: . Phys. Chem. Res. 32, 17, 125-256.
VARIABLES: Temperature		PREPARED BY: M. E. De	rrick
EXPERIMENTAL VALUES:	Total pressure is	s l atm for orig	inal measurements.
T/K 10 ⁴ x	N ₂ O Ostwald	coefficient, L *	Bunsen coefficient, α
313.15 109 298.15 132 283.15 165	.4 .9 .5	3.123 3.686 4.453	2.724 3.377 4.296
* original	data		
	$\Delta G^{\circ} = -RT \ln x_{N_2O}$ Std. dev. $\Delta G^{\circ} = 2$. $\Delta H^{\circ}/J \text{ mol}^{-1} = -1017$ T/K ΔG° 283.15 288.15 293.15 298.15 303.15 308.15 313.15	ed Data =(-10178.1 + 70 .86 J mol ⁻¹ . C 78.1; ΔS°/J mol G°/J mol ⁻¹ 9656.69 10006.9 10357.2 10707.4 11057.7 11408.0 11758.2	.0506T/K) J mol ⁻¹ coef. Corr. = 1.00 $^{-1} K^{-1} = -70.0506$ $\frac{x_{N_2O}}{0.01654}$ 0.01654 0.01331 0.01244 0.01165 0.01093
and 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	AUXILIARY	INFORMATION	
METHOD/APPARATUS/PR Composed of a gas reservoir, and an Volume of pipet is various heights of a weighed quantity the height of the cathetometer. Dr into degassed solv mixed using a magn saturation occurs. prevent solvent va gas in the gas bur determined from ga volume of liquid d height of meniscus pipet.	OCEDURE: buret, a solvent absorption pipet. determined at the meniscus using of water, measuring meniscus using a y gas is introduced ent. System is etic stirrer until Care is taken to por from mixing with et. Volume of gas s buret reading; etermined from in the absorption	SOURCE AND PURITY 1. Nitrous oxi hydroxylami nitrite bot pure grade) move nitric Fractionate 2. C ₆ H ₆ Extra sample from sodium amal P, 80.18 °C ESTIMATED ERROR: $\delta T/K = \pm 0.1$ REFERENCES:	OF MATERIALS: de prepared from ne sulfate and sodium h from Kahlbaum (extra . Gas washed to re- oxide and dried. d. pure, free from sulfur Merck refluxed with gam. B.P. at normal
		[†] Also report bull. Inst. Tokyo <u>1928</u> ,	ed in: Horiuti, J. <i>Phys. Chem. Rev.</i> , 7(2), 119-172.

ł

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Yen, L. C.; McKetta, J. J., Jr. J. Chem. Eng. Data <u>1962</u> , 7, 288-289.
² . Benzene, C_6H_6 ; [71-43-2]	
(Incorrectly given as C ₆ H ₁₆ in original paper.)	
VARIABLES:	PREPARED BY:
Temperature	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	
T/K Bunsen coefficient	Mole fraction of nitrous oxide, x_{N_2O}
283-16 4-256	0.01652
293.16 3.675	0.01446
303.16 3.173	0.01266
313.16 2.786	0.01127
The partial pressure of the	gas was 101.325 kPa.
Smooth	ed Data
$\Delta G^{\circ} = -RT \ln x_{N_2O} = (-994)$ (Std. deviation)	$1 + 67.449 \times T/K) J mol-1$
T/K Mole fraction of nit	rous oxide, x _{N2} O
283 16 0 01	654
293.16 0.01	442
303.16 0.01	269
313.16 0.01	126
AUXILIARY	INFORMATION
Mar APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of gas absorbed by a known volume of degassed liquid at a partial pressure of 101.325 kPa. The vapor pressure of the liquid was allowed for Gas buret and absorp-	 Gas of 98 per cent purity was purified at 193.16 K. Mass spectrograph then showed purity of 99.5 per cent.
tion pipet. Modified form of apparatus and technique used by Markham and Kobe (1).	 J. T. Baker Chemical Co. sample; Baker analyzed grade freshly fractionated.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1; \delta x_{N_0O} = \pm 2$ % (estimated)
	by compiler).
	REFERENCES:
	(1) Markham, A. E.; Kobe, K. A.
	J. Am. Chem. Soc. <u>1941</u> , 63, 449.

182 Nitrous Oxide COMPONENTS: ORIGINAL MEASUREMENTS: Patyi, L.; Furmer, I. E.; Makranczy, J.; Sadilenko, A. S.; Stepanova, Z. G.; Berengarten, 1. Nitrous oxide; N₂O; [10024-97-2] M. G. Zh. Prikl. Khim. 1978, 51, 1296-1300. 2. Benzene; C₆H₆; [71-43-2] VARIABLES: PREPARED BY: C. L. Young EXPERIMENTAL VALUES: Mole fraction of nitrous oxide at a α* partial pressure of 101.325 kPa T/K 0.01309 298.15 3.30 volume of gas (measured at 101.325 kPa and 273.15 K) dissolved by one volume of benzene. AUXILIARY INFORMATION METHOD APPARATUS / PROCEDURE : SOURCE AND PURITY OF MATERIALS: Purity better than 99 mole per Volumetric method. Pressure cent as determined by gas measured when known amounts of gas were added, in increments, to chromatography. a known amount of liquid in a vessel of known dimensions. Corrections were made for the partial pressure of solvent. Details in ref. (1). ESTIMATED ERROR: $\delta T/K = \pm 0.1$; $\delta \alpha = \pm 4$ % or less. **REFERENCES:** 1. Bodor, E.; Bor, G. J.; Mohai, B.; Sipos, G. Veszpremi. Vegyip. Egy. Kozl. 1957, 1, 55.

COMPONENTS :		ORIGINAL MEASUREMENTS:	
1. Nitrous ox	ide: N ₂ O: [10024-97-2]	Kunerth, W.	
		Phus Ray 1922	70 512-524
2. Methanol;	CH ₃ OH; [67-56-1]	- nyo. nev. <u>1722</u> ,	15, 512-524.
VARIABLES:		PREPARED BY:	
Temperat	ure	W. Gerrard/C	. L. Young
		(2
EXPERIMENTAL VALU	ES:	/	
	Option 1.1	m	
т/к	coefficient.	coefficient.	Mole fraction
-/*	L	dL/Ldt	
		·	N ₂ O
291.16	3.38	0.0040	0.00572
293.16	3.32	0.0058	0.00560
295.16	3.27	0.0077	0.00549
299.16	3.19	0.0118	0.00531
301.16	3.07	0.0138	0.00508
303.16	2.98	0.0157	0.00491
305.16	2.88	0.0177	0.00473
307.16	-	0.0197	-
309.16	-	0.0217	-
density o The L val barometri	f 1.9775 g dm ⁻³ at 273.1 ues were for a total pre c pressure. Kunerth's	16 K and 101.325 kPa essure equal to the value for x_{N_2O} at 2	(ref. 1), prevailing 93.16 K was (cont.)
0.0053.		<u></u>	
	AUXILIARY	INFORMATION	
METHOD/APPARATUS	S/PROCEDURE:	SOURCE AND PURITY OF MA	ATERIALS:
The volume of measured volu was measured equal to the pressure. If of McDaniel consisted of to leveling t and to pipet. Was held over	f gas absorbed by a me of degassed liquid at a total pressure prevailing barometric Based on the technique (ref. 2). Apparatus a gas buret attached tube containing mercury, A layer of liquid the mercury layer in caturate the gas with	 Gas (S.S.White per cent purity move volatile of passed over P20 found to be 1.9 273.16 K and 10 Attested by b.p 	Dental Co.) of 99.7 y was frozen to re- gases before being 0s. Density was 068 g dm ⁻³ at 01.325 kPa. o. and density.
vapor of the	liquid. Buret and	ESTIMATED EDDOD.	
pipet were ke temperature k	ept at a common by electric coils.	$\delta T/K = \pm 0.1; \delta x_{N_2}$	$O = \pm 2\%$
		(estimated by comp	oiler).
		REFERENCES :	
		1. Kaye, G. W. C. Tables of Physi Constants, Long	and Laby, T. H.; cal and Chemical mans, London, 1966.
		2. McDaniel, A. S. <u>1911</u> , <i>15</i> , 587.	; J. Phys. Chem.

183

84 Nitrous	s Oxide
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.
2. Methanol; CH₃OH; [67-56-1]	Phys. Rev. <u>1922</u> , 19, 512-524.
EXPERIMENTAL VALUES:	
Smooth	ed Data
$\Delta G^{\circ} = -RT \ln x_{N_2O} = -(120034 - 794)$	4.83(T/K) + 1.4615(T/K) ²) J mol ⁻¹
(Std. deviation =	$= 12.50 \text{ J mol}^{-1}$)
T/K Mole fract:	ion of nitrous oxide, ${}^{x}N_{2}O$
291.16 293.16 295.16 297.16 299.16 301.16 303.16 305.16	0.00569 0.00552 0.00552 0.00540 0.00526 0.00510 0.00492 0.00473

r F

	Organic C	ompounds		185
COMPONENTS:		ORIGINAL MEASUF	EMENTS:	
1. Nitrous oxide; N ₂ O; [3	10024-97-2]	Hsu, H.; Campbell, D.		
		Aerosol Age.	<u>1964</u> , December, 34.	
2. Alcohols				
		{		
VARIABLES:		PREPARED BY:	——————————————————————————————————————	
		w.	Gerrard / C.L. Young	
Pimppin				
LAPERIMENTAL VALUES:	т/к	Ostwald	Mole fraction * of	
Solvent	c	oefficient,	nitrous oxide in liquid.x.	
			N ₂ O	
Methanol; CH40; [67-56-1]	294.3	3.20	0.0054	
Ethanol; C ₂ H ₆ O; [64-17-5]	294.3	2.96	0.0072	
3-Methyl-1-butanol, , (iso-amyl alcohol);	294.3	2.3	0-0103	
C ₅ H ₁₂ O; [123-51-3]	23.00	210		
Cyclohexanol; C ₆ H ₁₂ O; [108-93-0]	294.3	0.23	0.0010	
1,2,3-Propanetriol, (Glycerol); C ₃ H ₈ O ₃ ; [56-81-5]	294.3	1.2	0.00365	
* calculated by gas of 101.325 taken as 23967 g dm ⁻³ at 101.	compiler as f kPa. Molar cm ³ based on 325 kPa and 2	or a partial volume of gas the density 73.15K.	pressure of at 294.26K (1) 1.9775	
	AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :		SOURCE AND PURI	TY OF MATERIALS:	
Copper equilibrium cell Bourdon gauge and therm Total amount of gas nee given but not stated, p measure. Ostwald coeff calculated from knowled of liquid and container	fitted with ometer. ded to attain ressure icient ge of volume	No de	tails given.	
		ESTIMATED ERROR	R:	
		$\delta T/K = \pm 0.$	5; $\delta x_{N_2O} = \pm 3\%$.	
		(estimated	by compiler).	
		REFERENCES: 1. Kaye, G Tables Constant 1966	W.C.; Laby, T.H. of Physical and Chemic ts, Longmans, London,	al

-				
COMPONENTS :		ORIGINAL MEASUREME	NTS:	
1. Nitrous oxide; N2	1. Nitrous oxide; N ₂ O; [10024-97-2]		, S.; Ito, Y.	
2 Alcoholo		Eng. Chem. rund	dam, <u>1975</u> , 14, 232-231	
2. AICONDIS				
WADTADI EC.				
VARIABLES:		PREPARED BY:		
		W. Gerrard/0	C.L. Young	
1]		
EVDEDIMENTAL VALUES.				
EAFERINEMIAL VALUED.	He	enry's law	Mole fraction* of	
Solvent	T/K cons	stant /atm	nitrous oxide in	
			liquid, x _{N2} O	
		100 4	0.00525	
Methanol; CH40;	298.15	190.6	0.00525	
[[0/-30-1]				
Ethanol;				
C ₂ H ₆ O;	298.15	145.8	0.00686	
[64-17-5]			1	
1-Propanol:				
$C_{3}H_{8}O;$	298.15	125.8	0.00795	
[71-23-8]				
2-Propanol;	298 15	125.8	0.00795	
[67-63-0]	290.19	123.0	0.00755	
* Calculated by compi.	ler for a partial	l pressure of nit	trous oxide	
= 101.325 KPa.				
NOTE: The Henry's law	v constant appear	s to have been d	derived by dividing the	
observed, but unspect	fied, pressure in	h atm by the card	culated mole fraction,	
x_1 , for that pressure.	•			
The mole fraction, x_1 ,	, was calculated	by 1/ (Henry's D	Law constant).	
	AUXILIARY	INFORMATION		
METHOD: /APPARATUS/PROCE	EDURE :	SOURCE AND PURITY	OF MATERIALS:	
A gas volumetric metho	d (1) was used.	Nitrous oxide y	vas used from a	
		commercial cyli	Inder (Japan), and	
Equilibrium establishe	and a measured	stated to be of	a purity better than	
amount of gas-free lic	uid in a cell	99.8%, as attes	sted by gas-chromatog-	
fitted with a magnetic	stirrer.	raphy.		
		The purity of t	the alcohol was stated	
		to be satisfact	cory (2).	
			······································	
		ESTIMATED ERROR:		
		1		
		REFERENCES :		
[(1) Onda, K.; S	ada, E.; Kobayashi, T.;	
		Kito, S.; Ito,	K. J. Chem. Eng. Jpn.	
		1970, 0,18; 137	·	
		(2) Sada, E., K	ito, S.; Ito, Y.	
1		J. Chem. Eng. J	pn. <u>1914</u> , 7, 57.	

4

ŧ

!

COMPONENTS	OPTOTNAL WEIGUNDUCTURE
	CALGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Rusz, L.; Balog-Megyery, K.
2. Methanol; CH40; [67-56-1]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES	
	PREPARED BY:
	C.D. Toung
EXPERIMENTAL VALUES:	
+ .	
T/K P'/kPa Ostu	vald Mole fraction of
COEII	x_{x_1}
	N ₂₀
298.15 101.3 3.	755 0.00626
* calculated by co	ompiler using a molar
volume of nitro	is oxide of 0.02430 m^3
at 298.15K	
+ partial pressure	e of nitrous oxide.
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
]
Volumetric method. The apparatus	No details given.
OI Bodor, Bor, Mohai and Sipos (1) Was used	
"us used.	
	ESTIMATED ERROR:
	ESTIMATED ERROR:
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$ REFERENCES: L Bodor E + Bor Gy + Mobai P +
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos. G.
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3 \%$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos. G. Veszpremi Vegyip. Egy. Kozl.
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$ REFERENCES: 1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos. G. Veszpremi Vegyip. Egy. Kozl. <u>1957</u> , 1, 55. <u>Charm</u> 1961 55 2175
	ESTIMATED ERROR: $\delta x_{N_2O} = \pm 3\%$ 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, 3175

Nitrous	Oxide
---------	-------

ł

ŝ

\$

COMPONENTS :	ORIGINAL MEASUREMENTS .	
1. Nitrous oxide: NoO. [10024-07-2]	Carius. L.	
1. Mittous oxide, $M_2^{(0)}$, $[10024^{(0)})$, $2]$		
2. Ethanol, C ₂ H ₆ OH; [64-17-5]	Annalen, <u>1855</u> , 94,129–166.	
VARIABLES:	PREPARED BY:	
Temperature	W. Gerrard	
EXPERIMENTAL VALUES:		
T/K Bunsen coefficier α	t, Mole fraction, x_1 (Calculated by compiler)*	
275.45 4.0262	0.010345	
280.15 3.7069	0.009575	
284.75 3.4219	0.008882	
	0.008128	
296.15 2.8861	0.007581	
Bunsen coefficient $\alpha = 4.17805$	$5 - 0.0698160 \pm \pm 0.0006090 \pm^{2}$	
(From 273.15 to 298.15 K)	t = 1/K - 2/3.15.	
Henrich (1) used Carius's data equation :	to give the modified smoothing	
$\alpha = 4.1902 - 0.0743$	$89 t + 0.00078226 t^2$	
Note: Henrich did not give any experimental data.		
* The gas molecular volume of N₂O at 273.15 K and 101.325 kPa was taken to be 22250 cm ³ , based on the standard density of 1.9775 g/dm ³ .		
AUXILIANI	INFORMATION	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Measurement of volume by the Bunsen gas buret. Gas placed in an absorption tube and its pressure	 Self prepared from pure ammonium nitrate. 	
and volume determined. Liquid was then added, the system shaken until volume constant. Pressure and volume redetermined.	<pre>2. Distilled "absolute" d²⁰ = 0.792.</pre>	
	ESTIMATED ERROR:	
	REFERENCES :	
1	L. Henrich, F.;	
	Z. Phys. Chem. <u>1892</u> , 9,435.	

CONTRACTOR	<u></u>		······································
COMPONENTS:		ORIGINAL MEASUREMENTS	:
1. Nitrous c	xide; N ₂ O; [10024-97-2]	Kunerth, W.	
2. Ethanol;	C ₂ H ₆ O; [64-17-5]	Phys. Rev. <u>1922</u> ,	, <i>19</i> , 512-524.
VARIABLES:	<u></u>	PREPARED BY:	
Tempera	ture	W. Gerrard/0	C. L. Young
EXPERIMENTAL VAL	LUES:		
T/K	Ostwald coefficient, L	Temperature coefficient, dL/Ldt	Mole fraction, ^x N ₂ O [*]
291.16 293.16 295.16 297.16 299.16 301.16 303.16 305.16 307.16 309.16	3.07 2.99 2.91 2.85 2.77 2.68 2.61 2.52 2.43 2.33	0.0116 0.0123 0.0132 0.0140 0.0148 0.0157 0.0167 0.0167 0.0174 0.0184 0.0190	0.00748 0.00725 0.00702 0.00685 0.00663 0.00640 0.00620 0.00596 0.00572 0.00546
* The x_{N_2O} values were calculated by the compiler, the molar volume of N ₂ O being taken as 22257 × (T/273.16) cm ³ , based on the standard density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1). The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for x_{N_2O} at 293.16 K was 0.0072. (cont.)			
	AUXILIARY	(INFORMATION	<u></u>
METHON/APPARAT	US/PROCEDURE :	SOURCE AND PURITY OF	MATERIALS:

The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus Consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid. Buret and pipet were kept at a common temperature by electric coils.

Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to remove volatile gases before being passed over PaOr. Density was

passed over P2O5. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa. 2. Attested by b.p. and density

DATA CLASS:

ESTIMATED ERROR: $\delta T/K = \pm 0.1; \quad \delta x_{N_2O} = \pm 2$ %

(estimated by compiler).

REFERENCES:

 Kaye, G. W. C. and Laby, T. H. Tables of Physical and Chemical Constants, Longmans, London, 1966.

2. McDaniel, A. S.; J. Phys. Chem. 1911, 15, 587.

189

190	Nitrou	s Oxide
COMPONENTS :		ORIGINAL MEASUREMENTS:
l. Nitrous oxid	de; N ₂ O; [10024-97-2]	Kunerth, W.
2. Ethanol; C ₂	H ₆ O; [64-17-5]	Phys. Rev. <u>1922</u> , 19, 512-524.
EXPERIMENTAL VAL	.UES :	
	Smoothe	d Data
∆G° =	$-RT \ln x_{N_2O} = -(5641)$	4.4 - 376.86(T/K) + 0.7688(T/K) ²) J mol ⁻¹
	(Std. deviation	$= 7.3 \text{ J mol}^{-1}$
	T/K Mole fract.	ion of nitrous oxide, x N ₂ O
	291.16 293.16 295.16 297.16 299.16 301.16 303.16 305.16 307.16 309.16	0.00745 0.00706 0.00685 0.00663 0.00618 0.00595 0.00571 0.00548

COMPONENTS :	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024-97-2] 	Makranczy, J.; Rusz, L.; Balog-Megyery, K.
2. Ethanol; C ₂ H ₆ O; [64-17-5]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6
VARIABLES:	PREPARED BY:
EXPERIMENTAL VALUES:	
T/K P ⁺ /kPa Ost coeff	wald Mole fraction of icient nitrous oxide*,
	^{<i>x</i>} N ₂ O
298.15 101.3 3.	078 0.00738
* calculated by co of nitrous oxide	ompiler using a molar volume e of 0.02430 m ³ at 298.15 K.
+ partial pressure	e of nitrous oxide.
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:
	$\delta x_{N_2O} = \pm 3\%$
	REFERENCES :
	<pre>1. Bodor, E.; Bor, Gy.; Mohai, B.; Sipos, G. Veszpremi Vegyip. Egy. Kozl. 1957, 1, 55.</pre>
	<i>Chem. Abstr.</i> <u>1961</u> , 55, 3175h

.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Rusz, L.; Balog-Megyery, K.
2. l-Propanol; C ₃ H ₈ O; [71-23-8]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES :	DEDADED DV.
	C.L. Young
EXPERIMENTAL VALUES:	
T/K P ⁺ /kPa Ostr coeff:	wald Mole fraction of icient nitrous oxide*, ${}^{x}N_{2}O$
298.15 101.3 2.	740 0.008404
* calculated by co volume of nitro at 298.15 K.	ompiler using a molar us oxide of 0.02430 m ³
+ partial pressure	e of nitrous oxide.
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: $\delta x_{N_2O} = \pm 3\%$
	<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>

COMPONENTS:		ORIGINAL MEASUREMENTS	:
l. Nitrous oxid	e; N ₂ O; [10024-97-2]	Kunerth, W.	
		D1 D 1000	10 510 504
2. 2-Propanone	(Acetone); C ₃ H ₆ O;	rnys. Kev. <u>1922</u>	, 19, 512-524.
[67-64-1]]		
VARIABLES:		PREPARED BY	
Tomporature		W Corrard/	
Temperacure		w. Gerraru/	C. L. Ioung
FYDEDIACNINAL MALUEC.			
CALERIMENTAL VALUES	Ostwald	Temporaturo	Molo
T/K	coefficient,	coefficient,	Fraction,
	L	dL/Ldt	^x N ₂ O [*]
	<u></u>		•
291.16	6.30	0.0150	0.0191
293.16	6.03	0.0196	0.0182
295.16	5.78	0.0244	0.0174
297.16	5.20	0.0294	0.0156
301.16	4.84	0.0393	0.0145
303.16	4.46	0.0440	0.0133
305.16	4.07	0.0492	0.0121
307.16	3.66	0.0540	0.0110
309.16	3.23	0.0590	0.0095
density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1). The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for x_{N_2O} at 293.16 K was 0.0185. (cont.)		Pa (ref. l). e prevailing 293.16 K was (cont.)	
	AUXILIARY	INFORMATION	· · · · · · · · · · · · · · · · · · ·
AUXILIARY INFORMATION			
APPARATUS	/PROCEDURE:	SOURCE AND PURITY OF	MATERIALS;
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with		 Gas (S.S.Whit per cent puri move volatile passed over P found to be 1 273.16 K and Attested by b 	e Dental Co.) of 99.7 ty was frozen to re- gases before being 205. Density was .968 g dm ⁻³ at 101.325 kPa. .p. and density.
pipet were kep	t at a common	ESTIMATED ERROR:	
temperature by	electric coils.	$\delta T/K = \pm 0.1; \delta x$	$N_2O = \pm 2\%$
		(estimated by co	mpiler).
		REFERENCES:	
		 Kaye, G. W. C Tables of Phy Constants, Lo 	. and Laby, T. H.; sical and Chemical ngmans, London, 1966.
		2. McDaniel, A. <u>1911</u> , <i>15</i> , 587	S.; J. Phys. Chem.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.
2. 2-Propanone (Acetone); C ₃ H ₆ O; [67-64-1]	Phys. Rev. <u>1922</u> , 19, 512-524.
EXPERIMENTAL VALUES:	
Smoothee	
$\Delta G^{\circ} = -RT \ln x_{N_2O} = -(299647 - 20)$	$055.7(T/K) + 3.639(T/K)^2) \text{ J mol}^{-1}$
(Std. deviation =	$= 23.5 \text{ J mol}^{-1}$)
T/K Mole fract:	ion of nitrous oxide, ${}^{x}N_{2}O$
291.16	0.0189
295.16	0.0175
299.16	0.0156
301.16 303.16	0.0146 0.0133
305.16 307.16	0.0121 0.0108
309.16	0.0096

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; 1 2. 2-Propanone (Ace	N ₂ O; [10024-97-2] etone); C ₃ H ₆ O;	Horiuti, J. Sci. Pap. Inst. Phys. Che (Japan) [†] 1931/32, 17, 125	2m. Res. 5-256.
[67-64-1]			
VARIABLES:		PREPARED BY:	
Temperature		M. E. Derrick	
EXPERIMENTAL VALUES:	Total pressure is	l atm for original measurem	nents.
T/K 10 ² x _p	N ₂ O Ostwald	l coefficient, Bunsen coe L * c	efficient,
313.15 298.15 283.15 271.74 *	71 4 55 5 25 7 38 9	.73 4.1 .95 5.4 .64 7.3 .30 9.3	. 3 15 37 35
original da	ita		
	Smoothe	d Data	
۵۵	$3^\circ = -RT \ln x_{N_2O} = (-$	12769.1 + 76.4162T/K) J mol	1
Std.	$\det AG^{\circ} = 11.95$	J mol ⁻¹ . Coef. Corr. = 1. AS°/J mol ⁻¹ $K^{-1} = -76$ 416	00
	-12709.11,	(1 mol^{-1})	, 2
17.4	20 ,	N ₂ O	
268. 273. 278. 283. 288.	,15 7 ,15 8 ,15 8 ,15 8 ,15 8	721.94 0.03132 104.02 0.02820 486.10 0.02549 868.18 0.02312 250.27 0.02104	
293.	15 9	632.34 0.01922	
298.	.15 10 .15 10	014.4 0.01760 396.5 0.01617	
308.	15 10	778.6 0.01489	
313.	AUXILIARY	INFORMATION	
		1	
METHOD/APPARATUS/PROCE	DURE:	SOURCE AND PURITY OF MATERIALS:	from
reservoir, and an a Volume of pipet is Various heights of a weighed quantity the height of the m cathetometer. Dry into degassed solve mixed using a magne saturation occurs. prevent solvent vap gas in the gas bure determined from gas volume of liquid de height of meniscus pipet.	bsorption pipet. determined at the meniscus using of water, measuring meniscus using a gas is introduced nt. System is tic stirrer until Care is taken to or from mixing with t. Volume of gas buret reading; termined from in the absorption	<pre>hydroxylamine sulfate a nitrite both from Kahlb pure grade). Gas wash move nitric oxide and d Fractionated. 2. C₃H₆O No. 1, extra pur Nippon Pure Chem. Co. o extra pure, recrystall sodium sulfite used. calcium chloride then f B.P. at normal P, 56.09 ESTIMATED ERROR:</pre>	nd sodium aum (extra ed to re- ried. e from r Merck, zed with Stored over ractionated. °C.

COMPONENTS :	ORTGINAL MEASUREMENTS .	
1. Nitrous oxide: NoO: $[10024-97-2]$	Hsu, H.; Campbell, D.	
 Aliphatic compounds containing oxygen. 	Aerosol Age. <u>1964</u> , December,34.	
VARIABLES:	PREPARED BY:	
	W. Gerrard/C.L. Young	
EXPERIMENTAL VALUES:		
SOLVENT T/K Ostw coeffi	ald Mole fraction [*] of cient,L nitrous oxide in liquid,x _{N2} O	
2-Propanone, (Acetone); C ₃ H ₆ O; 294.3 5. [67-64-1]	92 0.0178	
1,1 ⁻ -Oxybisethane, (diethyl ether); C ₄ H ₁₀ O; [60-29-7] 294.3 7.	65 0.0321	
Molar volume of gas at 294.24K taken as 23967 cm ³ based on the density (1) 1.9775 g dm ⁻³ at 101.325 kPa and 273.15K.		
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
Copper equilibrium cell fitted with Bourdon gauge and thermometer. Total amount of gas needed to attain given, but not stated, pressure measured. Ostwald coefficient calculated from knowledge of volume of liquid and container.	No details given.	
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.5; \ \delta x_{N_2O} = \pm 3\%.$	
	(estimated by compiler).	
	REFERENCES: 1. Kaye, G.W.C.; Laby, T.H. Tables of Physical and Chemical Constants, Longmans, London, 1966.	

Ì

COMPONENTS:	ORIGINAL MEASUREMENTS:
 Nitrous oxide; N₂O; [10024-97-2] 	Makranczy, J.; Rusz, L.; Balog-Megyery, K.
2. l-Butanol; C ₄ H ₁₀ O; [71-36-3]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.
VARIABLES	
	C.L. Young
EXPERIMENTAL VALUES:	
T/K p [†] /kPa Ostv coeff:	wald Mole fraction of icient nitrous oxide*, ${}^{x}{}_{N_{2}}O$
298.15 101.3 2.5	532 0.009494
* calculated by co volume of nitro at 298.15 K.	ompiler using a molar is oxide of 0.02430 m ³
+ partial pressure	e of nitrous oxide.
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 FREOR:
	$\delta x_{\rm N_2O} = \pm 3\%$
	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. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.
2. 3-Methyl-1-butanol, (<i>iso</i> -amyl alcohol); C ₅ H ₁₂ O; [123-51-3]	Phys. Rev. <u>1922</u> , 19, 512-524.
VARIABLES :	PREPARED BY:
Temperature	W. Gerrard/C. L. Young
EXPERIMENTAL VALUES:	
Ostwald T/K coefficient, L	Temperature Mole coefficient, fraction, dL/Ldt $x_{N_2O}^*$
291.16 2.52 293.16 2.47 295.16 2.43 297.16 2.37 299.16 2.32 301.16 2.27 303.16 2.24 305.16 2.19 307.16 2.12	0.0100.01140.00980.01110.00970.01090.00960.01060.00960.01030.00950.01000.00950.009870.00940.009700.00930.00939
of N ₂ O being taken as 22257 × (T/273.16) cm ³ , based on the standard density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1). The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for x_{N_2O} at 293.16 K was	
METHOD /APPARATUS/PROCEDURE :	SOURCE AND PURITY OF MATERIALS
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid. Buret and pipet were kept at a common temperature by electric coils.	<pre>1. Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to re- move volatile gases before being passed over P₂O₅. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa. 2. Attested by b.p. and density. ESTIMATED ERROR:</pre>
	<pre>REFERENCES: 1. Kaye, G. W. C. and Laby, T. H.; Tables of Physical and Chemical Constants, Longmans, London, 1966. 2. McDaniel, A. S.; J. Phys. Chem. 1911, 15, 587.</pre>

COMPONENTS:		ORIGINAL MEASUREMENTS:
1.	Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.
2.	3-Methyl-l-butanol, (iso -amyl alcohol); $C_5H_{12}O$; [123-51-3]	Phys. Rev. <u>1922</u> , 19, 512-524.

EXPERIMENTAL VALUES:

Smoothed Data

$\Delta G^{\circ} = -RT \ln x_{N_2O} = (48775.2 + 336.14 (T/K) - 0.4515 (T/K)^2) J mol⁻¹$ (Std. deviation = 12.1 J mol^{-1}) Mole fraction of nitrous oxide, T/K *x*_{N₂O} 291.16 0.0114 293.16 0.0111 0.0108 295.16 297.16 0.0106 299.16 0.0103 301.16 0.0101 303.16 0.00989 305.16 307.16 0.00971 0.00955 309.16 0.00941
COMPONENTS :	ORIGINAL MEASUREMENTS			
	OKIGINAL MEASUREMENIS:			
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Rusz, L.; Balog-Megyery, K.			
2. 1-Pentanol; C ₅ H ₁₂ O; [71-41-0]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6			
l-Hexanol; C ₆ H ₁₄ O; [111-27-3]				
VARIABLES:	PREPARED BY:			
	C.L. Young			
EXPERIMENTAL VALUES:	L.,,			
T/K P ⁺ /kPa Ost coeff	wald Mole fraction of icient nitrous oxide *, ^x N ₂ O			
1-Pen	tanol			
298.15 101.3 2.	369 0.01048			
1-Hex	anol			
298.15 101.3 2.	270 0.01157			
 * calculated by compiler using a molar volume of nitrous oxide of 0.02430 m³ at 298.15 K. + partial pressure of nitrous oxide. 				
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:			
	$\delta x_{N_2O} = \pm 3\%$			
	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			

1

ļ

COMPONENTS:				ORTGINA	I MEASUREMENTS .	
1. Nitrous oxide: N_20 : [10024-97-2]		RUSZ. L.: Makranczy. J.:				
$1. \text{Nitious oxide, N_20, [10024-37-2]}$		Balog-Megverv, K.; Patvi, L.				
2. Cyclo	hexanone;	C ₆ H ₁₀ O;		1	5 54 40	-
[108-	94-1]			Hun	g. J. Ind. Chem.	<u>1977, 5,</u>
-	-			225	-232.	
VARIABLES:				PREPARE	D BY:	
	~~~~~~~					
P P	ressure				C.L. YOU	ing
				L		
EXPERIMENTAL	VALUES:					
m /17			<b>D</b>		···· · · · · · · · · · · · · · · · · ·	Mala Guardan
176	p/atim	р/мга	coeffici	ent	volume	of nitrous
			a	enc,	coerrictenc,	oxide $x_{1}$
						N ₂ O
202.1-	10.0				1 040	
293.15	10.0	1.01	59.1		1.048	0.214
	20.0	2.03	253 /		1.220	0.5394
	37.5	3.80	498.0		1.900	0.696
	47.7	4.83	1179.8		3.400	0.845
	$= \frac{VOIUme}{VOI}$	or gas-sa	co solvent	.iquia		
	101	une or pu	e sorvent	•		
§ ca	lculated	by compile	er assumin	a idea	l gas molar	
vo	lume for	nitrous of	kide.	iy faca	i yub motul	
				INFORMA	TION	
AUXILIARY INFORMATION			110M			
METHOD APPARATUS/PROCEDURE:			SOURCE	AND PURITY OF MATER	RIALS:	
Static gl	ass cell	fitted wit	th			
Teflon-co	ated magn	etic stir	cer.		No details giv	en.
Pressure i	measured	by dead-we	eight			
gauge and	null det	ector. Vo	olume			
or satura	ted liqui	d measured	1.			
				ļ		
				110000000		
				ESTIMA	IED ERROR:	
				⁶ T	/K = ±0.1; δα =	±4.0%
				(e	stimated by comp	iler).
				1		
				REFERE	NCES:	
				1		
				1		
				1		

COMPONENTS	ORIGINAL MEASUREMENTS.	
1. Nitrous oxide: N ₂ O: [10024-97-2]	Cauquil, G. J. Chim. Phys. 1927	
2. Cyclohexanol, $C_6H_{12}O$ ; [108-93-0]	24, 53-55.	
VARIABLES:	PREPARED BY:	
	W. Gerrard	
EXPERIMENTAL VALUES:		
T/K Ostwal	d Mole fraction*	
COEffici	ent, L of nitrous oxide $x_{N}$ of	
·	N 2 O	
299.15 0.741	0.00322	
Pressure = 101.325 kP	a.	
* calculated by compile	r on basis of molar volume	
of nitrous oxide at 2	73.15 K and 101.325 kPa	
0.9446 at 299.15 K.	nsity of cyclonexanol being	
AUXILIARY	INFORMATION	
METHOD 'APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
Measurement of the initial and	1. Purity of $N_2O$ not stated.	
final volumes of gas in contact with liquid at 299.15 K and known	2. Cyclohexanol, b.p. 334.0 K at	
pressure, nearly 101.325 kPa.	102.125 kPa, degassed and tested to be air free.	
Apparatus appears to be of the		
Bunsen type, with one absorption		
vesser.		
	ESTIMATED EDDOD.	
	LSTIMATED ERROR:	
	REFERENCES:	

COMPONENTS	ORIGINAL MEASUREMENTS .	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Rusz, L.;	
2. 1-Heptapol: $C_{2}H_{1}O:$ [111-70-6]	Balog-Megyery, K.	
or 1=0ctapol: C-H: 0: [1]]=87=5]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.	
VARIABLES:	PREPARED BY:	
	C.L. Young	
EVDEDTAGNTAL VALUES.		
	Mole function of	
coeff.	icient nitrous oxide *,	
	^{<i>x</i>} N ₂ O	
1-Нер	tanol	
298.15 101.3 2.1	0 0.01265	
1-Oct.	anol	
298.15 101.3 2.	0.01376	
* calculated by co volume of nitro at 298.15 K	ompiler using a molar us oxide of 0.02430 m ³	
+ partial pressure	e of nitrous oxide	
AUXILIARY	INFORMATION	
METHOD APPARATUS/PROCEDURL:	SOURCE AND PURITY OF MATERIALS:	
Valumetric method The apparetur	No details given	
of Bodor, Bor, Mohai, and Sipos (1)	No details given	
was used.		
	ESTIMATED ERROR:	
	$\delta x_{\rm N_2O} = \pm 3\%$	
	REFERENCES:	
	Sipos. G.	
	1957, 1, 55.	
	<i>Chem. Abstr.</i> <u>1961</u> , <i>55</i> , 31/5h	
1		

COMPONENTS :	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Rusz, L.; Balog-Megyery, K.		
2. I-Nonanol; $C_{9}H_{20}0$ ; [143-08-8] or 1-Decanol; $C_{10}H_{22}0$ ; [112-30-1]	Hung. J. Ind. Chem. <u>1979</u> , 7, 41-6.		
VARIABLES:	PREPARED BY: C.L. Young		
EXPERIMENTAL VALUES:			
T/K P ⁺ /kPa Ostw coeffi	vald Mole fraction of icient nitrous oxide*, ^x N ₂ O		
l-Nonanol; C ₉ H ₂	2 ₀ 0; [143-08-8]		
298.15 101.3 2.0	0.01487		
l-Decanol; C ₁₀ H	i ₂₂ 0; [112-30-1]		
298.15 101.3 2.0	0.01591		
<ul> <li>* calculated by compiler using a molar volume of nitrous oxide of 0.02430 m³ at 298.15 K.</li> </ul>			
+ partial pressure of nitrous oxide.			
AUXILIARY	INFORMATION		
ME THOD '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:		
	$\delta x_{N_2O} = \pm 3\%$		
	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. Nitrous oxide; N ₂ O; [10024-97-2]	Makranczy, J.; Rusz, L.; Balog-Megyery, K.
2. 1-Dodecanol; C ₁₂ H ₂₆ O; [112-53-8]	Hung, J. Ind. Chem. 1979, 7, 41-6.
or 1-Undecanol; $C_{11}H_{24}O;$ [112-42-5]	
VARIABLES:	PREPARED BY:
	C.L. Young
EXPERIMENTAL VALUES:	
	ald Mala fur alder of
T/K P/KPA Ostw coeffi	cient nitrous oxide *,
	^x N ₂ O
l-Dodecanol; C _l	₂ H ₂₆ O; [112-53-8]
298.15 101.3 1.9	0.0180
l-Undecanol; C _l	1H240; [112-42-5]
298.15 101.3 2.0	0.0170
* calculated by co	mpiler using a molar
volume of nitrou at 298.15 K.	as oxide of 0.02430 m ³
	of nitrous oxide
+ partial pressure	of hitrous oxide.
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE	SOURCE AND PURITY OF MATERIALS
	Source and Forth of Intenties.
Volumetric method. The apparatus	No details given.
was used.	
	ESTIMATED ERROR:
	$\delta x = \pm 38$
	-N ₂ O
	REFERENCES:
	1. Bodor, E.; Bor, Gy.; Mohai, B.;
	Sipos. G. Veszpremi Veauip. Eau. Kozl.
	<u>1957</u> , 1, 55.
	Chem. Abstr. <u>1961</u> , 55, 3175h

COMPONENTS :	ORIGINAL MEASUREMENTS:	
1 Nitrovo ovider N.O. [10024.07.2]	Kuporth W	
1. Nitrous oxide; $N_20$ ; $[10024-97-2]$	Kunertn, w.	
2. Acetic acid; CH ₃ CO ₂ H; [64-19-7]	Phys. Rev. <u>1922</u> , 19, 512-524.	
VARIABLES:	PREPARED BY:	
Temperature	W. Gerrard/C. L. Young	
EXPERIMENTAL VALUES:		
Ostwald T/K coefficient, L	Temperature Mole coefficient, fraction, dL/Ldt $x_{N_2O}^*$	
291.16 5.00 293.16 4.85 295.16 4.70 297.16 4.55 299.16 4.39 301.16 4.25 303.16 4.11 305.16 3.98 307.16 3.84 309.16 3.75 * The $x_{N_2O}$ values were calculated H of N_2O being taken as 22257 × (T/ density of 1.9775 g dm ⁻³ at 273.3 The L values were for a total pre- barometric pressure. Kunerth's	0.0160 0.0119 0.0162 0.0115 0.0163 0.0111 0.0163 0.0107 0.0164 0.0099 0.0165 0.0095 0.0165 0.0092 0.0165 0.0088 0.0166 0.0088 0.0166 0.0086 0.0166 1.0088 0.0166 1.0086 0.0086	
0.0115.	(cont.)	
METHOD /APPARATUS /PROCEDURE .	SOUDCE AND DUDITY OF MATERIALS.	
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid, Buret and pipet were kept at a common temperature by electric coils.	<ul> <li>1. Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to re- move volatile gases before being passed over P₂O₅. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa.</li> <li>2. Attested by b.p. and density.</li> <li>FSTIMATED ERROR: δT/K = ±0.1; δx_{N₂O} = ±2% (estimated by compiler).</li> <li>REFERENCES:</li> <li>1. Kaye, G. W. D. and Laby, T. H.; Tables of Physical and Chemical Constants, Longmans, London, 1966.</li> <li>2. McDaniel, A. S.; J. Phys. Chem. 1911, 15, 587.</li> </ul>	

**Organic Compounds** 

COMPONENTS :	ORIGINAL MEASUREMENTS:
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>	Kunerth, W.
2. Acetic acid; CH ₃ CO ₂ H; [64-19-7]	Phys. Rev. <u>1922</u> , 19, 512-524.

EXPERIMENTAL VALUES:

## Smoothed Data

 $\Delta G^{\circ} = -RT \ln x_{N_2O} = (-13911.9 + 84.578(T/K)) J mol^{-1}$ 

# (Std. deviation = $10.8 \text{ J mol}^{-1}$ )

m /12	Mala	function	~ £		
TYK	MOTE	Traction	OT.	nicrous	oxide,

## ^{*x*}N₂O

 ······································	_	
291,16	0.0120	
293.16	0.0115	
295.16	0.0111	
297.16	0.0107	
299.16	0.0103	
301.16	0.0099	
303.16	0.0095	
305.16	0.0092	
307.16	0.0089	
309.16	0.0086	

COMPONENTS :	ORIGINAL MEASUREMENTS .
Nitrous oxide: N.O. $[10024-97-2]$	Hsu, H · Campbell, D.
** Microus Oxide, N20, [10024-9/-2]	Association and a second and as second and a
2. Acetic acid and pentyl ester	Aerobol Age, <u>1964</u> , December, 34.
WADTADI UC -	
VARIADLES:	W. Gerrard / C.L. Young
EXPERIMENTAL VALUES:	
Solvent T/K c	Ostwald Mole fraction of oefficient, nitrous oxide in L liquid, x _{N2} O
Acetic acid; $C_2H_4O_2$ ; [64-19-7] 294.3	4.77 0.0113
	4.77 0.0115
Acetic acid, pentyl	
ester, (amyl acetate); 294.3 $C_7H_{14}O_2$ ; [628-63-7]	5.1 0.0305
* calculated by compiler	as for a partial pressure
294.24K taken as 23967	cm ³ based on the density
(1) 1.9775 g $dm^{-3}$ at 1	01.325 kPa and 273.15K.
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;
Coppor equilibrium cell fitted	
with Bourdon gauge and thermometer.	
Total amount of gas needed to attain given, but not stated, pressure	No details given.
measured. Ostwald coefficient	
volume of liquid and container.	
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.5; \ \delta x_{N_2O} = \pm 3$ %.
	(estimated by compiler).
	REFERENCES:
	l. Kaye, G.W.C.; Laby, T.H.
	Tables of Physical and Chemical
	1966,
1	

ì

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitrous oxide: N.O. [10024-97-2]	Horiuti I
- Nicious Oxide, N20, [10024 5, 2]	Sci. Pap Inst. Phys. Chem. Res
2. Acetic acid, Methyl ester (Methyl	$(Japan)^{\dagger}$ 1931/32.17. 125-256.
acetate); $C_{3}H_{6}O_{2}$ ; [79-20-9]	<u> </u>
VARIABLES:	PREPARED BY:
Temperature	M E Derrick
	M. D. Dellick
EXPERIMENTAL VALUES: Total pressure is	l atm for original measurements.
$10^2 x_{N_2O}$ Ostwald	coefficient, Bunsen coefficient, L * α
313.15 1.547 4	.95 4.32
298.15         2.004         6           283.15         2.635         8	.27 5.74
* original data	
Smoothe	d Data
$\Delta G^{\circ} = -RT \ln x_{N_2O} = ($	$-13101.1 + 76.4835T/K) \text{ J mol}^{-1}$
Std. dev. $\Delta G^{\circ} = 8.52 \text{ J}$ $\Delta H^{\circ}/J \text{ mol}^{-1} = -13101 \text{ J}$	mol ⁻¹ . Coef. Corr = $1.00$ $\Delta S^{\circ}/I$ mol ⁻¹ $K^{-1} = -76.4835$
	$J mol^{-1}$
	"N ₂ O
283.15 8	555.17 0.02641
288.15 8	937.59 0.02398
293.15 9	702.42 0.01996
303.15 10	084.8 0.01829
308.15 10 313.15 10	467.3 0.01681 849.7 0.01550
AUXILIARI	
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
reservoir, and an absorption pipet.	1. Nitrous oxide prepared from hydroxylamine sulfate and sodium
Volume of pipet is determined at	nitrite both from Kahlbaum (extra
a weighed quantity of water, measuring	pure grade). Gas washed to remove nitric oxide and dried.
the height of the meniscus using a	Fractionated.
into degassed solvent. System is	2. $C_{3}H_{6}O_{2}$ Merck, extra pure used.
mixed using a magnetic stirrer until	several times and distilled
prevent solvent vapor from mixing	several times. B.P. at normal $P$ ,
With gas in the gas buret. Volume	57.12 °C.
reading; volume of liquid determined	ESTIMATED ERROR:
from height of meniscus in the	$\delta T/K = \pm 0.1.$
	REFERENCES :
	[†] Also reported in: Horiuti. J
	Bull. Inst. Phys. Chem. Res.
	Tokuo 1928, 7(2), 119-172.
	,, <b></b> ,

COMPONENTS :	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.	
<pre>2. Acetic acid, pentyl ester (Amyl acetate); C₇H₁₄O₂; [628-63-7]</pre>	Phys. Rev. <u>1922</u> , 19, 512-524.	
VARIABLES :	PREPARED BY:	
Temperature	W. Gerrard/C. L. Young	
EXPERIMENTAL VALUES:	I	
Ostwald T/K coefficient, L	Temperature Mole coefficient, fraction, dL/Ldt $x_{N_2O}^*$	
291.16 $5.24$ $0.0103$ $0.0313$ 293.16 $5.14$ $0.0104$ $0.0306$ 295.16 $5.05$ $0.0105$ $0.0299$ 297.16 $4.93$ $0.0106$ $0.0291$ 299.16 $4.83$ $0.0107$ $0.0285$ 301.16 $4.71$ $0.0109$ $0.0277$ 303.16 $4.60$ $0.0110$ $0.0269$ 305.16 $4.49$ $0.0111$ $0.0262$ 307.16 $4.39$ $0.0112$ $0.0255$ 309.16 $4.30$ $0.0113$ $0.0249$ * The $x_{N_20}$ values were calculated by the compiler, the molar volumeof N_20 being taken as $22257 \times (T/273.16)$ cm ³ , based on the standarddensity of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1).The L values were for a total pressure equal to the prevailingbarometric pressure. Kuperth's value for $x_{n-2}$ at 293.16 K was		
0.0312.	(cont.)	
AUXILIARY	INFORMATION	
METHOD / APPARATUS/PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid. Buret and	<ol> <li>Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to re- move volatile gases before being passed over P₂O₅. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa.</li> <li>Attested by b.p. and density.</li> </ol>	
pipet were kept at a common temperature by electric coils.	ESTIMATED ERROR: $\delta T/K = \pm 0.1;  \delta x_{N_2O} = \pm 2 $ (estimated by compiler).	
	REFERENCES: 1. Kaye, G. W. C. and Laby, T. H.; Tables of Physical and Chemical Constants, Longmans, London, 1966.	
	2. McDaniel, A. S.; J. Phys. Chem. <u>1911</u> , 15, 587.	

COMPONENTS: 1. Nitrous oxide: N20: [10024-97-2]	ORIGINAL MEASUREMENTS: Kunerth, W.			
2. Acetic acid, pentyl ester (Amyl acetate); C ₇ H ₁ ,O ₂ ; [628-63-7]	Phys. Rev. <u>1922</u> , 19, 512-524.			
EXPERIMENTAL DATA:				
Smooth	ed Data			
$\Delta G^{\circ} = -RT \ln x_{N_{\circ}O} = (-9670.1 + 61.962(T/K)) J mol^{-1}$				
(Std. deviation = 9.40 J mol-1)				
T/K Mole fraction of nitrous oxide,				
	^x N ₂ O			
291.16 293.16 295.16 297.16 299.16 301.16 303.16 305.16 307.16 309.16	0.0315 0.0307 0.0298 0.0291 0.0283 0.0276 0.0269 0.0262 0.0256 0.0250			

COMPONENTS :	ORIGINAL MEASUREMENTS.		
	ORIGINAL MERSOREMENTS.		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.		
	Phue Rev 1922 19 512-524		
	1000000000000000000000000000000000000		
2. Benzaldenyde; $C_7H_6O$ ; [100-52-7]			
VARIABLES:	PREPARED BY:		
Temperature	W. Gerrard/C. L. Young		
-			
EXPERIMENTAL VALUES:			
Ostupld	Temperature Mole		
T/K coefficient.	coefficient. fraction.		
L	dL/Ldt		
	N ₂ O		
291.16 3.23	0.0126 0.0136		
	0.0125 0.0125		
299.16 2.93	0.0125 0.0122		
301 16 2.85	0.0126 0.0118		
303.16 2.78	0.0126 0.0114		
305.16 2.72	0.0126 0.0111		
307.16 2.65	0.0126 0.0108		
309.16 2.59	0.0126 0.0105		
of N ₂ O being taken as 22257 × (T/273.16) cm ³ , based on the standard density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1). The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for $x_{N_2O}$ at 293.16 K was 0.0134 (cont.)			
	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid. Buret and	<ol> <li>Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to remove volatile gases before being passed over P₂O₅. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa.</li> <li>Attested by b.p. and density.</li> </ol>		
pipet were kept at a common	ESTIMATED ERROR:		
temperature by electric coils.	$\delta T/K = \pm 0.1;  \delta x_{N_2O} = \pm 2\%$		
	(estimated by compiler).		
	REFERENCES: 1. Kaye, G. W. C. and Laby, T. H.; <i>Tables of Physical and Chemical</i> <i>Constants</i> , Longmans, London, 1966.		
	2. McDaniel, A. S.; J. Phys. Chem. <u>1911</u> , 15, 587.		
	•		

COMPONENTE			
COMPONENTS:	ORIGINAL MEASUREMENTS:		
<pre>l. Nitrous oxide; N₂O; [10024-97-2]</pre>	Kunerth, W.		
2. Benzaldehyde; C ₇ H ₆ O; [100-52-7]	Phys. Rev. <u>1922</u> , 19, 512-524.		
EXPERIMENTAL VALUES:			
Smooth	ned Data		
$\Delta G^{\circ} = -RT \ln x_{N_2O}^{\circ} = (-10791.5 +$	72.774(T/K)) J mol ⁻¹		
(Std. deviation =	$= 8.9 \text{ J mol}^{-1}$		
T/K Mole fracti	ion of nitrous oxide,		
	^{<i>x</i>} N ₂ O		
291.16	0.0136		
293.16 295.16	0.0132 0.0128		
297.16	0.0125		
301.16	0.0118		
303.16	0.0114		
307.16	0.0108		
309.16	0.0105		

COMPONENTS:	ORIGINAL MEASUREMENTS:		
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> </ol>	Kunerth, W.		
<pre>2. Aniline, (Benzenamine); C₆H₅NH₂; [62-53-3]</pre>	Phys. Rev. <u>1922</u> , 19, 512-524.		
VARIABLES:	PREPARED BY:		
Temperature	W. Gerrard/C. L. Young		
EXPERIMENTAL VALUES:	I		
Ostwald T/K coefficient, L	Temperature Mole coefficient, fraction, dL/Ldt $x_{N_2O}^*$		
291.161.500.00830.00573293.161.480.00840.00562295.161.450.00850.00548297.161.420.00870.00534299.161.400.00890.00523301.161.370.00900.00510303.161.320.00930.00487307.161.310.00940.00480309.161.280.00960.00467* The $x_{N_2O}$ values were calculated by the compiler, the molar volume of N ₂ O being taken as 22257 × (T/273.16) cm³, based on the standard density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1).The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for $x_{N_2O}$ at 293.16 K was			
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE: The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid. Buret and pipet were kept at a common temperature by electric coils.	<pre>1. Gas (S.S.White Dental Co.) of 99.7     per cent purity was frozen to re-     move volatile gases before being     passed over P₂O₅. Density was     found to be 1.968 g dm⁻³ at     273.16 K and 101.325 kPa. 2. Attested by b.p. and density. ESTIMATED ERROR:</pre>		
	<pre>REFERENCES: 1. Kaye, G. W. C. and Laby, T. H.; Tables of Physical and Chemical Constants, Longmans, London, 1966. 2. McDaniel, A. S.; J. Phys. Chem. 1911, 15, 587.</pre>		

Organic Compounds		215
COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.	
2. Aniline, (Benzenamine); C ₆ H ₅ NH ₂ ; [62-53-3]	Phys. Rev. <u>1922</u> , 19, 512-524.	
EXPERIMENTAL VALUES:	L	
Smootl	ned Data	
$\Delta G^{\circ} = -RT \ln x_{N_2O} = (-8524.)$	16 + 72.178(T/K)) J mol ⁻¹	
(Std. deviation =	$= 5.9 \text{ J mol}^{-1}$ )	
T/K Mole fra	action of nitrous oxide, ^x N ₂ O	
291.16 293.16 295.16 297.16 299.16 301.16 303.16 305.16 307.16 309.16	0.00574 0.00561 0.00574 0.00535 0.00523 0.00511 0.00500 0.00489 0.00478 0.00468	

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.		
2. Pyridine; C₅H₅N; [110-86-1]	Phys. Rev. <u>1922</u> , 19, 512-524.		
VARIABLES:	PREPARED BY:		
Temperature	W Gerrard/C I Young		
	w. Gerrard/c. H. Toung		
EXPERIMENTAL VALUES:			
Ostupld	Tomporature		
T/K coefficient,	coefficient, fraction,		
L	$dL/Ldt = x_{N_2O}^*$		
293.16 3.58	0.0111 0.0119		
295.16 3.50	0.0114 0.0116		
297.16 3.45	0.0117 0.0114		
305.16 3.10	0.0129 0.0101		
307.16 3.02	0.0132 0.00975		
309.16 2.94	0.0136 0.0095		
density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1). The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for $x_{N_2O}$ at 293.16 K was 0.0120.			
	TNEODWATTON		
	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with	<ol> <li>Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to re- move volatile gases before being passed over P₂O₅. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa.</li> <li>Attested by b.p. and density.</li> </ol>		
pipet were kept at a common temperature by electric coils	ESTIMATED ERROR: $\delta T/K = \pm 0.1$ ; $\delta T = \pm 28$		
	(estimated by compiler)		
	(Colonated of Compiler).		
	REFERENCES :		
	<ol> <li>Kaye, G. W. D. and Laby, T. H.; Tables of Physical and Chemical Constants, Longmans, London, 1966.</li> </ol>		
	2. McDaniel, A. S.; J. Phys. Chem. <u>1911</u> , 15, 587.		

Organic Compounds

COMPONENTS:	ORIGINAL MEASUREMENTS:		
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> </ol>	Kunerth, W.		
2. Pyridine; C ₅ H ₅ N; [110-86-1]	Phys. Rev. <u>1922</u> , 19, 512-524.		
EXPERIMENTAL VALUES:			
Smoothe	d Data		
$\Delta G^{\circ} = -RT \ln x_{N_2O} = (10870.5 + 73.869(T/K)) J mol^{-1}$			
(Std. deviation = $13.5 \text{ J mol}^{-1}$ )			
T/K Mole fraction of nitrous oxide,			
	^{<i>w</i>} N ₂ O		
293.16 295.16 297.16 299.16 301.16 303.16 305.16 307.16 309.16	0.0120 0.0116 0.0113 0.0110 0.0106 0.0103 0.0101 0.00978 0.00951		

COMPONENTS:		ORIGINAL MEASUREMENTS:	
1. Nitrous or	xide: N2O: [10024-97-2]	Horiuti, J.	
			Cham Bac
2. Tetrachlor	romethane; (Carbon	Sci. Pap. Inst. Phys.	chem. Res.
tetrachlor	ride); CC1 ₄ ; [56-23-5]	(Japan) <u>1931/32</u> , 17,	125-256.
		)	
VARIABLES:		PREPARED BY:	
Memperature		M E Derrick	
Temperature		M. D. Berriow	
EXPERIMENTAL VALU	ES: Total pressure is	1 atm for original measu	irements.
	fotal pressure is	I atm for organiar mouse	
Т/К 1	$0^2 x_{\rm NO}$ Ostwald	coefficient, Bunsen	coefficient,
, ·	N ₂ O	L *	α
			2 110
313.15	L.354 3	. 202	3.346
303.15	1,549 J	.005	3.609
298.15	1.672 4	.285	3.926
293.15	1.801 4	.57	4.26
288.15	1.947 4	.89	4.64
283.15	2.111 5	.26	5.07
<u> </u>	<u></u>		
origi:	nal data		
	Smoothe	d Data	
		052 2 1 70 7619m/K) T m	-1 ⁻¹
	$\Delta G^{\circ} = -RT In x_{N_2O} = -10$	955.5 + 70.701817K7 0 m	51
Std.	dev. $\Delta G^{\circ} = 3.43 \text{ J mol}^{-1}$	1 . Coef. Corr. = 1.00	
ΔH°/	$J mol^{-1} = -10953.3; \Delta S^{0}$	$/J \text{ mol} \cdot K^{-} = -/0.7618$	
	T/K ∆G°/J	$mol^{-1}$ $x_{N_2O}$	
	······		
	202.15 908	2 99 0 02111	
	283.15 900	6 69 0 01947	
	293.15 979	0.50 0.01801	
	298.15 1014	4.3 0.01670	
	303.15 1049	8.1 0.01553	
	308.15 1085		
	313.15 1120	0.01332	
		INFORMATION	
		INFORMATION	
METHOD/APPARATU	S/PROCEDURE:	SOURCE AND PURITY OF MATERIA	ALS:
Composed of a	cas buret a solvent	1 Nitrous oxide prepar	red from
reservoir, and	an absorption pipet.	hvdroxvlamine sulfat	te and sodium
Volume of pipe	t is determined at	nitrite both from Ka	ahlbaum (extra
various height	s of the meniscus using	pure grade). Gas wa	ashed to remove
a weighed quan	tity of water, measuring	nitric oxide and dr:	ied.
the height of	the meniscus using a	Fractionated.	
into decassed	solvent. System is	2. CCl ₄ sample from Kal	hlbaum, dried
mixed using a	magnetic stirrer until	and distilled. B.I	P. at normal
saturation occ	urs. Care is taken to	P, 10.14 °C.	
prevent solven	t vapor from mixing	1	
with gas in the	e gas buret. Volume		
or gas determi	nea from gas buret	ESTIMATED ERROR:	
from height of	meniscus in the	$\delta T/K = \pm 0.1$	
absorption pip	et.		
]		PEPEPENOUC	
		REFERENCES:	
		T Also reported in: Ho	oriuti, J.
		Bull. Inst Phus Ch.	em. Res.
			10, 172
		токуо <u>1928</u> , 7(2), 11	19-1/2.

2010	
OMPONENTS: ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Yen, L. C.; McKetta, J. J., Jr.
2. Totrachloremethance (Carbon	J. Chem. Eng. Data 1962, 7, 288-289.
tetrachloride); CCl _k ; [56-23-5]	
VARIABLES:	PREPARED BY:
Temperature	W. Gerrard/C. L. Young
EXPEDIMENTAL MALUES.	<u> </u>
- DATENTAL VALUES:	
T/K Bunsen coefficient	Mole fraction of nitrous oxide,
	^{<i>x</i>} N ₂ O
273.16 6.071	0.02506
283.16 5.096	0.02137
303.16 3.634	0.01570
313.16 3.111	0.01364
The partial pressure of	the gas was 101.325 kPa.
Smooth	ed Data
$\Delta G^{\circ} = -RT \ln x_{N-O} = (-108)$	$58 + 70.366 \times T/K$ J mol ⁻¹
(Std. deviation	$= 8.4 \text{ J mol}^{-1}$ )
	iteres and as a
T/K Mole fraction of n	itrous oxide, x _{N2} O
273.16 0.4	02516
	02125
303.16	01568
313.16 0.	01366
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Measurement of volume of gas absorbed	1. Gas of 98 per cent purity was
by a known volume of degassed liquid	purified at 193.16 K. Mass
at a partial pressure of 101.325 kPa.	spectrograph then showed purity
allowed for. Gas buret and absorp-	or 99.5 per cent.
tion pipet. Modified form of	2. J. T. Baker Chemical Co., Baker
apparatus and technique used by	analyzed grade freshly fraction-
Markham and Robe (1).	ated.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.1;  \delta x_{N_2O} = \pm 2$ % (estimated)
	by compiler).
	REFERENCES:
	(1) Markham, A. E.; Kobe, K. A.;
	J. Am. Chem. Soc. <u>1941</u> , 63, 449.

PAND AND AND AND AND AND AND AND AND AND			
COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Hsu, H.; Campbell, D.		
	Aerosol Age, 1964, Pecember. 34.		
2. Halogenated hydrocarbons			
VARIABLES:	PREPARED BY:		
	W Gerrard / C. L. Young		
	w. Gettalu / C.D. Toung		
EXPERIMENTAL VALUES:	Octuald Mole fraction of		
Solvent	coefficient, nitrous oxide in		
	L liquid, $x_{N_0}$		
	1120		
Tetrachloromethane;			
(Carbon tetrachloride); 294.3	2.5 0.00997		
CC1,, [56-23-5]			
Trichloromethane:			
(Chloroform); CHCl ₃ ; 294.3	5.54 0.0182		
[67-66-3]			
1.2-Dichloroethane.			
$C_2H_kCl_2$ ; [107-06-2] 294.3	3.2 0.0104		
1,2-Dibromoethane;			
$C_2H_4Br_2; [106-93-4] 294.3$	2.7 0.00962		
"Chlorothene" 294.3	4.96 -		
of 101 325 kPa Molar vol	ime of das at 294 26 K taken		
as 23967 $\text{cm}^3$ based on the	density (1) 1.9775 g $dm^{-3}$ at		
101.325 kPa and 273.15K.	-		
AUXILIA	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Copper equilibrium cell fitted with Bourdon gauge and thermometer			
Total amount of gas needed to attain	No details given.		
given, but not stated, pressure			
measured. Ostwald coefficient			
of liquid and container.			
	ESTIMATED ERROR:		
l	$\delta T/K = \pm 0.5; \ \delta x_{NO} = \pm 3\%.$		
	(estimated by compiler).		
	REFERENCES :		
ļ	1. Kaye, G.W.C.; Laby, T.H.		
	Tables of Physical and Chemical		
	<i>Constants</i> , Longmans, London, 1966.		

COMPONENTS:		ORIGINAL MEASUREMENTS	· · · · · · · · · · · · · · · · · · ·	
1 Nitroug orido: N.O. (10)	24 07 21	Kuranth M		
1. Nitrous oxide; N ₂ O; [10024-97-2]		Kuller ul, w.		
2. Trichloromethane; (Chloroform); CHCl ₃ ; [67-66-3]		Phys. Rev. <u>1922</u>	, 19, 512-524.	
VARIABLES:		PREPARED BY:	<u>.</u>	
Temperature		W. Gerrard/C	C. L. Young	
EXPERIMENTAL VALUES:				
Octupld		Tomporaturo	Molo	
T/K coefficient,		coefficient,	fraction,	
L		dL/Ldt	^x N ₂ O [*]	
291.16 5.70		0.0066	0.0189	
293.16 5.60		0.0103	0.0184	
295.16 5.51		0.0140	0.0181	
297.16 5.26		0.0180	0.0172	
		0.0220	0.0165	
303 16 4.83		0.0258	0.0157	
305.16 4.29		0.0335	0.0138	
307.16 4.03		0.0370	0.0130	
309.16 3.70		0.0407	0.0119	
of N ₂ O being taken as 22257 × (T/273.16) cm ³ , based on the standard density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1). The L values were for a total pressure equal to the prevailing barometric pressure. Kunerth's value for $x_{N_2O}$ at 293.16 K was				
0.0102.		<u></u>		
	AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE :		SOURCE AND PURITY OF	MATERIALS:	
The volume of gas absorbed h measured volume of degassed was measured at a total press to the prevailing barometric Based on the technique of Mc (ref. 2). Apparatus consis gas buret attached to leveli Containing mercury, and to p layer of liquid was held over mercury layer in the buret to rate the gas with vapor of to Buret and pipet were kept at	y a liquid sure equal pressure. Daniel eted of ing tube oipet. A ir the so satu- the liquid. a common	<ol> <li>Gas (S.S.White per cent purit move volatile passed over P2 found to be 1. 283.16 K and 1</li> <li>Attested by b.</li> </ol>	e Dental Co.) of 99.7 by was frozen to re- gases before being Os. Density was 968 g dm ⁻³ at .01.325 kPa. p. and density.	
cemberature by electric coll	5.	ESTIMATED ERROR:		
		$\delta T/K = \pm 0.1;  \delta x$	$N_2 O = \pm 2\%$	
		(estimated by	compiler).	
		REFERENCES: 1. Kaye, G. W. C. Tables of Phys Constants, Lon	and Laby, T. H.; ical and Chemical gmans, London, 1966.	
		2. McDaniel, A. S <u>1911</u> , <i>15</i> , 587.	.; J. Phys. Chem.	
		-		

COMPO	DNENTS:	ORIGINAL MEASUREMENTS:
1.	Nitrous oxide; N2O; [10024-97-2]	Kunerth, W.
2.	Trichloromethane; (Chloroform); CHCl ₃ ; [67-66-3]	Phys. Rev. <u>1922</u> , 19, 512-524.

EXPERIMENTAL VALUES:

#### Smoothed Data

 $\Delta G^{\circ} = -RT \ln x_{N_2O} = -(195338 - 1331.7(T/K) + 2.3827(T/K)^2) J mol^{-1}$ (Std. deviation =  $12.0 \text{ J mol}^{-1}$ ) T/K Mole fraction of nitrous oxide, *x*N 2 O 291.16 293.16 0.0189 0.0184 295.16 0.0179 297.16 0.0173 299.16 0.0165 301.16 0.0157 303.16 0.0148 0.0139 305.16 307.16 0.0129 309.16 0.0119

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kunerth, W.		
2. 1,2-Dibromoethane; CH ₂ BrCH ₂ Br; [106-93-4]	Phys. Rev. <u>1922</u> , 19, 512-524.		
VARIABLES:	PREPARED BY:		
Temperature	W. Gerrard/C. L. Young		
EXPERIMENTAL VALUES:	L		
Ostwald T/K coefficient, L	Temperature Mole coefficient, fraction, dL/Ldt $x_{N_2O}^*$		
291.16 2.87 293.16 2.81 295.16 2.75 297.16 2.69 299.16 2.64 301.16 2.58 303.16 2.52 305.16 2.46 307.16 2.42 309.16 2.37 * The $x_{N_2O}$ values were calculated h	0.0106 0.0103 0.0106 0.0100 0.0107 0.00977 0.0108 0.00952 0.0109 0.00930 0.0110 0.00904 0.0111 0.00879 0.0112 0.00855 0.0113 0.00837 0.0114 0.00816		
density of 1.9775 g dm ⁻³ at 273.16 K and 101.325 kPa (ref. 1).			
The L values were for a total pressure equal to the prevailing			
balometric pressure. Runertin s	value for $n_{\rm N_2O}$ at 255.10 K was		
0.0100.	(Cont.)		
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The volume of gas absorbed by a measured volume of degassed liquid was measured at a total pressure equal to the prevailing barometric pressure. Based on the technique of McDaniel (ref. 2). Apparatus consisted of a gas buret attached to leveling tube containing mercury, and to pipet. A layer of liquid was held over the mercury layer in the buret to saturate the gas with vapor of the liquid. Buret and pipet were kept at a common temperature by electric coils.	<ol> <li>Gas (S.S.White Dental Co.) of 99.7 per cent purity was frozen to re- move volatile gases before being passed over P₂O₅. Density was found to be 1.968 g dm⁻³ at 273.16 K and 101.325 kPa.</li> <li>Attested by b.p. and density.</li> <li>ESTIMATED ERROR: δT/K = ±0.1; δx_{N₂O} = ±2% (estimated by compiler).</li> </ol>		
	<pre>REFERENCES: 1. Kaye, G. W. C. and Laby, T. H.; Tables of Physical and Chemical Constants, Longmans, London, 1966.</pre>		

 McDaniel, A. S.; J. Phys. Chem. <u>1911</u>, 15, 587.

00N - P

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1 Nitrong ovider N Or [10024 07 2]	Kuperth W		
1. Nitrous Oxide; $N_20$ ; [10024-97-2]	Kulerth, w.		
2. 1,2-Dibromoethane; CH ₂ BrCH ₂ Br; [106-93-4]	Phys. Rev. <u>1922</u> , 19, 512-524.		
EXPERIMENTAL VALUES:			
Smooth	ned Data		
$\Delta G^{\circ} = -RT \ln x_{N_2O} = (-9702.7 + 71.360(T/K)) J mol-1$			
T/K Mole fracti	on of nitrous oxide,		
	^w N ₂ O		
······································			
291.16			
295.16	0.00976		
297.16	0.00951		
301.16	0.00926		
303.16	0.00880		
305.16	0.00858		
307.16	0.00837		
	0.00010		

Organic Compounds

COMPONENTS:			ORIGINAL MEASU	REMENTS:	
l. Nitrous	oxide; N ₂ O; [1	0024-97-2]	Horiuti,	J.	
2. Chlorob	enzene; C ₆ H ₅ Cl;	[108-90-7]	Sci. Pap.	Inst. Phys. C.	hem. Res.
			(Jmm) ⁺ 10	×	5 256
			( <i>spn</i> ), 1:	931/32, 17, 12	5-256.
VARIABLES:			PREPARED BY:		
Т	emperature			M. E. Derrick	
EXPERIMENTAL VA	ALUES: Total pre	ssure is l	atm for orig:	inal measureme	nts.
т/к	10 ² x _{N2} O	Ostwal	d Coefficien	t, L* Bunsen Co	oefficient, α
328.15	0.8837		2.279		1.897
318.15	0.9969		2.520		2.164
313.15 308.15	1.059		2.650 2.801		2.311 2.483
303.15	1.216		2.981		2.686
298.15	1.309		3.174 3.382		2.908
288.15	1.533		3.636		3.447
283.15	1.659		3.891		3./54
	ň	original d	ata		
	9/T mol ⁻¹	Smoothe	$\frac{d}{d} \frac{d}{d} \frac{d}$	2 2 2 1 5 m / 12	
5 5 4 A	$\int \frac{1}{10} \operatorname{mol}^{-1} = -RT$	$x_{N_2O} = +10.72$	-10821.7 + 72	1 - 10921 7	
stu. u	Coeff. Corr.	$= 1.00 \Delta S$	°/J mol ⁻¹ K ⁻	= -72.3315	
Т/К	$\Delta G^{\circ}/J \text{ mol}^{-1}$	^x N ₂ O	т/к	$\Delta G^{\circ}/J \text{ mol}^{-1}$	^x N ₂ O
283.15	9658.91	0.01653	308.15	11467.2	0.01138
288.15	10020.6	0.01526	313.15	11828.9	0.01064
298.15	10743.9	0.01311	323.15	12552.2	0.009355
303.15	11105.5	0.01220	328.15	12913.8	0.008798
		AUXILIARY	INFORMATION		
METHOD/APPARA	TUS/PROCEDURE:		SOURCE AND PUR	ITY OF MATERIALS	
Composed of	a gas buret, a	solvent	N ₂ O: Prep	pared from hyd:	roxylamine
reservoir,	and an absorpti	on pipet.	sult	fate and sodium	m nitrite
various hei	ghts of the men	iscus using	pure	e grade). Gas	washed to
a weighed q	uantity of wate	r, measur-	remo	ove nitric oxio	de and dried.
a cathetome	ter. Dry gas	is intro-	CeHeCl: S	Sample from Kal	hlbaum, dried
duced into	degassed solven	t. System stirrer	drie	ed, and distil	led. B.P.
until satur	ation occurs.	Care is	at r	normal P, 131.9	96 °C.
mixing with	event solvent v gas in the gas	apor from buret.			
Volume gas	detn. from gas	buret	ESTIMATED ERRC	DR:	
from height	of meniscus in	the	$\delta T/K = \pm 0.$	.1.	
adsorption	pipet.				
			REFERENCES .		·····
1			+	that in the the	
1			Larso repor	t Phus Cham	$R_{ab}$ $T_{ab}$
		1029 2/9	) 110_170	100, 10KY0,	
			<u>1920</u> , /(2)	, 119-116.	

COMPONENTS:	EVALUATOR:
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> <li>Biological fluids.</li> </ol>	Colin L. Young School of Chemistry University of Melbourne Parkville, Victoria, 3052 <u>AUSTRALIA:</u> June, 1981

#### CRITICAL EVALUATION:

In study of gas solubility in biological fluids it is evitable that some variation in solubility arises from the source of the sample and its treatment before being used. Therefore careful characterisation of the sample is necessary. As has been pointed out by Kozam *et al* (1) and may be inferred from the early work of Siebeck (2) it appears that some of the discrepancies between the results of various workers for the solubility of nitrous oxide in blood are probably due to the fraction of red cells in the sample. Thorough degassing of the sample is rarely achieved with biological fluids and there is some indication that this also gives rise to a significant additional variation in the reported solubilities

Many gas solubilities in biological fluids have been determined using a Van Slyke apparatus and are therefore not of the highest accuracy. See reference 3 for a discussion of the reliability of this technique. The gas chromatographic (GC) method used by Kozam *et al* (1) appears to be capable of fairly accurate results although, at present, not widely used Jay *et al* (4) have carried out a comparison between GC and the Van Slyke method. The GC method can be used to study the solubility of mixtures of gases. The Scholander microgasometric method (5) has been applied to solubilities in biological fluids by Saidman *et al* (6) and the results appear to be more reliable than those determined by the Van Slyke method.

In general, when more attention is paid to a detailed characterisation of the sample it appears that it will be desirable to further develop techniques which are more accurate than the Van Slyke method. The method is quick but, unless carried out with great care, is not as accurate as the Scholander thechnique.

It is very difficult to establish which solubility measurements are more reliable in the present context. The measurements of Saidman *et al* (6) are probably the most accurate for human blood.

In addition to measurements given in the compiled tables the solubility of nitrous oxide in bovine serum albumen and bovine globulin have been reported by Muehlbaecher *et al* (7). The results were presented in graphical form and little information was given as to the method employed. This workers also quoted Bunsen coefficient for water and blood but it was not clear whether these coefficients were "average" values from the literature or new experimental values. The results are summarized in the table below.

$T/^{\circ}C = 37$	
SOLVENT	BUNSEN COEFFICIENT
Water	0.440
Blood	0.466
Bovine serum albumen in sodium phosphate buffer	
pH = 5.6 - 6.3	0.42
Bovine β -globulin in sodium phosphate buffer	
pH = 6.3 - 6.6	0.41
Bovine $\partial$ -globulin in sodium phosphate buffer	
pH = 6.3 - 6.6	0.42
Bovine hemoglobin in sodium phosphate buffer	
pH = 6.3 - 6.6	0.43

COMPONENTS:		EVALUATOR.	
1.	Nitrous oxide; N ₂ O; [10024-97-2]	Colin L. Young School of Chemistry University of Melbourne	
2.	Biological fluids.	June, 1981	
CRITIC	CAL EVALUATION:		
REF	'ERENCES:		
1.	Kozam, R.L.; Landau, S,M.; Cubin J. Appl. Physiol. <u>1970</u> ,29,593.	a, J.M.; Lukas, D.S.	
2.	2. Siebeck, R.; Skand. Arch. Physiol. <u>1909</u> ,21,368.		
3.	Markham, A.E.; Kobe, K.A. <i>Chem. Revs.</i> <u>1941</u> ,28,519.		
4.	Jay, B.E.; Wilson, R.H.; Doty, V.; Pingree, H.; Hargis, B. Anal. Chem. <u>1962</u> ,34,414.		
5.	5. Douglas, E.; J. Phys. Chem. <u>1964</u> ,68,169.		
6.	Saidman, L.J.; Eger, E.I.; Manso Anesthesiology, <u>1966</u> ,27,180.	n, E.S.; Severinghaus, J.W.	
7.	7. Muehlbaecher, C.; DeBon, F.L.; Featherstone, R.M.; Intern. Anesth. Clinics. <u>1963</u> , 1, 937.		

COMPONENTS .			MEASUREMENTS		
$\frac{1}{1} \text{ Nitrous oxide: N=0: [10024-97-2]}$			Sichock P		
1. NITEOUS OXIDE; $N_20$ ; [10024-97-2]			Stepeck, K. Stand Anah Physical		
1 Or blood and red blood cells			21 368-382		
2. Ox blood and red blood cells			<u>,</u> 21, 300-302.		
	······				
VARIABLES:		PREPARE	D BY:		
Temperat	ure, pressure		C. L. Youn	g	
	<u></u>		· · · · · · · · · · · · · · · · · · ·		
EXPERIMENTAL VALUES:	Partial pr	essure	Ratio of volume	Bunsen	
Т/°С Т/Н	c of nitrous	oxide	of absorbed gas	coefficient,	
	p/mmHg	р/кРа	(reduced to 273.15 K and	α	
			101.3 kPa		
			solution		
	Ox	Blood			
23.1 296.	.3 707.28 4 71.4 22	94.296	0.5486	0.5895	
22.5 295.	7 543.90	72.514	0.4212	0.5885	
23.1 296.	.3 174.10	23.211	0.1253	0.5470	
	Red blood c	ells "s	olution"		
22.9 296. 23.2 296.	1 663.50 4 706.60	88.459	0.5520 0.5727	0.6323 0.6160	
$37.9^+$ 311.	1 500.44	66.720	0.2705	0.4108	
38.0 $31137.7$ $310$	.2 645.70 .9 581.50	86.086	0.3630 0.3159	0.4273 0.4129	
38 311.	2 202.65	27.018	0.1023	0.3837	
38 311. 38 311.	2 357.60 2 702.45	47.676	0.1911 0.3741	0.4061 0.4047	
*	mple contained 66 0	ma of F	a nor 100 a soluti	07	
5 5 5	mple contained 59.7	mg of F	e per 100 g soluti	on.	
+ sa	ample contained 39.7	mg of F	e per 100 g soluti	on.	
		INFORMA'	TION		
		Tagunan			
METHOD APPARATUS/PRO	CEDURE:	SOURCE	AND PURITY OF MATERIA	LS ;	
Solvent placed i	n a 3 dm³ glass.				
cylinder. Cyli	nder flushed with				
nitrous oxide to	remove air and then		No details give	en.	
solvent equilibr	ated with gas at				
known pressure.	Samples of solvent				
removed and gas	extracted under				
reduced pressure	e and estimated				
volumetrically.		FSTIMAT	TED EDDOD.	·····	
		δα/α -	= ±4% (estimated b	y compiler).	
		REFEREN	ICES :		
		1			
		1			

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide; N ₂ O; [10024-97-2]	Findlay, A.; Creighton, H. J. M.		
2. Ox blood and ox serum	Biochem. J.		
	1910, 5, 294-305.		
	<u></u> , , ,		
WADT ADT DO			
Prossure	PREPARED BY:		
Flessule	C. D. 100119		
EXPERIMENTAL VALUES:			
Density of soln.	Solubility,		
$T/K$ /g cm ⁻³ $p_{N_2O}/mn$	$p_{N_2O}/MPa s^{\dagger}$		
Blood			
298.15 1.065 745	0.099 0.521		
854	0.114 0.530 0.135 0.539		
1152	0.154 0.544		
1277	0.188 0.548		
Serum			
298.15 1.025 737	0.098 0.517		
846	0.113 0.509		
925	0.123 0.513		
1169 1402	0.156 0.524 0.187 0.528		
[†] Solubility, S. given as <u>Concentrat</u>	ion of gas in the liquid phase		
Concentr	ation of gas in the gas phase		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS;		
Gas buret and adsorption pipet	1. Obtained by neating pure		
similar to that of Geffcken (1)	ammonium nitrate, purified by passing through solutions of potassium hydroxide and ferrous		
except that the manometer tube was			
longer to give the higher pressures.	sulfate.		
	2. As obtained from slaughter house:		
	not degassed.		
	ESTIMATED ERROR:		
	$\delta T/K = \pm 0.1;  \delta S/S = \pm 2\%$		
	(estimated by compiler)		
	REFERENCES:		
	1. Geffcken, G.		
	2. Phys. Chem.		
	<u>1904</u> , 49, 207.		

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Orcutt, F.S.; Seevers, M.H.,
	J. Biol.Chem. <u>1937</u> , 117,509-15.
2 Blood	
2. 51000.	
VARIABLES:	PREPARED BY:
	W. Gerrard
EXPERIMENTAL VALUES:	
T/K Bunsen coeffi	cient, Ostwald coefficient, L
310.65 0.416	0.454
210.02	
METHOD / APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Van Slyke-Neill (1) manometric	Not specified.
solution. Pressure of extracted gas	
was measured, allowance being made	
for the gas not extracted.	
	ESTIMATED ERROR:
	REFERENCES :
	l. Van Slyke, D.D., Neill, J.M.
	J. Biol. Chem. <u>1924</u> , 61,523.
	1

COMPONENTS:	ORIGINAL MEASUREMENTS:	
l. Nitrous oxide; N ₂ O; [10024-97-2]	Cullen, S. C.; Cook, E. V.	
2. Human blood	J. Biol. Chem.	
	1943, 147, 23-26.	
	, · · · · · ·	
VARIABLES:	PREPARED BY:	
Pressure	C. L. Young	
EXPERIMENTAL VALUES: T/°C = 37.5; T/K	= 310.7	
Sample mole per cent composition p	ressure of N ₂ O, $p_{N_2O}$ +	
No. $CO_2 O_2 N_2 N_2O$	/mmHg /mmHg Solubility	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	740         583         30.9           737         616         33.2	
3 6.30 1.04 4.16 88.5	738 609 34.0	
	740 531 28.7	
6 5.30 46.80 0 47.9	738 330 17.8	
7 5.60 9.50 38.00 46.9	738 323 17.7	
	740 639 34.0 740 678 37.4	
10 5.80 33.70 0 60.5	738 417 22.0	
11 5.70 7.50 30.00 56.8	737 391 21.8	
12 5.25 75.80 0 19.0 13 5.38 15.60 62.40 16.6	736 $131$ $7.4736$ $114$ $6.6$	
14 0.42 0.40 0 99.1	736 681 37.6	
15 5.45 16.25 65.00 13.3	738 92 4.8	
17 0.57 0.28 0 99.1	742 213 11.7	
18 5.53 53.60 0 40.8	738 281 15.1	
$\begin{bmatrix} 19 & 6.44 & 11.00 & 44.00 & 38.5 \\ 20 & 5.71 & 39.60 & 0 & 54.7 \end{bmatrix}$	738 265 14.2	
21 5.63 8.12 32.48 53.7	737         376         19.9           736         369         20.9	
[†] Solubility is the volume (reduced t dissolved by 100 cm ³ of blood.	o 273.2 K and 1 atmosphere pressure)	
Ostwald coefficient at 1 atmosphere p	ressure = 0.472	
AUXILIARY	INFORMATION	
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Blood equilibrated with gas of	l. No details given.	
Samples analyzed by the Van Slyke	2. Oxalated venous blood.	
manometric procedure.		
Details in source and ref. (1).		
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.1;  \delta \alpha / \alpha = \pm 3\%$	
	(estimated by compiler).	
	REFERENCES:	
	1. Cullen, S. C.; Cook, E. V.	
	Am. J. Physiol.	
	1942. 137. 238.	

COMPONENTS :	ORIGINAL MEASUREMENTS:
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kety, S.S.; Harmel, M.H., Broomell, H.T., Rhode, C.B.
2 Plood	I Pict Cham 1948 173 487-496
2. 81000.	<i>J. Blot. Chem.</i> <u>1946</u> , 175, 487-498.
VARIABLES :	DEEDADED BY.
	W Corrard
	W. Gerraru
EXPERIMENTAL VALUES:	
	Man
bog, 6 animars	hematocrit
α*	α*
0.419	28.8 0.400
0.419	34.2 0.408
0.433	41.0 0.410
0.421	44.0 0.414
0.435	
0.421	
Mean: 0.425	0.412
Standard	
error: 0.003	0.004
cm ³ of N ₂ O (reduced to dissolved by 1 cm ³ of a nitrous oxide press	to 273.15 K and 101.325 kPa) f blood when equilibrated at sure of 101.325 kPa.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Blood is equilibrated with nitrous	1. Not stated.
closed and shaken at 310.15 K. Gas	2. Freshly shed heparinised
was removed and the nitrous oxide	whole blood.
content of the liquid was determined	
using a Van Slyke-Neill manometric	
apparatus.	
	ESTIMATED ERROR:
	REFERENCES :
<b>\</b>	
{	
-	

**Biological Fluids** 

COMPONENTS:	ORIGINAL MEASUREMENTS:	
1. Nitrous oxide; N ₂ O; [10024-97-2]	Hattox, J. S.; Saari, J. M.;	
	Faulconer, A.	
2. BIOOd	Anesthesiology <u>1953</u> , 14, 584-590.	
VARIABLES:	PREPARED BY:	
	C. L. Young	
EXPERIMENTAL VALUES:		
T = 37 °C		
Sample No. Distribution coeffi	cient, [†] D Concentration [§] /mg cm ⁻³ (a) (b)	
	0 71 7 0 27 2	
2 0.453	0.713 0.373	
3 0.454 4 0.460	0.689 0.364 0.716 0.367	
5 -	0.684 0.372	
Standard 0.455		
deviation	0.0115 0.0075	
(a) partial pressure of $N_2O$ = 1 atmosphere (b) partial pressure of $N_2O$ = 0.5 atmosphere.		
AUXILIARY INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:	
Mass spectrometric method based on the relative height of argon and nitrous oxide peaks at 40 and 30 respectively. Solubility of argon in blood assumed to be same as in water.	No details given.	
	ESTIMATED EREOR-	
	$\delta T/K = \pm 0.5;  \delta D = \pm 2\%.$	
	REFERENCES :	

COMPONENTS: 1. Nitrous oxide; N ₂ O; [10024-97-2] 2. Human blood	ORIGINAL MEASUREMENTS: Jay, B.E.; Wilson, R.H.; Doty, V.; Pingree, H.; Hargis, B.
	Anal. Chem. <u>1962</u> ,34,414-418
VARIABLES :	PDEPADED BY.
	C.L. Young
EXPERIMENTAL VALUES:	
т/к	Ostwald coefficient, ^a
309.2	0.405 ± 0.004
a Average of 14 values. Incorrectly called Bunsen coefficient in source.	
AUXILIARY	INFORMATION
METHOD 'APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Saturated blood samples were	1. Matheson Gas Co. sample.
analysed using GC with an activated charcoal or activated silica gel stationary phase. Thermal conduct- ivity detector used and helium was used as carrier gas. Results checked against Van Slyke method.	<ol> <li>Hemoglobin content 14g per 100 cm³ of solution.</li> </ol>
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.5$
	REFERENCES:

**Biological Fluids** 

biological Fluius 23				
COMPONENTS:	ORIGINAL MEASUREMENTS:			
<pre>l. Nitrous oxide; N₂O; [10024-97-2]</pre>	Sy, W. P.; Hasbrouck, J. D. Anesthesiology <u>1964</u> , 25, 59-63.			
2. Dog blood (in vivo)				
VARIABLES:	PREPARED BY:			
	C. L. Young			
EXPERIMENTAL VALUES:	Landana			
T/K Partial pressure [†] of nitrous oxide Ostwald coefficient P/mmHg				
310.65 499.1	0.400 0.395 0.396 0.392 0.393 0.395			
Mean Ostw	ald coefficient = 0.395			
Sta	ndard deviation = 0.002			
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Healthy dog anesthetized with sodium pentobarbital, trachea intubated and lungs mechanically ventilated with a mixture of 80 per cent nitrous oxide and 20 per cent oxygen. End expira- tory partial pressure of carbon di- oxide maintained at 39.5-40.5 mmHg. After 75 minutes samples of arterial blood taken and analysed with van Slyke apparatus. Details in source.	No details given.			
	ESTIMATED ERROR:			
	$\delta T/K = \pm 0.1;  \delta P/mmHg = \pm 0.1$			
	REFERENCES:			
COMPONENTS:	ORIGINAL MEASUREMENTS:			
-----------------------------------------	--------------------------------------------------------	--	--	--
	ORIGINAL MEASUREMENTS:			
1. Nitrous oxide; $N_20$ ; [10024-97-2]	Saidman, L. J.; Eger, E. I.;			
	Munson, E. S.; Severinghaus, J. W.			
	Anesthesiology <u>1966</u> , 27, 180-184.			
2. Human blood				
VARIABLES:	PREPARED BY:			
	C I Young			
	C. L. Ioung			
EXPERIMENTAL VALUES:				
	Ostwald coefficient			
T/°C T/K No. of samples	Mean Standard deviation			
37 310 2 5	0 462 0 007			
25 298.2 5	0.602 0.007			
AUXILIARY	INFORMATION			
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
	CONSI MA FORTI OF MEDALAD,			
Modified Scholander apparatus used.	1. No details given.			
Known amount of blood equilibrated				
with a known volume of gas and change	2. Nitrogen bubbled through sample			
coefficient. Details of apparatus	to remove other gases. Mean hemoglobin 14 per cent.			
in source and ref. 1. Correction	nomegrowin in por cont.			
made for nitrogen in sample.				
ł	ESTIMATED ERROR:			
]	$\delta T/K = \pm 0.1$ (estimated by compiler).			
	,			
	REFERENCES:			
	L. Douglas, E. J. Phys. Cham. 1964			
	1. 5049143, 1. 5. 1. nyb. chem. <u>1904</u> ,			
	00, 109.			

L

COMPONENTS:	ORIGINAL MEASUREMENTS:
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> <li>2. Dog blood</li> </ol>	Saidman, L. J.; Eger, E. I.; Manson, E. S.; Severinghaus, J. W. Anesthesiology <u>1966</u> , 27, 180-184.
VARIABLES:	PREPARED BY:
	c. f. foung
EXPERIMENTAL VALUES:	
T/°C T/K No. of samples	Ostwald coefficient Mean Standard deviation
37     310.2     5       25     298.2     3	0.472 0.009 0.618 0.015
AUXILIA METHOD/APPARATUS/PROCEDURE:	RY INFORMATION SOURCE AND PURITY OF MATERIALS:
Modified Scholander apparatus used. Known amount of blood equilibrated with a known volume of gas and chang in volume used to estimate Ostwald coefficient. Details of apparatus in source and ref. 1.	<ol> <li>No details given.</li> <li>Nitrogen bubbled through sample to remove other gases.</li> </ol>
	ESTIMATED ERROR: $\delta T/K = \pm 0.1$ (estimated by compiler)
	SI/A - 10.1 (ESCIMATED BY COMPTEE).
	REFERENCES: 1. Douglas, E. J. Phys. Chem. <u>1964</u> , 68, 169.
	•

COMPONENTS:	ORIGINAL MEASUREMENTS:
l. Nitrous oxide; N2O; [10024-97-2]	Ostiguy, G. L.; Becklake, M. R. J. Appl. Physiol. <u>1966</u> , 21, 1397-1399.
2. Human blood	
VARIABLES:	PREPARED BY:
	C. L. Young
EXPERIMENTAL VALUES: T/°C	= 37
Chole No. of ra samples 10 ³	sterol Total Ostwald nge lipids coefficient g m ⁻³ 10 ³ g m ⁻³ Mean SD*
Normal subjects (both sexes) 40	0.465 0.0095
Thyrotoxic subjects 4 1.04	-2.84 0.461 0.0093
Subjects with hyperlipidemia 4 2.41	-4.54 10.75-17.95 0.472 0.0200
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE: Venous blood taken in heparinized syringes from 40 normal healthy sub- jects and from 4 thyrotoxic subjects with hyperlipidemia. Blood equili- brated with gas mixture (8% N ₂ O, 20% O ₂ and 72% He) in flow system. Samples then analysed by extracting in stream of oxygen and using infra- red analyser. Details in source and ref. 1.	SOURCE AND PURITY OF MATERIALS: See method.
	ESTIMATED ERROR: δT/K = ±0.1. REFERENCES: 1. Lawther, P. J.; Bates, D. V. <i>Clin. Sci.</i> <u>1953</u> ,12, 91.

COMPONENTS:	ORIGINAL MEASUREMENTS:		
l Nithern cuide, N.O. (10004.07.2)			
1. Nitrous Oxide; $N_20$ ; $[10024-97-2]$	Ustiguy, G. L.; Becklake, M. R.		
	J. Appl. Physiol. <u>1966</u> , 21,		
	1397-1399.		
2. Human blood			
VARIABLES:	PREPARED BY:		
	C I Young		
EXPERIMENTAL VALUES: T/°C	= 37		
Men	Ostwald coefficient		
Age/yr No. of samples	Mean Range		
Under 20 3	0.472* 0.461 - 0.491		
20-29 4	0.456 $0.450 - 0.460$		
40-49 3	0.461 $0.458 - 0.4660.465$ $0.460 - 0.468$		
50-59 3	0.464 0.448 - 0.473		
60-69 2	0.465 0.462 - 0.468		
70 and over 3	0.461 0.459 - 0.462		
Total 24	0.463 ± 0.0083 (standard deviation)		
Women			
20-29 3	0.463 0.457 - 0.468		
30-39 3	0.458 0.449 - 0.463		
	0.468 $0.463 - 0.473$		
60-69 3	$0.475^{\dagger}$ $0.473^{-}$ $0.477^{-}$		
	$0.468 \pm 0.0105$ (standard dowiation)		
	$0.408 \pm 0.0105$ (Standard deviation)		
⁺ Authors claim values for women aged 50-69 yr were significantly different from those for women aged 20-49 yr.			
AUXILIARY INFORMATION			
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Venous blood taken in heparinized syringes from normal healthy men and women. Blood equilibrated with gas mixture $(8\% N_2O, 20\% O_2 \text{ and } 72\% \text{ He})$ in flow system. Samples then analy- sed by extracting nitrous oxide in stream of oxygen and using infrared analyser. Details in source and ref. 1.	See method.		
	ESTIMATED FREOR.		
	$\delta T/K = \pm 0.1$		
	REFERENCES:		
	1. Lawther, P. J.; Bates, D. V.		
	Clin. Sci. <u>1953</u> ,12, 91.		

COMPONENTS :	·····	······································	ORIGIN	AL MEASUREMENT	'S :		
1. Nitrous oxide; N ₂ O; [10024-97-2]		Maple	Mapleson, W. W.; Evans, D. E.;				
		Floo	Flook, V.				
2. Rabbit Ti	ssue and	Blood	Brit	. J. Angesth	1970. 42	1033-1041	
				•••••••••••••••	<u>15,00</u> , 10,		
VARIABLES:			PREPAR	ED BY:			
			C.L	. Young			
				·			
EXPERIMENTAL VAL	UES:	T =	37.5 °(				
	Blo	od	twald co Bra	defficients ain	Hea	art	
Sample No.	<i>vivo</i>	vitro	vivo	vitro	<i>vivo</i>	vitro	
1	0.51	0.48	0.44	0.46	0.34	- (	
2	0.47	0.42	0.48	0.46	0.44	0.48	
3	0.47	0.44	0.34	0.44	0.39	0.35	
4	0.45	0.46	0.45	0.48	0.42	0.31	
6	0.46	0.46	0.49	0.50	0.43	0.43	
	Kidn	ey	Liv	ver	Musc	le	
	0100	vitro	0100	vitro	0100	vitro	
1	0.45	0.52	0.39	0.48	0.42	0.40	
2	0.38	0.40	0.46	0.51	0.27	0.35	
3	0.36	0.40	0.35	0.39	0.31	0.22	
4	0.39	0.40	0.3/	0.37	0.31	0.38	
6	0.39	0.42	0.41	0.45	0.38	0.40	
		AUXILIA	RY INFORMA	ATION			
METHOD/APPARAT	US/PROCED	URE :	SOURCE	AND PURITY OF	MATERIALS:		
Samples take	n from ra	bbits of a	1. 1	No details g	iven.		
variety of s	trains.	Details in		2 Details of sample propagation			
source. Ni from samples apparatus. during handl estimated at	using va Loss of ing of <i>in</i> about 3	n Slyke nitrous oxide vivo samples per cent.		given in sou	ampie prepa rce.	IFATION	
			ESTIMA	TED ERROP.			
			Detai	led analysi	s of error	given in	
			paper			J	
			REFERE	INCES :			

Biological Fluids			241	
COMPONENTS:	ORIGINAL MEASI	JREMENTS:		
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>	Kozam, R. L Cubina, J. J. Appl. Ph	.; Landa M.; Luka ysiol. <u>1</u>	u, S. M. s, D. S. <u>970</u> , 29,	; 593-597.
2. Human blood components		_		
VARIABLES:	PREPARED BY:			
	C. L. Yo	ung		
EXPERIMENTAL VALUES:	1			
T/°C	: = 37			
		Bunson	coeffic	ient. a
Substance No. of samples No. of	analyses	Mean	SD*	SE*
Water 6	19	0.433	0.008	0.002
0.156 M NaCl 5	33	0.398	0.003	0.001
Plasma 13	62	0.400	0.008	0.002
hyperlipidemic 2 plasma 2	8	0.436	0.002	0.001
Red blood cells 14	75	0.450	0.021	0.002
Red cell membrane l	8	0.412	0.002	0.001
AUXILIARY	INFORMATION			
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PU	RITY OF MAT	ERIALS:	
Blood samples taken from five normal subjects. Details of sample pre- paration in source. Samples equili- brated by bubbling nitrous oxide through mixture and then allowing to stand. Nitrous oxide then esti- mated by gas chromatography.	1. Nitrou 2. Water- other	s oxide-U distilled samples i	SP Pure : detai n source	sample. ls of
	ESTIMATED ERF	OR:	· · · · · · · · · · · · · · · · ·	
	$\delta T/K = \pm 0.2$	•		
	REFERENCES			

COMPONENTS :	ORIGINAL MEASUREMENTS:
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> </ol>	Kety, S.S.; Harmel, M.H. Broomell, H.T.; and Rhode, C.B.
<ol> <li>Brain, homogenized in distilled water.</li> </ol>	J. Biol. Chem. <u>1948</u> , 173, 487-496.
VARIABLES:	PREPARED BY:
	W. Gerrard.
EXPERIMENTAL VALUES:	
Dog (7 animals) $\begin{array}{r} 0.434\\ 0.406\\ 0.430\\ 0.420\\ 0.458\\ 0.455\\ 0.454\\ Mean  0.437\\ Standard error  0.008\\\\\end{array}$ Bunsen coefficient, $\alpha$ , for 310.1 (reduced to 273.15 K and 101.325 brain when equilibrated at 310.1 pressure of 101.325 kPa. Given $\begin{array}{r} W_b\\ \alpha_h  \frac{W_b}{1.05} + \\ \hline & W_b\\ \alpha_h  \frac{W_b}{1.05} + \\ \hline $	Man (7 deceased patients) $\alpha$ 0.428 0.434 0.437 0.425 0.438 0.432 0.464 0.437 0.005 5 K defined as cm ³ of N ₂ O 5 K and at a nitrous oxide by : $V_w - V_w \alpha_w$ $\alpha$ for 1 cm ³ of water; $W_b$ = weight ter; 1.05 = specific gravity of brain.
AUXILIARY	INFORMATION
METHOD APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS.
Homogenate was equilibrated with nitrous oxide in a 50 cm ³ glass syringe, capped and shaken at 310.15 K. Undissolved gas removed and the nitrous oxide content of the liquid was determined using a Van Slyke-Neill manometric apparatus.	N2O: Not stated.
	ESTIMATED ERROR:
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>	Cander, L.;J. Appl. Physiol. <u>1959</u> 14, 538-540.
<ol> <li>Human lung tissue-blood free homogenate.</li> </ol>	
VARIABLES:	PREPARED BY:
	W. Gerrard.
EXPERIMENTAL VALUES:	
From 5 deceased patient	s. α [*]
1	0.433
2	0.371
	0.390 0.384
3	0.403
	0.413
4	0.414
5	0.429 0.423
Mean	0.407 ±7%
101.325 kPa, and 310.15 K.	
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
5 cm ³ of homogenate deaerated and transferred to a 50 cm ³ syringe containing nitrous oxide. After equilibration at 310.15 K (1), the undissolved gas removed and the nitrous oxide content of the liquid phase was determined using a Van Slyke manometric apparatus.	<ol> <li>98.0% pure.</li> <li>Lung samples from deceased patients with no history of acute or chronic lung disease.</li> </ol>
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.5; \delta \alpha = \pm 2-9 \%$ (estimated by compiler).
	REFERENCES: 1. Kety, S.S.; Harmel, M.H., Broomell, H.T.; and Rhode,C.B. J. Biol. Chem. <u>1948</u> , 173,487.

COMPONENTS :	ORIGINAL MEASUREMENTS:			
1 Nitrous oxide: N=0: [10024-97-2]	Assali. N. S.: Boss. M.			
2 Human Fotal and Utaring Missurg	Soc. Exp. biol. Med. Proc. <u>1959</u> ,			
2. Human Fetal and Uterine Tissues	100. 497-498.			
VARIABLES:	PREPARED BY:			
	C. L. Young			
	or in roung			
T = 37  °C Pressu	re = 1 atmosphere = 1.01325 bar			
	<b>1</b>			
Tissue Kuene	n Coefficient, S			
Spleen	0.589			
Skeletal muscle	0.473			
Skin	0.458			
Brain	0.439			
Heart	0.496			
Lung	0.432			
Scalp	0.327			
Umbilical cord	0.333			
Uterine muscle	0.472			
Mean	0.430			
[†] Incorrectly called Bunsen coefficient per gram of tissue in original paper.				
AUXILIARY	INFORMATION			
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Samples homogenized and equilibrated	l. No details given.			
with nitrous oxide. No details of apparatus given. Five to eight determinations made for each type of tissue.	<pre>2. Samples of fetal material taken from one to five month immature fetus (therapeutic abortion) and one 8 months premature fetus and one full term fetus who died shortly after delivery. Myometrial tissue obtained from patients undergoing cesarean section. Placental tissues collected from spontaneously delivered pregnancies. ESTIMATED ERROR:</pre>			

COVERNMENT			0.0.7.0.7.1			
COMPONENTS :		ORIGINAL MEASUREMENTS:				
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> </ol>		Kozam, R	.L.; L	andau, S.	м.;	
		Cubina,	J. M.;	Lukas, D.	s.	
			J. Appl.	Physiol	. <u>1970</u> , <i>29</i>	, 593-
2. Human myocardiu	ım		597.			
				<del></del>		_
VARIABLES:			PREPARED BY:			
			C. L. Yo	ung		
EXPERIMENTAL VALUES:		T/°C =	= 37			
				Bunse	n coeffici	ent,
Nature of comple	No. of	No. of	Mean	Moon	a CD*	CP*
Mature or sample	sampres	anaryses	10 ⁶ g m ⁻³	Mean	50"	SE"
Normal						
Left ventricle Right ventricle	5	30 22	1.055	0.395	0.016 0.038	0.003
Hypertrophy	0		1.050	0.102	01050	0.000
Left ventricle	3	20	1.046	0.396	0.029	0.007
Right ventricle	3	19	1.048	0.448	0.023	0.005
ASHD and MI						
Left ventricle Right ventricle	2 1	13 8		0.382 0.449	0.013 0.010	0.004 0.004
Cardiomyopathy						
Left ventricle	1	9	1.053	0.409	0.012	0.004
Right ventricle	1	7	1.039	0.468	0.102	0.005
* SD - standard deviation; SE - standard error [†] Arteriosclerotic heart disease and myocardial infaction						
		AUXILIARY	INFORMATION			
METHOD /APPARATUS/PI	ROCEDURE :		SOURCE AND P	URITY OF N	ATERIALS:	
			1 Nitrow	a avida	USD Duro	a amp lo
segments of connect	ctive tissu	es re-	I. NICIOU	s oxide	- USP Pule	sampie.
moved from left an	nd right ve	ntricular	2. Obtain	ed at au	topsy from death (som	subjects
displacement of wa	ater. Mus	cle	stored at -15 °C).			
minced and homoger	nized. De	tails of				
Samples equilibrat	ted by bubb	ling				
nitrous oxide through the stand a	ough mixtur	e.				
Oxide estimated by	gas chrom	atography.				
			ESTIMATED ER	ROR:		
			<b>δ</b> τ/K = :	±0.2.		
			DEPEDENCING			
			REFERENCES:			

COMPONENTS :	ORIGINAL MEASUREMENTS .
1. Nitrous oxide; N ₂ O; [10024-97-2]	Kozam, R. L.; Landau, S. M.; Cubina, J. M.; Lukas, D. S.
2. Dog myocardium	19. Appl. Ingelol. <u>1570</u> , 20, 555-557.
VARIABLES:	PREPARED BY:
	C. L. Young
EXPERIMENTAL VALUES:	°C = 37
1/	= 57 Bunsen coefficient, a
No. of No. o Nature of sample samples analys	f Mean es density Mean SD* SE* 10 ⁶ g m ⁻³
Left ventricle 7 40	1.037 0.386 0.022 0.008
Right ventricle 1 4	1.037 ⁺ 0.374
AUXILIAR	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
All large vascular structures and segments of connective tissues re- moved from left and right ventricular myocardium. Density determined by displacement of water. Muscle mince and homogenized. Details of sample preparation in source. Samples equilibrated by bubbling nitrous oxide through mixture. Allowed to stand and then nitrous oxide esti- mated by gas chromatography.	<pre>1. Nitrous oxide-USP Pure sample. 2. Myocardium samples obtained from freshly killed dogs. d</pre>
	ESIIMALED EKKOK:
	$\delta T/K = \pm 0.2.$
	REFERENCES :

	24/			
COMPONENTS :	ORIGINAL MEASUREMENTS:			
<pre>1. Nitrous oxide; N₂O; [10024-97-2]</pre>	Campos Carles, A.; Kawashiro, T.; Piiper, J.			
2. Rat abdominal muscle	Pflugers Arch. <u>1975</u> , 359, 209-218.			
VARIABLES: T/K: 310.15	PREPARED BY: A.L. Cramer H.L. Clever			
EXPERIMENTAL VALUES: T/K Solubility coefficient µmol dm ⁻³ torr ⁻¹ µmo	Corrected ² Solubility Bunsen coefficient Coefficient, ol dm ⁻³ torr ⁻¹ α			
310.15 24.6 ± 0.7	27.7 0.471			
¹ Mean value ± standard error of ² Corrected for unextracted gas i lost during transfer of the sam Another report from this labora constant, K = (20.0 ± 0.4) x l and the diffusion coefficient, nitrous oxide in rat abdominal The sample is a non-homogenised	12 measurements. In the sample, and for gas mple. atory gives Krogh's diffusion $0^{-9}$ m mol m ⁻¹ cm ⁻¹ torr ⁻¹ , D = 12.1 x 10 ⁻⁶ cm ² s ⁻¹ , for muscle at 310.15 K (1). I solid, not a liquid.			
ΔΙΙΥΤΙΤΑΦΥ ΙΝΕΩΟΜΑΤΙΩΝ				
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS.			
The nitrous oxide gas was pre- saturated with water vapor, then passed through an equilibration chamber containing the muscle sample resting on a screen to expose all sides. The gas was passed through the equilibration chamber for one hour at a rate of 8 cm ³ m ⁻¹ . The muscle was transferred to an extraction chamber filled with air for the same length of time as equilibration. The gas in the extraction chamber was then forced	<ol> <li>Nitrous oxide. Source not given. Stated to be 99.9 per cent pure.</li> <li>Rat abdominal muscle. Flat abdominal wall muscle layer of about 1.6 g, 1.4 mm thick, and surface area of 10 cm² on one side. Sample taken from 250-430g rat.</li> </ol>			
into a gas chromatograph by mercury entering the chamber.	<pre>REFERENCES: 1. Kawashiro, T.; Campos Carles, A.; Perry, S.F.; Piiper, J. Pflugers Arch. 1975, 359, 219.</pre>			

COMPONENTS:	ORIGINAL MEASUREMENTS:		
	Findlay, A.; Creighton, H.J.M.		
1. Nitrous oxide; N ₂ O; [10024-97-2]	J. Chem. Soc. 1910, 97,536 - 561		
2. Water, H ₂ O; [7732-18-5]			
3 Serum albumen (colloidal)			
VARIABLES:	PREPARED BY.		
Pressure, concentration	W. Gerrard		
Concentration	of the gas in the liquid phase		
Solubility, S, given as concentration	of the gas in the gaseous phase		
T/K = 298.16.			
Conc. of colloid Density of solution	on Pressure of Solubility, S		
$/ 10^{-2} \text{g cm}^{-3}$ .	gas /kPa		
0.32 0.000	99.457 0.583		
0.32 0.998	116.388 0.581		
0.32 0.998	130.387 0.579		
0.32 0.998	167.850 0.588		
0.32 0.998	185.981 0.591		
1.40 1.001	99.057 0.537		
1.40 1.001	112.255 0.538		
1.40 1.001	139.719 0.550		
1.40 1.001	163.717 0.558		
1.40 1.001	105.040 0.502		
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS;		
Gas buret and absorption pipet similar to that of Geffcken (1), except that	<ol> <li>Self prepared and purified; not attested.</li> </ol>		
the manometer tube was longer to give the higher pressures.	2. Neutral serum-albumen was		
	obtained from fresh ox-blood by a method described.		
	ESTIMATED ERROR:		
	$\delta S/S$ Stated to be $\mp$ 0.25%.		
	REFERENCES:		
	1. Geticken, G. <u>Z. Phys. Chem.</u>		
	<u>1904</u> , <i>49</i> ,257.		

COMPONENTS: 1. Nitrous oxide; N ₂ O; [10024-97-2] 2. Water; H ₂ O; [7732-18-5] 3. Serum albumen (colloidal)	ORIGINAL MEASUREMENTS: Shkol'nikova, R.I. <i>Uchenye Zapiski</i> Leningrad. Gosudart, <u>1959</u> , No. 18,		
solution.	Part 272, 64-86.		
VARIABLES:	PREPARED BY:		
Temperature, concentration of colloid	W. Gerrard		
EXPERIMENTAL VALUES:			
T/K Concn. of colloid			
283.15 0.575	0.7094 0.7354		
288.15	0.6245 0.6588		
293.15	0.5520 0.5923		
298.15	0.4850 0.5379		
308.15	0.4031 0.4548		
313.15	0.3490 0.3999		
283.15 1.15	0.6988 0.7244		
288.15	0.6162 0.6500		
293.15	0.5440 0.5837		
298.15			
308.15	0.3681 0.4153		
313.15	0.3000 0.3438		
283.15 1.68	0.6324 0.6556		
288.15	0.5852 0.6173		
293.15	0.5390 0.5783		
298.15	0.4513 0.4927		
303.15	0.3340 0.3768		
313.15	0.2380 0.2727		
283.15 1.99 288.15	0.5900 0.6116 0.5374 0.5669		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
The volume of $N_2O$ absorbed was measured by the use of a gas buret and absorbtion pipet.	(1) Nitrous oxide stated to be of a purity of 99.6 - 99.7%; 0.4 to 0.3% $N_2$ .		
Reproducibility stated to be to within $\pm 0.2$ %.	(2) Water may be taken as of satis- factory purity.		
Heat of solution, U, appeared to be based on :	(3) Obtained by "salting out from the serum of horse blood by ammonium sulfate." Dialized		
$\frac{d \log L}{dT} = - \frac{U}{RT^2}$			
	REFERENCES :		
	<u> </u>		

ſ <u></u>					
COMPONENTS:	ORICINAL MEASUREMENTS:				
	Shkol'nikova, R.I.				
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> <li>Water; H₂O; [7732-18-5]</li> <li>Serum albumen (colloidal) solution.</li> </ol>	Uchenye Zapiski Leningrad Gosudart, <u>1959</u> , No. 18, Part 272, 64-86.				
EXPERIMENTAL VALUES:					
T/K Concn. of colloi	.d a L				
293.15 1.99	0.4120 0.4421				
298.15	0.4021 0.4390				
303.15	0.3920 0.4347				
308.15	0.3091 0.3487				
313.15	0.2190 0.2510				
<ul> <li>α = the bunsen absorbtion coefficient.</li> <li>L = α x T/K /273, but defined as the ratio of the concentration of the gas in the liquid phase to that in the gas phase. Partial pressure of gas taken to be 760 mmHg. 760mmHg = 1 atm = 101.325 kPa.</li> </ul>					
Heat of solution / cal $mol^{-1}$					
Concn. of colloid a	L				
0.575% 4190	3580				
1.15 % 5430	4830				
1.68 % 7460	6860				
1.99 % 5770	5160				

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitrous oxide: NaO: [10024-07-2]	Findlay, A.; Creighton, H.J.M.		
	J. Chem. Soc. 1910, 97,536-561		
2. Water; H ₂ O; [7732-18-5]			
3. Egg albumen, (colloidal).			
VARIABLES:	PREPARED BY.		
Pressure, concentration	W. Gerrard		
EXPERIMENTAL VALUES: Concentration	of the gas in the liquid phase		
Solubility, S, given as concentration	of the gas in the gaseous phase		
T/K = 298.16	· · ·		
Conc. of soln. Density of solution	Pressure of Solubility, S		
/10 ⁻² g cm ⁻³	gas /kPa		
0.35 0.998	97,990 0,580		
0.35 0.998	110.656 0.578		
0.35 0.998	127.187 0.580		
0.35 0.998	166 517 0.580		
0.35 0.998	181.715 0.580		
0.75 1.000	97.990 0.569		
0.75 1.000	109.322 0.562		
0.75 1.000	147.185 0.573		
0.75 1.000	179.182 0.577		
1.60 1.005	97.190 0.548		
1.60 1.005			
	126.121 0.540		
1.60 1.005	159.851 0.553		
1.60 1.005	186.515 0.558		
AUXILIARY	INFORMATION		
METHOD: / APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Gas buret and absorption pipet	1. Self prepared and purified:		
similar to that of Geffcken (1),	not attested.		
except that the manometer tube was	2. Egg albumen was obtained from		
Tonger to give the higher pressures.	fresh eggs by the method described.		
determined by heating the solution to	added to prevent putrifaction.		
effect complete coagulation. The			
coagulate was dried at 373.16K and			
weighed.			
	ESTIMATED ERROR:		
	STITUTED ERROR:		
	05/5 Stated to be + 0.25%.		
	REFERENCES :		
	1 Geffeken G. 7 Phus Cham		
	1. Geficken, G., Z. Phys. Chem.		
	<u>1904</u> , 49,257.		
	1		

COMPONENTS:	ORIGINAL MEASUREMENTS:		
	Findlay, A.: Howell, O. R.		
1. Nitrous oxide; N ₂ O; [10024-97-2]	I Cham See 1014 105 201-9		
2. Water; H ₂ O; [7732-18-5]	<i>o. chem. 500.</i> <u>1914</u> , 105, 291-6.		
3. Egg-albumen (colloid)			
VARIABLES:	PREPARED BY:		
Pressure, concentration	W. Gerrard		
EXPERIMENTAL VALUES: Temperature not stat	ed: presumably 298.16 T/K		
Solubility, s, given as <u>concentratio</u> concentration	n of the gas in the liquid phase of the gas in the gaseous phase		
Conc. of Density $P_{N,O}^{\dagger}$	$P_{N,O}^{\dagger}$ $P_{N,O}^{\dagger}$		
colloid of $N_2 O$ s	N ₂ O 8 N ₂ O 8		
(soln.) kPa	kPa kPa		
0 38 0 998 33 157 0 572	48,169 0,573 70,753 0,573		
84.485 0.572	100.750 0.570 132.813 0.571		
0.62 1.000 33.877 0.568			
0.38 0.998 34.943 0.572	49.395 0.573 71.633 0.573		
84.592 0.572	97.790 0.571 121.988 0.568		
AUXILIARY	INFORMATION		
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Measurement of volume of $N_2O$ by gas	1. Nitrous oxide self prepared and		
buret and pipet (ref. 1).	<pre>purified, see ref. 2. 3. Commercial egg-albumen was treated with water, the solution was filtered and dialysed.</pre>		
	ESTIMATED ERROR:		
	REFERENCES :		
	1. Findlay, A.; Williams, T.		
	J. Chem. Soc. <u>1913</u> , 103, 636.		
	2. Findlay, A.; Creighton. H. J. M. J. Chem. Soc. <u>1910</u> , 97, 536.		
	1		

COMPONENTS :	ORIGINAL MEASUREMENTS:			
1. Nitrous oxide; N ₂ O; [10024-97-2]	Findlay, A.; Howell, O.R.			
2. Water; H, O; [7732-18-5]	J. Chem. Soc. <u>1914</u> , 105,291-8			
3. Dextrin (colloidal);				
VARIABLES:	PREPARED BY:			
Pressure, concentration	W. Gerrard			
EXPERIMENTAL VALUES: Temperature not s	stated: presumably 298.16 T/K			
concentrati	on of the gas in the liquid phase			
Solubility, S, given as concentrati	on of the gas in the gaseous phase			
Conc. of soln. Density of ${}^{p}N_{2}O^{+}$ /10 ⁻² g cm ³ . solution /kPa	S ^P N2O ⁺ S ^P N2O ⁺ S /kPa /kPa			
6.82 1.019 37.530	0.557 54.275 0.550 75.339 0.542			
6.82 1.019 89.738	0.542 109.202 0.547 133.920 0.554			
6.70 1.019 37.903 6.70 1.019 88.618	0.555 54.368 0.550 74.753 0.544 0.544 103.070 0.546 130.734 0.554			
12.41 1.037 37.836 12.41 1.037 88.058	0.537 54.355 0.532 76.632 0.526 0.527 104.750 0.526 131.320 0.534			
12.50 1.037 37.543 12.50 1.037 89.551	0.535 55.501 0.530 76.939 0.526 0.526 103.190 0.524 129.507 0.532			
19.24 1.060 39.063	0.515 56.194 0.510 79.819 0.504			
19.24 1.060 92.724	0.501 106.563 0.500 132.988 0.506			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$			
+ p _{N2O} is the pressure of N ₂ O o	ver the solution.			
AUXILI	ΑΡΥ ΙΝΕΟΡΜΑΤΙΟΝ			
METHOD. /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS.			
Measurement of volume of $N_2O$ by gas	1. Self prepared and purified (2).			
buret and pipet (1).	2. Kablbaum's purest dextrip was			
The concentration of the dextrin in the solutions was determined by evaporating to dryness, drying the residue in a steam oven and weighin	g.			
	ESTIMATED ERROR:			
	REFERENCES :			
	<ol> <li>Findlay, A.; Williams, T. J. Chem. Soc. <u>1913</u>, 103,636.</li> </ol>			
	2. Findlay, A.; Creighton, H.J.M. J. Chem. Soc. <u>1910</u> , 97, 536.			

COMPONENTS :	ORIGINAL MEASUREMENTS:			
	Findlay, A.; Creighton, H.J.M.			
1. Nitrous oxide; N ₂ O; [10024-97-2]	I Chem Soc. 1910, 97 536-561			
2. Water, H ₂ O; [7732-18-5]	0. CREM. DOC. 1910, 87, 530-301			
3. Glycogen, (colloidal).				
VARIABLES:	PREPARED BY:			
Pressure, concentration	W. Gerrard			
EXPERIMENTAL VALUES:	· · · · · · · · · · · · · · · · · · ·			
Concentrat Solubility, S given as	ion of the gas in the liquid phase			
concentrat	ion of the gas in the gaseous phase			
T/K = 298.16				
Conc. of colloid Density of sol /g cm ⁻³ (soln)	ution Pressure of Solubility, S gas /kPa.			
0.0049 0.999	98.390 0.590			
0.0049 0.999 0.0049 0.999	118.521 0.588 130.254 0.591			
0.0049 0.999	146.919 0.594			
0.0049 0.999	184.782 0.594			
0.0100 1.002	98.257 0.585			
0.0100 1.002	116.122 0.584 132.120 0.589			
0.0100 1.002	139.986 0.591			
0.0100 1.002	181.315 0.596			
AUXILIA	Y INFORMATION			
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Gas buret and absorption pipet	1. Self prepared and purified;			
similar to that of Geffcken (1), except that the manometer tube was	not attested.			
longer to give the higher pressure.	<ol> <li>Kahlbaum's pure glycogen was dialysed. Toluene was added to prevent putrifaction.</li> </ol>			
	ESTIMATED ERROR:			
	$\delta S/S$ Stated to be $\overline{+}$ 0.25%.			
	REFERENCES:			
	<ol> <li>Geffcken, G.; Z. Phys. Chem. <u>1904</u>, 49, 257.</li> </ol>			

COMPONENTS:	ORIGINAL MEASUREMENTS .			
	Findlay, A . Creighton H T M			
1. Nitrous oxide; N ₂ O; [10024-97-2]	Findlay, A.; Creighton, H.J.M.			
2. Water; H ₂ O; [7732-18-5]	J. Unem. Soc. <u>1910</u> , 97, 536-561			
3 Devtrin (colloidal);				
S. Dextrin, (corrordar);				
VARIABLES:	PREPARED BY:			
Pressure, concentration	W. Gerrard			
EXPERIMENTAL VALUES:	of the gas in the liquid shace			
Solubility, S given as	or the gas in the right phase			
T/K = 298.16	of the gas in the gaseous phase			
Cong of colloid Dongity of Dr	cours of goo Colubility C			
/g cm ⁻³ (soln) solution	/kPa			
	·			
0.0698 1.018	98.523 0.549			
0.0698 1.018	109.589 0.550 126.521 0.555			
0.0698 1.018	145.585 0.560			
0.0698 1.018	165.183 0.562			
0.0698 1.018	182.382 0.569			
0.1301 1.039	97.190 0.529			
0.1301 1.039	121.854 0.526			
0.1301 1.039	136.386 0.533			
0.1301 1.039	164.917 0.540 181.049 0.544			
0.2020	00 657 0 503			
0.2030 1.082	111.456 0.499			
0.2030 1.062	121.454 0.503			
0.2030 1.062	153.185 0.509			
0.2030 1.062	181.315 0.516			
AUXILIARY	INFORMATION			
METHOP /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Gas buret and absorption pipet	1. Self prepared and purified:			
except that the manometer tube was	not attested.			
longer to give the higher pressures.	2. Kahlbaum's purest dextrin was used			
	ESTIMATED ERROR:			
	$\delta S/S$ Stated to be $\mp 0.259$			
	REFERENCES			
	(1) Gericken, G.; 2. Phys. Chem. <u>1904</u> , 49,257.			

I

256 Nitro	Nitrous Oxide				
COMPONENTS: ORIGINAL MEASUREMENTS:					
1. Nitrous oxide; N ₂ O; [10024-97-2]	Meyer, K.H.; Gottlieb-Billroth, H.; Z. Phys. Chem. <u>1921</u> , 112,55.				
2. Olive oil.					
VARIABLES:	PREPARED BY: W. Gerrard				
EXPERIMENTAL VALUES:					
T/K Ostwald coeffi	cient, <i>L</i> , taken as				
<u>Concn. of gas</u> Concn. of gas	in the liquid phase in the gaseous phase				
(Final pressur were about 0.7	es, accurately measured, 9 x 101.325 kPa.)				
310.16 1.44 1.47 1.34 1.34	Mean 1.40 ±0.06				
AUXILIARY	INFORMATION				
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:				
Cylindrical absorption pipet attached to buret and levelling tube assembly. Measurement of concentration of gas in the liquid and in the gas phase by measurement of volume and pressure, and by the assumption of the ideal gas laws.	Not specified.				
	ESTIMATED ERROR:				
	REFERENCES :				

COMPONENTE	ODTOTIVIT
COMPONENTS:	ORIGINAL MEASUREMENTS:
<ol> <li>Nitrous oxide; N₂O; [10024-97-2]</li> </ol>	Gniewosz, S.; Walfisz, A.
2. Petroleum.	Z. Physik. Chem. <u>1887</u> . 1,70-72.
VARIABLES:	PREPARED BY:
Temperature	M.E. Derrick.
EXPERIMENTAL VALUES:	
No pressures given; however work pressure. Gas is assumed to be be obeyed.	carried out at atmospheric ideal and Henry's Law, to
	officient Puncen
	coefficient,*
	α
293.15 2.26	2.11
203.15 2.50	2.49
<ul><li>* original data.</li></ul>	
AUXILIARY	INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
Composed of an absorption flask	Gas: no information given.
Connected to a gas buret using a flexible lead capillary. System	Petroleum: Russian petroleum used.
is thermostated in a large water	Cleaned by boiling in a large copper
bath. Volume of gas absorbed in	flask.
ured using a gas buret.	
	ESTIMATED ERROR:
	REFERENCES ·

ONENTS:
Nitrous oxide; N ₂ O; [10024-
Nitrogen dioxide; NO ₂ ; [10102-44-0]

COMPONEN	TS:			ORIGINAL MEASUREMEN	NTS:	
1. Ni	trous oxide	; N ₂ O; [100]	24-97-2]	Rocker, A.W.	Anal. Chem	. <u>1952</u> , 24,
2. Ni	trogen diox	ide: NO		1322-1324.		
[1	0102-44-0]					
VARIABLE	:S :	·		PREPARED BY:		
Tem	perature, p	pressure		W. G	errard	
EXPERIME	NTAL VALUES:			Mole fractio	$on^* x_1$	
T/K	Partial	Solubility	base	ed on NO ₂	based on	$N_2O_4$ for
	pressure p _{N+O} /kPa	weight N ₂ O	' [*] observe	ed 101.325 kPa	observed	101.325kPa
	N 2 O					
263.0	82.66	1.28	0.0134	0.0164	0.0268	0.0328
263.1	83.99	1.33	0.0139	0.0167	0.0278	0.0334
263.1	75.99	1.52	0.0159	0.0191	0.0318	0.0382
268	75.99	1.27	0.0133	0.0177	0.0266	0.0354
273.2	67.99	1.11	0.0116	0.0172	0.0232	0.0344
273.0	67.99 58 66		0.0109	0.0162	0.0218	0.0324
278.4	57.33	0.82	0.00853		0.0189	0.0292
283.0	49.33	0.65	0.00679	0.0140	0.0136	0.0280
283.1	46.66	0.59	0.00617	0.0136	0.0123	0.0272
203.1	45.33	0.63	0.00658	0.0146	0.0132	0.0292
			AUXILIARY	INFORMATION		
	ADD D D D D D D D D D D D D D D D D D D	DDOGDDUDD.		LAUDER AND DUDING	07. MARED 110	
METHOD /	APPARATUS/	PROCEDURE:	ntur Mhr	SOURCE AND PURITY	OF MATERIALS:	of commons.
gas bur	et was a F	isher precis	ion model	ial grade, 99.2% purity, or better.		
absorpt	, graduate	a in U.I cm ⁻ as graduated	. The .1	2. The nitrogen dioxide was commerc-		
cm ³ to	50 cm ³ . C	onnections w	ere by	ial grade, 97.8	-99% pure.	
plastic	tube. Gla	ss joints we	re lub-			
was fit	ted with a	levelling t	ube con-			
taining	g mercury.	A slight pos	itive			
differe	ence of gas	pressure wa	s main-			
flowbac	on the bur	et side to n den dioxide.	inder the			
itenback of hiteogen aloxide.		ESTIMATED ERROR:				
				REFERENCES :		
l				}		
]						
ļ						
ļ						
L						

COMPONENTS:	ORIGINAL MEASUREMENTS:	
l. Nitrous oxide; N2O; [10024-97-2]	Yen, L. C.; McKetta, J. J., Jr. J. Chem. Eng. Data 1962. 7. 288-289.	
2. Carbon disulfide; CS ₂ ; [75-15-0]		
VARIABLES:	PREPARED BY:	
Temperature	W. Gerrard/ C. L. Young	
EXPERIMENTAL VALUES:	······································	
T/K Bunsen coefficient	Mole fraction of nitrous oxide, $x_{N_2O}$	
263.16 3.409	0.008842	
273.16 2.801	0.007359	
293.16 2.124	0.005721	
The partial pressure of the	ne gas was 101.325 kPa.	
Smoothe	ed Data	
$\wedge G^{\circ} = -RT \ln x = (-9394)$	$4 + 75.146 \times T/K$ J mol ⁻¹	
(Std. deviatio	$n = 53 \text{ J mol}^{-1}$	
TU/V Mole fraction of mid		
17K More fraction of hit	rous oxide, " _{N2O}	
263.16 0.009	3697	
273.16 0.007	7432	
	5422	
AUXILIARY	INFORMATION	
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:	
Measurement of volume of gas absorbed	1. Gas of 98 per cent purity was	
at a partial pressure of 101.325 kPa.	spectrograph then showed purity	
The vapor pressure of the liquid was allowed for. Gas buret and absorp-	of 99.5 per cent.	
tion pipet. Modified form of	2. Allied Chemical and Dye Corp. ACS	
Apparatus and technique used by Markham and Kobe (1).	grade, freshly fractionated.	
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.1;  \delta x_{N_2O} = \pm 2$ % (estimated	
	by compiler).	
	PEEPENCUS.	
	(1) Nowham A E . Koho K A	
	I $Am$ $Chem$ $Soc 1941$ $63$ $A49$	
1	0, Am. Chem. DOC. 1311, 00, 143.	
L		

COMPONENTS:	EVALUATOR
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Water; H₂O; [7732-18-5]</li> </ol>	Rubin Battino, Department of Chemistry, Wright State University, Dayton, Ohio, 45431, <u>U.S.A.</u>

#### CRITICAL EVALUATION:

Only the data determined by Winkler (1) was considered to be of sufficient accuracy to use in the smoothing equation. We used all nine of his data points. The standard deviation of the fit was 0.76%. The fitting equation is :

 $\ln x_1 = 62.8086 + 82.3420/(T/100K) + 22.8155 \ln (T/100K)$ (1)

where  $x_1$  is the mole fraction solubility at 101.325 kPa (1 atm) partial pressure of gas. Table 1 gives smoothed values of the mole fraction (at 101.325 kPa) and the Ostwald coefficient at 5K intervals. Table 1 also gives values of the thermodynamic functions  $\Delta \overline{G}_1^\circ$ ,  $\Delta \overline{H}_1^\circ$ ,  $\Delta \overline{S}_1^\circ$  and  $\Delta \overline{C}_{p_1}^\circ$  for the transfer of the gas from the vapor phase at 101.325 kPa partial gas pressure to the (hypothetical) solution phase of unit mole fraction.

The earlier paper by Winkler (2) contains an identical set of data. Although Usher's datum point was quite close to the smoothed values it was not used in the fitting equation so that the data from one consistent set could be used alone (3). Armor's single value was considerably further off and this may be due to the chemical method used for analysis (4).

#### **REFERENCES:**

- 1. Winkler, L.W.; Ber. 1901, 34,1408-22.
- 2. Winkler, L.W., Z. Physik. Chem. 1892, 9, 171-5.
- 3. Usher, F.L., Z. Physik.Chem. 1908, 62, 622-5.
- 4. Armor, J.N., J. Chem. Eng. Data. 1974, 19, 82-4.

(Table 1 on next page)

T/K	$x_{1} \times 10^{5b}$	$L \times 10^{2^{C}}$	${}^{\Delta {\tt G} {\tt Y}^d}$	$\Delta \mathbf{H} \mathbf{\hat{g}}^d$	∆Si ^e
273.1	.5 5.905	7.346	22.11	-16.65	-141.9
278.1	5 5.196	6.583	22.81	-15.70	-138.6
283.1	.5 4.625	5.964	23.50	-14.75	-135.1
293.1	5 3.786	5.047	24.17	-12.85	-128.5
298.1	.5 3.477	4.708	25.45	-11.90	-125.3
303.1	5 3.222	4.430	26.07	-10.96	-122.1
308.1	.5 3.012	4.203	26.67	-10.01	-119.0
313.1	.5 2.838	4.017	27.26	- 9.06	-116.0
518°1	.5 2.695	3.867	27.83	-8.11	-113.0
328.1	5 2.577	3.656	28.93	- 6.21	-107.1
333.1	5 2.404	3.587	29.46	- 5.26	-104.3
338.1	5 2.343	3.539	29.97	- 4.32	-101.4
843.1	5 2.297	3.511	30.47	- 3.37	- 98.6
348.1	.5 2.264	3.500	30.96	- 2.42	- 95.9
353.1 350 1	5 2.242	3.506	31.43	- 1.4/	- 93.2
).	190 J K ⁻¹ mol ⁻¹ Mole fraction s gas. Ostwald coeffic	olubility at 101 ient.	.325 kPa p	artial pre	ssure of
1.	Units are J mol	-1. cal _{th} = 4.1	.84 J.		
э.	Units are J K ⁻¹	$mol^{-1}$ .			
			,		
····			,		

62 Nitric Oxide			
COMPONENTS :	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Winkler, L.W.,		
2. Water; H ₂ O; [7732-18-5]	Ber., <u>1901</u> , 34, 1408-22.		
VARIABLES:	PREPARED BY:		
Т/К: 273-353	R. Battino		
EXPERIMENTAL VALUES:			
$T/K^{a}$ $x, \times 10^{5}$ L	$\alpha \times 10^{2}$ $\alpha \times 10^{2}$		
273.22 5.922 283.17 4.587	7.369 7.367 5.915 5.706		
293.17 3.787	5.049 4.704		
303.16 3.231 313.11 2.842	4.022 3.509		
323.19 2.562	3.727 3.151		
	3.601 2.954		
353.00 2.231	3.487 2.698		
<ul> <li>b. Mole fraction solubility at 101.3 gas. Calculated by compiler.</li> <li>c. Ostwald coefficient calculated by</li> <li>d. Bunsen coefficient.</li> </ul>	25 Pa (l atm) partial pressure of compiler.		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Using his "absorptionmeter" method.	<ol> <li>Nitric oxide - prepared and purified chemically by author.</li> </ol>		
	ESTIMATED ERROR:		
	$\delta \alpha / \alpha = 0.01$ (compiler's estimate)		
	REFERENCES:		

W	ater
---	------

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Usher, F.L.		
2. Water; H ₂ O; [7732-18-5]	Z. Physik. Chem., <u>1908</u> , 62, 622-5.		
VARIABLES:	PREPARED BY:		
	R. Battino		
EXPERIMENTAL VALUES:	······································		
$T/K^{a}$ $\alpha \times 10^{2} b$	T/K $x_1 \times 10^5$ $c$ L x $10^2$ $d$		
$293.15 \qquad \begin{array}{r} 4.51 \\ 4.49 \\ 4.48 \\ 4.68 \\ 4.71 \\ 4.73 \\ \underline{4.87} \\ Avg. = 4.64 \pm 0.15 \end{array}$	293.15 3.74 4.98		
a. Temperature reported to 1°C. b. Bunsen coefficient.			
c. Mole fraction solubility at 101. gas calculated by compiler.	325 Pa (l atm) partial) pressure of		
d. Ostwald coefficient calculated b	y compiler.		
AUXILIARY	INFORMATION		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
Used the "Ostwald" apparatus.	<ol> <li>Nitric oxide - chemically prepared and purified.</li> </ol>		
	2. Water - no comment by author.		
	ESTIMATED ERROR:		
	$\delta \alpha / \alpha = 0.03$ (compiler's estimate)		
	REFERENCES :		

64 Nitric Oxide				
COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Armor, J.N.			
2. Water; H ₂ O; [7732-18-5]	J. Chem. Eng. Data, <u>1974</u> , 19, 82-4.			
VARIABLES:	PREPARED BY:			
	R. Battino			
EXPERIMENTAL VALUES:				
$T/K^{a}$ $x_{1} \times 10^{5}$ b	L x 10 ² ^C M x 10 ³ ^d			
298.15 3.523	4.770 1.95			
a. Temperature reported to 0.1 K.				
b. Mole fraction solubility at 101.3 gas. Calculated by compiler.	25 Pa (1 atm) partial pressure of			
c. Ostwald coefficient. Calculated	by compiler.			
d. M is the solubility in molarity c	or moles per litre of solution.			
e. The author also reports solubilit pHs, and salt solutions, all at 2	ies in buffered solutions at various 5°C.			
AUXILIARY	INFORMATION			
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
Pure water was saturated for at least 30 min in a reaction vessel. A 5 cm ³ aliquot was removed and injected into 80 cm ³ of oxygen saturated water. This solution was analysed spectrophotometrically for NO ₂ ⁻ .	<ol> <li>Nitric oxide - from Matheson Gas Products. "Vigorously" scrubbed to remove NO₂.</li> <li>Water - distilled water redistilled from alkaline permanganate.</li> </ol>			
	ESTIMATED ERROR:			
	$\delta M/M = 0.03$ (author's estimate) $\delta T = 0.1 K$ (author's estimate)			
	REFERENCES :			

COMPONENTS:	EVALUATOR:
1. Nitric oxide; [10102-43-9]	W. Gerrard
2. Solutions of metallic salts	The Polytechnic of North London Holloway, London, N7 8DB UK March 1980

CRITICAL EVALUATION:

## Ferrous salts:

Caution should be exercised in looking at all the published data from the aspect of the solubility of nitric oxide in aqueous and nonaqueous solutions of ferrous salts; because the main, if not the only purpose, of the measurements has been to show that the equilibrium

# $Fe^{2+} + NO \rightleftharpoons Fe^{2+}NO$

occurs up to a maximum ratio of one NO to one  $Fe^{2+}$ . Thus Manchot *et al's* [1,2] technique was to measure the volume of nitric oxide absorbed by the iron solution in excess of that volume, not reported, required to saturate the liquid before the addition of the ferrous salt. The maximum volume of nitric oxide absorbed for one mole of ferrous salt was taken to be approximately 22.4 dm³, achieved at a sufficiently low T/K and high pressure. The evaluator deems it inadvisable to attempt a detailed evaluation, especially as there is a wide variation in concentration of the ferrous iron in the different sets of data. This means that the volume of nitric oxide due to the presence of liquid, water or organic liquid, which is holding the ferrous salt is ignored. When looking at a set of data, readers should ask "what volume of nitric oxide would the stated volume of solution of ferrous salt absorb if the iron salt were not present?"

Gay's [3] measurements appear to have been carefully conducted on a comprehensive scale. Thomas's work [4,5,6] is deemed to be less satis-The work of Manchot et al. appears to be of satisfactory accuracy factory. for the purpose of the measurements [i.e. to fix the constitution of the 1:1 complex of Fe²⁺NO]. It must be kept in mind, however, that the reported volume of nitric oxide appears to be that in excess of the volume required to saturate the iron-free liquid. Although the data of Kohschutter and Kutscheroff [7] should be compared with those of Manchot et al., the presentation of these is deemed to be unsatisfactory for the Ganz and Mamon [8] were concerned with the absorption of present purpose. nitric oxide from gaseous mixtures containing that gas. From the aspect of the solubility of nitric oxide their presentation of data is also deemed unsatisfactory. A similarly conclusion was reached by Battino and Clever [9]. Data by Pozin et al. [10] on aqueous solutions of ferrous salts should be read alongside those of Manchot et al. The Pozin et al. data were for several concentrations of ferrous salt and for several temperatures. How~ ever a table was given showing the relative absorbing powers of the aqueous solutions of the following salts at 293 K: ferrous sulfate, ferrous chloride, sodium sulfite plus sodium hydroxide, cuprous chloride plus ammonia, nickel sulfate, manganese sulfate, cobalt sulfate, copper sulfate, cupric chloride, and phosphoric acid. The main concern of Pozin et al. appears to have been the absorption of nitric oxide in technical operations

COMPONENTS:	EVALUATOR:
1. Nitric oxide; [10102-43-9]	W. Gerrard
2. Solutions of metallic salts	

## CRITICAL EVALUATION: Continued

and reference only is now given to the two papers which followed [11,12]. It may, however, be stated that those authors concluded that aqueous solutions of cuprous ammonium chloride, sodium sulfite, and the ferrous salts named in the foregoing were the most efficient absorbing media.

# Ferric salts

The data of Manchot [13] on ferric sulfate in aqueous solutions containing each of several concentrations of sulfuric acid should be accepted with caution as gas-liquid solubilities. Thus 1 dm³ of solution containing 0.01 gram-ion of Fe³⁺, also contained 18.3 moles of  $H_2SO_4$ , and absorbed 44.7 dm³ of nitric oxide "per gram-atom of iron". This means that 100 dm³ of solution containing 1 gram-atom of iron and 1832 moles of  $H_2SO_4$  absorbs 44.7 dm³ [about 2 moles] of nitric oxide. A similar remark applies to the data of Griffith, Lewis, and Wilkinson [14] on an ethanolic solution of ferric chloride. For a molarity of 0.017 of ferric chloride, 21.3 dm³ of nitric oxide were absorbed "per mole" presumably of ferric chloride. That is, 58.8 dm³ of solution absorbs 21.3 dm³ of nitric oxide; whereas 58.8 dm³ of ethanol itself would absorb about 16.8 dm³ of the gas.

# Cupric salts

The data on cupric salts in ethanol furnished by Manchot [15] and by Griffith *et al.* [14] should be looked at from the aspect of the volume of solution and not from the aspect of the volume of nitric oxide per mole of copper salt. This adjustment of attitude is required also in the scrutiny of the data on the solution of cupric salts in several different organic liquids as given by Kohlschutter and Kutscheroff [16].

### Salts of nickel, cobalt and manganese

Hüfner [17] declared that aqueous solutions of these salts absorb "notable quantities" of nitric oxide; but Usher [18] disagreed with Hüfner, and declared that these salts diminished the solubility in water. The evaluator is dubious about the form of presentation of the Hüfner results; and the short paper by Usher is of no consequence. It must be left with readers to draw their own conclusions from the data sheets.

#### Sodium salts

The Ostwald coefficients based on the data by Kohlschutter and Kutscheroff [7] are less than that for water itself under the same conditions, and are probably approximately of the acceptable magnitude.

```
266
```

COM			
		EVALUATOR:	
1.	Nitric oxide; [10102-43-9]	W. Gerrard	
2.	Solutions of metallic salts		
CRI	TICAL EVALUATION: Continued		
REF	ERENCES:		
1.	Manchot, W.; Zechentmayer, K. A	nnalen, 1906, 350, 368	
2.	Manchot, W.; Huttner, F. Annale	n, 1910, <i>372</i> , 153	
3.	Gay, J. Ann. Chim. Phys. 1885, [	6], 5, 145	
4.	Thomas, V. Compt. rend. 1896, 12	3, 943	
5.	Thomas, V. Compt. rend. 1897, 12	4, 366	
6.	Thomas, V. Bull. Soc. Chim. (Fra	nce) <u>1898</u> , [3], <i>19</i> , 343, 419	
7.	7. Kohlschutter, V.; Kutscheroff, M. Ber. 1907, 40, 873		
8.	. Ganz, S.N.; Mamon, L.I. J. Applied Chem. [USSR], <u>1953</u> , 26, 927		
9.	Battino, R.; Clever, H.L. Chem.	<i>Rev.</i> <u>1966</u> , <i>66</i> , 395	
10.	Pozin, M.E.; Zubov, V.V.; Teresh	chenko, L. Ya.; Tarat, E. Ya.;	
	Panomarev, Yu. L. Izv. Vysshikh. Uchebn. Zavedenii, Khim. i Khim.		
	Tekhnol. <u>1963</u> , 6 [4], 608		
11.	Pozin, M.E.; Tarat, E.Ya.; Zubo	v, V.V.; Tereshchenko, L.Ya.	
	Izv. Vysshikh. Uchebn. Zavedenii,	Khim. i. Khim. <u>1963</u> 6 [6], 974	
12.	Pozin, M.E.; Tarat, E.Ya.; Tere	shchenko, L.Ya.; Zubov, V.V.;	
	Treushchenko, N.N. Izv. Vyashikh	Uchebn. Zavedenii, Khim. i. Khim.	
	Tekhnol. <u>1965</u> , 8 [4], 628		
13.	Manchot, W. Annalen, <u>1910</u> , 372,	179	
14.	Griffith, W.P.; Lewis, J.; Wilk	inson, G. J. Chem. Soc. <u>1958</u> , 3993	
15.	Manchot, W. Ber., <u>1914</u> . 47, 1601		
16.	Kohlschutter, V.; Kutcheroff, M.	Ber. <u>1904</u> , <i>37</i> , 3044	
17.	Hüfner, G. Z. Phys. Chem. 1907,	59, 416	
18.	Usher, F.L. Z. Phys. Chem. 1908	, 62, 622	

268 Nitric	Oxide
COMPONENTS:	ORIGINAL MEASUREMENTS:
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Water; H₂O; [7732-18-5]</li> <li>Iron chloride, (ferrous chloride); Focla: [7758-94-3]</li> </ol>	Gay, J., Ann. Chim. Phys. <u>1885</u> , (6),5,145.
rec12; [//36-94-3]	
VARIABLES:	PREPARED BY:
Temperature, pressure and concentrat- ion.	W. Gerrard.
EXPERIMENTAL VALUES:	
T/K P _{NO} /kPa V _{NO} /cm	³ Bunsen Conc*/gl ⁻¹ coefficient α
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	44.87 150.04 49.06 57.12 59.10 60.28 61.68 68.61 62.29 60.10 63.05 66.63 70.34 72.50 73.78 73.29 69.73 76.67 64.66 67.73 71.56 74.63 68.82 33.28 29.32 90.84 cont.
AUXILIARY	INFORMATION
METHOD /APPARATUS/PROCEDURE: $P_{NO}$ is the pressure of NO over the solution. $V_{NO}$ is the volume of NO (adjusted to 101.325 kPa and 273.16K) absorbed by the stated volume of aqueous solution of salt. $\alpha = 101.325 V_{NO}/P_{NO} \times (vol. of$ soln. of iron salt). The $V_{NO}$ value was determined by extraction of NO in a manometer assembly; diagram given.	SOURCE AND PURITY OF MATERIALS: NO: Not stated. Water was distilled. The concentration of salt was checked by titration with permanganate. DATA CLASS: ESTIMATED ERROR: REFERENCES:

Salt Solutions

COMPONENTS	<u> </u>	- <u></u>	ORIGINAL MEASUR	EMENTS:
<ol> <li>Nitric oxide;</li> <li>Water; H₂O; [</li> <li>Iron chloride FeCl₂; [7758</li> </ol>	NO; [10102 7732-18-5] 2, (ferrous 8-94-3]	2-43-9] chloride);	Gay, J., Ann. 5,145.	Chim. Phys. <u>1885</u> ,(6)
EXPERIMENTAL VAL	JUES:	<u></u>		
т/к	₽ _{NO} /kPa	V _{NO} /cm ³	Bunsen coefficient a	Conc* /gl ⁻¹
283.76 283.76 281.96 282.16 282.66 281.96 282.16 280.16 280.16 280.56 280.56 280.86 281.16 285.56 284.96 284.96 284.96 284.96 284.96 284.96 284.96 284.66 284.66 284.66	51.662 45.422 36.423 32.983 28.051 24.358 19.491 16.598 10.812 7.439 5.039 2.866 1.467 62.567 52.395 47.302 43.689 37.383 30.930 25.197 18.891 13.572 9.026 4.840 1.653 Fe in 1.0 ^g	420.9 391.2 371.6 350.1 312.4 277.2 239.0 204.3 155.0 118.0 78.4 39.2 14.5 410.9 391.9 362.6 326.9 293.0 257.8 222.5 184.6 143.1 101.5 60.0 14.5 0	34.39 36.35 43.06 44.81 46.99 48.04 51.74 51.96 60.51 66.94 65.68 57.73 41.74 33.25 37.89 38.83 37.89 39.71 42.22 44.73 49.47 53.39 56.96 62.77 44.38	90.84 73.76
284.96 284.56 284.66 284.66 273.66 * g of	Fe in 1.0 l	222.5 184.6 143.1 101.5 60.0 14.5	44.73 49.47 53.39 56.96 62.77 44.38	

GINAL MEASUREMENTS: Y, J., Ann. Chim. Phys. <u>1885</u> , (6),		
145.		
PARED RY		
W. Gerrard.		
<pre>'K g Fe in g NO per Mole NO* 100 cm³ 28 g Fe per mole solution Fe salt</pre>		
Volumetric determination		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
* Calculated by compiler.		
AUXILIARY INFORMATION		
METHOD /APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:		
NO, not stated. The water was distilled, and the concentration was checked by titration with permanganate.		
IMATED ERROR:		
FERENCES :		

COMPONENTS :	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Gay, J., Ann. Chim. Phys. <u>1885</u> ,(6) 5,		
2. Water; H ₂ O; [7732-18-5]	145.		
<ol> <li>Iron chloride, (ferrous chloride); FeCl₂; [7758-94-3]</li> </ol>			
VARIABLES:	PREPARED BY:		
Temperature, concentration	W. Gerrard.		
EXPERIMENTAL VALUES:	Landra and a second a second a second a second		
T/K g Fe per g NO per 28 100 cm ³ of g Fe solution.	T/K g Fe per g NO per 28 100 cm ³ of g Fe solution		
Gravimetric determination	Volumetric determination		
294.66       23.9       7.03         294.66       23.9       6.85         294.66       23.9       7.26         294.66       23.9       6.95         294.66       11.0       5.95         298.16       11.0       6.01         298.16       11.0       5.80	277.16       15.0       9.96         285.16       6.56       9.52         289.16       21.4       7.3         289.16       21.4       7.7         289.16       21.4       7.6         289.16       26.5       7.45         292.66       18.2       7.4		
298.16       11.0       6.33         298.16       15.6       5.96         298.16       15.6       6.04         298.16       15.6       6.02         298.16       15.6       5.88	292.00       18.2       7.0         295.16       15.6       7.3         298.16       2.6       5.7         298.16       2.6       5.1         298.16       2.6       5.1		
AUXILIARY INFORMATION			
METHOD /APPARATUS/PROCEDURE: (a) Determined weight of NO absorbed by known weight of solution containing the ferrous salt. Water entrained by passage of NO was absorbed by anhyd- rous CaCl ₂ . Pressure appeared to be atmospheric.	SOURCE AND PURITY OF MATERIALS: NO, not stated. Distilled water was used, and the concentration of salt was checked by titration with permangate.		
(b) Volume of NO absorbed was determ- ined by "extraction" in a manometer assembly (diagram given) over several days. The volume was adjusted to that at 273.16K and 101.325 kPa.			
	ESTIMATED ERROR:		
	REFERENCES :		
272	Nitric	c Oxide	
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--
COMPONENTS:	ORIGINAL MEASUREMENTS:		
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Water; H₂O; [7732-18-5]</li> <li>Iron(II) ammonium sulfate; Fe(NH₄)₂(SO₄)₂; [10045-89-3]</li> </ol>		Gay, J. Ann. Chim. ^P hys. <u>1885</u> , 5 (6), 145.	
VARIABLES: Temperature, pressure, concentration		PREPARED BY: W. Gerrard	
EXPERIMENTAL VALUES:			
T/K g Fe/	/100	cm ³ soln. g NO/28 g Fe	
Gravimetr	ric ć	determination	
273.16 273.16 279.16 288.16 299.66 299.66	1.1 5.7 3.5 1.1 5.7 2.8	15       10.2         7       9.8         5       11.1         15       7.45         7       5.9         8       5.6	
Volumetr	ric d	determination	
295.66 298.66	4.5	7 4.8 5 5.7	
AUXI L	_I ARY	INFORMATION	
METHOD APPARATUS/PROCEDURE: $P_{NO}$ is the pressure of NO over the solution. $V_{NO}$ is the volume of NO (adjusted to 101.325 kPa and 273.16 K) ab- sorbed by the stated volume of aqueous solution of ferrous salt containing the stated weight of ferrous iron (Fe). The volume of NO was determined be extraction during several days. The weight of NO was that absorbed at the atmospheric pressure. Entrained water was absorbed in anhydrous CaCl ₂ .	he 1 by ed	SOURCE AND PURITY OF MATERIALS: 1. NO: not stated. 2. Water was distilled. 3. The salt was pure crystalline standard; the solution was titrated by permanganate. ESTIMATED ERROR: REFERENCES.	

Salt Solutions

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitric oxide; NO; [10102-43-9]	Gay, J.
2. Water; $H_2O$ ; [7732-18-5] 3. Iron(II) ammonium sulfate:	Ann. Chim. Phys.
Fe (NH ₄ ) ₂ (SO ₄ ) ₂ ; [10045-89-3]	<u>1885</u> , 5 (6), 145.

EXPERIMENTAL VALUES:

Solution	T/K	P _{NO} /kPa	^V NO∕cm³	α
0.440 g Fe	273.16	91.324 65.820	109.1	6.05
in 20 cm ³		46.182	90.7	9,95
solution		29,450	75.0	12.90
		14.000	50.3	18.20
		5.506	18.0	16.56
1.250 g Fe	285.16	65.380	229.2	11.28
$in 25 cm^3$	284.96	55.634	211.1	15.38
		47.195	181.9	15.62
solution	285.16	38.943	157.2	16.35
	284.77	29.557	126.1	17.30
	284.66	20.971	95.8	18.51
		12.759	62.1	19.73
		4.653	24.1	21.00
	284.56	2.786	5.0	7.26
0.685 g Fe	284.16	74.939	137.8	7.45
in 25 $cm^3$	284.66	60.061	119.0	8.02
111 25 Cm	284.56	43.862	98.6	9.12
solution		29.597	79.6	10.88
		21.131	61.5	11.79
	283.56	13.599	42.0	12.49
	283.96	3.040	7.8	10.40

 $\alpha$  =  $V_{\rm NO}$  (Volume of solution × partial pressure)

274		Nitric	Oxide	
COMPONENTS:	· · · · · · · · · · · · · · · · · · ·		ORIGINAL MEASUREME	ENTS:
1. Nitric oxide; NG	D; [10102-43	-9]	Thomas, V. Bu 19, (3), 343.	111. Soc. Chim. <u>1898</u> ,
2. Water; H ₂ O; [773	2-18-5]		See also Ref.	(1), (3).
3. Iron bromide (fe FeBr ₂ ; [7789-46-	errous bromi 0]	de);		
VARIABLES:			PREPARED BY:	· · · · · · · · · · · · · · · · · · ·
Temperature, c	oncentratio	n	и	J. Gerrard
EXPERIMENTAL VALUES:	····			
Weight of ferrous Fe in 1 cm ³ of solution g.	Volume of solution /cm ³	T/K	Volume of NO absorbed /cm ³	Mole of NO per mole of salt*
0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.05978 0.59978 0.59978 0.59978 0.59978	2 9.1 2.8 2.8 3.5 3.7 2.3 4.1 3.5 2.9 3 2 1.5 3.5 3.5 2.5 * Calcula	279.16 283.16 268.16 279.16 281.16 281.16 281.16 283.16 283.16 283.16 277.16 293.66 277.16 293.66 277.16 280.16	30 97 53 45 38.5 47 25 65 38.8 29.9 29.5 36.5 25.4 22.7 50.7 41 compiler.	0.628 0.446 0.792 0.673 0.460 0.532 0.455 0.663 0.465 0.431 0.412 0.764 0.0706 0.0205 0.0604 0.0684
	А	UXILIARY	INFORMATION	
METHOD APPARATUS/PROCEDURE: The liquid was contained in a simple glass vessel furnished with an inlet tube leading into the liquid, and an exit tube. Nitric oxide was slowly passed into the liquid, and entrained water vapor was collected and weighed. It was simply stated that the quantity of absorbed gas was determined. The pressure was not mentioned.		SOURCE AND PURITY NO: Not menti prepared nitric ac	OF MATERIALS: oned; but presumably from mercury and id as in ref.(2)	
In the calculation NO/Fe, the compiler correction to 273.1	of the mole has assumed 6 K, and the	ratio, 1 the 9	DATA CLASS:	
pressure, p _{NO} , to b	e 101.325 kl	Pa.	ESTIMATED ERROR:	
			REFERENCES: (1) Thomas, V., 123,943.	Compt.rend., <u>1896</u> ,
			(2) Thomas, V., (3),19,419.	Bull Soc. Chim., 1898,
			(3) Thomas, V., 13,(7), 145	Ann. Chim. Phys. <u>1898</u> ,

t

COMPONENTS :	ORIGINAL MEASURENTS .			
1. Nitric oxide; NO; [10102-43-9]	Thomas, V.; Bull, Soc. Chim., <u>1898</u> ,			
2. Water; H ₂ O; [7732-18-5]	Thomas, V., Ann. Chim. Phys. <u>1898</u> ,			
3. Iron iodide, (ferrous iodide); FeI ₂ ; [7783-86-0]	13,(7), 145.			
VARIABLES:	PREPARED BY			
Memory truck concentration	W Command			
Temperature, concentration	W. Gerrard			
EXPERIMENTAL VALUES:				
Weight of ferrous Volume of T, iron, Fe, g, in solution cm ³ of solution. of salt /cm ³	/K Volume of Mole NO/56 g Fe* NO, absorbed /cm ³			
	9.16     58     0.375       16     45     0.367			
2.926 8.5 270	0.16 36 0.362			
2.926 5.8 29	L.16 19 0.280			
2.926 8.3 280	5.16 37 0.381			
NO/Fe, is based on the assumption that the volume of NO observed was adjusted to that at 273.16 K, and that the pressure, p _{NO} was 101.325 kPa.				
AUXILIARY INFORMATION				
METHOD: /APPARATUS/PROCEDURE: SOURCE AND PURITY OF MATERIALS:				
The liquid was contained in a simple glass vessel furnished with an inlet tube passing right into the liquid, and an exit tube. Nitric oxide was slowly passed into the liquid, the entrained water vapor being collected and weighed. It was stated that the quantity of absorbed gas was determin- ed. The pressure was not mentioned.	NO: Not mentioned; but presumably it was prepared from mercury and nitric acid (1).			
	ESTIMATED ERROR:			
	REFERENCES :			
	1. Thomas. V., Bull. Soc. Chim. <u>1898</u> , 19, (3), 419.			

COMPONENTS:	ORIGINAL MEASUREMENTS:		
2. Water: $H_2O$ : [7732-18-5]	Manchot, W.; Zechentmayer, K.		
3. Iron(II) sulfate (ferrous sulfate)			
FeSO ₄ ; [7780-78-7]	Annalen		
4. Sodium sulfate; Na ₂ SO ₄ ;	1006 750 269 280		
[//5/-82-6] or Ammonium culfate: (NH,), SO,	<u>1906</u> , <i>350</i> , 368-389.		
10043-02-41			
VARIARIES	DEEDADED BY.		
	TREFARED DT.		
	W. Gerrard		
EXPERIMENTAL VALUES:			
T/K = 28	19.35		
1 cm ³ of ferrous sulfate solution of	contained 0.1013 g of ferrous iron.		
	Molarity Pressure Volume, $V_1$ ,		
	sulfate oxide oxide for		
The solution	l mole of		
was made up of:	ferrous salt		
/	mol dm ⁻³ /kPa /dm ³		
$10 \text{ cm}^3$ of a coturated colution of )	0 0257 98 390 10 5		
sodium sulfate. 10 cm ³ of water.	0.0257 107.989 10.6		
and 20 cm ³ of ferrous iron.	0.0257 116.122 10.7		
20 cm ³ of a saturated solution of }			
ammonium sulfate, 5 cm ³ of water,	0.0402 89.058 8.9		
solution.	0.0402 113.055 10.3		
,			
AUXILIARY	INFORMATION		
METHOD 'APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
	1. Which and the same amount of from		
Volumetric apparatus. A three-way	1. Nitric oxide was prepared from		
tube was connected to a gas buret	sodium nitrite and dilute sul-		
and absorption pipet; the third	furic acid and washed with alkali.		
port was used for exhausting the	Stated to be 100% pure.		
apparatus and for adding gas. The			
apparatus and for dating gabt the	3 and 4. Appear to be of		
pressure and volume of gas in the	acceptable purity.		
buret could be measured using a			
levelling tube containing mercury.			
	ESTIMATED ERROR:		
	REFERENCES:		

ł

ł

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitric oxide; NO; [10102-45-9]	Manchot, W.; Zechentmayer, K.
2. Water; H ₂ O; [7732-18-5]	Annalen
3. Iron(II) ammonium sulfate;	
$FeSO_4 (NH_4)_2 SO_4; 6H_2O;$ [10045-89-3]	1906, 350, 368-389.
VARIABLES:	PREPARED BY:
	W. Gerrard
EXPERIMENTAL VALUES:	
T/K =	= 272.65
SERIES A	
A known weight of salt was disso	olved in 50 cm ³ of water plus 2 cm ³ of
sulfuric acid (17%). The molarity is of nitric oxide absorbed refers to the	is stated in the table. The volume ne volume of liquid containing 1 mole
of ferrous salt.	
Molarity of salt Pressure o	f Volume, V1. of nitric oxide
nitric oxid	le for 1 mole salt
/mol dm ⁻ ' /kPa	/dm ³
0.0242 6.426 0.0222 11.839	3.8 5.3
0.0222 13.572	5.8
0.0328 25.704	11.6
0.0337 20.000	13.6
0.033 61.994	15.5
0.033 76.792	17.0
0.033 89.724	17.4
0.033 97.537	18.1
0.033 128.920	19.2
0.033 $140.3860.033$ $164.384$	20.4
0.033 177.982	21.5 (cont.)
	(cont.)
AUXILIARY	INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. A three-way	1. Nitric oxide was prepared from
tube was connected to a gas buret and	a sodium nitrite and dilute sul-
absorption pipet: the third port	furic acid and washed with alkali.
Was used for exhausting the apparatu	Stated to be 100% pure.
and for adding gas The pressure	
and volume of the gas in the buret	2 and 3. Appear to be of
Could be measured using a levelling	acceptable purity.
tube containing mercury	
cabe containing mercury.	ESTIMATED ERROR:
	REFERENCES:
1	

COMPONENTS	5:			ORIGINAL MEA	SUREMENTS:	<u></u>
1. Nitric oxide; NO; [10102-45-9]		Manchot, W.; Zechentmayer, K.				
2. Water; H ₂ O; [7732-18-5]		Annalen				
3. Iron(II FeSO()	I) ammonium	sulfate;	,	1906 350 3	368-389	
[10045-	-89-3]	, ni 20,		<u>1900</u> , 000, 3		
					<u>,</u>	
EXPERIMENT	TAL VALUES:					
SERIES A	(cont.)	F	ressure	of Va	olume. V., of	nitric oxide
Molarity	of salt	n	itric oxi	.de	for 1 mo	le salt
/1101 0			/ KPd		/ 4	
0.0	33		159.584		20.	2
0.0	33 33		177.316	21.0		
0.0	33		202.113		21.	2
0.0	34		258.507		21.	9
0.0	298 329		205.046 236.910		21. 21.	0 8
0.0	332		253.975		21.	7
0.0	382		298.370		21.	8
			<u></u>		·	
	Û Wa	as given	in error	as 0.0033		
SERIES B			1		-	Volume, V.,
Т/К	of	of	of *	of	nitric	of nitric
	salt	water	acid	salt	oxide	1 mole of
	/g	/ cm °	/ cm *	mol dm °	/kPa	salt /dm°
270.65	0.6680	100	4	0.0164	246.775	20.9
270.65	0.6868 0.6868	100 100	10 10	0.0159 0.0159	246.375 265.973	21.5 21.5
268.15	0.1321	100	100	-	239.976	20.6
272.65	0.3255	100	-	0.0083	258.774	21.2
[						
* 17% sulfuric acid.						
The stated weight of salt was dissolved in 50 cm ³ of water plus 2 cm ³						
sulfuric acid.						
T/K	Weight o	f salt	nitric	oxide	for 1 mole of	of salt
	/g		/kPa	1	/dm 3	
272.65	0.67	48	97.53	37	18.15	
275.75	0.67	66 20	99.48 98.67	33 70	17.11	:
281.65	0.65	30 51	100.49	97	15.15	
285.05	0.67	04	98.65	57	13.39	
290.05	0.66	04 63	97.61	L7 30	12.01	
292.65	0.68	99	97.24	14	10.98	
292.75	0.67	70 73	97.97	77 57	10.88 8.64	
304.55	0.67	28	93.41	17	6.22	
317.45 0.6842 88.698 2.34						
In a 101.	In all series of measurements $V_1$ was reduced to 273.15 K and 101.3 kPa.					

Nitric Oxide

COMPONENTS:	ORIGINAL MEASUREMENTS: Manchot, W.; Zechentmayer, K.	
<ol> <li>Water; H₂O; [7732-18-5]</li> </ol>	Annalen, <u>1906</u> , 350, 368-389.	
3. Iron II sulfate, (ferrous sulfate); FeSO ₄ ; [7720-78-7]		
VARIABLES:	PREPARED BY:	
Temperature	W. Gerrard	
EXPERIMENTAL VALUES:	L	
T/K Molarity of salt Pres / mol dm ⁻³	Volume of nitric oxide absorbed by volume of solution containing 1 mole of salt /dm ³ (101.325 kPa, 273.15K)	
289.25-289.45 0.0257 0.0257 0.0257 0.0257 0.0257	92.257       12.4         96.790       12.8         109.06       13.4         116.26       14.0         128.25       14.4	
0.0257 275.25 0.0257 0.0257 0.0257 0.0257 0.0257 0.0257	143.3215.699.1917.3115.3218.0129.7218.3143.8518.9161.7219.4	
AUXILIARY	INFORMATION	
METHOD /APPARATUS/PROCEDURE: Volumetric apparatus. A three-way tube was connected to a gas buret and an absorption pipet; the third member of the connection was used for exhausting the apparatus, and for passing in the gas. By means of a levelling tube containing mercury, the pressure and volume of gas in the buret could be regulated. Water, and a small tube containing the salt were put into the absorption pipet. The volume of gas absorbed by the water was first determined: the small tube	<ul> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>1. Nitric oxide was prepared from sodium nitrate and diluted sulfuric acid, and washed with alkali. Stated to be 100% pure.</li> <li>2. and 3. Appeared to be of acceptable purity.</li> </ul>	
was broken, and the absorption for the solution was measured.	ESTIMATED ERROR:	
Drops of dilute sulfuric acid were added to the ferrous sulfate solution.		
	REFERENCES:	

280 Nitric	Oxide		
COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Manchot, W.; Zechentmayer, K.		
2. Water; H ₂ O; [7732-18-5]	Annalen, <u>1906</u> , 350, 368-389.		
3. Iron chloride (Ferrous chloride); FeCl ₂ ; [7758-94-3]			
VARIABLES:	PREPARED BY:		
	W. Gerrard		
EXPERIMENTAL VALUES:	colution of formous chloride		
was made up by adding the stated weig to 50 cm ³ of water plus 2 cm ³ of hydro	ht of ferrous chloride, FeCl ₂ , ochloric acid (14% HCl)		
Weight of FeCl ₂ Molarity of FeCl ₂ /g / mol dm ⁻³	Pressure of Volume, V ₁ , of nitric nitric oxide. oxide absorbed per 1 /kPa mole of FeCl ₂ , /dm ³ (101.325 kPa)		
0.2528 0.0383	34.530 12.1		
*0.229 0.034	98.977 17.3 100.310 17.1		
*0.1639 0.0248	232.377 21.2		
0.2542 (0.0385)**	267.440 21.8		
For a solution made up by adding 0.1974 g of FeCl ₂ to 52 cm ³ of hydrochloric acid (14% HCl), V ₁ was 17.1 dm ³ at T/K = 273.65 and for 100.097 kPa. For a solution made up by adding 0.1954 g of FeCl ₂ to 50 cm ³ of water, V ₁ was 17.7 dm ³ at T/K = 273.65 and for 100.097 kPa.			
AUXILIARY	INFORMATION		
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Volumetric apparatus. A three-way tube was connected to a gas buret and an absorption pipet; the third member was used for exhausting the apparatus, and for passing in the	1. Nitric oxide was prepared from sodium nitrite and dilute sul- furic acid, and washed with alkali. Stated to be 100% pure.		
gas. By means of a levelling tube containing mercury, the pressure and volume of gas in the buret could be	3. Prepared by action of hydrogen chloride on heated sheet iron. Contained 43.96-44.06% Fe.		
regulated.	DATA CLASS:		
	ESTIMATED ERROR:		
	REFERENCES:		
1			

Salt Solu	tions
-----------	-------

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Huiner, G.			
2. Water; H ₂ O; [7732-18-5]	Z. Phys. Chem. <u>1907</u> , 59, 416-423.			
3. Iron II sulfate, (ferrous sulfate); FeSO; [7720-78-7]				
VARIABLES:	PREPARED BY:			
Concentration of salt	W. Gerrard			
EXPERIMENTAL VALUES:				
The form in which the data wer analysis by the compiler.	e given requires a detailed			
The volume of the solution of $(205.69 \text{ cm}^3)$ for each series.	ferrous salt was the same			
W = weight of ferrous iron in	205.69 $cm^3$ of solution.			
P = pressure of nitric oxide.				
V ₁ = volume of nitric oxide, cm solution at the stated pre	³ , absorbed by 205.69 cm ³ of ssure.			
By a certain argument, the author derived the following equation:				
$V_1 = \underline{a} + \underline{bP}$ , where $\underline{a}$ is a constant, believed to represent the chemically combined part; and $\underline{b}$ is a constant representing the "simply" absorbed part. A number referred to as the "absorption coefficient, $\alpha$ ," was obtained by the operation: ( $\underline{b}/205.69$ ) x 760; but this is not the quantity which is usually understood by the term "absorption coefficient". There is consequent confusion in the reviews:				
	(cont.)			
AUXILIARY	INFORMATION			
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
The volume of nitric oxide absorbed by a fixed volume of solution was measured at the observed pressure	<ol> <li>Nitric oxide was prepared from hydrogen iodide and nitric acid (Winkler,1).</li> </ol>			
or yas.	<ol> <li>Attested by titration with permanganate.</li> </ol>			
	ESTIMATED ERROR:			
	REFERENCES:			
	1. Winkler, L.W,			
	Ber. <u>1901</u> , <i>34</i> , 1408.			

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitric oxide; NO; [10102-43-9]	Hufner, G.
2. Water; H₂O; [7732-18-5]	Z. Phys. Chem. <u>1907</u> , 59, 416-423.
<pre>3. Iron II sulfate, (ferrous sulfate); FeSO₄; [7720-78-7]</pre>	

## EXPERIMENTAL VALUES:

Additional columns in the table are :  $V_3 \star = \text{volume}, \text{dm}^3$ , of solution containing 56 g of ferrous iron.  $V_1 \star = \text{volume of NO/dm}^3$ , absorbed by  $V_3 \star \text{ of solution}$ , as for 101.325 kPa.  $V_w(NO) = \text{volume of NO/dm}^3$ , absorbed by  $V_3 \star \text{ of water itself}$ .

Т/К	W/g	P/mmHg	$V_1/cm^3$		
293.25 293.25 293.25 293.25 293.25 292.35 293.20 293.15	0.0221	760.0 704.9 683.5 668.6 651.9 632.9 613.7	15.33** 14.42 14.10 13.80 13.58 13.15 12.98	a b $V_3 */dm^3$ $V_1 */dm^3$ $V_{1'}$ (NO) / dm ³	= 2.8466 = 0.01642 = 0.06067 = 521.2 = 38.85 = 24.50
293.20 293.20 293.19 293.15 293.30 293.29	0.0296	760.0 677.5 655.3 639.1 620.2 600.5 581.2	15.57** 14.30 14.07 13.81 13.39 13.20 12.92	a b $\alpha$ $V_3 * / dm^3$ $V_1 * / dm^3$ $V_w (NO) / dm^3$	= 4.2407= 0.0149= 0.05505= 389.1= 29.46= 18.29
293.19 293.17 293.15 293.15 293.25	0.0409	760.0 667.6 650.6 613.1 594.6 577.1	18.50** 16.79 16.65 15.71 15.41 15.32	a b $v_3 * / dm^3$ $v_1 * / dm^3$ $v_2 (NO) / dm^3$	= 4.749 = 0.01809 = 0.06684 = 281.6 = 25.33 = 13.23
293.25 293.25 293.23 293.25 293.25 293.25 293.25	0.0513	760.0 644.8 623.8 606.4 589.7 571.1 553.1	21.33** 18.82 18.47 18.02 17.56 17.19 16.95	$v_a$ b $v_3 * / dm^3$ $v_1 * / dm^3$ $v_w$ (NO) / dm ³	= 4.9136 = 0.02160 = 0.07981 = 224.5 = 23.28 = 10.55
293.25 293.25 293.25 293.23 293.19 293.15	0.0663	760.0 697.3 678.9 660.4 638.2 620.7 602.5	23.32** 21.91 21.60 21.18 20.71 20.28 19.87	a b V ₃ */dm ³ V ₁ */dm ³ V _w (NO)/dm ³	= 6.7589 = 0.02181 = 0.08059 = 173.7 = 19.70 = 8.16
293.25 293.30 293.35 293.15 293.00 293.00	0.099	760.0 649.9 631.1 618.4 603.3 588.6 574.2	37.40** 34.26 33.82 33.26 32.76 32.34 31.95	a b $\alpha$ $V_3 */dm^3$ $V_1 */dm_3$ $V_w (NO)/dm^3$ ginal author's	= 13.78 = 0.031558 = 0.11661 = 116.3 = 21.16 = 5.47 value.
$V_3^*$ , $V_1^*$ and $V_w(NO)/dm^3$ were calculated by the compiler.					

COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]		Kohlschutter, V.; Kutscheroff, M.			
2. Water; H ₂ O; [7732-18-5]		Ber. <u>1907</u> ,40, 873-878.			
3. Iron FeCl	chloride (Ferrous chl 2; [7758-94-3]	oride);			
VARIABLES	:		PREPARED BV.		
	Concentration		W. Gerrard		
EXPERIMENT	TAL VALUES:	<u></u>			
	The pressu	re of nit	ric oxide, p _{NO} , was	not	
	stated. T	he compil	er has taken p _{NO} to	be	
	101.325 kP	a.			
т/к	Volume of water, V _s containing one mole of ferrous chloride	Volume o absorbed salt) /d	f nitric oxide, V _l by V _s (1 mole of m ³	Ostwald coefficient L, based on b Calculated by	
		a	b	compiler	
295.15	2.5	3.15	3.30	1.320	
	5.18	4.62	4.83	0.932	
	10.35	5.9	6.56	0.634	
	51.8	8.6	11.89	0.230	
	Column (a) shows the allowance for the vol i.e., b - a is the vo V _S dm ³ of pure water, water.	volume of ume absor lume of No taken as	nitric oxide absor bed by V _s dm ³ of pu O which would be ab 0.0636 dm ³ of NO pe	bed after re water, sorbed by r dm ³ of	
METHOD / AI	PPARATUS/PROCEDURE :		SOURCE AND PURITY OF M	IATERIALS:	
An Ostwa were con	ald type gas buret an nnected by a lead cap	d pipet illary.	Ferrous chloride pure iron wire. for other compone	prepared from No details given ents.	
			ESTIMATED ERROR:		
			REFERENCES :		

284	Nitric Oxide					
COMPONENT	COMPONENTS:			ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]		Kohlsc	hutter, V.; Kutscheroff, M.			
2. Water; H ₂ O; [7732-18-5]		Ber, <u>19</u>	07,40,873-878.			
3. Irc sul	n II sulfate, (ferrous fate); FeSO4; [7720-78-	-7]				
VARIABLE	5:		PREPARED E	Y:		
	Concentration		W. Ger	rard.		
EXPERIME	VTAL VALUES:		L			
	The pressure The compiler	has take	n p _{NO} to	p _{NO} , was not stated. be 101.325 kPa.		
т/к	Volume, V _s , of water in which 1 mole of ferrous sulphate is dissolved /dm ³	Volume, nitric d absorbed /dm	V ₁ , of oxide d by V _s	Ostwald coefficient, $L$ , based on $V_1$ (b) calculated by compiler.		
		(a)	(ם)			
298.15	1.2 1.8 2.4 4.82 7.2 12.0 18.6 36.0	1.4 1.9 2.4 4.1 5.06 5.70 6.9 8.2	1.47 2.01 2.55 4.40 5.52 6.46 8.01 10.4	1.225 1.117 1.0625 0.913 0.767 0.538 0.431 0.289		
		AUXILIARY	INFORMATIO	N		
METHOD /	APPARATUS/PROCEDURE:		SOURCE ANI	D PURITY OF MATERIALS:		
An Ost were c	wald type gas buret and onnected by a lead capi	l pipet llary.	No d	etails given.		
			LSIIMATED	LKKUK:		
			REFERENCE	S :		

COMPONENTS: 1. Nitrogen oxide, (Nitric oxide);	ORIGINAL MEASUREMENTS:
NO; [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.
2. Water; H ₂ O; [7732-18-5]	Ber, <u>1907</u> , 40,873-878.
3. Iron chloride, (ferrous chloride) FeCl ₂ ; [7758-94-3]	
VARIABLES:	PREPARED BY:
Concentration	W. Gerrard
EXPERIMENTAL VALUES:	
The pressure of nitric	oxide, p _{NO} , was not
stated. The compiler I	has taken p _{NO} to be
101.325 kPa. Temperatu	ure assumed to be 295.15K.
T/K l mole of ferror	us chloride Volume, V ₁ , of
dissolved in 10 the following:	.37 dm° of nitric oxide absorbed /dm ³
295.15 Water; H ₂ O;	6.559
Sodium chloride (saturated aqueo solution)	; NaCl; ous 6.549
Ammonium chlorid (saturated aqued solution)	de; NH4Cl; ous 6.549
Hydrochloric ac: (about 30%)	id 15.64
(10%)*	6.17
* given as such in original tab	ble (probably wt %)
AUXILIARY	INFORMATION
METHOD: /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An Ostwald type gas buret and pipet were connected by a lead capillary.	Ferrous chloride solution was prepared from iron wire. No details of source or preparation of other components given.
	ESTIMATED ERROR:
	BEREPENCING
	REFERENCES :

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitric oxide; NO; [10102-43-9] 2. Water; H₂O; [7732-18-5]</pre>	Kohlschutter, V.; Kutscheroff, M. Ber, <u>1907</u> , 40, 873-878.
(Ferrous nitrate); Fe(NO ₃ ) ₂ ; [14013-86-6]	
VARIABLES:	PREPARED BY:
Concentration of salt	W. Gerrard
EXPERIMENTAL VALUES:	······
The pressure of nitric oxide, p has taken p _{NO} to be 101.325 kPa	p _{NO} , was not stated. The compiler a.
T/K Volume, V, of water in ^S which l mole of ferrous nitrate is dissolved /dm ³	Volume, V ₁ , of Ostwald coefficient, nitric oxide L, based on V ₁ (b) absorbed by V _s calculated by compiler (1 mole of ferrous nitrate) /dm ³
	(a) (b)
296.15 3.25	2.56 2.77 0.852
13.0	4.10     0.640       4.71     5.54       0.426
26.0	4.90 6.61 0.254
	C C C C C C C C C C C C C C C C C C C
AUXILI	IARY INFORMATION
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
An Ostwald type gas buret and pipet were connected by a lead capillary.	Ferrous nitrate solution was prepared by the interation of ferrous sulfate and barium nitrate.
	ESTIMATED ERROR:
	REFERENCES:

CONTROLINATIO		ODTOTIC		· · · · · · · · · · · · · · · · · · ·
COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [1010	Kohlschu	tter, V.; Kut	scheroff, M.	
2. Water; H ₂ O; [7732-18-5]		Ber, <u>190</u>	<u>7</u> , 40,873-878	•
3. Iron chloride, (Ferrous FeCl:: [7758-94-3]	chloride);			
4. Hydrochloric acid; HCl;				
		·		
VARIABLES:		PREPARED I	BY:	
Concentration			W. Gerra	rd
EXPERIMENTAL VALUES: The pres	sure of nit	ric oxide	, P _{NO} was not	
stated.	The compile	er has ta	ken p _{NO} to be	
101.325	kPa.			
The stock solution of ferr solution contained 1 mole	ous chloride of FeCl2.	e contain	.ed 45.365 g/d	m ³ ; 1.234 dm ³ of
Concentration of "strong h	ydrochloric	acid" wa	s not specifie	ed.
The aqueous solutions were	made up as	specifie	d in the table	e. The
competature was probably 2	99•TOV•			
Ferrous chloride Water	Hydrochlori	ic acid	Volume,V _s , solution	Volume, V, of nitric oxide
cm ³ cm ³	cm ³		containing	absorbed by
			1 mole ferrous	s /am'
			chloride /dm	3
10 40	-		6.16	9.3
	40		6.16 12.32	20.48 10.81
5 15	30		12.32	17.2
5 5	40		12.3 24.64	19.2 10.42
2.5 37.5	10		24.64	9.165
2.5 27.5	20 40		24.64	20.62
				·······
	AUXILIARY	INFORMATIC	)N	
METHOD /APPARATUS/PROCEDURE	:	SOURCE AN	D PURITY OF MATE	RIALS:
An Ostwald type gas buret	and	Ferrous chloride solution		
pipet were connected by a	lead	pre	pared from ir	on wire.
capillary.		NO	details of ot	her components
		giv	ven.	
		ł		
		ESTIMATED	ERROR:	
		REFERENCE	CS :	
		]		
		1		

288	Niti	ric Oxide			
COMPONENTS: 1. Nitric ox 2. Water; H ₂	ide; NO; [10102-43-9] O; [7732-18-5]	ORIGINAL MEASU Manchot, V	JREMENTS: N.; Huttner, F.		
3. Iron(II) [7720-78-	sulfate; FeSO ₄ ; 7]	<u>1910</u> , 372,	, 153-178.		
VARIABLES:		PREPARED BY:			
Conce	ntration of salt		W. Gerrard		
EXPERIMENTAL VA	LUES:				
т/к	Conc. of ferrous sulfate r /mol dm ⁻³	Pressure of hitric oxide /kPa	Volume, V, of nitric oxide absorbed of Iron(II) salt (reduced to 273.15 K, 101.325 kPa) /dm ³		
273.15	0.0034 0.0429	98.257 98.257	17.8 17.9		
	0.44	98.257	17.2		
	1.2140	100.657	15.4		
	AUXILIAR	Y INFORMATION			
METHOD / APPARATE	US/PROCEDURE:	SOURCE AND PU	RITY OF MATERIALS:		
		1. Nitric	1. Nitric oxide was probably		
The volume	of gas absorbed was	taken a	as 100% pure, see ref. (1).		
measured by	the Ostwald-type gas	2, 3. App	peared to be of		
buret and a	bsorption pipet. The	satisfa	actory purity.		
apparatus a	nd method were stated to				
described (	1). except that the				
technique f	or introducing the	ESTIMATED ERR	OR:		
ferrous sal	t was modified.				
		REFERENCES :			
		1. Manchot Annaler	t, W.; Zechentmayer, K.		
		<u>1906</u> , 3	<i>350, 3</i> 68-389.		

ł

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Manchot, W.; Huttner, F.			
2. Water; $H_2O$ ; $[7732-18-5]$	Annalen			
$\begin{array}{c} \text{J. Sufficience} \\	1910, 372, 153-178.			
Fe $(NH_4)_2$ (SO ₄ ) ₂ ; [10045-89-3]				
VARIABLES:	PREPARED BY:			
Concentration of	W. Gerrard			
components 3 and 4				
EXPERIMENTAL VALUES: T/K = 27	3.15			
M S P V /mol dm ⁻³ /mol dm ⁻³ /kPa /dm ³ mol ⁻	$\frac{M}{1} \frac{S}{mol dm^{-3}} \frac{P}{mol dm^{-3}} \frac{V}{kPa} \frac{V}{dm^{3}mol^{-1}}$			
0.0077 18.32 (97.6) 98.124 22.4	0.0396 18.32 (97.6) 151.185 22.6			
0.0105 14.69 (82.0) 98.657 22.1	0.0452 18.32 (97.6) 157.184 22.2 0.0153 18.32 (97.6) 48.528 22.2			
0.0127 1.00 (9.8) 100.657 16.1	0.0156 18.32 (97.6) 48.528 22.8			
0.0131 2.25 (19.3) 100.657 16.2 0.0138 18.32 (97.6) 99.723 23.0	0.0063 0 0 100.657 17.3			
0.0148 18.32 (97.6) 99.323 22.4	0.0120 0 0 100.657 17.3			
0.0152 18.32 (97.6) 99.323 22.7 0.0153 2.25 (19.9) 99.723 16.3	0.0313 0 0 100.657 17.4 0.0624 0 0 100.657 17.1			
0.0154 6.67 (47.6) 99.723 18.3	0.0974 0 0 100.657 17.1			
0.0155 11.73 (70.8) 99.457 21.0 0.0382 18.32 (97.6) 98.257 22.4	0.2035 0 0 100.657 16.6			
0.0782 18.32 (97.6) 97.990 22.3	0.0103 18.32 (97.6) 101.723 22.4*			
* T/K = 284.15.				
M is the number of moles of t	the sulfate in 1 dm ³ of solution.			
S is the number of moles of s	sulfuric acid in 1 dm ³ of solu-			
V is the volume in dm ³ (at 2)	73.15 K and 101.325 kPa) of			
nitric oxide absorbed fo	or 1 mole of ferrous salt.			
P is the pressure of hitric of				
AUXILIARY	INFORMATION			
	SOURCE AND FURTH OF IMIERIALS.			
	1. Nitric oxide probably taken as			
The volume of gas absorbed was	100% pure, see ref. (1).			
measured by the Ostwald-type gas				
buret and absorption pipet. The	2, 3. Appeared to be of			
apparatus and method were stated to	satisfactory purity.			
be similar to those previously				
described (1), except that the				
technique for introducing the	VETIMATED EDDOD-			
gerrous salt was modified.	LOTTENTED ERROR:			
	REFERENCES:			
	l Monghot W & Fostertmours V			
	Annalen			
	1906, 350, 368-389.			
	<u></u> ,,			

		Nitric	: Oxide
			ORIGI

ORIGINAL MEASUREMENTS: Manchot, W.; Huttner, F. Annalen
<u>1910</u> , <i>372</i> , 153-178.
PREPARED BY:
W Gerrard
W. Gerrard
M/mol dm ⁻³ C/mol dm ⁻³ P/kPa V/dm ³
$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Sulfate in 1 dm ³ of solution. Aydrogen chloride in 1 dm ³ of oxide. 23.15 K, 101.325 kPa) of nitric for 1 mole of iron(II) salt.
INFORMATION
<pre>1. Nitric oxide was probably taken as 100% pure, see ref. (1). 2, 3. Appeared to be of satis- factory purity. ESTIMATED ERROR: REFERENCES: 1. Manchot, W.; Zechentmayer, K. Annalen <u>1906</u>, 350, 368-389.</pre>

COMPONENTS:	ORIGINAL MEASUREMENTS.		
1. Nitric oxide: NO: [10102-43-9]	Manchot, W.: Huttner, F.		
2. Water: $H_{2}()$ ; $[7732-18-5]$	Manchot, w., Matcher, F.		
$\frac{1}{3} \operatorname{Iron}(\mathrm{II}) \operatorname{chlorido} \operatorname{Eo(1)}$	Annalen		
[7758-94-3]	<u>1910</u> , <i>372</i> , 153-178.		
<pre>4. Hydrochloric acid; HCl; [7647-01-0]</pre>			
VARIABLES:	PREPARED BY:		
Concentration of	M. Connord		
components 3 and 4	w. Gerraru		
EXPERIMENTAL VALUES:			
Conc. of Conc. of	Pressure Volume, V1, of NO.		
T/K Iron HCl	of NO 1 mole of iron		
salt /mol dm	-3 salt (101.325 kPa)		
/mol dm (soln.)	/kPa /dm³		
273.15 0.0054 0	100.123 16.7		
0.0111 12.56	99.457 22.1		
0.0111 0	100.123 16.7		
0.0209 7.3	99.590 19.1		
0.0216 0	100.257 16.2		
0.4219 12.56	100.123 20.4		
0.5616 0	99.057 15.1		
0.0219 11.0	165.583 22.0		
0.0226 11.0	159.717 22.6		
0.0201 11.0	48.662 21.3		
	48.662 21.3		
AUXILIARY	INFORMATION		
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
	1. Nitric oxide probably taken as		
	being 100% pure as in ref (1)		
Apparatus and method were similar to	being 100% pure as in rer. (1).		
there dependently (1)			
chose described (1), except that the	2, 3, 4. Appeared to be of		
procedure for introducing the ferrous	satisfactory purity.		
salt was modified.			
The volume of gas absorbed was			
measured by means of the gas buret	ESTIMATED EDDOD.		
and absorption ninet technique	ESTIMATED ERROR:		
apportant biber recuirdne.			
	REFERENCES:		
	1 Nonchot W - Kachantrawan V		
	1. Manchot, W.; Zechentmayer, K.		
	Annalen		
	1906, 350, 368-389.		

Nitric Oxide

COMPONENTS	OPTOTNAT AGUPPAGNAG			
CONFONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Manchot, w.			
2. Water; $H_2O$ ; [7732-18-5]	Ber. <u>1914</u> , 47,1601-1614			
[10035-10-6]				
4. Iron bromide, (Ferrous bromide); FeBra: (7789-46-0) (see note)				
VARIABLES				
	N. Compand			
Concentration	w. Gerrard			
EXPERIMENTAL VALUES: T/K = 273.15	L			
The pressure of practically 1 at	NO was stated to be tm (101.325 kPa).			
Conc of HBr / mol dm ⁻³	Volume, V,, of NO absorbed			
	by 1 mole of ferrous salt			
	/dm ³			
0. 1.918	17.45			
2.110	10.06			
4.54	12.65			
6.40 9.35	13.55			
11.52	18.70 19.60			
13.83	21.78			
14.33	23.61			
* appears to be the amount al	bsorbed by ferrous bromide in			
excess of amount absorbed h	by hydrogen bromide solution.			
AUXILIARY	INFORMATION			
METHOD: /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The volume of nitric oxide absorbed	3. Hydrogen bromide was prepared			
was observed as previously stated (1) The "Ferrous" molarity was stated to	from bromine and naththalene, and treated with red phosphorus.			
be equivalent to 0.0127 mole of	Other components prographly 20			
solution.	previously stated in ref. (1).			
	ESTIMATED ERROR:			
	REFERENCES:			
	1. Manchot, W.; Zechentmayer, K. Annalen, 1906. 350.368-389.			
	See also Manchot, W.; Huttner, F.			
1	Annalen, 1910,372,153-178			
	,,			
	,			

å

00//00//00//00			
l. Nitric oxide; NO; [10102-43-9]	ORIGINAL MEASUREMENTS: Manchot, W.; Haunschild, H.		
2. Water; H ₂ O; [7732-18-5]	Z. anorg. Chem. <u>1924</u> , 140, 22-36.		
3. Iron II sulfate, (ferrous sulfate); FeSO ₄ ; [7720-78-7]			
VARIABLES:	PREPARED BY:		
	W. Gerrard.		
EXPERIMENTAL VALUES: T/K =	l		
M is the molarity of ferrous sulf $V_3$ is the volume of solution conta	ate aining 1 mole of ferrous sulfate.		
P is the pressure of nitric oxide V ₁ is the volume of nitric oxide a 1 mole of sulfate;	bsorbed by the solution containing		
$v_1$ is adjusted to (2/3.15 K, 101.3	20  Kfd		
M/mol dm ⁻ , V ₃ /dm ³ , F	//KPa V ₁ /dm°		
0.0031 320 9	0.844 11.4		
0.0031 320 9	00.751 11.4		
0.00625 160 9	0.564 10.9		
	00.751 10.4 00.938 10.1		
0.0125 80 9	0.658 10.9		
	0.844 10.4 0.751 11.2		
0.025 40 9	0.191 11.1		
	0.378 11.0		
0.05 20 9	0.938 11.4		
0.1493 6.69 9	0.378 10.9		
0.363 2.75 9	00.844 10.6 00.191 9.8		
0.911 1.10 9	01.204 9.9		
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
The volume of nitric oxide absorbed was observed as previously stated (1).	Presumably as previously described (1).		
	ESTIMATED ERROR:		
	REFERENCES: 1. Manchot, W.; Zechentmayer, K. <i>Annalen</i> , <u>1906</u> , 350, 368-389. See also Manchot, W.; Huttner, F. <i>Annalen</i> , <u>1910</u> , 372, 153-178.		

ORIGINAL MEASUREMENTS:			
Manchot, W.; Linckh, E. Z. Anorg. Chem. <u>1924</u> , 140,37-46.			
PREPARED BY:			
W. Gerrard			
ethanol was 90%.			
Pressure of NO /kPa Volume of nitric oxide (adjusted to 273.15, 101.325 kPa) absorbed per mole of ferrous salt /dm ³			
92.031       20.4         93.631       20.6         93.497       20.6         92.031       20.3         93.231       20.2         93.097       21.4         92.564       22.2         92.791       22.2         92.604       22.6         93.164       22.4         93.551       22.1			
INFORMATION			
SOURCE AND PURITY OF MATERIALS.			
<ol> <li>Nitric oxide was stated to be essentially pure.</li> <li>Analytically tested.</li> </ol>			
ESTIMATED ERROR:			
REFERENCES:			
1. Manchot, W.; Huttner, F.			
Annalen, <u>1910</u> ,372,153.			

Į.

-

COMPONENTE -	ADD OT WALL AND A SHORE AND AND A SHORE AND			
Nitria ouidar No. (20200 10 0)	ORIGINAL MEASUREMENTS:			
2. Water; $H_2O$ ; $[7732-18-5]$	Manchot, W.; Linckh, E.			
3. Iron (II) selenate; FeSeO ₄ ;	7 Anong Cham 1924 140 27-46			
$\begin{bmatrix} 15857-43-9 \end{bmatrix}$	2. Anoly, chem. $1924$ , 140, $37-46$ .			
4. Selenic acid; H ₂ SeO ₄ ; [//83-08-6]				
VARIABLES :				
	TREFARED BI:			
Concentration	W. Gerrard			
EXPERIMENTAL VALUES:				
T/K is presumably 273.15.	The Volume, V1, of nitric			
oxide stated to be absorbed	d for 1 mole of ferrous			
selenate is for a pressure	of nitric oxide equal to			
101.525 KPa.				
Conc of ferrous Concentrat	tion of $H_2$ SeQ, $V_1$ , $dm^3$ (NO)			
selenate /mol Weight &	/mol dm = 3			
dm ⁻³ weight, a				
0.0100				
0.0195 67.9	7.15 18.6			
0.049 84.8	13.2 11.9			
0.0371 91.5	15.1 11.6			
AUXILIARY	INFORMATION			
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:			
Was measured by means of the apparat-	1. Nitric oxide was stated to be nearly 100% pure.			
us referred to by Manchot and				
Huttner (1).	3,4. Were analytically attested.			
	ESTIMATED ERROR:			
	REFERENCES:			
	1. Manchot, W.; Huttner, F.			
	Annalen, <u>1910</u> , 372,153.			

COMPONENTS:	ORIGINAL MEASUREMENTS:
	Manchot, W.; Linckh, E.
1. Nitric oxide; NO; [10102-43-9]	
2. Water; $H_20$ ; $[7/32-18-5]$ 3. Trop (II) selenate: FeSeO ₄ :	2. Anorg. Chem. $1924$ , $140$ , $37-46$ .
[15857-43-9]	
VARIABLES:	PREPARED BY:
Concentration	W. Gerrard
EXPERIMENTAL VALUES:	- 273 15
Cong of forroug golt Broggur	= 273.13
/mol dm ⁻³ /kPa	a 101.325 kPa) absorbed per
,,,	mole of salt / dm ³
0.459 94.4	
0.0755 94.4	14 17.3
0.0582 95.	18.0
0.0577 94.3	17.7
0.0403 94.0	17.5
	1/.9
0.027 94.1	19.1
0.021 95.1	19 18.7
0.0176 94.9	19.9
0.0088 95.5	6 19.3
	20.7
0.0208 146.9	22 21.5
0.0186 155.5	20.3
0.0165 134.9	2 20.3
	2 22.0
AUXILI	ARY INFORMATION
METHOD /APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
The volume of nitric oxide	1. Nitric oxide stated to be nearly
absorbed was measured by means	100% pure.
Manchot and Huttner (1).	3. Ferrous selenate was self prepared
	and analytically attested.
1	
	ESTIMATED ERROR.
	BOTTINIED ERROR.
Į	
	REFERENCES:
1	1. Manchot, W.; Huttner, F.
	Annalen, <u>1910</u> , 372,153.
}	
1	

COMPONENTS	· · · · · · · · · · · · · · · · · · ·			
I Nitric oxide, NO: [10]0	2-13-01	ORIGINAL MEASUR	REMENTS:	
2. Water: $H_00$ : [7732-18-5]	2-45-51	Manchot W	• Haunschild H	
3, Tron(TT) ammonium culfa-	te:	handhoey wey hadhsenittu, h.		
S. HOH(H) anunomium saila		Z. anorg. Chem. 1924, 140, 22-36.		
Fe $(NH_4)_2$ $(SO_4)_2$ ; $[10045-8]$	9-3]	g.	<u></u> ,,	
1				
VARIABLES				
		PREPARED BY:		
Temperature, press	sure		W. Gerrard.	
EXPERIMENTAL VALUES:				
The concentration of the	e ferrous s	1+ wag 0 03 1	molos $dm^{-3}$ D is the	
pressure of NO. $V_1$ is	the volume of	of NO $(273.15)$	$K_{\star}$ 101.325 kPa) absorb-	
ed by the volume of solu	ution. dm ³ .	containing 1	mole of ferrous salt.	
i.e., per mole of ferror	us salt. K	is the equil	ibrium constant.	
$K = P [22.4 - V_1)/V_1]$		1		
т/к	P/kPa	V _l /dm ³	K	
273.15	43.662	13.8	27.21	
273.15	44.009	13.7	27.95	
273.15	61.407	16.4	22.47	
273.15	61.247	16.0	24.50	
2/3.15	60.04/	16.5	21.47	
2/3.15	83.125	1/.3	24.50	
2/3.15	82.018	1/.0	20.24	
		Mea	n <u>24.91</u>	
286 15	23 558	6 0	64 39	
286.15	23.530	5 7	68 94	
286.15	23.518	5.6	70.55	
286.15	45.809	9.6	61.08	
286.15	44.476	9.4	61.51	
286.15	80.125	12.6	62.32	
286.15	81.045	12.7	61.90	
286.15	79.619	12.5	63.06	
		Mean	n <u>64.22</u>	
	AUXILIARY	INFORMATION		
		· · · · · · · · · · · · · · · · · · ·		
METHOD 'APPARATUS / PROCEDURE :		SOURCE AND PUR	ITY OF MATERIALS:	
The volume of mitric ovide	absorbod	Procumably	as proviously	
was observed as previously	stated (1)	described	(1)	
was observed as previously	Statta (1).	deberibed	(=).	
		]		
		}		
		ESTIMATED ERRO	R:	
]				
		REFERENCES:		
		1. Manchot	, W.; Zechentmayer, K.	
		Annalen	, <u>1906</u> , 350, 36 <mark>8</mark> -389.	
1		600 ala		
1		Annalan	1910, 372, 153-178.	
1		Annaven	$\frac{1}{2}$	
1		1		
		1		

N	itr	ic	$\mathbf{O}$	xic	ĺe
1 1	111	16	U.	XI L	

СОМ	PONENTS:			ORIGINAL	MEASUREMENT	5
1.	Nitric ox Water; H ₂	ide; NO; [1 O; [7732-18	0102-43-9] -5]	Manchot	, W.; Haunscl	hild, H.
3.	Iron(II)	ammonium su	lfate;	Z. anor	g. Chem. <u>1924</u>	<u>1</u> , <i>140</i> , 22-36.
	re(NH ₄ ) ₂ (	SO4)2;[1004	5-89-5]			
				<u> </u>		
EXP	ERIMENTAL	VALUES:				
		T/K	P/kPa	$V_1/dm^3$	K	
	····				150 50	······································
		298.15	46.675	5.3	149.86	
		298.15	59.834	6.2	156.34	
		298.15	60.074	6.2	156.97	
1		298.15	91.564	8.3	155.55	
				Mea	n <u>153.29</u>	
	Heat of r	eaction was	calculated by	the van't H	off formula :	:
			4.571 T.T.			
		$\Delta H$	$= \frac{T_1 - T_2}{T_1 - T_2}$ (	log K ₁ - log	K ₂ )	
	The follo and those	calculated	shows the value by the compile	s given by t er*.	he original a	authors,
	T/K (1)	т/к (2)	∆H/kcal mole ⁻¹	∆H/kcal m	$\Delta H_{/}$	/kJ mole ⁻¹ *
	286.15	273.15	11.25	11.29		47.24
	298.15	273.15	11.74	11.75		49.16
	290.10	280.15 M	ean <u>11.76</u>	12.29	l.	49.27
	Estimated	by a graph	, ∆H was given	as 11.9 kca	1.	
	Where V ₁ of ferrou calculate nitric ox has also	is the volu s ammonium d, by means ide, P, req given the c	me, dm ³ , of ni sulfate in a 0 of the equili uired to give orresponding k	tric oxide a .03 molar so brium consta stated value Pa values. wired P	bsorbed for l lution, the a nt, the press of $V_1$ . The	mole authors sure of compiler
	V1,			NO NO		
	(273.15 K 101.325 kPa).	, T/K = 27 /atm	3.15 T/K /kPa /atm	= 286.15 /kPa	T/K = 298 /atm	3.15 /kPa
	11.2 17.0	0.246 0.774	24.926 0.63 78.407 1.99	3    64.168 3   201.983	1.513 1 4.76 4	53.321 82.307
	17.3	0.834	84.486 2.14	9 217.715	5.13 5	519.797
	17.8	0.951	96.360 2.45	0 248.246	5.85 5	592.751
	20.0	27.3 27	07.582 5.28 66. 70.3	534.996 7123.	12.61 12	22.6
	— · · · · ·					
						1
1						
1						

.

		·····						
COMPONE	INTS:			ORIGI	NAL MEASUI	REMENTS:	-	
<pre>1. Nitric oxide; NO; [10102-43-9] 2. Water; H₂O; [7732-18-5] 3. Iron (II) sulfate; FeSO₄; [7720-78-7]</pre>				Gan: Zh. and J. A 927-	Ganz, S. N.; Mamon, L. I. <i>Zh. Prikl. Khim.</i> <u>1953</u> , <i>26</i> , 1005-13 and <i>J. Applied Chem.</i> (USSR) <u>1953</u> , <i>26</i> , 927-935.			
VARIABL	.ES :			PREPA	RED BY:	w.	Gerrard	
EXPERIM	ENTAL VALUES:		·····			· _ · · · · · · · · · · · · · · · · · ·		
			TA	BLE 1				
Value	es of the eq which	uilibrium j a volume,	pressure V, of ni	tric oxi	soluti de has	ons of 20 dissolved	D% FeSO. 1.	in
	V/cm ³	1000	2000	3000	4000	5000	6000	13000
т/к	θ/°C			р _{NO} /	mmHg			
293 303 313 323 333 343 353 363	20 30 40 50 60 70 80 90	1.26 3.55 8.5 29 50 100 224 390	2.63 6.9 15.2 34.7 74 135 295 500	5.25 12.0 24.5 52.5 105 214 450 692	8.8 20.4 40.6 79.4 162 290 550	14.8 31.6 60.1 114.0 224 380 603	21.3 49 87 162 288 500 740	52.5 107 191 380 630 - -
	(101.325 kP	a) and a te	emperatu	re of 27	'3.15 К.			
			<u>w u</u>				(0	
			AUXILIA	ARY INFORM	IATION			
METHOD	APPARATUS/PROC	CEDURE :		SOURC	E AND PURI	TY OF MATH	ERIALS:	
The r aqueo fitto and p was s press "inve	nitric oxide ous solution ed scrubber placed in a simply state sures over t estigated" b	was absorb contained filled with thermostat d that nith he solution by the stat	bed in t in a n rings . It ric oxid ns were ic metho	he d,	No det	tails giv	ven.	
and h	by the dynam	ic method.	The	ESTIM	ATED ERROR	R:		
to be	e "20%". I	t appears t	that thi	S	No det	tails giv	ven.	
salt.	<i>i.e.,</i> a co	ncentration	n of	REFER	FNCES			
1.317	7 mole FeSO ₄	per 1000 c	g of	REFER				
solut	ion.							
				}				

1. Nitr 2. Wate 3. Iron [772	/TS:							
<ol> <li>Nitr</li> <li>Wate</li> <li>Iron</li> <li>[772</li> </ol>		COMPONENTS: ORIGINAL MEASUREMENTS:						
<pre>1. Nitric oxide; N0; [10102-43-9] 2. Water; H₂O; [7732-18-5] 3. Iron (II) sulfate; FeSO₄; [7720-78-7] Ganz, S. N.; Mamon, L. I. Zh. Prikl. Khim. <u>1953</u>, 26, and J. Applied Chem. (USSR) <u>19</u> 927-935.</pre>				, 1005-13 9 <u>53</u> , <i>26</i> ,				
	<del> </del>			TABLE	2			
Values of	the solu	bility c	oefficie	ent, H f	for solut	ion cont	aining 2	20% FeSO4.
T/K	293	303	313	323	333	343	353	363
θ∕°С	20	30	40	50	60	70	80	90
V/cm ³			Solu	bility c	oefficie	ent, H		
1000 2000 3000 4000 5000 6000 13000	9.4 9.8 13.0 16.4 22.0 26.6 30.1	25.0 25.8 30.0 38.2 47.2 61.0 62.0	63.5 56.6 61.0 76.0 90.0 101.0 110.0	149.0 129.0 130.0 148.0 170.0 202.0 218.0	373.0 276.0 288.0 303.0 334.0 359.0 362.0	745.0 505.0 535.0 550.0 568.0 622.0	1670.0 1100.0 1120.0 1130.0 1140.0	2910.0 2000.0 1720.0 - - -
Values o and 2.68	f the sol g of nit	ubility o ric oxide	coeffici e + stat	TABLE ent [*] , H ed % aci	3 for solu d. (%	ntion con acid are	taining probabl	20% FeSO⊾ y per-
Values o and 2.68	f the sol g of nit	ubility o ric oxido	coeffici e + stat cen	TABLE ent [*] , H ed % aci tage by	3 for solu d. (% weight)	ation con acid are	taining probabl	20% FeSO₄ y per-
Values o and 2.68 T/K 0/°C	f the sol g of nit 293 20	ubility o ric oxido 	coeffici e + stat cen 313 40	TABLE ent [*] , H ed % aci tage by 323 50	3 for solu d. (% weight) 333 60	ation con acid are 343 70	taining probabl 353 80	20% FeSO₄ y per- 363 90
Values o and 2.68 T/K θ/°C	f the sol g of nit 293 20	ubility o ric oxido 303 30	coeffici e + stat 313 40 Solu	TABLE ent [*] , H ed % aci tage by 323 50 bility c	3 for solu d. (% weight) 333 60	ation con acid are 343 70	taining probabl 353 80	20% FeSO ₄ y per- 363 90
Values o and 2.68 T/K θ/°C	f the sol g of nit 293 20	ubility o ric oxido 303 30	coeffici e + stat 313 40 Solu	TABLE ent [*] , H ed % aci tage by 323 50 bility c	3 for solu d. (% weight) 333 60 coefficie	ation con acid are 343 70 ent, H	taining probabl 353 80	20% FeSO, y per- 363 90
Values o and 2.68 T/K θ/°C Without acid	f the sol g of nit 293 20 9.8	ubility o ric oxido 303 30 25.8	coeffici e + stat cen 313 40 Solu 56.7	TABLE ent [*] , H ed % aci tage by 323 50 bility c 129.0	3 for solu d. (% weight) 333 60 coefficie 276.0	ation con acid are 343 70 ent, H 505.0	taining probabl 353 80 1100	20% FeSO↓ y per- 363 90 1865
Values o and 2.68 T/K θ/°C Without acid 5% H ₂ SO ₄	f the sol g of nit 293 20 9.8 11.3	ubility o ric oxido 303 30 25.8 29	coeffici e + stat 313 40 Solu 56.7 63.5	TABLE ent [*] , H ed % aci tage by 323 50 bility c 129.0 139.0	3 for solu (% weight) 333 60 coefficie 276.0 310.0	ation con acid are 343 70 ent, H 505.0 594.0	taining probabl 353 80 1100 1290	20% FeSO, y per- 363 90 1865 2100
Values o and 2.68 T/K θ/°C Without acid 5% H ₂ SO ₄ 5% HNO ₃	f the sol g of nit 293 20 9.8 11.3 12.1	ubility of ric oxide 303 30 25.8 29 31.7	coeffici e + stat cen 313 40 Solu 56.7 63.5 71.0	TABLE ent [*] , H ed % aci tage by 323 50 bility c 129.0 139.0 159.0	3 for solu d. (% weight) 333 60 coefficie 276.0 310.0 373.0	ation con acid are 343 70 ent, H 505.0 594.0 710.0	taining probabl 353 80 1100 1290 1590	20% FeSO y per- 363 90 1865 2100 2580
Values o and 2.68 T/K θ/°C Without acid 5% H ₂ SO ₄ 5% H ₂ SO ₄ 5% H ₂ SO ₄ + 5% HNO	f the sol g of nit 293 20 9.8 11.3 12.1 3 13.1	ubility o ric oxide 303 30 25.8 29 31.7 37.3	coeffici e + stat cen 313 40 Solu 56.7 63.5 71.0 93.5	TABLE ent [*] , H ed % aci tage by 323 50 bility c 129.0 139.0 159.0 214.0	3 for solu d. (% weight) 333 60 coefficie 276.0 310.0 373.0 515.0	ation con acid are 343 70 ent, H 505.0 594.0 710.0 1030	taining probabl 353 80 1100 1290 1590 2460	20% FeSO y per- 363 90 1865 2100 2580 -
Values o and 2.68 T/K θ/°C Without acid 5% H ₂ SO ₄ 5% HNO ₃ 5% H ₂ SO ₄ + 5% HNO ₃ 8% H ₂ SO ₄	f the sol g of nit 293 20 9.8 11.3 12.1 3 13.1 + 14.5	ubility o ric oxide 303 30 25.8 29 31.7 37.3 48.2	coeffici e + stat cen 313 40 Solu 56.7 63.5 71.0 93.5 121.0	TABLE ent [*] , H ed % aci tage by 323 50 bility c 129.0 139.0 159.0 214.0 317.0	3 for solu (% weight) 333 60 coefficie 276.0 310.0 373.0 515.0 817.0	ation con acid are 343 70 ent, H 505.0 594.0 710.0 1030 1740	taining probabl 353 80 1100 1290 1590 2460 -	20% FeSO, y per- 363 90 1865 2100 2580 - -
Values o and 2.68 T/K θ/°C Without acid 5% H ₂ SO ₄ 5% HNO ₃ 5% H ₂ SO ₄ + 5% HNO ₃ 8% H ₂ SO ₄ 10% H ₂ SO ₄ + 7% HNO	f the sol g of nit 293 20 9.8 11.3 12.1 3 13.1 + 14.5 4 16.3	ubility o ric oxide 303 30 25.8 29 31.7 37.3 48.2 59.0	Coeffici e + stat cen 313 40 Solu 56.7 63.5 71.0 93.5 121.0 170.0	TABLE ent*, H ed % aci tage by 323 50 bility c 129.0 139.0 159.0 214.0 317.0 526.0	3 for solu d. (% weight) 333 60 coefficie 276.0 310.0 373.0 515.0 817.0 1550.0	ation con acid are 343 70 ent, H 505.0 594.0 710.0 1030 1740 -	taining probabl 353 80 1100 1290 1590 2460 - -	20% FeSO, y per- 363 90 1865 2100 2580 - - -

Nitric Oxide

(cont.)

-

COMPONENTS:		ORIGINA	AL MEASUR	EMENTS:	
l. Nitri 2. Water 3. Iron [7720	Gar Zh, and J, 927	nz, S. N. Prikl. Applied 7-935.	; Mamon, L. Khim. <u>1953</u> , . Chem. (USSR)	I. 26, 1005-13 <u>1953</u> , 26,	
Effects	TA of additives upon the absor solution at 293 K ar	ABLE 4 Sption of nd 101.3	E nitric kPa pres	oxide in 20% sure.	FeSO ₄
	Solution	Gas: NO %	*cm ³	NO absorbed	mol ⁻¹ FeSO ₄
FeSO ₄	<pre>pure +5% H₂SO₄ + 1% hydroquinone + 1% phenol + 1% sodium sulfide + 1% HNO₃ + 3% HNO₃ + 5% HNO₃ + 1% HNO₃ + 1% hydroquinone + 1% hydroquinone + 3% HNO₃ + 1% phenol + 3% HNO₃ + 1% phenol + 5% HNO₃ + 1% phenol + 5% HNO₃ + 1% hydroquinone + 2% H₂SO₄ + 3% HNO₃</pre>	76 79 70 72 72 72 75 75 75 75 75 75 75	378 191 258 131 208 202 184 195 276 276 276 276 276 208 212 268	0.017 0.0085 0.012 0.0059 0.0093 0.009 0.00825 0.00875 0.0123 0.0123 0.0123 0.0123 0.0123 0.0093 0.0095	0.43 0.215 0.301 0.148 0.234 0.225 0.208 0.22 0.31 0.31 0.31 0.294 0.24

* per 30 cm³ of solution.

Note the original paper presents data on solubilities after several regenerations of the solution by boiling.

Nitric Oxide

002		0,000		
COMPONENTS :		ORIGINAL MEASUREMENTS:		
<ol> <li>Nitric oxide; NO;</li> <li>Water; H₂O; [7732-]</li> <li>Iron (II) sulfate; [7720-78-7]</li> </ol>	[10102-43-9] 18-5] FeSO ₄ ;	Pozin, M.E.; Zubov, V.V.; Tereshchenko, L. Ya.; Tarat, E. Ya.; Ponomarev, Yu.L. Izv. Vysshikh Uchebn. Zavedenii, Khim. i. Khim. Tecknol. <u>1963</u> , 6, (4), 608-616.		
VARIABLES:		PREPARED BY:		
Temperature, concentra	ation of salt	W. G	errard.	
-				
EXPERIMENTAL VALUES:	l atm = 101	.325 kPa.		
Concn. of salt	ጥ/K	Vol. NO. abs.	n	
/ mol dm-3		per mole salt /dm ³ *	PNO /atm	
1.54	283.15 288.15 288.15	13.5 11.14 11.08	0.93 0.93 0.93	
	293.15	9.35	0.92	
	303.15	5.87	0.93	
	303.15	6.62	0.90	
	318.15	2.90	0.79	
	328.15	2.12	0.80	
	333.15	1.60	0.77	
	338.15	1.22	0.68	
	338.15	1.1/5	0.73	
	348.15	0.76	0.57	
0.705	278.15	15.05	0.93	
	283.15	13.4	0.93	
	288.15	11.6	0.93	
	293.15	10.00	0.92	
	308.15	5.5	0.945	
	323.15	2.8	0.89	
				(Cont.
	AUXILIARY	INFORMATION		
METHOD APPARATUS/PROCEDURE:		SOURCE AND PURITY OF	MATERIALS;	
Volume of gas absorbed by the change in volum ing buret, water satur	l was measured ne in a measur- cated with	1. Dry gas state Source not st	d to be 95-98% ated.	•
gas being used as a li	iquid seal.	2. Water may be	assumed to be	of
diluent to obtain resu	used as a gas ults for	Satisfactory	purrey.	
various partial pressu oxide. Vapor pressure taken into account. A	res of nitric of water was	3. Ferrous sulfa to be of sati	te may be assu sfactory purit	med Y•
first effected at 363	K, and the			
increased again to giv	ve 2 values for			
each temperature. The	ese were stated	ESTIMATED ERROR:		
to agree well. Desor	otion measure-			
		PEEEDENCI C.		
		REFERENCES:		1

COMPONENTS:		ORIGINAL MEAS	ORIGINAL MEASUREMENTS:	
<pre>1. Nitric oxide; NO; [10102-43-9] 2. Water; H₂O; [7732-18-5] 3. Iron (II) sulfate; FeSO₄; [7720-78-7]</pre>		Pozin, M.E.; Tereshchenko, Ponomarev, Yu Izv. Vysshikh Khim. i. Khim (4), 608-616.	Zubov, V.V.; L. Ya.; Tarat, E.Ya. I. Uchebn. Zavedenii, . Tecknol. <u>1963</u> , 6,	
EXPERIMENTAL VALUES:	l atm =	101.325 kPa.		
Concn. of salt / mol dm ⁻³	т/к	Vol. NO. abs. per mole salt /dm ³ *	^p NO /atm	
0.705	353.15	0.3	0.55	
0.262	278.75 283.15 283.15 288.15 293.15 293.15 303.15 313.15	17.3 15.2 15.3 13.3 10.85 8.9 7.7 4.9	0.94 0.935 0.93 0.93 0.924 0.91 0.90 0.87	
0.065	283.15 283.15 288.15 293.15 293.15 298.15 303.15 313.15 313.15 328.15 343.15 353.15 358.15	16.2 16.2 13.7 11.3 11.3 8.8 7.3 4.7 4.6 1.8 1.3 0.7 0.5	0.935 0.92 0.93 0.92 0.91 0.92 0.90 0.88 0.88 0.88 0.88 0.80 0.66 0.52 0.42	
* Volume ad	justed to 1 atm	and 273 K.		

COMPONENTS :		ORIGINAL MEASUREMENTS:	
		Pozin, M.E.; Zubov, V	.v.;
1. Nitric oxide; NO; [10102-43-9]		Tereshchenko, L. Ya.; Ponomarev, Yu. L.	Tarat, E. Ya.;
2. Water; H ₂ O; [7	732-18-5]	Izv. Vysshikh Ushebn.	Zavedenii, Khim.
3. Iron chloride; FeCl ₂ ; [7758-9	(ferrous chloride) 94-3]	i. Khim. Tecknol. <u>196</u> 608-616.	<u>3</u> , 6, (4).
VARIABLES:		PREPARED BY:	
		W. Gerr	ard.
EXPERIMENTAL VALUES:	1 atm = 10	1.325 kPa.	
Conc. of salt	Vol	. No. abs. per	p _{NO}
/mol dm ⁻³	T/K mol	e of salt /dm³*	/atm
1.771	283.15	13.8	0.82
	303.15	7.15	0.93
	313.15	4.65	0.91
	323.15	2.95	0.87
1	333.15	1.82	0.81
0 885	283 15	13,98	0.81
0.000	293.15	10.3	0.92
1	303.15	6.95	0.94
	313.15	4.44	0.92
	323.15	2.69	0.88
	348.15	0.657	0.63
0.435	283.15	14.4	0.88
	293.15	10.45	0.93
	303.15	6.8	0.92
-	313.15 323 15	4.33 2.52	0.90
	333.15	1.38	0.78
	348.15	0.468	0.62
	* Volume adjust	ed to 1 atm, 273.15 K	
	AUXILIARY	INFORMATION	
METHOD 'APPARATUS/PROCEI	OURE :	SOURCE AND PURITY OF MATER	RIALS:
Volume of gas abso	orbed was measured	1. Dry gas stated to	be 95-98%.
ing buret, water s	saturated with the	2 Uptor may be take	•
Purified nitrogen	was used to obtain	2. Water may be take	n as pure
lower partial pres	sure of nitric	3. Ferrous chloride	may be taken of
taken into account	Absorption was	satisfactory puri	ty.
first effected at	363 K, and then	}	
the temperature wa	is lowered.		
Desorption measure	ments were also		
Moneroned.		ESTIMATED ERROR:	
		PEPEDENCIA .	
		REFERENCES:	
		1	
1			

ł

COMPONENTS:	ORIGINAL MEASUREMENTS.	
1. Nitric Oxide: NO: [10102-43-9]	Polovchenko, V.I.: Skvortsov, G.A.	
2. Water; $H_2O$ ; $[7732-18-5]$	2. Prikl. Khim. <u>1974</u> , 47, 1917–1922	
<pre>3. Iron (II) sulfate; FeSO₄; [7720-78-7]</pre>		
VARIABLES:	PREPARED BY:	
Pressure	C.L. Young	
EXPERIMENTAL VALUES:		
T/°C T/K Partial p/atm	pressure of NO p/MPa dm ³ (at 273.2 K and 101.3kPa) mol ⁻¹	
22.4 295.6 1.0	0.10 9.3	
21.8 295.0 1.5	0.15 11.74	
21.5 294.7 3.1	0.47 17.35	
21.1 294.3 4.7	0.48 17.35	
22.5 $295.7$ $5.421.7$ $294.9$ $7.0$	0.55 $17.750.71$ $18.78$	
20.4 293.6 7.7	0.78 19.80	
20.3 293.5 13.1	1.33 20.95	
21.4 294.6 19.7	2:00 22:10	
METHOD ADDADATHS (DDOCEDUDE -		
High pressure static bomb. Known amount of gas dissolved in solution of known volume in a vessel of known volume. Pressure measured with Bourdon gauge. Solubilities determined for 20,10, 5 and 2.5 wt iron sulfate solutions but results tabulated for 10 wt% only. Graphi results given for other concentrations.	SOURCE AND PURITY OF MATERIALS: No details given.	
	ESTIMATED ERROR:	
	$\delta T/K = \pm 0.1; \ \delta C = \pm 0.1$	
	REFERENCES:	

Nitric	Oxide
--------	-------

COMPONENTS:		ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]		Thomas, V. Bull Soc. Chem. <u>1898</u> , 19, (3), 343.		
2. Ethanol, $C_2H_5OH$	[; [64-17-5]		Thomas, V. Ann. Chim. Phys. <u>1898</u> ,13,	
<ol> <li>Iron bromide, (f FeBr₂; [7789-46</li> </ol>	errous brom	ide);	(7), 145.	
VARIABLES:			PREPARED BY:	
Temperature	,concentrat	ion	W. Gerrard	
EXPERIMENTAL VALUES:				
Weight of ferrous Fe, g, in 100 cm ³ of solution	Volume of salt solution /cm ³	т/к	Volume of Mole of NO/56 NO absorbed of ferrous iron* /cm³	
0.789	11.2	290.16	21 0.595	
0.789	16.5	291.16	28 0.538	
0.784	11.3	286.16	24.5 0.687	
3.110	8 4.8	289.16	52 0.523 47 0.787	
3.110	8	288.16	54 0.543	
3.110	5	28/.16	44 0.708	
* Calculated P _{NO} assumed	by compiler to be 101.	325 kPa.		
NOTE: The volume 56 g of fer the first g	of pure ether rous iron we roup of date	anol equa ould abso a, and 0	al to the volume of solution containi orb approximately 0.09 mole of NO for .08 mole NO for the second group.	ng
In the calc assumed tha as appears	ulation of t the volum to be done	the mole e of abso in the pa	ratio, NO/Fe, the compiler has orbed NO has been adjusted to 273.16 aper (1).	к,
NOTE: In the seco iron (Fe) a per 100 cm ³ given as 17	nd paper ci s 8.89 g pe: , given in s .0°C in the s	ted above r 100 cm ³ the first second pa	e, Thomas gave the weight of ferrous ³ instead of the above quoted 0.789 g t cited paper. The temperature was aper.	
		AUXILIARY	INFORMATION	
METHOD /APPARATUS/P	ROCEDURE :		SOURCE AND PURITY OF MATERIALS:	
The liquid was contained in a simple glass vessel furnished with an inlet tube which passed right into the liquid, and with an exit tube. Nitric oxide was slowly passed into the liquid, and the entrained water vapor was collected and weighed. It was simply stated that the quantity of absorbed gas was determined. The pressure was not mentioned.		NO: Not mentioned; but presumably prepared from mercury and nitric acid as in ref.(1).	c	
			ESTIMATED ERROR:	_
			REFERENCES :	
			(1) Thomas, V. Bull. Soc. Chim., <u>1898</u> , 19, (3), 419.	

Salt Solutions

Salt Solutions 307				
COMPONENTS:	ORIGINAL MEASUREMENTS:			
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>2. Ethanol; C₂H₅OH; [64-17-5]</li> </ol>	Thomas, V. Bull.Soc. Chim. <u>1898</u> , 19, (3), 419; Ann. Chim. Phys. <u>1898</u> , 13,(7), 145.			
<ol> <li>Iron chloride (ferrous chloride); FeCl₂; [7758-94-3]</li> </ol>				
VARIABLES: Temperature.	PREPARED BY: W. Gerrard			
EXPERIMENTAL VALUES:				
The solution contained 4.6 g of At 290.16 K 12.2 cm ³ of this so of NO (adjusted to 273.16 K).	E ferrous iron in 1 dm³. Dution absorbed 21.5 cm³			
At 288.16 K 12.5 cm ³ of this solution absorbed 23.4 cm ³ of NO (adjusted to 273.16 K)				
Although the pressure was stated to be 101.325 kPa, "augmentee de la pression de tension maxima du solvant", the actual pressure was not stated.				
Assuming p _{NO} to be 101.325 kPa, the solution containing 56 g of ferrous iron absorbed 0.959 moles of NO at 290.16 K; and 1.02 moles of NO at 288.16 K. The alcohol contained in the solution would when pure absorb about 0.148 mole of NO.				
AUXILIARY	INFORMATION			
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
A measured volume of the alcoholic solution of ferrous salt was intro- duced into a graduated test-tube resting over mercury in a larger vessel. By means of a second grad- uated test-tube a known volume of nitric oxide was passed into the first tube. There was no diagram, and the actual operation is difficult to visualize from this description	Nitric oxide was self prepared by the action of mercury on nitric acid.			
chis description.	ESTIMATED ERROR:			
	REFERENCES:			
COMPONENTS:	ORIGINAL MEASUREMENTS:			
-------------------------------------------------	---------------------------------------------	--	--	--
1. Nitric oxide; NO; [10102-43-9]	Thomas, V.;			
2. Ethanol; $C_2H_6O$ ; [64-17-5]	Bull. Soc. Chim. 1898, 19 (3), 343.			
<pre>3. Iron(II) iodide; FeI₂;</pre>	Thomas, V.;			
[7783-86-0]	Ann. Chim. Phys. 1898. 13 (7), 145.			
VARIABLES :	PREPARED BY:			
Temperature	W. Gerrard			
EVDEDIMENTAL VALUES.				
ERIERIE VALUES.				
The block forward inch an Holumon	of Mole NO/			
weight of ferrous iron, g, volume salt so	In. T/K NO absorbed for 56 g			
In 100 cm of solution /cm ³	/cm³ Fe*			
1.925 8 1.925 9.1	288.16 23 0.374 294.16 26 0.371			
1.925 9	285.16 27 0.390			
* Calculated by the compil	er. Based on the assumption			
that the observed volume	of NO had been adjusted to			
kPa.	lessure of No, P _{NO} , and forest			
AUXILIAR				
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The liquid was contained in simple	1. NO: not mentioned; but			
alass wessel furnished with an	presumably it was prepared from			
	mercury and nitric acid (1).			
inlet tube passing right into the				
liquid, and an exit tube. Nitric				
oxide was slowly passed into the				
liquid. It was simply stated that				
the quantity of absorbed gas was	ESTIMATED ERROR:			
determined The process was not				
determined. The pressure was not				
stated.	REFERENCES :			
	1. Thomas, V.;			
	Bull. Soc. Chim.			
	<u>1898</u> , <i>19</i> (3), 419.			
4				

COMPONENTS:	ORIGINAL MEASUREMENTS.
1. Nitric oxide: NO: [10102-42-9]	Manchot W . Zochostmarcz V
1. NICHC OXIGE, NO; [10102-43-9]	Manchot, w.; Zechentmayer, K.
2. Ethanol; $C_2H_5OH$ ; [64-17-5]	Annalen, <u>1906</u> , 350,368-389.
3. Iron chloride (Ferrous chloride); FeCl ₂ ; [7758-94-3]	
VARIABLES:	PREPARED BY:
Temperature, pressure	W. Gerrard
EXPERIMENTAL VALUES:	
T/K Weight of FeCl ₂ Pressure added to 50 cm ³ nitric of ethanol + 2 cm ³ /kPa of hydrochloric acid, 14% HCl /g	e of Volume, V ₁ , of nitric oxide absorbed per mole of FeCl ₂ . /dm ³ (273.15 K, 101.325 kPa)
201 15 0 2464 80 14	
284.75 0.2289 94.63	17 21.4
281.55 0.2766* 96.3	21.9
270.95 0.2210 98.2	73 21.8
275.36 0.5716** + 183.44	48 21.7
270.95 0.2320 + 183.1	75 22.5
270.95 0.1369*** 97.8	57 22.7
*** 20 cm ² of ethanol, and no hydro + Only 3 drops of hydrochloric ac	cid (14% HCl).
AUXILIARY	INFORMATION
METHOD: /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Volumetric apparatus. A three-way tube was connected to a gas buret and an absorption pipet; the third member was used for exhausting the apparatus, and for passing in the gas. By means of a levelling tube containing mercury, the pressure and volume of gas in the buret could be regulated.	<ol> <li>Prepared from sodium nitrite and dilute sulfuric acid, and washed with alkali. Stated to be 100% pure.</li> <li>Stated to be absolute.</li> <li>Prepared from hydrogen chloride and hot sheet iron. Attested analytically.</li> </ol>
	ESTIMATED ERROR:
	REFERENCES :

Nitric Oxide

COMPONENTS :		ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]		Manchot, W.; Huttner, F.			
2. Organic liquid		Annalen			
2. Trop(II) chlorido, PoCl.		1010 379 152-179			
[7758-94-3]	3. Iron(II) chloride; FeCl ₂ ; [7758-94-3]		<u> </u>		
VARIABLES .		PREPARED BI:			
		W. G	errard		
EXPERIMENTAL VALUES: $\pi/\kappa = 273$	15				
1/1 - 2/5	Conc. d	of Pressure of	Volume, V, of NO per mole of		
Organic liquid	Iron (II	I) NO	Iron(II) salt		
		/ KF d	/ cm		
Ethanol; $C_2H_5OH$ ; [64-17-5]	0.0102	100.257	22.2		
Ethyl benzoate; $C_6H_5CO_2C_2H_5$ ; [93-89-0]	0.0292	100.257	22.5		
	0.0667	100.790	22.6		
Ethyl acetate; CH ₃ CO ₂ C ₂ H ₅ ; [141-78-6]	0.0154	99.190	22.2		
<pre>Diethyl propanedioate (Ethyl malonate); CH₂(CO₂C₂H₅)₂; [105-53-3]</pre>	0.0571	98.257	22.8		
2-Propanone; $CH_3COCH_3$ ;	0.0193	100.257	22.2		
[07-04-1]	0.0302	98.257	21.9		
Pyridine; $C_5H_5N$ ;	0.0224	100.390	22.6		
[110-86-1]	0.0229	100.390	22.4		
* not free from water.	v	is the volume of M adjustment to 101.	NO after .325 kPa.		
	AUXILIARY	INFORMATION			
METHOD / APPARATUS / PROCEDURE :		SOURCE AND PURITY OF	MATERIALS:		
The volume of gas absorbed wa	c	1 Nitric oside	probably taken as		
measured by the Ostwald-type	gas	1. NITTIC OSIGE probably taken as			
buret and absorption pipet.	The				
apparatus and method were sta	ted to	2, 3. Appeared	to be of		
be similar to those previousl	У	satisfactory	purity.		
described (1), except that th	e				
technique for introducing the		RETINATED EDDOD			
Terrous sait was mourried.		ESTIMATED ERROR:			
		PERFORMANC			
		REFERENCES:			
		1. Manchot, W.; Zechentmayer, K.			
		Annalen 1906, 350, 368-389.			
		<u></u> , , , , , , , , , , , , , , , , , ,			

COMPONENTS .			OPICINA	10.000		
l Nituia	L NELES IN NO. [10100 42 0]		Manchot W			
1. Nitric oxide; NO; [10102-43-9]		Manchot, W.				
2. Water; H ₂ O; [7732-18-5]		Annal	en			
3. Sulfur	tic acid; $H_2SO_4$ ; [7	664-93-9]	1910	379 179-18	6	
4. Iron(I	II) sulfate; Fe ₂ (S	504)3;	<u> 1,110</u> ,	0/2, 1/0-10	•••	
[10028	3-22-5]					
VARIABLES:	**************************************	·····	PREPAREI	) BY ·	<u> </u>	
	Concentration of					
	components 3 and	4		Ψ.	Gerrard	
Dimension	-		L			
EXPERIMENTAL	L VALUES:				Volume, V, of NO	
	Gram-atom of Fe	Conc. of H	I ₂ SO ₄	Pressure of	and 101.325 kPa,	
T/K	in 1 dm ³ of	/mol dm	- 3	NO	absorbed per	
	solution	(soln.)		/kPa	l mole Fe	
272.15	0.0000	10 20 /07	<u> </u>	100 100	A A 7	
2/3.15	0.0096	18.32 (97)	.68) .68)	102.123	44.7	
	0.0106	0	,	99.857	0	
	0.0108	16.92 (90	.6%)	99.323	44.8	
	0.0109	6.67 (47.	.6%) 99)	99.323	0	
	0.0113	14.69 (82)	.03) .08)	99.323	0	
	0.0500	16.92 (90.	.6%)	101.723	44.4	
	0.1000	16.92 (90.	.68)	101.723	42.2	
	0.1960	16.92 (90.	.68)	101.723	31.0	
	0.0102	16.92 (90.	.6%)	166.783	44.9	
	0.0117	16.92 (90.	.6%)	42.529	44.7	
284.15	0.0100	16.92 (90.	.6%)	101.723	44.8	
		AUXILIARY	INFORMAT	ION		
METHOD ADDA						
METHOD APPAI	RATUS/PROCEDURE:		SOURCE A	AND PURITY OF M	ATERIALS:	
Apparatus	and method were s	imilar	1. Ni	tric oxide p	robably taken as	
to these	described (1) soo	also(2)	ha	ing 100% pure	e as in refs. (1)	
	described (1), see	aiso (2).	De.			
The volum	e of absorbed gas	was	and	a (2).		
measured	by means of a gas	buret		1 3	d to be of	
and absor	ption pipet.		2, 3,	4. Appeare		
			sat	tisfactory p	urity.	
			RETIMATI	TD EBDOD.		
			LSIIMATI	ED ERROR:		
			DEPENDEN	010		
			KEFEREN	urs: nchot W ·	Zechentmaver, K	
			Anı	nalen, <u>1906</u> ,	350, 368-389.	
			2 3/	achot W	Huttpor F	
			Ann Ann	nalen, 1910,	<i>372</i> , 153–178.	
				·		

312 Nitric Oxide				
CCMPONENTS:ORIGINAL MEASUREMENTS:1. Nitric oxide; NO; [10102-43-9]Griffith, W. P.; Lewis, J.;2. Ethanol; $C_{2H_5}OH$ ; $[64-17-5]$ Griffith, W. P.; Lewis, J.;3. Iron chloride (Ferric chloride); FeCl ₃ ; $[7705-08-0]$ Wilkinson, G.VARIABLES:PREPARED BY:W. GerrardEXPERIMENTAL VALUES:W. GerrardM = Molarity of FeCl ₃ /mol dm ⁻³ . $P$ = Pressure of NO/kPa. $V_1$ = Volume NO/dm ³ (adjusted to 273.15 K, 101.325 kPa); $V_1$ is based on the authors' loose statement: "Vol of NO absorbed per mole at N.T.P.", the mole apparently referring to FeCl ₃ . $K$ = Equilibrium constant, given by the authors as the mean value of $P_{NO}$ FeCl ₃ /FeCl ₃ NO, in mmHg. $K^*$ = The compiler's values based on $K = P_{NO}$ (22.4 - $V_1$ )/ $V_1$ , in mmHg. $\Delta H$ = 4.571(log $K_1$ - log $K_2$ ) × $T_1T_2/(T_1 - T_2)$ , T = T/K.NOTE: The authors simply stated: "heat of reaction 20.4 kcal/mole", but the basis of the calculation was not revealed. $V_1$ (E) = Volume of NO (adjusted to 273.15 K, 101.325 kPa) which would be absorbed by that volume of ethanol equal to the volume of solution				
(cont.)				
AUXILIARY	INFORMATION			
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
It was simply stated that the gas absorption was measured in a conventional Warburg-type apparatus.	<ol> <li>Nitric oxide was prepared in a sodium nitrite-ferrous sulfate generator; nitrogen dioxide was removed by a concentrated aqueous solution of potassium hydroxide.</li> <li>3. Probably of satisfactory purity.</li> </ol>			

ESTIMATED ERROR:

REFERENCES :

<pre>l. Nitric oxide: NO: [10102-43-9]</pre>	Griffith, W. P.; Lewis, J.;
<ol> <li>2. Ethanol; C₂H₅OH; [64-17-5]</li> </ol>	Wilkinson, G.
3. Iron chloride (Ferric chloride); FeCl ₃ ; [7705-08-0]	J. Chem. Soc. <u>1958</u> , 3993-3998.

EXPERIMENTAL VALUES:

т/к	М	P/kPa	$V_1/dm^3$	K/(mmHg)	K*/(mmHg)	V ₁ (E)	No.
282.4	0.034	98.657	21.3	_	38.2	8.4	1
	0.017		21.0	43.9	49.3	16.8	2
294.4	0.034	96.537	18.0	-	177.0	7.7	3
	0.017		17.4	196.0	208.1	15.4	4
298	0.034	93.99	15.2	-	333.9	7.6	5
	0.017		16.1	305.0	275.9	15.2	6

ΔH values, calculated by compiler: T/K range (): (1-3) 21.09; (1-4) 23.32; (1-5) 23.22; (1-6) 21.17; (2-3) 17.58; (2-4) 19.81; (2-5) 20.49; (2-6) 18.44; (3-5) 30.70; (3-6) 21.47; (4-5) 22.87; (4-6) 13.63 kcal mol⁻¹(1 kcal - 4.1840 kJ).

#### Nitric Oxide

(A)/D())))///	
COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitric oxide: NO; [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.
2. Water; H ₂ O; [7732-18-5]	Ber. 1904. 37.3044-3052
3. Hydrochloric acid; HCl;	
[7647-01-0] 4 Coppor (II) chloride (Cupric	
chloride); CuCl ₂ ; [7447-39-4]	
VARIABLES:	PREPARED BY:
Concentration	W Corrord
Concentración	W. Gerrard.
EXPERIMENTAL VALUES: Neither temperature	nor pressure of nitric oxide
were stated. T/K th	ought to be 293.16 K, and p _{NO}
to be 101.325 kPa.	
Volume, V, of Volume, V	, Ostwald coefficient, L,
bydrochloric acid absorbed	by calculated by compiler.
(concentrated) $V_{\perp}/dm^3$	
containing one mole s	
of cupric chloride	
/ d.ii	
	2.059
0.840 2.838	3.379
1.230 3.426	2.785
2.462 3.989	1.620
12.500 3.606	0.524
18.750 3.153	0.168
28.650 1.976	0.069
	Pure water $0.0505(1)$
AUXILIARY	INFORMATION
	CONDCE AND DUDITY OF MATERIALS.
A gas buret and pipet of the Ostwald	SOURCE AND FURITI OF MATERIALS;
type were connected to a gasometer by	No details given.
a lead capillary tube. Two electrodes	
and the specific conductance was	
determined before and after the	
absorption. It was stated that the	
point of saturation could be sharply	
determined.	
	ESTIMATED ERROR:
	REFERENCES :
	1. Winkler, L.W. Ber. 1901, 34, 1414

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.			
2. Water; H ₂ O; [7732-18-5]	Ber. <u>1904</u> ,37,3044-3052.			
3. Copper chloride, (Cupric chloride);				
VARIABLES:	PREPARED BY:			
Concentration	W. Gerrard.			
	L			
EXPERIMENTAL VALUES: Neither temperature	nor pressure of nitric oxide			
were stated. T/K th	ought to be 293.16 K, and p _{NO}			
to de 101.325 kPa.				
Volume of solution, V Volume of	nitric oxide, Ostwald coefficient, L,			
containing 1 mole of ⁵ absorbed b	y the volume calculated by compiler.			
s, or sor				
$ \begin{array}{cccc} 0.231 & 0.1 \\ 0.277 & 0.0 \end{array} $	20 0.519 98 0.354			
0.371 0.0	52 0.140			
	Pure water (1) 0.0505			
AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	No details given.			
	ESTIMATED ERROR:			
}				
	REFERENCES			
	1. Winkler, L.W. Ber. 1901, 34, 1414			

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide: NO: [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.			
2. Water: H ₂ O: [7732-18-5]	Ber. <u>1904,</u> 37,3044-3052.			
3. Copper bromide (Cupric bromide):				
CuBr ₂ ; [7789-45-9]				
VARIABLES:	PREPARED BY:			
Concentration	W. Gerrard			
EXPERIMENTAL VALUES:				
Neither temperature no were stated. T/K tho to be 101.325 kPa.	or pressure of nitric oxide ught to be 293.16 K, and p _{NO}			
Volume, V., of water Volume V	of nitric Ostwald coefficient L			
containing one mole oxide abs	1, of Millie Ostward Coefficiency,			
of cupric bromide /dm ³ /dm	n ³ s carcaracea by comprise			
0.37 0.5	15 1.392 20 0.194			
0.925 0.0	00 -			
	Pure water (1) 0.0505			
AUXILIARY	INFORMATION			
METHOD / APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
A gas buret and pipet of the Ostwald	Ne details given			
a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	No details given.			
	ESTIMATED ERROR:			
	REFERENCES: 1. Winkler, L.W. Ben 1901. 34 1414			
	,,,,,,,,			

COMPONENTS :			ORIGINAL MEASUREMENTS:		
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Water; H₂O; [7732-18-5]</li> <li>Copper (II) sulfate; CuSO₄; [18939-61-2]</li> </ol>		Manchot, W. Annalen, <u>1910</u> , <i>375</i> , 308-315			
4. Sulfur [7664-	ic acid; H ₂ SO ₄ ; 93-9]				
VARIABLES:			PREPARED	BY:	
Temp	perature, concen	tration		W. Ger	rard
EXPERIMENTAL	VALUES:		•		· · · · · · · · · · · · · · · · · · ·
T/K	Conc. of cupric salt /mol dm ⁻³ (soln).	Conc. of H ₂ /mol dm ⁻³ (s	SO4 oln)	Pressure of NO/kPa	Volume in dm ³ (adjusted to 101.325 kPa) of NO absorbed per 1 mole salt.
273.15	0.0053 0.0119 0.0159 0.0236 0.0241 0.0246 0.0251 0.0265 0.0265 0.0265 0.0266 0.0586 0.1183 0.1376 7.833 0.0179 0.0175 0.0180	$\begin{array}{c} 18.32 & (97.6) \\ 18.32 & (97.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 0 & 0 \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 16.92 & (90.6) \\ 18.32 & (97.6) \\ 0 & 0 \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ 18.32 & (97.6) \\ $	용) 용) 용) 용) 용) 용) 용) 용) 용) 용) 용) 용)	100.257 100.390 100.257 100.257 100.257 100.257 100.257 100.257 100.257 100.257 100.257 100.390 100.390 100.390 98.790 173.716 42.929 101.723	22.3 $22.4$ $16.6$ $22.4$ $0$ $16.7$ $16.9$ $0$ $22.4$ $0$ $1.4$ $0$ $10.4$ $0$ $22.3$ $22.4$ $22.7$
		AUXILIARY	INFORMAT	ION	
METHOD APPAR.	ATUS/PROCEDURE:	·····	SOURCE A	ND PURITY OF M	ATERIALS:
The volume was observ stated (1)	e of absorbed ni ved presumably a	tric oxide s previously	Prest (1).	umably as pro	eviously stated
			Lotteri	D ERROR.	
			REFERENC 1. Ma A1	CES: anchot, W.; 3 nnalen, <u>1906</u>	Zechentmayer, K. , 350, 368-389.

### Nitric Oxide

COMPONENTS:			ORIGINAL MEASUR	EMENTS:		
			Manchot, W.			
1. Nitric oxide; NO; [10102-43-9]			10 775 200 215			
2. Water	; H ₂ O; [7732-18-5]		Annalen, <u>19</u>	<u>10</u> , <i>375</i> , 308-315		
3. Ethan	$O1; C_2H_60; [64-1/-]$	5].				
4. Coppe	r(II) chloride, (Ci	upric				
	$(ae); CuCI_2;$					
[/44/	-32-4]					
VARIABLES:			PREPARED BY:			
Tempe	rature, concentrat:	ion	W.	Gerrard		
EXPERIMENTAL	VALUES:		<u> </u>			
m / W	Conc. of CuCl.	8 (vol/vo	1) Proceura	of Volume V., of		
1/1	/mol $dm^{-3}$ (solp)	of ethano	1 NO/kPa.	NO $(101.325 \text{ kPa})$		
	,	in soluti	on	absorbed per 1		
ļ				mole of CuCl		
				/dm ³		
			100 057	17.0		
2/3.15	0.005	ADSOLUTE	100.257	τ/•σ 18.0		
	0.0123	Absolute	100.257	18.1		
1	0.0234	70	99.990	2.7		
	0.0256	50	99.990	0.3		
l	0.0256	Absolute	100.390	17.5		
	0.0271	90	99.990	10.4		
	0.02//	0 Abcoluto	100.390			
	0.0555	Absolute	100.125	17.4		
	0.1268	0	100.390	0		
	0.1352	Absolute	100.390	17.3		
]	0.2689	Absolute	98.257	15.9		
	0.2806	Absolute	100.390	15.3		
	0.6490	Absolute	100.390	14.1		
	4-2800	Absolute	98.657	5.5		
	11.7300	0	98.657	0.3		
Ì	0.0183	Absolute	173.983	19.3		
	0.0176	Absolute	44.262	15.2		
286.35	0.0494	Absolute	98.257	16.1		
		AUXILIARY	INFORMATION			
METHOD APPAR	ATUS/PROCEDURE:		SOURCE AND PURI	TY OF MATERIALS:		
The volum	e of nitric oxide a	absorbed	1. Presuma	bly as previously stated		
was obser	a volumetric appai	ratus	l (1). P nitrate	and dilute sulfuric		
The volum	e of gas first abs	orbed	acid.			
by ethano	1-water mixture fin	rst				
measured	and then a small to	ube				
containin	g salt was broken a	and				
the absor	ption of solution r	neasured.	ļ			
]						
			LSTIMATED ERROR	R:		
ł						
			REFERENCES			
1						
1			1. Manchot	, W.; Zechentmayer, K.		
			Annalon	. 1906. 350. 368-389.		
			Innaten	, <u> </u>		
1						
<b>)</b>			1			

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.			
2. Methanol: CH.OH: [67-56-1]	<i>Ber</i> . <u>1904</u> , <i>37</i> , 3044-3052			
3. Copper chloride (Cupric chloride); CuCl ₂ ; [7447-39-4]				
VARIABLES:	PREPARED BY:			
Concentration	W. Gerrard			
EXPERIMENTAL VALUES: Neither temperature were stated. T/K th to be 101.325 kPa.	nor pressure of nitric oxide ought to be 293.16 K, and p _{NO}			
Volume, V , containing Volume V ₁ , l mole of ^s cupric oxide abso chloride in solution /dm /dm ³	of nitric Ostwald coefficient,L, rbed by V calculated by compiler.			
1.60 3.3	2.062			
8.22 5.6	0.681			
82.25 4.9	0.0596			
Pur	e methanol (1) 0.350			
82.25 dm ³ of pure methanol would absorb 28.79 dm ³ of nitric oxide.				
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	SOURCE AND PURITY OF MATERIALS: No details given.			
	ESTIMATED ERROR:			
	REFERENCES: 1. Riccoboni, L. Gazz. chim. ital. <u>1941</u> , 71, 139			

00N - V

MILLIC ONICE
--------------

CMMFORMENTS: 1. Nitric oxide; N0; [10102-43-9] 2. Ethanol; C ₂ H ₂ OH; [64-17-5] 3. Copper chloride (Curic chloride); CuCl ₂ ; [7447-39-4] VARIABLES: Concentration VARIABLES: Concentration VARIABLES: Concentration VARIABLES: Concentration Volume, V _g , of ethanol volume, V _g , of ethanol Volume, V _g , of nitric containing one mole of cupric chloride /dm ³ 1.50 8.7 3.64 12.38 32.2 12.9 1.50 3.64 12.38 3.22 12.9 1.50 3.64 12.38 3.22 12.9 15.91 Concentration VARIABLES: No details given. METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes ware fitted to the absorption tube, and the specific conductance was determined. BETERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129 REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129				
1. Nitric oxide; NO; [10102-43-9] 2. Ethanol; C ₂ H ₂ OH; [64-17-5] 3. Copper chloride (Cupric chloride); CuCl ₂ ; [7447-39-4] VARIABLES: Concentration VARIABLES: No there target a random or pressure of nitric oxide were stated. 7% thought to be 293.16 K, and P _{NO} to be 101.325 kPa. Volume, V ₃ , of ethanol Volume, V ₄ , of nitric Ostandard of the ostabad. 7% thought to be 293.16 K, and P _{NO} to be 101.325 kPa. Volume, V ₃ , of ethanol Volume, V ₄ , of nitric Ostandard of the ostabad. 7% thought to be 293.16 K, and P _{NO} to be 101.325 kPa. Volume, V ₃ , of ethanol Volume, V ₄ , of nitric Ostandard of the ostabad by V ₃ calculated by compiler outpic of lorder data 1.50 3.64 12.8 1.50 6.7 5.80 3.64 12.38 3.22 1.205 1.2.8 1.50 6.7 5.80 3.64 12.38 3.22 1.205 1.2.8 1.50 6.63 1.8.15 0.4235 1.92.1 Ethanol alone 0.285 (1) METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald beorption tube, and the specific conductance was debarder by a lead capillary tube. Two electrodes was debarder by a lead capillary tube. Two electrodes was debarded to the aborption tube, and the specific conductance was debarder by a lead capillary tube. Two electrodes was debarded to the aborption tube, and the specific conductance was debarded to the stated that the point of saturation could be sharply determined. REFERENCES: 1. Carlus, L. Annalen, <u>1855</u> , 94,129	COMPONENTS:	ORIGINAL MEASUREMENTS:		
<pre>1. Nitric oxide; NO; [10102-33-9] 2. Ethanol; C.H.GOH; [64-17-5] 3. COpper chloride (Cupric chloride); CuCl;; [7447-39-4]  VARIABLES: Concentration  PREPARED BY: Neither temperature nor pressure of nitric oxide Were stated. T/K thought to be 293.16 K, and P_{NO} to be 101.325 kPa.  Volume, V_g, of ethanol Volume, V₁, of nitric Ostwald coefficient, L, containing one mole of oxide absorbed by V_g calculated by compiler cupric chloride /dm³  1.50 1.50 1.50 1.50 1.54 12.38 3.64 12.38 3.62 12.6 1.5.43 18.05 0.235 192.1 15.92 0.0829 Ethanol alone 0.285 (1)  METHOD/ APPARATUS/PROCEDURE: A gas burct and pipet of the Ostwald to gasometer by lead engillary thos. Two electrodes are fitted to the absorption tube, and the geoific conductance was determined.  REFERENCES: 1. Carius, L. Annalen, <u>1855</u>, 94,129 </pre>		Kohlschutter, V.; Kutscheroff, M.		
2. Ethanol, C.B.ROH, [64-17-5] 3. Copper chloride (Cupric chloride); CuCl ₂ ; (7447-39-4] VARIABLES: Concentration VARIABLES: Neither temperature nor pressure of nitric oxide were stated. T/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa. Volume, V _g , of ethanol Volume, V ₁ , of nitric Ostwald coefficient, L, containing one mole of cupric chloride /dm ³ 1.50 1.50 2.64 1.2.8 12.8 12.9 1.50 2.64 12.9 1.50 2.64 12.9 1.50 2.64 12.9 1.50 2.64 12.9 1.50 2.64 12.9 12.9 1.50 2.64 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 12.9 132.1 15.92 0.0829 Ethanol alone 0.285 (1) METHOD / APPARATUS/PROCEDURE: A gas burct and pipet of the Ostwald AUXILIANT INFORMATION METHOD / APPARATUS/PROCEDURE: A gas burct and pipet of the Ostwald determined before and after the absorption. It was stated that the point of saturation could be sharply determined. REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129	1. Nitric oxide; NO; [10102-43-9]	Ber. 1904, 37,3044-3052.		
3. Copper chloride (Cupric chloride); CuCl ₂ ; [7447-39-4] VARIABLES: Concentration EXPERIMENTAL VALUES: Noither temperature nor pressure of nitric oxide were stated. T/K thought to be 293.16 K, and P _{NO} to be 101.325 KRa. Volume, V _g , of ethanol Volume, V ₁ , of nitric Ostwald coefficient, L, containing one mole of cupric chloride /dm ³ 1.50 3.84 12.86 12.86 3.84 12.38 12.9 12.9 13.9 12.9 12.9 12.9 12.9 12.9 13.9 12.9 13.9 12.9 12.9 12.9 12.9 12.9 12.9 13.92 12.9 12.9 15.92 20.00829 Ethanol alone 0.285 (1) METHOD/APPARATUS/FROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. EXFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129	2. Ethanol; C ₂ H ₅ OH; [64-17-5]			
CUCL1: [ 7/44/-39-4]         VARIABLES: Concentration         PREFARED BY: W. Gerrard.         EXPERIMENTAL VALUES: Neither temperature nor pressure of nitric oxide were stated. T/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa.         Volume, V _s , of ethanol       Volume, V ₁ , of nitric         Containing one mole of cupric chloride /dm ³ oxide absorbed by V _s /dm ³ 1.50       8.7         3.84       12.38         12.8       15.43         12.8       15.43         192.1       15.92         Ethanol alone       0.285 (1)             METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.       SOURCE AND PURITY OF MATERIALS: No details given.	3. Copper chloride (Cupric chloride);			
VARIABLES: Concentration       PREPARED BY: W. Gerrard.         EXPERIMENTAL VALUES: Neither temperature nor pressure of nitric oxide were stated. T/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa.         Volume, Vg, of ethanol       Volume, V1, of nitric         Ostman, of ethanol       Volume, V1, of nitric         containing one mole of cupric chloride /dm³       oxide absorbed by Vg         1.50       8.7         3.84       12.38         12.8       15.43         12.8       15.43         12.9       0.0829         Ethanol alone       0.285 (1)	CuCl ₂ ; [7447-39-4]			
Concentration       W. Gerrard.         EXPERIMENTAL VALUES: were stated. 7/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa.       Source stated. 7/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa.         Volume, V _s , of ethanol       Volume, V ₁ , of nitric       Ostwald coefficient, L, containing one mole of cupric chloride /dm ³ 1.50       8.7       5.80         3.84       12.38       3.225         12.8       15.43       1.005         3.84       12.38       3.225         12.9       15.92       0.0829         Ethanol alone       0.285 (1)         Ethanol alone         NO details given.         METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.       ESTIMATED ERROR:         EEFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129	VARIABLES:	PREPARED BY:		
EXPERIMENTAL VALUES: Neither temperature nor pressure of nitric oxide were stated. 7/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa. Volume, V _s , of ethanol Volume, V ₁ , of nitric Ostwald coefficient, <i>L</i> , containing one mole of oxide absorbed by V _s calculated by compiler cupric chloride /dm ³ /dm ³ 1.50 8.7 5.80 3.84 12.38 3.22 12.8 15.43 0.473 38.41 18.15 0.473 192.1 15.92 0.00829 Ethanol alone 0.285 (1) METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129	Concentration	W. Gerrard.		
EXPERIMENTAL VALUES: Neither temperature nor pressure of nitric oxide were stated. T/K thought to be 293.16 K, and P _{NO} to be 101.325 kPa. Volume, V _g , of ethanol Volume, V ₁ , of nitric Ostwald coefficient, L, containing one mole of cupric chloride /dm ³ /dm ³ /dm ³ 1.50 8.7 5.80 3.84 12.38 3.22 12.8 15.43 1.205 38.41 18.15 0.473 76.83 18.05 0.235 192.1 15.92 0.0829 Ethanol alone 0.285 (1) METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were first or duber the absorption. It was stated that the point of saturation could be sharply determined. REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129				
Volume, Vg, of ethanol containing one mole of cupric chloride /dm³       Volume, V1, of nitric oxide absorbed by Vg /dm³       Ostwald coefficient, L, calculated by compiler calculated by compiler         1.50       8.7       5.80         3.64       12.38       3.22         12.8       15.43       1.205         3.64       12.38       3.22         12.8       15.43       0.473         76.83       18.05       0.235         192.1       15.92       0.0829         Ethanol alone         NORCE AND PURITY OF MATERIALS:         NORCE AND PURITY OF MATERIALS:         No electrodes         Were connected to a gasometer by alsa calilary tube. Two electrodes         Wore fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.         ESTIMATED ERROR:         REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129	EXPERIMENTAL VALUES: Neither temperature were stated. T/K th to be 101.325 kPa.	nor pressure of nitric oxide ought to be 293.16 K, and p _{NO}		
containing one mole of cupric chloride /dm ³ oxide absorbed by V _g /dm ³ calculated by compiler /dm ³ 1.50       8.7       5.80         3.84       12.38       3.22         12.8       15.43       1.205         38.41       18.15       0.473         76.83       18.05       0.235         192.1       15.92       0.0829         Ethanol alone         O.285 (1)	Volume, V, of ethanol Volume, V	, of nitric Ostwald coefficient, L,		
cupric chloride /dm³       /dm³       5         1.50       8.7       5.80         3.84       12.38       3.22         12.8       15.43       1.205         38.41       18.15       0.473         76.83       18.05       0.235         192.1       15.92       0.00829         Ethanol alone       0.285 (1)         MUNILIARY INFORMATION         METROD/APPARATUS/PROCEDURE:         A gas buret and pipet of the Ostwald       SOURCE AND PURITY OF MATERIALS:         No details given.       No details given.         were fitted to the absorption tube, alosoption. It was stated that the point of saturation could be sharply determined.       ESTIMATED ERROR:         REFERENCES:         1. Carius, L. Annalen, <u>1855</u> , 94,129	containing one mole of oxide abs	orbed by V calculated by compiler.		
1.50       8.7       5.80         3.84       12.38       3.22         12.8       15.43       1.205         38.41       18.15       0.473         76.83       18.05       0.235         192.1       15.92       0.0829         Ethanol alone       0.285 (1)         MUXILIARY INFORMATION         METHOD/APPARATUS/PROCEDURE:         AUXILIARY INFORMATION         METHOD/APPARATUS/PROCEDURE:         A gas buret and pipet of the Ostwald         type were connected to a gasometer by         alead capillary tube. Two electrodes         Metermined before and after the         absorption. It was stated that the         point of saturation could be sharply         determined.         REFERENCES:         1. Carius, L. Annalen, <u>1855</u> , 94,129	cupric chloride /dm ³ /	dm ³ S		
1.30       8./       5.80         12.8       15.43       1.205         12.8       15.43       1.205         38.41       18.15       0.473         76.83       18.05       0.235         192.1       15.92       0.0829         Ethanol alone       0.285 (1)         MUXILIARY INFORMATION         METHOD/APPARATUS/PROCEDURE:         A gas buret and pipet of the Ostwald       SOURCE AND PURITY OF MATERIALS:         N details given.       No details given.         vere filted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.         REFERENCES:         1. Carius, L. Annalen, <u>1855</u> , 94,129	1.50	7 5 00		
12.8       15.43       1.205         38.41       18.15       0.473         76.83       18.05       0.235         192.1       15.92       0.0829         Ethanol alone       0.285 (1)    METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.          ESTIMATED ERROR:       ISTIMATED ERROR:         REFERENCES:       1. Carius, L. Annalen, <u>1855</u> , 94,129	1 1.50 8 3.84 12	.7 5.80 .38 3.22		
38.41       18.15       0.473         76.83       18.05       0.235         192.1       15.92       0.0829         Ethanol alone       0.285 (1)    Ethanol alone          AUXILIARY INFORMATION    METHOD/APPARATUS/PROCEDURE:          A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.          ESTIMATED ERROR:       ISTIMATED ERROR:         REFERENCES:       1. Carius, L. Annalen, <u>1855</u> , 94,129	12.8 15	.43 1.205		
192.1 192.1 192.1 15.92 Ethanol alone 0.285 (1) METROD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129		.15 0.473		
Ethanol alone       0.285 (1)         AUXILIARY INFORMATION         METHOD/APPARATUS/PROCEDURE:       Source AND PURITY OF MATERIALS:         A gas buret and pipet of the Ostwald       Source AND PURITY OF MATERIALS:         No details given.       No details given.         year of the desorption tube,       Source and after the         absorption. It was stated that the       Point of saturation could be sharply         determined.       ESTIMATED ERROR:         REFERENCES:       1. Carius, L. Annalen, <u>1855</u> , 94,129	192.1	.05 0.235		
AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129				
AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129		Ethanol alone 0.285 (1)		
AUXILIARY INFORMATION METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129				
METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129	AUXILIAR	Y INFORMATION		
	METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrode were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	SOURCE AND PURITY OF MATERIALS: No details given. ESTIMATED ERROR: REFERENCES: 1. Carius, L. Annalen, <u>1855</u> , 94,129		

COMPONENTS:	ORIGINAL MEASUREMENTS:			
	Kohlschutter, V.; Kutscheroff, M.			
1. Nitric oxide; NO; [10102-43-9]				
2. Ethanol; C ₂ H ₅ OH; [64-17-5]	Ber. <u>1904</u> , 37,3044-3052.			
3. Copper bromide, (Cupric bromide);				
CuBr ₂ ; [7789-45-9]				
VARIABLES:	PREPARED BY:			
Concentration	W. Gerrard.			
EXPERIMENTAL VALUES:				
Neither temperature nor pressure of nitric oxide were stated. T/K thought to be 293.16 K, and p _{NO} to be 101.325 kPa.				
Volume, V, of ethanol Volume, V	, of nitric Ostwald coefficient,L,			
containing one mole of oxide absorb	prbed by V_ calculated by compiler			
cupric bromide /dm ³ /dm	n ³ S S S S S S S S S S S S S S S S S S S			
2.625 16.	6.103			
5.25 19.	26 3.669			
13.12 20.1 43.74 21.1				
131.2 22.	0.169			
	46 0.089			
650.1 50.1				
	Ethanol alone 0.285 (1)			
AUXILIARY INFORMATION				
	SOURCE AND DURITY OF MATERIALS.			
A gas burst and pipet of the Ostwald	SOURCE AND PURITY OF MATERIALS:			
type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorp- tion tube, and the specific conduct- ance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	No details given.			
	ESTIMATED ERROR:			
	REFERENCES :			
	1. Carius, L. Annalen, <u>1855</u> , 94, 129.			

CONTROLING -	ODT CTIVAL AND LOUDER THE
COLL ONEN 19 :	UNIGINAL MEADUREMENTS:
1. Nitric oxide: NO; [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.
2. Formic acid: $CH_0Q_1$ : $[64-18-6]$	Ber. <u>1904</u> , 37,3044-3052.
3. Copper chloride. (Cupric chloride):	
CuCl ₂ ; [7447-39-4]	
VARIABLES:	PREPARED BY:
Concentration	W. Gerrard
EXPERIMENTAL VALUES: Neither temperature no were stated. T/K thou to be 101.325 kPa.	or pressure of nitric oxide ught to be 293.16 K, and P _{NO}
Volume, V of formic Volume, V.,	of nitric Ostwald coefficient,L.
acid (98%) containing oxide absorb	ped by V calculated by compiler.
one mole of cupric /dm ³	s s
Chioride /am	
27.0	76 0 457
56.0 13.	17 0.235
140 14.	34 0.102
1400 27.	29 0.0195
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE :	SOURCE AND PURITY OF MATERIALS:
A gas buret and pipet of the Ostwald	No details given.
a lead capillary tube. Two electrodes	
were fitted to the absorption tube,	
determined before and after the	
absorption. It was stated that the	
determined.	
	ESTIMATED ERROR:
	REFERENCES:

<pre>COMPONENTS: 1. Nitric oxide; NO; [10102-43-9] 2. Acetic acid; C₂H₄O₂; [64-19-7] 3. Copper chloride,(Cupric chloride); CuCl₂; [7447-39-4]</pre>	ORIGINAL MEASUREMENTS: Kohlschutter, V.; Kutscheroff, M. <i>Ber</i> . <u>1904</u> , <i>37</i> , 3044-3052.			
VARIABLES: Concentration	PREPARED BY: W. Gerrard.			
EXPERIMENTAL VALUES: Neither temperature n were stated. T/K tho to be 101.325 kPa.	or pressure of nitric oxide ught to be 293.16 K, and p _{NO}			
Volume, V _s , of acetic Volume, V acid containing one oxide abs mole of cupric chloride /dm /dm ³	1, of nitric Ostwald coefficient,L, orbed by V calculated by compiler.			
252 51. 504 39. 1269 81.	77       0.205         67       0.079         6       0.064			
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE: A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	SOURCE AND PURITY OF MATERIALS: No details given.			
	ESTIMATED ERROR:			
	REFERENCES :			

324 Nitric	Oxide		
COMPONENTS :	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Kohlschutter, V.; Kutscheroff, M.		
2. 2-Propanone, (Acetone); C ₃ H ₆ O; [67-64-1]	Ber. <u>1904</u> , <i>37</i> , 3044-3052		
2. Copper chloride, (Cupric chloride); CuCl ₂ ; [7747-39-4]			
VARIABLES:	PREPARED BY:		
Concentration	W. Gerrard.		
EXPERIMENTAL VALUES: Neither temperature no were stated. T/K tho to be 101.325 kPa.	or pressure of nitric oxide ught to be 293.16 K, and p _{NO}		
Volume, V _c , of acetone Volume, V ₁	, of nitric Ostwald coefficient, L,		
containing one mole of oxide absord cupric chloride /dm ³ /dm ³	rbed by V _s calculated by compiler.		
A 667 ]A	0.4 3.010		
29.16 14. 29.1	01 0.823		
58.33 24. 291.6 40.	60 0.422 99 0.141		
583.2 67.	0.115		
1166.4 81.	96 0.070		
AUXILIARY INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
A gas buret and pipet of the Ostwald type were connected to a gasometer by a lead capillary tube. Two electrodes were fitted to the absorption tube, and the specific conductance was determined before and after the absorption. It was stated that the point of saturation could be sharply determined.	No details given.		
	ESTIMATED ERROR:		
	REFERENCES:		

COMPONENTS:	ORIGINAL MEASUREMENTS:			
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Ethanol; C₂H₆O; [64-17-5]</li> <li>Copper (II) bromide, (Cupric bromide; CuBr₂; [7789-45-9]</li> </ol>	Manchot, W. Ber. <u>1914</u> , 47,1601-1614.			
VARIABLES:	PREPARED BY:			
Temperature, concentration	W. Gerrard.			
-	W. Seriald.			
EXPERIMENTAL VALUES:				
V ₁ is the volume of NO (10 absorbed for 1 mole of	)1.325 kPa) in dm ³ of CuBr ₂ .			
T/K Conc /mol dm ⁻³ Pres (soln)	ssure of NO/kPa V1/dm ³			
273.15 0.00498 0.00548 0.0107 0.0599 0.1187 0.3833 0.1126	99.19020.0299.85720.3299.45721.3699.59020.5799.59021.4899.85720.90149.18519.98			
293.65 0.05656	99.723 21.00			
273.15 ⁺ 0.0478	45.529 18.66 99.457 19.07			
+ "Spirit" was used ethanol.	l instead of absolute			
AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
The volume of nitric oxide absorbed was observed as previously stated (1).	<ul> <li>(1) and (3) Presumably as previously described (1).</li> <li>(2) Absolute ethanol; distilled from lime and sodium ethylate.</li> </ul>			
	ESTIMATED ERROR:			
	<pre>REFERENCES: 1. Manchot, W.; Zechentmayer, K. Annalen, 1906,350,368-389. See also Manchot, W.; Huttner, F. Annalen, 1910, 372,153-178.</pre>			

326 Nitric	Oxide			
<pre>COMPONENTS: 1. Nitric oxide; NO; [10102-43-9] 2. Ethanol; C₂H₅OH; [64-17-5] 3. Copper chloride (Cupric chloride); CuCl₂; [7447-39-4]</pre>	ORIGINAL MEASUREMENTS: Griffith, W. P.; Lewis, J.; Wilkinson, G. J. Chem. Soc. <u>1958</u> , 3993-3998.			
VARIABLES:	PREPARED BY: W. Gerrard			
the authors' loose statement: "Vol of NO absorbed per mole at N.T.P.", the mole apparently referring to $CuCl_2$ . $K = Equilibrium constant given by the authors as the mean value of P_{NO} CuCl_2/CuCl_2NO in mmHg. K^* = Compiler's value based on P_{NO} (22.4-V_1)/V_1, in mmHg. The H values have been calculated by the compiler from the expression:$				
$MH = 4.571(\log K_1 - \log K_2) \times T_1T_2/(T_1 - T_2)$ in kcal mole ⁻¹ ;				
T = T/K. The K values are those of the original authors, and the temperature range 1s shown (). $V_1(E)$ = Volume of NO (adjusted to 273.15 K, 101.325 kPa) which would be absorbed by that volume of ethanol equal to the volume of solution containing 1 mole of CuCl ₂ .				
	(cont.)			
AUXILIARY	INFORMATION			
METHOD APPARATUS/PROCEDURE: It was simply stated that the gas absorption was measured in a conventional Warburg-type apparatus.	SOURCE AND PURITY OF MATERIALS: 1. Nitric oxide was obtained from a sodium nitrite-ferrous sulfate generator, and washed with a concentrated aqueous solution of			

- NOTE: The authors did not show how the "heat of reaction 7.3 kcal/mole" was obtained.
- concentrated aqueous solution of potassium hydroxide. 2, 3. Probably of satisfactory
  - purity.

ESTIMATED ERROR:

**REFERENCES:** 

	Griffith. W. P.: Lewis, J.:
1. Nitric oxide; NO; [10102-43-9]	
2. Ethanol; C ₂ H ₅ OH; [64-17-5]	Wilkinson, G.
3. Copper chloride (Cupric chloride); CuCl ₂ ; [7447-39-4]	J. Chem. Soc. <u>1958</u> , 3993-3998.

EXPERIMENTAL VALUES:

No.	T/K	М	P/kPa	$V_1/dm^3$	K/(mmHg)	K*/(mmHq)	V₁(E)/dm³
1	273.4	0.05	99.043	19.1		128.35	6.3
2		0.025		20.1	115.0	85.05	12.6
3	283.0	0.05	97.577	17.3		215.76	5.7
4		0.025		17.0	226.4	232.46	11.4
5	297.6	0.05	92.911	15.6	340.8	303.7	5.2
6	304.4	0.025	91.458	12.2	568.0	573.54	10.2

 $\Delta H$  values  $\dot{T}/K$  range (): (2-4, 10.84; (2-5) 7.25; (2-6), 8.51; (4-6), 7.35; (5-6), 13.51. Mean is 9.5 kcal mol⁻¹. The authors gave  $\Delta H$  as 7.3 kcal mol⁻¹ (30.55 kJ mol⁻¹).

COMPONENTS:	ORIGINAL MEASUREMENTS:		
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Water; H₂O; [7732-18-5]</li> <li>Nickel (II) sulfate; NiSO₄;</li> </ol>	Hufner, G. Z. Phys. Chem. 1907, 59, 416-423.		
[7786-81-4]			
VARIABLES:	PREPARED BY:		
Pressure	W. Gerrard.		
EXPERIMENTAL VALUES:			
$V_1/cm^3$ , is the volume of ni 205.69 cm of solution cont as nickel sulfate, at the t P/mmHg, of nitric oxide sta	tric oxide absorbed by aining 0.0506 g of nickel emperature and pressure, ted.		
T/K P/mmHg	V ₁ /cm ³		
760.0	25.4*		
293.35 654.7	23.00		
293.35 629.8	22.54		
293.30 591.7	21.65		
293.29 573.4	21.18		
<ul> <li>Calculated by the original author where a = 8.3146, and b = 0.02249 product 760b/205.69 as the "absor is not the quantity usually refer ient; α was stated to be 0.08311.</li> <li>The following values were calculated The volume of solution, V₃/dm³, conta 238.7 dm³. The volume of nitric oxid = 29.47 dm³ (760 mmHg, 101.325 kPa). would be absorbed by 238.7 dm³ of wat (101.325 kPa).</li> </ul>	from the equation: $V = a + bP$ , 3. The author referred to the ption coefficient a;" but this red to as an absorption coeffic- by the compiler : ining 58.71 g of nickel as sulfate = e absorbed by this volume of solution The volume of nitric oxide which er is 238.7 x 0.047 = 11.22 dm ³		
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
The volume of nitric oxide absorbed by 205.69 cm ³ of solution was observ- ed at the observed pressure of gas.	<ol> <li>Nitric oxide was prepared from hydrogen iodide and nitric acid Winkler, (1).</li> </ol>		
	3. Prepared from pure metal.		
	ESTIMATED ERROR:		
	REFERENCES:		
	1. Winkler, L.W.		
	Ber, <u>1901</u> , <i>34</i> , 1408.		

COMPONENTE			
<pre>COMPONENTS: 1. Nitric oxide; NO; [10102-43-9] 2. Water; H₂O; [7732-18-5] 3. Cobalt (II) sulfate; CoSO₄;       [10124-43-3]</pre>	ORIGINAL MEASUREMENTS: Hufner, G. Z. Phys. Chem. <u>1907</u> , 59, 416-423.		
VARIABLES: Pressure	PREPARED BY: W. Gerrard		
EXPERIMENTAL VALUES: $V_1/cm^3$ , is the volume of ni 205.69 cm ³ of solution cont as cobalt sulfate, at the t P/mmHg, of nitric oxide sta	tric oxide absorbed by aining 0.0598 g of cobalt emperature and pressure, ted.		
T/K P/mmHg	$V_1/cm^3$		
293.30 760 293.30 678.3 293.31 653.5 293.35 636.6 293.45 615.9 293.55 600.0 * Calculated by the origin	25.57* 23.47 23.01 22.55 21.99 21.56 al author from the		
equation: $V = a + bP$ , where $a = 6.7288$ , and $b = 0.024791$ . The author referred to the product 760 /205.69 (0.09146) as the "absorption coefficient, $\alpha$ ;" but this is not equal to $V_1/205.69$ .			
The following values were calculated by the compiler: The volume, $V_3/dm^3$ , of solution containing 58.93 g of cobalt as sulfate = 202.7 dm ³ . The volume of nitric oxide absorbed by this volume of solution = 25.20 dm ³ (101.325 kPa). The volume of nitric oxide which would be absorbed by 202.7 dm ³ of water is 202.7 x 0.047 = 9.53 dm ³ (101.325 kPa).			
AUXILIARY	INFORMATION		
METHOD / APPARATUS / PROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
The volume of nitric oxide absorbed by 205.69 cm ³ of solution was observed at the observed pressure.	<ol> <li>Nitric oxide was prepared from hydrogen iodide and nitric acid (Winkler, (1)).</li> </ol>		
	3. Prepared from pure metal.		
	ESTIMATED ERROR:		
	REFERENCES: 1. Winkler, L.W. <i>Ber</i> . <u>1901</u> , <i>34</i> , 1408.		

Nitric Oxide
--------------

COMPONENTS:	ORIGINAL MEASUREMENTS:				
1. Nitric oxide; NO; [10102-43-9]	Hufner, G.				
2. Water; H ₂ O; [7732-18-5]	Z. Phys. Chem. <u>1907</u> , 59, 416-423.				
3. Manganese chloride; MnCl ₂ ; [7773-01-5]					
VARIABLES:	PREPARED BY:				
Pressure	W. Gerrard				
EXPERIMENTAL VALUES: $V_1/cm^3$ , is the volume of nitric oxide absorbed by 205.69 cm ³ of solution containing 0.0697 g of manganese as manganese chloride, at the temperature and pressure of NO, P/mmHg,					
T/K P/m	mHg $V_1/cm^3$				
293.15 760	.0 15.12*				
293.15 /11 293.20 686	.5 13.99				
293.35 657	.4 13.49				
293.45 638 293.60 621	.9 13.05				
* Calculated by the original author a = 2.5518, and $b = 0.016538$ . The 205.69 (0.06111) as the "absorptio equal to V ₁ /205.69.	from the equation: $V_1 = a + bP$ , where author referred to the product $760b/$ n coefficient, $\alpha$ "; but this is not				
The following values were calculat	ed by the compiler:				
The volume, $V_3/dm^3$ , of solution co = 162.1 dm ³ .	ntaining 1 mole of manganese chloride				
The volume of nitric oxide absorbed by this volume of solution = $11.92$ dm ³ (101.325 kPa).					
The volume of nitric oxide which w is 162.1 x 0.047 = 7.62 dm ³ (101.3	The volume of nitric oxide which would be absorbed by $162.dm^3$ of water is 162.1 x 0.047 = 7.62 dm ³ (101.325 kPa.)				
	INFORMATION				
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:				
The volume of nitric oxide absorbed by 205.69 cm ³ of solution was observed at the observed pressure.	<ol> <li>Nitric oxide was prepared from hydrogen iodide and nitric acid (Winkler, 1).</li> <li>Concentration attested as pyrophosphate.</li> </ol>				
	ESTIMATED ERROR:				
	REFERENCES :				
	(1). Winkler, L.W. Ber, <u>1901</u> , 34, 1408.				

COMPONENTS:	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Usher, F.L.		
2. Water; H ₂ O; [7732-18-5]	Z. Phys. Chem. <u>1908</u> , 62, 622-625.		
3. Metal salts.			
VARIABLES:	PREPARED BY:		
EXPERIMENTAL VALUES: $T/K = 2$	93.15		
The volume of pitric oxide	absorbed was express as		
the Bunsen coefficient $\alpha$ (2	73.15 K, 101.325 kPa).		
<pre>(3) Sulfuric acid, nickel   (2+) salt,(Nickel   sulfate); NiSO₄; [7786-81-4]</pre>	"Hufner's concentration"* $\alpha = 0.048$ "Saturated solution" $\alpha = 0.0245$		
<pre>(3) Sulfuric acid, cobalt (2+) salt,(Cobalt sulfate); CoSO₄; [10124-43-3]</pre>	"Saturated solution" $\alpha = 0.0288$		
<pre>(3) Manganese chloride; MnCl₂; [7773-01-5]</pre>	"Saturated solution" $\alpha = 0.0082$		
<pre>(3) Sulfuric acid,iron (2+) salt  (Ferrous sulfate); FeSO₄;  [7720-78-7]</pre>	"Hufner's concentration"** $\alpha$ = 0.180 For water alone $\alpha$ = 0.049		
<ul> <li>* Hufner's concentration was 0.050</li> <li>203.69 cm³ of solution.</li> </ul>	6 g of nickel (as sulfate) in		
** This concentration appears to re contained 0.099 g of iron (as su the Bunsen $\alpha$ value was 0.170.	fer to Hufner's solution that lfate) in 205.69 cm³ of solution;		
NOTE: Usher gave two sets of Bunsen $\alpha$ values for water alone. One set obtained by a large absorption pipet: 0.0451, 0.0449, 0.0448, were for NO washed with concentrated sulfuric acid. The other set: 0.0468,0.0471, 0.0473,0.0487 were for NO washed with aqueous potassium hydroxide. In the ferrous sulfate system he purported to show that discrepancies could occur by the reduction of NO to N ₂ O and N ₂ ; but this contention was not confirmed by the detailed analysis of Tarte (2)			
METHOD APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:		
Volume of nitric oxide absorbed was determined by the gas buret and absorption pipet technique of Ostwald. The maximum error was stated to be 3%.	<ol> <li>Nitric oxide was prepared from hydrogen iodide and nitric acid, Winkler (1). It was washed with aqueous potassium hydroxide.</li> </ol>		
	ESTIMATED ERROR:		
	REFERENCES: (1) Winkler, L.W. Ber, <u>1901</u> , 34, 1408.		
	(2) Tarte, P. Ind. Chim. Belg. <u>1952</u> , 17, 42.		
	Ind. Chim. Belg. <u>1952</u> , 17, 42.		

COMPONENTS:		ORIGINAL MEASUREMENTS:		
<pre>1. Nitrogen oxide; (Nitric oxide); NO; [10102-43-9]</pre>		Kohlschutter, V.; Kutscheroff, M.		
2. Water; H ₂ O; [7732-18-5]		<i>Ber</i> , <u>1907</u> , <i>40</i> , 873-878		
3. Sodium salts.				
VARIABLES:		PREPARED BY:		
		w. Gerrard		
EXPERIMENTAL VALUES:	The pressure of nit	ic oxide, p , was not		
	stated. The compile	$p_{NO}$ , which have $p_{NO}$ and $p_{NO}$ to be		
	101.325 kPa. Temper	ature assumed to be 295.15K.		
т/к	Volume of water, V,	in Volume, $V_1$ , of nitric		
	which one mole of sa was dissolved / dm ³	alt oxide absorbed by one $dm^3$ of salt solution		
		/dm		
295.15	Sodium chloride; Nac [7647-14-5]	21;		
	0.5	0.0580		
Sulfuric acid, disodium salt, (sodium sulfate);		lium ce);		
	4.0	0.0397		
2.0		0.0277		
Water; H ₂ O; [7732-18-5] ` 0.0636		3-5] ` 0.0636		
	AUXILIARY	INFORMATION		
METHOD 'APPARATUS/P	ROCEDURE :	SOURCE AND PURITY OF MATERIALS:		
An Ostwald type g were connected by	as buret and pipet a lead capillary.	No details given.		
		ESTIMATED ERROR:		
		REFERENCES :		

COMPONENTS: ORIGINAL MEASUREMENTS:				
1. Nitric oxide; NO;	[10102-43-9]	Armor, J.N.		
2. Water; H ₂ O; [7732-18-5]		J. Chem. Engng. Data. <u>1974</u> ,19,		
3. Electrolytes.		82-84.		
VARIABLES:		PREPARED BY:		
Concentration		C.L. Young		
EXPERIMENTAL VALUES:	т/К = 298.15	pH = 7.0		
Electrolyte	Conc. of elect /mol dm ⁻³	rolyte Solubility of nitric ⁺ oxide, S/mol dm ⁻³		
H ₂ O	-	1.95		
H ₂ PO ₄ -/OH-	0.1*	1.80		
NaCl	0.1	1.62		
	1.0	1.81		
LICI	0.1 1.0	1.78 1.52		
LiClO ₄	1.0	1.58		
NaClO ₄	1.0	1.28		
* Total ionic strength.				
METHOD APPARATUS / PROCEDURE .	AUXILIARI	INFORMATION		
METHOD APPARATUS/PROCEDURE: Solution was saturated with gas for at least 30 minutes in a reaction vessel. A 5 cm ³ aliquot was removed and injected into 80 cm ³ of oxygen saturated water. This solution was analysed spectrophotometrically of product of reaction of NO ₂ with sulfanilamide and N-(1-naphty1)- ethylenediamine hydrochloride.		<pre>SOURCE AND PURITY OF MATERIALS: 1. Matheson sample. Nitrogen dioxide   removed by "vigorous" scrubbing. 2. Distilled water, redistilled from   alkaline permanaganate. 3. LiCl, recrystallised. LiClO₄ and   NaClO₄ prepared by action of HClO₄   on corresponding carbonates,   resulting solution concentrated   and crystals obtained by cooling   in ice bath ESTIMATED ERROR: REFERENCES: REFERENCES:</pre>		

Nitric Oxide

	CARGO CARGO		
COMPONENTS :	ORIGINAL MEASUREMENTS:		
1. Nitric oxide; NO; [10102-43-9]	Armor, J.N.		
2. Water; H O; [7732-18-5]	J. Chem. Engng. Data. <u>1974</u> ,19, 82-84.		
3. Sodium chloride; NaCl; [7647-14-5]			
4. Buffer solutions.			
VARIABLES:	PREPARED BY:		
	C.L. Young		
EXPERIMENTAL VALUES: T/K	= 298.15		
Solution Conc. of NaCl /mol dm ⁻³	pH Solubility of nitric oxide, ⁺ S/mol dm ⁻³		
Buffer (1) 0.1	13.0 1.70		
0.10	12.9 1.52 12.7 1.35		
Buffer# 0.0	12.12 1.78		
0.10			
0.10	10.8 1.73		
1.0			
0.10	9.88 1.71		
1.0	9.56 1.29		
0.1	9.27 1.68		
1.0	9.00 1.23		
0.0	8.15 1.85		
0.1			
0.0	7.18 1.80		
0.1			
0.0	4.24 1.73		
0.1	4.09 1.78		
AUXILIARY	INFORMATION		
METHOD APPARATUS/PROCEDURE:	Source and PURITY OF MATERIALS.		
for at least 30 minutes in a reaction vessel. A 5 cm ³ aliguot	removed by "vigorous" scrubbing.		
was removed and injected into a 80 cm ³ of oxygen saturated water.	<ol> <li>Distilled water, redistilled from alkaline permanagonate.</li> </ol>		
This solution was analysed spectrophotometrically of product of reaction of NO: with	3. and 4. No details given.		
sulfanilamide and N-(1-naphty1)- ethylenediamine hydrochloride.			
	LETIMATED LEDOD.		
	$\delta T/K = \pm 0.1: \delta S = \pm 4\%$		
	,		
	REFERENCES.		

COMPONENTS:			ORIGINAL MEASUREMENTS:	
1. Nitric oxid	e; NO; [10102-43-9]		Armor, J.N.	
2. Water; H ₂ O; [7732-18-5] J. Chem. Engr			J. Chem. Engng. Data. <u>1974</u> ,19,	
3. Sodium chlo	ride; NaCl; [7647-14-	5]	82-84.	
4. Buffer solu	tions.			
EXPERIMENTAL VA	LUES:			
Solution	Conc. of NaCl /mol dm-3	рĦ	Solubility of nitric oxide, ⁺ S/mol dm ⁻³	
Buffer#	1.0	3.91	1.36	
Buffer (2) Buffer (3) Buffer (4) Buffer (5) Buffer (6)	0.0 0.1 1.0 0.0 1.0	2.0 1.0 0 2.0 0	1.69 1.47 1.02 1.71 1.37	
+ at a part	ial pressure of gas	of 101.3}	«Pa.	
§ conc. of	NaClO ₄ .			
Buffer (1)	0.1 mol dm ⁻³ NaOH			
Buffer (2)	0.01 mol $dm^{-3}$ HClO ₄			
Buffer (3)	0.1 mol dm ⁻³ HCl			
Buffer (4)	Buffer (4) 1.0 mol dm ⁻³ HCl			
Buffer (5)	Buffer (5) 0.01 mol dm ⁻³ HCl			
Buffer (6)	1.0 mol dm ⁻³ HClO ₄			
<pre># Authors quot H2PO4⁻/OH⁻ HPO4⁻/OH⁻ (p The total ic</pre>	ed "buffers were pre (pH 6-8), borax/HCl () (H 10.5-12.0)" (pnic strength of buffe	pared fro pH 8-9.2) ers appea	om HOAc/NaOAc (pH4), borax /OH- (pH 9.2-10.5), ars to be about 0.1 mol dm ⁻³	

Nitric Oxide

COMPONENTS:	EVALUATOR:
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Organic liquids</li> </ol>	Colin L. Young, Department of Physical Chemistry, University of Melbourne, Parkville, Victoria 3052, Australia.
	October 1980.

CRITICAL EVALUATION:

The data of Vosper (1) are thought to be reliable since they were carried out with carefully purified materials and corrections for the vapor pressure of the liquid and non-ideality of the gas were applied. His data are classified as tentative.

The temperature-dependence of Klemenc *et al.*'s (2) mole fraction solubility of nitric oxide in tetrachloromethane is unusual and of opposite sign to that of Vosper (1). On the other hand Klemenc *et al.* (2) data for nitrobenzene show the normal increase in mole fraction solubility for a decrease in temperature but the opposite is true for benzene. Therefore the data of Klemenc *et al.* (2) on all three solvents are classified as doubtful. The data of Tsiklis and Svetlova (3) show a fairly large scatter and are classified as doubtful.

The data of Riccoboni (4) for methanol and Carius (5) for ethanol are included but in view of the year in which these data were determined must be regarded at best as doubtful. Garelli and Monath's data (6) based on the depression of freezing point are rejected.

The results of Trautz and Gerwig (7) for pentane and toluene are thought to be unreliable. The temperature-dependence of the solubility for pentane should be similar to that for hexane as measured by Vosper (1) but the pentane data show no such similarity. The Trautz and Gerwig (7) results for toluene are in poor agreement with those of Vosper (1) and are rejected.

#### References:

- Shaw, A. W.; Vosper, A. J. J. Chem. Soc., Faraday Trans. I <u>1977</u>, 73, 1239.
- 2. Klemenc, A.; Spitzer-Neumann, E. Monatsh. 1929, 53, 413.
- 3. Tsiklis, D. S.; Svetlova, G. M. Zh. Fiz. Khim. 1958, 32, 1476.
- 4. Riccoboni, L. Gazz. chim. ital. 1841, 71, 139.
- 5. Carius, L. Annalen 1855, 94, 129.
- 6. Garelli, F.; Monath, E. Att. Accad. Torino 1926, 61, 12.
- 7. Trautz, M.; Gerwig, W. Z. anorg. Chem. 1925, 146, 1.

COMPONENTS				
COMPONENTS:		ORIGINAL MEASUREMENTS:		
		Tsiklis, D.S.; Svetlova, G.M.		
1. Nitric oxide; NO; [10102-43-9]				
2 $Cycloboyanot C H_{1} + [110-92,7]$		Zh. Fiz. Khim. <u>1958</u> , 32,1476-80.		
$\begin{bmatrix} 2 & c_{j} $	[110-02-7]			
VARIABLES:		PREPARED BY:		
Temperature, pres	sure	C.L. Young		
_				
EXPERIMENTAL VALUES:				
		Mole fraction of		
T/K	<i>P/</i> bar	nitric oxide in		
		liquid, x _{NO}		
283.15	0 133	0.00020		
	0.267	0.00059		
}	0.400	0.00089		
	0.533	0.00119		
	0.667	0.00148		
l	0.800	0.00178		
	0.933	0.00208		
202.15	1.067	0.00237		
293.15	0.133	0.00026		
	0.267	0.00049		
	0.400	0.00074		
	0.667	0.00123		
	0.800	0.00148		
	0.933	0.00173		
	1.067	0.00199		
313.15	0.133	0.00025		
	0.267	0.00049		
	0.400	0.00074		
	0.555	0.00099		
	0.800	0.00123		
	0.933	0.00173		
	1.067	0.00199		
	AUXILIARY	INFORMATION		
METHOD APPARATUS / PROCEDURE :		SOURCE AND PURITY OF MATERIALS		
		1 Purified by passing through		
Volumetric apparatus.	Gas	"caustic" at 233K to remove		
admitted from a gas bur	et to	acidic oxides.		
absorption pipet. Mole	fraction	2 Commercial sample twice distilled		
calculated from measure	ments of	2. Commercial Sample, twice distilled.		
pressure and volume.				
		DATA CLASS:		
ļ				
		ESTIMATED ERROR:		
		$\delta T/K = \pm 0.0.1; \delta P/bar = \pm 0.005;$		
		$\delta x_{\rm NO} = \pm 2 \times 10^{-5}$		
1		NU		
		DEDEDENCING		
		KEFERENCES:		
1				
		1		

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Shaw, A. W.; Vosper, A. J.			
	J. Chem. Soc. Faraday Trans. I			
2. Hexane; C ₆ H ₁₄ ; [110-54-3]	<u>1977</u> , 73, 1239-1244.			
VARIABLES:	PREPARED BY:			
Tomporaturo	A J Vosper			
Temperature	A. D. VOSPEI			
EXPERIMENTAL VALUES:				
Absorption measurements	Desorption measurements			
T/K Mole fraction Concentration $x_1^*$ mol dm ⁻³	T/K Mole fraction Concentration $x_1^*$ mol dm ⁻³			
	242.2 0.00200 0.0220			
291.0         0.00240         0.0185           283.0         0.00248         0.0193	243.2         0.00289         0.0236           253.0         0.00277         0.0224			
273.4 0.00256 0.0202	260.0 0.00270 0.0217			
1264.2 $0.00264$ $0.0211257.4$ $0.00271$ $0.0218$	268.2 0.00262 0.0208			
248.5 0.00281 0.0229				
238.7         0.00294         0.0242           233.2         0.00304         0.0252				
* The mole fractions follow directly f concentrations were calculated using of hexane, extrapolating where neces	from the authors' results whereas the literature values (1) for the density ssary.			
Mean values for the partial molar er entropy of solution over the tempera	thalpy of solution and partial molar ature range 233-291 K were given:			
$AH^{\circ} = -2.23 \pm 0.03 \text{ km} \text{ mol}^{-1}$	$AS^{2} = -57.8 \pm 0.01 \text{ J} \text{ mol}^{-1} \text{ k}^{-1}$			
AUXILIARY	INFORMATION			
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
A gas burette was used to determine the volume of gas absorbed by a known weight of the degassed liquid at a known temperature and at the pre- vailing barometric pressure. Measurements of desorption of gas	The gas (Matheson Co. Inc.) was passed through 90 per cent $H_2SO_4$ and a trap at <i>ca</i> . 190 K. It was solidified at 77 K and volatile impurities pumped away. The product contained less than 0.2 per cent $N_2O$ as the			
from the saturated liquid with increasing temperature were also made.	only detectable impurity.			
Corrections were applied for the vapor pressure of the liquid (1) and non-ideality of the gas (2). Results were calculated for a gas	The liquid (BDH 99 per cent minimum) was dried over CaCl ₂ then sodium wire and fractionated. The fraction boiling between 341.5-341.8K was used.			
pressure of 101.325 kPa assuming	ESTIMATED ERROR:			
shown to be valid over the relevant pressure range.				
	REFERENCES: 1. Timmermans, J. "Physico-chemical constants of pure organic com- pounds". Elsevier, Vol. 1, p.4? and Vol. 2, p.10.			
	<ol> <li>Johnson, H. L.; Weimer, H. W. J. Amer. Chem. Soc. <u>1934</u>, 56, 625.</li> </ol>			

COMPONENTS :	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]		Klemenc, A.; Spitzer-Neumann, E.		
2. Benzene, C ₆ H ₆ , [71-43-2]		Monatsh. <u>19</u> 2	9, 53,413-4	19.
			_	
VARIABLES:		PREPARED BY:		
Temperature, pressure			W. Gerrar	d
EXPERIMENTAL VALUES:				<u></u>
т/К	281.96	287.76	297.76	307.76
Pressure range, *	60 220	00 750	07 (7)	70 274
to (kPa);	69.328 132.53	92.752	87.673	80.513
Ostwald coefficient, *				
From :	0.284	0.279	0.300	0.316
10:	0.200	0.294	0.306	0.520
Mean: * *	0.275	0.284	0.300	0.318
Mole fraction, *** x1:	0.0010	0.00106	0.00109	0.00114
Number of measurements:	11	5	5	5
* Irregular distribution. ** Given by authors. *** Calculated by compiler	•			
т/к	281.96	287.6	287.76	307.76
$\Delta F^{0}$ , cal mole ⁻¹	2480	2520	2600	2660
From $\Delta F^0 = -RT$ in (L/RT). $\Delta H_{298} = 940$ cal mole ⁻¹ .				
* The Ostwald coefficient	was given	as :		
$L = \frac{\text{Conc}}{\text{Conc}}$	of gas in the	e liquid pha e qas phase	ase	
MITHOD ADDADATHS (DDOCEDURE -		SOURCE AND DUDITY OF MATERIALS.		
An absorption wassal and a	a se	Depared by the action of		
buret with a levelling tube	of the	mercury on nitric acid in		
usual form were used. The v of NO absorbed was measured	olume at a	the presence of 90% sulfuric acid.		
total pressure, $p_T = p_{NO} + p_{T}$	s' ^{where}	2. Bendered gas free.		
$P_{NO}$ is the partial pressure	of the	z. Kendered gas free.		
gas, and p _s is the vapour pr	essure of			
the liquid S over the solution.				
		ESTIMATED ERROR:		
		REFERENCES:		

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitric oxide; NO; [10102-43-9]	Shaw, A. W.; Vosper, A. J.
2. Methylbenzene: C ₇ H ₄ ;	J. Chem. Soc. Faraday Trans. I
[108-88-3]	1977, 73, 1239-1244.
VARIABLES:	PREPARED BY:
Temperature	A. J. Vosper
EVDEDIMENTAL VALUES.	
Absorption measurements	Desorption measurements
T/K Mole fraction Concentration	T/K Mole fraction Concentration*
$x_1$ * mol dm ⁻³	x ₁ * moldm '
289-0 0.00120 0.0123	217.2         0.00171         0.0175           219.7         0.00169         0.0172
279.8 0.00125 0.0130	222.7 0.00167 0.0169
265.4 0.00137 0.0133	225.8 0.00164 0.0166
256.0 $0.00141$ $0.0139$	233 2 0 00158 0 0159
238.4 0.00151 0.0151	235.5 0.00156 0.0156
230.7 0.00157 0.0158	241.7 0.00152 0.0151
219.7 0.00168 0.0171	245.7 0.00149 0.0148
213.7 0.00175 0.0180	255.0 0.00142 0.0140 272 1 0.00123 0.0128
	272.1 0.00133 0.0128
* The mole fractions follow directly	from the authors work whereas the
concentrations were calculated usin	g literature values for the density
of toluene, ¹ extrapolating where n	ecessary.
Noon welves for the neutiel moleu -	-theles of colution and contiol
molar entropy of solution over the	temperature range 214-289 K were
given	competatute range 214 200 K were
$\Delta H^{\circ} = -2.28 \pm 0.04 \text{ kJ mol}^{\circ}$	; $\Delta S^{\circ} = -63.4 \pm 0.02 \text{ J mol}^{-1} \text{K}^{-1}$
AUXILIARY	INFORMATION
	SOURCE AND DUDITY OF MATERIALS.
APPARATUS/PROCEDURE:	The sea (Netherer Co. Trailer
A gas burette was used to determine	The gas (Matheson Co. Inc.) was
known weight of the degassed liquid	a trap at $ca$ , 190 K. It was solidi-
at a known temperature and at the	fied at 77 K and volatile impurities
prevailing barometric pressure.	pumped away. The product contained
Measurements of desorption of gas	less than 0.2 per cent $N_2O$ as the
from the saturated liquid with in-	only detectable impurity. The
Corrections were applied for the	over CaCl, then sodium wire and
vapor pressure of the liquid ¹ and	fractionated. The portion boiling
nonideality of the gas ² . Results	between 383.8-383.9 K was used.
were calculated for a gas pressure	ECTIMATED EDDOD.
Law which had previously been shown	ESTIMATED ERROR:
to be valid over the relevant	
pressure range.	
	REFERENCES:
	1. TIMMermans, J. "Physico-chemical Constants of Pune Organic Com-
1	pounds". Elsevier, Vol. 1.
1	p.150 and Vol. 2, p.99.
	2. Johnson, H. L.; Weimer, H. R.
	J. Amer. Chem. Soc. <u>1934</u> , 56, 625.

	_	•		
COMPONENTS :		ORIGINA	MEASUREMENTS:	
1. Nitric oxide; NO; [10	102-43-9]	Shaw,	A. W.; Vosper, A	A. J.
2. 1,3-Dimethylbenzene; C ₈ [108-38-3]	Η ₁₀ ;	J. Che <u>1977</u> ,	m. Soc. Faraday 1 73, 1239-1244.	Trans. I
VARIABLES:		PREPARE	D BY:	
Temperature		A. J.	Vosper	
			-	
EXPERIMENTAL VALUES:		_		
Absorption measureme	ents . *	De	sorption measurem	nents *
T/K Mole fraction Con x1*	ncentration mol dm ⁻³	т/к	Mole fraction $x_1^*$	Concentration mol dm ⁻³
294.1 0.00134 284.1 0.00140	0.0111 0.0115	243.2	0.00162 0.00156	0.0139
274.1 0.00144	0.0120	259.2	0.00152	0.0128
263.2 0.00148	0.0125	267.4	0.00149	0.0124
	0.0129	271.7	0.00147	0.0122
245.4 0.00159	0.0136	285.4	0.00142	0.0113
239.4 0.00164	0.0141			
234.0 0.00169	0.0146			
Mean values for the partial molar anthalpy of solution and partial molar entropy of solution over the temperature range 234-294 K were given: $\Delta H^\circ = -2.17 \pm 0.04 \text{ kJ mol}^{-1}  \Delta S^\circ = -62.4 \pm 0.2 \text{ J mol}^{-1} \text{ K}^{-1}$				
AUXILIARY INFORMATION				
METHOD /APPARATUS/PROCEDURE	:	SOURCE	AND PURITY OF MATERIA	ALS:
A gas burette was used to the volume of gas absorbed weight of the degassed lid known temperature and at vailing barometric pressur Measurements of desorption from the saturated liquid increasing temperature we made. Corrections were the vapor pressure of the and non-ideality of the ga Results were calculated fo pressure of 101.325 kPa as	determine d by a known quid at a the pre- re. n of gas with re also applied for liquid (1) as (2). or a gas ssuming	The ga sed th trap a fied a pumped less t only d The li dried fracti betwee ESTIMAT	is (Matheson Co. 1 rough 90 per cent t $ca$ . 190 K. If t 77 K and volati away. The proc han 0.2 per cent etectable impurit quid (BDH ANALAR over CaCl ₂ then s onated. The fra n 437.8-437.9 K w ED ERROR:	Inc.) was pas- t $H_2SO_4$ and a t was solidi- ile impurities duct contained $N_2O$ as the ty. GRADE) was sodium wire and action boiling was used.
Henry's Law which had prevented been shown to be valid over relevant pressure range.	viously er the			
		REFEREN 1. Tim con pou and	CES: mermans, J. "Phy stants of pure or nds". Elsevier, Vol. 2, p.112.	ysico-chemical gganic com- Vol. 1, p.164
		2. Joh J. 625	nson, H. L.; Wei Amer. Chem. Soc. •	lmer, H. R. 1934, 56,

Nitric Oxide

		-			
COMPONENTS:		ORIGINAL MEASUREMENTS:			
1. Nituria anida: No. $(10102-42-9)$		Riccoboni, L.			
1. Nitric oxide; NO; [10102-43-9]		Gazz. chim. ital.			
2. Methanol; $CH_3OH$ ; [67-5	6-1]	1841	, 71, 13	9-53.	
		-			
VARIABLES:		PREPARED BY:			
Temperature, pres	sure	W. Gerrard			
EXPERIMENTAL VALUES:					
т/к	273.16	2	83.16	293.16	303.16
Pressure, kPa, *					
from:	65.35	5	63.327	57.198	60.955
to:	150.82	L T	74.767	188.130	181.396
Ustwald coefficient, L, *	0.30	7	0 366	0 355	0 358
to:	0.36	, D	0.356	0.346	0.339
Mean: **	0.36	3	0.362	0.350	0.347
Mole fraction, : ***	0.00	0640	0.00062	3 0.000589	0.000571
Calculated by compiler The author assumed L to be independent of pressure. The compiler used the gram-mole volume of NO (22388 cm ³ at 273.16, 101.325 kPa) based on the standard density, 1.3402 g/dm ³ . The volume for other temperatures was obtained by 22388 × (T/273.16). The L value was assumed to be for 101.325 kPa.					
	AUXILIARY	INFORMA	TION		
METHOD 'APPARATUS / PROCEDURE :	- <del></del>	SOURCE	AND PURIT	Y OF MATERIALS	
Determination of weight of absorbed by a known weight Converted into the Ostwald ficient, L. Solvent was f	gas of liquid. coef- reed from	1. N a 2. M	itric ox nd rigor ttested. ethanol.	ide. Self-p ously purifi Redistille	repared ed and d.
air and vacuum distilled in ampoule. Solvent and solu were weighed in a removable	to the tion ampoule				
which also served as a dila	tometer.				
Diagram given by author.	;	ESTIMA	TED ERROR:		
		REFERE	NCES:		
			·		

COMPONENTS:	ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102-43-9]	Carius, L.			
	Annalen, <u>1855</u> , 94,129-166.			
2. Ethanol, $C_2H_6O$ ; [64-17-5]				
VARIABLES:	PREPARED BY:			
	W. Gerrard			
EXPERIMENTAL VALUES.				
T/K Bunsen absortion	n Mole fraction, $x_{NO}$ ,			
coefficient, a	(Calculated by compiler)			
275.15 0.30895	0.0007885			
279.15 0.29684	0.0007615			
284.95 0.28162	0.0007262			
	0.0007062			
297.35 0.26014	0.0006800			
Absorption coefficient, $\alpha = 0.31606 - 0.0034870t + 0.0000490 t^2$ (From 273.15 to 298.15 K) where t = T/K - 273.15				
Henrich (1) used Carius's data to give a modified smoothing				
equation :				
$\alpha = 0.31578 - 0.0$	$003469 \pm + 0.00004827 \pm^2$			
<u>Note</u> : Henrich did not give	e any experimental data.			
* The gas molecular volume of	of NO at 273.15 K and 101.325 kPa			
was taken to be 22.385 dm	, based on the standard density			
of 1.3402 g /dm ⁻³ .				
	INFORMATION			
METHOD /APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:			
Measurement of volume by the	1. NO: Self prepared and purified.			
Bunsen gas buret.	2. Ethanol was distilled as			
	"absolute", $d^{20} = 0.792$ .			
	ESTIMATED ERROR:			
	REFERENCES :			
	1. Henrich, F. Z. Phys. Chem. 1892,			
	9, 435.			
COMPONENTS:	ORIGINAL MEASUREMENTS:			
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------			
<pre>1. Nitric oxide; NO; [10102-43-9] 2. 1,1'-Oxybisethane, (diethyl     ether); C₄H₁₀O; [60-29-7]</pre>	Shaw, A. W.; Vosper, A. J. J. Chem. Soc. Faraday Trans. I <u>1977</u> , 73, 1239–1244.			
VARIABLES :	PREPARED BY.			
Temperature	A. J. Vosper			
EVDEDTMENTAL VALUES.				
Absorption measurements	Desorption measurements			
T/K Mole fraction Concentration $x_1^*$ mol dm ⁻³	T/K Mole fraction Concentration $x_1^*$ mol dm ⁻³			
279.4 0.00264 0.0260 271.9 0.00271 0.0271 264.0 0.00283 0.0287 255.5 0.00294 0.0300 247.4 0.00306 0.0317 240.4 0.00320 0.0333 233.4 0.00337 0.0355 230.7 0.00343 0.0364 225.7 0.00360 0.0385 * The mole fractions follow directly for the concentrations were calculated using of diethyl ether. Mean values for the partial molar energy of solution over the temperations $\Delta H^\circ = -3.02 \pm 0.08$ kJ mol	227.9 0.00355 0.0377 236.2 0.00335 0.0352 243.2 0.00321 0.0334 252.7 0.00306 0.0314 260.2 0.00296 0.0301 267.4 0.00287 0.0287 from the authors' work whereas the g literature values (1) for the density hthalpy of solution and partial molar ature range 226-279 K were given: $\Delta S^{\circ} = -60.2 \pm 0.3 \text{ J mol}^{-1} \text{ K}^{-1}$			
AUXILIARI				
A gas burette was used to determine the volume of gas absorbed by a known weight of the degassed liquid at a known temperature and at the prevail- ing barometric pressure. Measure- ments of desorption of gas from the saturated liquid with increasing temperature were also made. Corrections were applied for the vapor pressure of the liquid (1) and non-ideality of the gas (2). Results were calculated for a gas pressure of 101.325 kPa assuming Henry's Law which had previously been shown to be valid over the relevant pressure range.	The gas (Matheson Co. Inc.) was passed through 90 per cent H ₂ SO4 and a trap at ca. 190 K. It was solidified at 77 K and volatile impurities pumped away. The product contained less than 0.2 per cent N ₂ O as the only detectable impurity.         The liquid (BDH ANALAR GRADE) was dried over CaCl ₂ then sodium wire and fractionated. The fraction boiling at 307.7 K was used.         ESTIMATED ERROR:         REFERENCES:         1. Timmermans, J. "Physico-chemical constants of pure organic compounds". Elsevier, Vol. 1, p. 342			
	<ul> <li>pounds . Elsevier, vol. 1, p.342.</li> <li>2. Johnson, H. L.; Weimer, H. R. J. Amer. Chem. Soc. <u>1934</u>, 56, 625.</li> </ul>			

344

COMPONEN	TS:		ORTGINAL	MEASUDEMENTS .	
				TERSORETEN IS:	
l. Nit	ric oxide; NO;	[10102-43-9]	Shaw, A	A. W.; Vosper,	A.J.
		•	J. Chen	n. Soc. Faraday	Trans. I
2. Eth	lyi acetate; C ₄ H ₆ 1-78-61	10 ₂ ;	<u>1977</u> , 7	3, 1239-1244.	
_					
VARIABLE	2S :		PREPARED	BY:	
Temper	ature		A. J. 1	/osper	
_				-	
EXPERIME	NTAL VALUES:				
	Absorption measu	irements	De	sorption measur	rements
ייע איז	Mole fraction	Concentration*	ጥ/ሄ	Mole fraction	Concentration*
1/1	$x_1^*$	mol dm ⁻³	1/1	$x_1^*$	mol dm ⁻³
286.6	0.00173	0.0179	226.2	0.00224	0.0249
277.8	0.00176	0.0184	236.0	0.00212	0.0234
266.2	0.00182	0.0193	242.0	0.00205	0.0224
257.8	0.00187	0.0201	249.2	0.00199	0.0216
239.8	0.00204	0.0213	260.7	0.00197	0.0205
231.7	0.00213	0.0236	271.2	0.00187	0.0197
224.7	0.00223	0.0249			
220.2	0.00230	0.0258			
of e Mean entr	thyl acetate. values for the p opy of solution of $\Delta H^\circ = -2.53 \pm 0$	partial molar er over the tempera 0.09 kJ mol ⁻¹	hthalpy c ture rar ΔS°	of solution and age 220-287 K we = -62.0 ± 0.4 J	partial molar re given: mol ⁻¹ K ⁻¹
		AUXILIARY	INFORMATIC	DN	
METHOD /	APPARATUS/PROCEDU	IRE :	SOURCE AN	D PURITY OF MATERI	ALS
A gas the vo weight known vailin Measur from t increa Correc vapor non-id were co	burette was used lume of gas absor of the degassed temperature and a g barometric pres ements of desorpt he saturated liqu sing temperature tions were applie pressure of the 1 eality of the gas alculated for a g	to determine bed by a known liquid at a at the pre- sure. tion of gas hid with were also made. d for the iquid (1) and (2). Results as pressure of	The gas sed thr trap at fied at pumped less th only de The liq dried o $P_2O_5$ . portion	(Matheson Co. rough 90 per cent ca. 190 K. I 77 K and volat away. The pro an 0.2 per cent tectable impuri uid (BDH ANALAR over potassium c It was fraction boiling at 350	Inc.) was pas- it $H_2SO_4$ and a t was solidi- ile impurities duct contained $N_2O$ as the ty. GRADE) was arbonate then ated and the .3 K was used.
had pr	э кга assuming He eviously been sho	nry's Law which wh to be valid	ESTIMATED	ERROR:	
overt	he relevant press	ure range.			
			REFERENCE 1. Timm cons poun 2. John J. A 625.	S: ermans, J. "Ph tants of pure of ds". Elsevier, son, H. L.; We mer. Chem. Soc.	ysico-chemical rganic com- Vol. 1, p.415. imer, H. R. <u>1934</u> , 56,
L					

345

,

COMPONENTS:	ORIGINAL MEASUREMENTS:
<pre>1. Nitric oxide; NO; [10102-43-9] 2. Tetrachloromethane; (Carbon     tetrachloride); CCl₄; [56-23-5]</pre>	Klemenc, A.; Spitzer-Neumann, E.; Monatsh. <u>1929</u> ,53,413-419.
VARIABLES: Temperature, pressure.	PREPARED BY: W. Gerrard
EXPERIMENTAL VALUES:	
т/к 28	31.96 292.76 307.76
Pressure range,* from (kPa) : 5 to (kPa) : 13	59.462 108.391 75.754 33.456 58.823 100.192
Ostwald coefficient,* from : to :	0.336 0.338 0.368 0.342 0.355 0.385
Mean :**	0.339 0.345 0.375
Mole fraction, $x_1$ :	0.00140 0.00139 0.00146
Number of measurements : * Irregular distribution. ** Given by the authors. *** Calculated by compiler	9 11 7
$\Delta F^{\circ}, \text{ cal mole}^{-1} 236$ From $\Delta F^{\circ} = -RT \ln (L/RT)$ $\Delta H_{298} = 700 \text{ cal mole}^{-1}$ * The Ostwald coefficient was take	50 2460 2570 en to be :
$L = \frac{\text{Concentration of gas}}{\text{Concentration of gas}}$	in the liquid phase in the gas phase.
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE: An absorption vessel, and a gas buret with levelling tube of the usual form were used. The volume of NO absorbed at a total pressure $p_T = p_{NO} + p_S$ , where $p_{NO}$ is the partial pressure of the gas, and $p_S$ is the vapor pressure of the solvent over the solution.	<ol> <li>SOURCE AND PURITY OF MATERIALS:</li> <li>Prepared by the action of mercury and nitric acid in the presence of 90% sulfuric acid.</li> <li>The solvent was rendered gas free.</li> </ol>
	ESTIMATED ERROR: REFERENCES:

Organic C	Compounds 347			
COMPONENTS:	ORIGINAL MEASUREMENTS:			
<ol> <li>Nitric oxide; NO; [10102-43-9]</li> <li>Tetrachloromethane, (carbon tetrachloride); CCl₄; [56-23-5]</li> </ol>	Shaw, A. W.; Vosper, A. J. J. Chem. Soc. Faraday Trans. I <u>1977</u> , 73, 1239-1244.			
VARIABLES:	PREPARED BY:			
Temperature	A. J. Vosper			
EXPERIMENTAL VALUES:				
Absorption measurements	Desorption measurements			
T/K Mole fraction Concentration [*] $x_1^*$ mol dm ⁻³	T/K Mole fraction Concentration $x_1^*$ mol dm ⁻³			
292.2       0.00138       0.0144         288.0       0.00139       0.0145         283.5       0.00141       0.0149         278.4       0.00142       0.0150         273.7       0.00144       0.0153         268.0       0.00145       0.0155         264.0       0.00147       0.0158         258.2       0.00149       0.0161         253.7       0.00151       0.0165	256.2       0.00150       0.0163         261.2       0.00148       0.0160         266.4       0.00147       0.0157         270.7       0.00145       0.0154         275.7       0.00144       0.0153         285.0       0.00137       0.0143			
* The mole fractions follow directly from the authors' results whereas the concentrations were calculated using literature values (1) for the density of carbon tetrachloride extrapolating where necessary. Mean values for the partial molar enthalpy of solution and partial molar entropy of solution over the temperature range 253-292 K were given: $\Delta H^\circ = -1.42 \pm 0.03 \text{ kJ mol}^{-1}$ $\Delta S^\circ = -59.6 \pm 0.1 \text{ J mol}^{-1} \text{ K}^{-1}$				
AUXILIARY	INFORMATION			
METHOD /APPARATUS/PROCEDURE: A gas burette was used to determine the volume of gas absorbed by a known weight of the degassed liquid at a known temperature and at the pre- vailing barometric pressure. Measurements of desorption of gas from the saturated liquid with increasing temperature were also made. Corrections were applied for the vapor pressure of the liquid (1) and non-ideality of the gas (2). Results were calculated for a gas pressure of 101.325 kPa assuming Henry's Law which had previously been shown to be valid over the relevant pressure range.	SOURCE AND PURITY OF MATERIALS: The gas (Matheson Co. Inc.) was pas- sed througn 90 per cent H ₂ SO ₄ and a trap at <i>ca</i> . 190 K. It was solidi- fied at 77 K and volatile impurities pumped away. The product contained less than 0.2 per cent N ₂ O as the only detectable impurity. The liquid (BDH ANALAR GRADE) was refluxed with NaOH solution, dried over CaCl ₂ and fractionated. The fraction boiling between 349.9-350.1K was used. ESTIMATED ERROR:			
	<ul> <li>REFERENCES:</li> <li>1. Timmermans, J. "Physico-chemical constants of pure organic compounds". Elsevier, Vol. 1, p.224.</li> <li>2. Johnson, H. L.; Weimer, H. R. J. Amer. Chem. Soc. <u>1934</u>, 56, 625.</li> </ul>			

21	10
34	ŧO

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Nitric oxide; NO; [10102-43-9]	Shaw, A. W.; Vosper, A. J.
2. Acetonitrile; CH ₃ CN; [75-05-8]	<u>1977</u> , 73, 1239–1244.
VARIABLES:	PREPARED BY
Temperature	A. J. Vosper
EXPERIMENTAL VALUES:	
Absorption measurements	Desorption measurements
T/K Mole fraction Concentration $x_1 *$ mol dm ⁻³	* T/K Mole fraction Concentration $x_1$ * mol dm ⁻³
282.9 0.000786 0.0152	235.7 0.000913 0.0188
274.7 0.000794 0.0155	242.0 0.000888 0.0181
264.7         0.000824         0.0163           252.4         0.000840         0.0171	
244.9 0.000881 0.0171	260.7 0.000833 0.0166
237.6 0.000908 0.0186	269.3 0.000816 0.0161
232.5 0.000929 0.0192	
ΔH° = -1.83 ± 0.05 kJ m	ol $\Delta S^{\circ} = -66.0 \pm 0.2 \text{ J mol}^{\circ} \text{K}^{\circ}$
AUXILIARY	INFORMATION
METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
A gas burette was used to determine the volume of gas absorbed by a known weight of the degassed liquid at a known temperature and at the pre- vailing barometric pressure. Measurements of desorption of gas from the saturated liquid with increasing temperature were also made Corrections were applied for the vapo pressure of the liquid (1) and non- ideality of the gas (2). Results were calculated for a gas pressure of 101.325 kPa assuming Henry's Law which had previously been shown to be valid over the relevant pressure range.	The gas (Matheson Co. Inc.) was pas- sed through 90 per cent H ₂ SO ₄ and a trap at <i>ca</i> . 190 K. It was solidi- fied at 77 K and volatile impurities pumped away. The product contained less than 0.2 per cent N ₂ O as the only detectable impurity. The liquid (BDH ANALAR GRADE) was refluxed over P ₂ O ₅ then fractionated. The fraction boiling at 354.8 K was used.
	REFERENCES :
	<ol> <li>Timmermans, J. "Physico-chemical constants of pure organic com- pounds". Elsevier, Vol. 1, p.527 and Vol. 2, p.343.</li> <li>Johnson, H. L.: Weimer, H. P.</li> </ol>
	J. Amer. Chem. Soc. <u>1934</u> , 56, 625.

COMPONENTS :		ORIGINAL M	EASUREMENT	`S :	
1. Nitric oxide; NO; [10	102-43-9]	Klemenc, A.; Spitzer-Neumann, E.			
2. Nitrobenzene; $C_6H_5NO_2$ ; [98-95-3]		Monatsh	. 1929. 4	53.413-419	
			. <u>1525</u> / .	50,415 415	•
VARIABLES:		PREPARED I			
Temperature, pres	sure		W. Gei	rrard	
EXDEDIMENTAL VALUES.		<u> </u>		· · · · · · · · · · · · · · · · · · ·	
EXIENTIAL VALUES:					
T/K	293.16 29	98.16	313.16	333.16	363.16
Pressure range,*					
from (kPa) :	62.128 1	33.056	136.522	144.921	142.388
to (kPa):	140.225	-	65.995	67.728	61.195
Ostwald coefficient,*	0 176		0 100	0.164	0.100
to :	0.200	-	0.182	0.184	0.196
Mean: **	0.189	0.190	0.190	0.193	0.188
Mole fraction, x1: ***	0.000805	0.000799	0.00076	59 0.0007	47 0.000685
Number of measurements:	9	1	7	6	4
* Irregular distribu	t-				
** Given by authors.					
*** Calculated by					
$\Delta F^{0}$ . cal mole ⁻¹	2820 28'	70 3	050	3276	3656
From $\Delta F^0 = -RT$ in (L/	RT)				
$\Delta H_{200} = 0$					
298					
Henry's law was assumed	•				
	AUXILIARY	INFORMATIO	N		
		Tagunan an			
METHOD/APPARATUS/PROCEDURE:	vessel	SOURCE ANI	O PURITY OF	MATERIALS:	
Ostwald coefficient taken	to be	1. Pre	pared by	the action	n of
concentration of gas in the	he liquid	mer	cury on n	itric acio	d in
gas phase. Measurement of	f volume of	acio	j.	9 OL 90% S	uiruire
gas absorbed at a measured	d pressure,	1 Dom			
Total. Partial pressure	or gas -	Z. Rend	lereu gas	, itee.	
p _{Total} - p _s , where p _s is t	the partial				
pressure of the solvent of	ver the				
solution.					-
		ESTIMATED	ERROR:		
		REFERENCE	ç.		
1			- •		
1					

Nitric Oxide

COMPONENTS :	EVALUATOR:
<ol> <li>Nitric oxide</li> <li>Inorganic, nonaqueous liquids</li> </ol>	W. Gerrard The Polytechnic of North London Holloway, London, N7 8DB UK March 1980
CRITICAL EVALUATION:	
Sulfuric acid; H ₂ SO ₄ ; [7664-93-9]	
The data of Manchot, Konig, and Reimber sulfuric acid of a range of concentrat	erger [1] on aqueous solutions of tions up to 96% H ₂ SO ₄ enables a
rational, but speculative extrapolation enable straightforward Ostwald coeffice deemed acceptable. For 273 K and 1 at "pure" acid is calculated to be 0.0003 Results by Lunge [2] and by Tower [3], approximately into the data of Manchot	on to be made to $100\%$ H ₂ SO ₄ . These data cients to be recorded; and these are of the mole fraction $x_{\rm NO}$ , for the B57, compared with 0.0000592 for water. and by Pinkus and Jacobi [4] fit the et al.
Nitrosyl chloride; NOCl; [2696-92-6]	
The mole fraction, $x_{NO}$ , at 220 K [1 at of Trautz and Gerwig [5] appears to be	m], 0.0028, based on the observation e approximately of the right magnitude.
Nitrose	
Tseitlin [6] gave data on the solubili nitrosyl sulfuric acid which appear to	ity of nitric oxide in solutions of be acceptable.
REFERENCES:	
<ol> <li>Manchot, W.; Konig, J.; Reimling</li> <li>Lunge, G. Ber. <u>1885</u>, 18, 1393</li> <li>Tower, O.F. Z. anorg. Chem. <u>1906</u>,</li> <li>Pinkus, A.; Jacobi, J. Bull. Soc.</li> <li>Trautz, M.; Gerwig, W. Z. anorg.</li> <li>Tseitlin, A.N. J. Applied Chem.</li> </ol>	ger, S. Ber. <u>1926</u> , 59B, 2672 50, 382 Chim. Belg. <u>1927</u> , 36, 448 Chem. <u>1925</u> , 146, 1 [USSR] <u>1946</u> , 19, 820

COMPONENTS :		ORIGINAL MEASUREMENTS:			
1. Nitric oxide; NO; [10102	-43-9]	Manchot,	W.; Konig,	J.; Reimlinger,S.	
2. Water; H ₂ O; [7732-18-5]		Ber, <u>1926</u>	, 59B, 2672	-2681.	
3. Sulfuric acid; $H_2SO_4$ ; [7	664-93-9]	,			
VARIABLES:		PREPARED BY:			
Composition			W. Gerrar	đ	
		<u> </u>			
EXPERIMENTAL VALUES:					
T/K = 273.15 Pres	ssure of n	itric oxide	appeared t	o be 1 atm.	
Conc.of H ₂ SO ₄	Vol	ume of NO,	cm ³ , absorb	ed by of solv	
we s	a	b b	a	b	
0	7.38	<i>с</i> 1	7.38		
8.8	6.5 5.2	6.1 4.9	6.9 5.9	6.5 5.6	
28.0	4.5	4.3	5.4	5.2	
38.6	3.8	3.6	4.9	4.6	
52.6	2.4	2.3	3.4	3.2	
58.7	2.2	2.1	3.3	3.1	
70.8	1.9	1.8	3.0	2.8	
76.7	1.8	1.7	3.1	2.9	
	2.0	1.8	3.2	3.1 3.4	
89.1	2.1	1.9	3.7	3.6	
90.0	2.3	2.1	4.1	3.8	
90.4	2.4	2.2	4.3	4.0	
92.4	2.5	2.4	4.6	4.4	
95.0	3.8	3.7	7.7	7.2	
a an	d b are d	uplicate me	asurements		
	AUXILIARY	INFORMATION			
METHOD /APPARATUS /PROCEDURE .		SOURCE AND F	DIRITY OF MATE	PTAIS.	
The apparatus and technique	were	Appeared	to be of sa	tisfactory	
stated to be those of Mancho	t (1).	purity.			
		)			
		ESTIMATED EN	RROR:		
		REFERENCES:		<b></b>	
		1. Mancho	ot, W. Z. An	org. Chem. <u>1924</u> ,	
		141, 3	38.		
		}			
		1			

## SYSTEM INDEX

A

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-.

Abdominal muscle, fat see fat abdominal muscle		0.0.0	
Acetic acid + nitrous oxide	<u>161</u> ,	206 -	208
Acetic acid (aqueous) + nitrous oxide		<u>116</u> ,	222
Acetic acid (ternary) + nitric oxide		336	345
Acetic acid, ethyl ester + hitric Oxide		<u> </u>	545
+ nitric oxide			310
Acetic acid methyl ester + nitrous oxide			209
Acetic acid, pentyl ester + nitrous oxide		161.	208.
		210,	211
Acetone see 2-propanone			
Acetonitrile + nitric oxide		336,	348
Albumen, egg see egg albumen		······································	
Albumen, serum see serum albumen			
Aluminium nitrate see nitric acid, aluminium	salt		
Aluminium sulfate see sulfuric acid, aluminium	m		
salt			
2-Aminoethanol see ethanol, 2-amino-			
Ammonium bromide (aqueous) + nitrous oxide		29,	48
Ammonium chloride (aqueous) + nitrous oxide	29,	46,	47
Ammonium nitrate see nitric acid, ammonium s	alt		
Ammonium sulfate see sulfuric acid, ammonium			
salt			
Amyl acetate see acetic acid, pentyl est	er		
iso-Amyl alcohol see l-butanol, 3-methyl-			
Aniline see benzenamine			
Arsenious sulfide (aqueous colloidal)			
+ nitrous oxide		145,	148
<u>B</u>			
Parium chlorido (aqueous) + nitrous ovide		32	75
Benzaldehyde (uqueous) + nitrous oxide		$2\frac{32}{12}$	213
Benzandenyde + nitrous Oxide		214	215
Benzena + nitria ovide		336	230
Pongono + nitrous ovide	160	180'-	182
Benzene, chloro- + nitrous oxide	<u>100</u> ,	<b>T</b> 00	225
Benzene, 1.3-dimethyl- + nitric oxide		336.	341
Benzene, methyl + nitric Oxide		336	340
Denzency methyl i hitric oxido		550,	
		336.	349
Benzoic acid, ethyl ester (ternary)		<u>336</u> ,	349
Benzoic acid, ethyl ester (ternary) + nitric oxide		<u>336</u> ,	349 310
Benzene, hitto- + hitto oxide Benzoic acid, ethyl ester (ternary) + hitric oxide Blood see bovine blood, dog blood		<u>336</u> ,	349 310
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood.	,	<u>336</u> ,	349 310
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide	, emic	<u>336</u> ,	349 310
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects,	, emic	<u>336</u> ,	349 310
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic	, emic	<u>336</u> ,	349 310
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects,	, emic	<u>336</u> ,	349 310
Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood	, emic	<u>336</u> ,	349 310
Blood cells	, emic	<u>336</u> ,	349 310
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood	, emic 226,	<u>336</u> , 227,	349 310 228
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer)	, emic <u>226</u> ,	<u>336</u> , <u>227</u> ,	349 310 228
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide	, emic <u>226</u> ,	<u>336</u> , <u>227</u> , 2 <u>2</u> 6,	349 310 228 227
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide bovine γ-globulin + nitrous oxide	, emic <u>226</u> ,	<u>336</u> , <u>227</u> , <u>226</u> , <u>226</u> ,	349 310 228 <u>227</u> <u>227</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer)	, ∋mic <u>226</u> ,	<u>336</u> , <u>227</u> , <u>226</u> , <u>226</u> ,	349 310 228 <u>227</u> <u>227</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood-hyperlipide Subjects, human blood-thyrotoxic Subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer) + nitrous oxide	, emic <u>226</u> ,	<u>336</u> , <u>227</u> , <u>226</u> , <u>226</u> , <u>226</u> ,	349 310 228 <u>227</u> <u>227</u> <u>227</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, dog blood human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer) + nitrous oxide Bovine serum	, emic <u>226</u> , <u>226</u> ,	<u>336</u> , <u>227</u> , <u>226</u> , <u>226</u> , <u>226</u> , <u>227</u> ,	349 310 228 <u>227</u> <u>227</u> <u>227</u> <u>229</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood-hyperlipide subjects, human blood-hyperlipide subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine γ-globulin (in phosphate buffer) + nitrous oxide Bovine serum Bovine serum Bovine serum albumen (in phosphate buffer)	, emic <u>226</u> , <u>226</u> ,	$\frac{336}{227}$ , $\frac{226}{226}$ , $\frac{226}{227}$ ,	349 310 228 <u>227</u> <u>227</u> <u>227</u> <u>229</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine serum Bovine serum Bovine serum Bovine serum albumen (in phosphate buffer) + nitrous oxide	, emic <u>226</u> , <u>226</u> ,	<u>336</u> , <u>227</u> , <u>226</u> , <u>226</u> , <u>226</u> , <u>227</u> , <u>226</u> , <u>227</u> , <u>226</u> ,	349 310 228 <u>227</u> <u>227</u> <u>227</u> <u>227</u> <u>229</u> <u>227</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood, human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer) + nitrous oxide Bovine serum Bovine serum Bovine serum Bovine serum Bovine serum albumen (in phosphate buffer) + nitrous oxide Brain see homogenized brain,	, emic <u>226</u> , <u>226</u> ,	<u>336</u> , <u>227</u> , <u>226</u> , <u>226</u> , <u>226</u> , <u>227</u> , <u>226</u> ,	349 310 228 <u>227</u> <u>227</u> <u>227</u> <u>229</u> <u>227</u>
Benzoic acid, ethyl ester (ternary) + nitric oxide Blood see bovine blood, dog blood human blood-hyperlipide subjects, human blood-thyrotoxic subjects, rabbit blood Blood cells see human red blood cells Bovine blood Bovine β-globulin (in phosphate buffer) + nitrous oxide Bovine hemoglobin (in phosphate buffer) + nitrous oxide Bovine serum Bovine serum Bovine serum Bovine serum albumen (in phosphate buffer) + nitrous oxide Brain see homogenized brain, human fetal brain,	, emic <u>226</u> , <u>226</u> ,	$\frac{336}{227}$ , $\frac{226}{226}$ , $\frac{226}{227}$ , $\frac{226}{227}$ , $\frac{226}{227}$ ,	349 310 228 <u>227</u> <u>227</u> <u>227</u> <u>229</u> <u>227</u>

-

Bromide see ammonium bromide, potassium bromide, sodium bromide 1-Butanol + nitrous oxide 197 1-Butanol, 3-methyl-+ nitrous oxide 185, 198, 199 С Cadmium nitrate see nitric acid, cadmium salt 31, 70 - 72 Calcium chloride (aqueous) + nitrous oxide Calcium nitrate see nitric acid, calcium salt Carbonic acid, dipotassium salt (aqueous) + nitrous oxide 38, 112 Carbonic acid, disodium salt (aqueous) + nitrous oxide 35, 93 Carbonic acid, monopotassium salt (aqueous) + nitrous oxide Carbonic acid, monosodium salt (aqueous) 38, 112 + nitrous oxide <u>35</u>, 93 Carbon disulfide + nitrous oxide 259 Carbon tetrachloride see methane, tetrachloro- $\frac{38}{114}$ ,  $\frac{39}{115}$ , Cesium chloride (aqueous) + nitrous oxide 158, 159 Charcoal suspension + nitrous oxide Chloral hydrate see 1,1-ethanedio1, 2,2,2trichlorosee ammonium chloride, barium Chloride chloride, calcium chloride, cesium chloride, lithium chloride, magnesium chloride, potassium chloride, rubidium chloride, sodium chloride, strontium chloride see benzene, chloro-Chlorobenzene see methane, trichloro-Chloroform 220 Chlorothene + nitrous oxide Chromic sulfate see sulfuric acid, chromium salt Chromium sulfate see sulfuric acid, chromium salt Cobaltous sulfate see sulfuric acid, cobalt salt see sulfuric acid, cobalt salt Cobalt sulfate  $\frac{266}{321}, \frac{316}{325}$ Copper bromide (aqueous) + nitric oxide Copper bromide (in ethanol) + nitric oxide Copper chloride (aqueous) + nitric oxide Copper chloride (aqueous, ternary) 266, 315 266, 314 + nitric oxide Copper chloride (in acetic acid)  $\frac{266}{266}$ , 323  $\frac{266}{318}$ , 318, + nitric oxide Copper chloride (in ethanol) + nitric oxide 320, 326, 327 Copper chloride (in formic acid) 266, 322 + nitric oxide Copper chloride (in methanol) + nitric oxide 266, 319 Copper chloride (in 2-propanone) + nitric oxide 266, 324 Copper nitrate see nitric acid, copper salt see copper bromide see copper chloride Cupric bromide Cupric chloride Cuprous nitrate see nitric acid, copper salt 336, 337 + nitric oxide Cyclohexane + nitrous oxide 179 Cyclohexane 185**,** 202 + nitrous oxide Cyclohexanol Cyclohexanone 201 + nitrous oxide D 160, 172 Decane + nitrous oxide 1-Decanol + nitrous oxide 204 253, 255 + nitrous oxide Dextrin (aqueous)

1.2-Dibromoethane	see ethane. 1.2-dibromo-	
1.2-Dichloroethane	see ethane, 1.2-dichloro-	
Diethanolamine	see ethanol. 2.2'-iminobis-	
Diethyl ether	see ethane. 1.1'-oxybis-	
Diethylene glucol	see ethanol, 2,2'-oxybis-	
Diethyl propanedioate (t	ernary)	
	+ nitric oxide	310
Di <i>iso</i> propanolamine	see 2-propanol, 1,1"-iminobis-	
1,3-Dimethyl benzene	see benzene, 1,3-dimethyl-	
Disodium hydrogen phosph	ate	
	see phosphoric acid, disodium sa	lt
Dodecane	+ nitrous oxide	160, 174
l-Dodecanol	+ nitrous oxide	205
Dog blood	+ nitrous oxide	226, 227,
	2	32, 235, 237
Dog homogenized brain	+ nitrous oxide <u>2</u>	<u>26, 227,</u> 242
Dog myocardium	+ nitrous oxide <u>2</u>	<u>26, 227,</u> 246
<u>E</u>		
Egg albumen	+ nitrous oxide	$\frac{226}{253}, \frac{227}{253},$
		251, 252
Ethane, 1,2-dibromo-	+ nitrous oxide 2	20, 223, 224
Ethane, 1,2-dichioro-	+ nitrous oxide	220
Ethane, 1,1'-oxybis-	+ nitric oxide	$\frac{336}{161}$ , $\frac{344}{166}$
Etnane, 1,1'-oxypis-	+ nitrous oxide	$\frac{161}{120}$ , 196
1,2-Ethanediamine	+ nitrous oxide	139
1,2-Ethanediol (aqueous)	+ nitrous oxide	122
1,1-Ethanedio1, 2,2,2-tr.	chioro- (aqueous)	3.4.4
1 2-Ethanodicia agid (ag	+ hitrous oxide	144
1,2-Echaneurore actu (aq	t nitroug ovido	16 120 - 121
Fthanol	+ nitria ovido $\underline{1}$	$\frac{10}{10}$ , $\frac{129}{129}$ - $\frac{131}{131}$
Ethanol	+ nitrous oxide	$\frac{330}{161}$ 185
Benanoi	1 mitious oxide	$\frac{101}{188} - 191$
	Ĩ	00, 100 101
Ethanol (aqueous)	+ nitrous oxide	118
Ethanol (ternary)	+ nitric oxide	294. 306.
		312, 313,
	3.	18. 320. 321.
	3.	25, 326, 327
Ethanol, 2-amino-	+ nitrous oxide	138
Ethanol, 2,2'-iminobis-	(aqueous)	
	+ nitrous oxide	141
Ethanol, 2,2',2"-nitrilo	ris- (aqueous)	
	+ nitrous oxide	143
Ethanol, 2,2'-oxybis-	+ nitrous oxide	126
Ethanolamine	see ethanol, 2-amino-	
Ethylenediamine	see 1,2-ethanediamine	
Ethylene glucol	see 1,2-ethanediol	
Ethyl acetate	see acetic acid, ethyl ester	
Ethyl ether	see ethane, 1,1'-oxybis-	
Ethyl malonate	see diethyl propanedioate	
<u>F</u>		
Ferric hydroxide	see iron hydroxide	
Ferric sullate	see sulfuric acid, iron (3+) salt	E
rerrous ammonium sulfate	see sulluric acid iron (2+)	
Downeys byend to	ammonium sait	
Ferrous promide	see from promide	
Ferrous chioride	see from contoride	
Ferrous nitrato	see mitric acid iron (21) colt	
Forrous solepato	see mining and iron (21) salt	
Farrous sulfate	see setenic actu, iton $(2\tau)$ Sdit	
ICIIONS SUITURE	calt	
Formic acid	+ nitric ovide	266 322
Formic acid	+ nitrous oxide	$\frac{1}{116}$ , 128
LOTWING GOIN	I HILLOUD ONLUE	<u>++</u> , ++0

see bovine  $\beta$ -globulin see bovine  $\gamma$ -globulin see 1,2,3-propanetriol

see human fetal heart, rabbit heart

152 - 155

254

Glycogen + nitrous oxide Heart Hemoglobin, bovine

see bovine hemoglobin 1-Heptanol Hexadecane Hexane + nitrous oxide 160, 167, 168 + nitrous oxide 203 + nitrous oxide 160, 178  $\frac{\overline{336}}{160}$ ,  $\frac{\overline{338}}{165}$ ,  $\frac{338}{166}$ + nitric oxide + nitrous oxide Hexane 1-Hexanol + nitrous oxide 200 Human blood  $\frac{226}{230}$ ,  $\frac{227}{234}$ , + nitrous oxide 236, 238, 239  $\begin{array}{c} 236, \ 237, \ 234\\ \hline 226, \ 227, \ 244\\ \hline \end{array}$ Human fetal brain+ nitrous oxideHuman fetal heart+ nitrous oxide Human fetal liver Human fetal lung + nitrous oxide + nitrous oxide Human fetal scalp + nitrous oxide Human fetal skeletal muscle  $\frac{226}{226}, \frac{227}{227}, 244$  $\frac{226}{226}, \frac{227}{227}, 244$ + nitrous oxide Human fetal skin + nitrous oxide Human fetal spleen + nitrous oxide Human homogenized brain + nitrous oxide 226, 227, 242 Human hyperlipidemic plasma 226, 227, 241 + nitrous oxide Human lung homogenate (blood free tissue)  $\begin{array}{c} \frac{226}{226}, \ 227, \ 243\\ \underline{226}, \ \underline{227}, \ 245\\ \underline{226}, \ \underline{227}, \ 244\\ \underline{226}, \ \underline{227}, \ 241\\ \underline{226}, \ \underline{227}, \ 241\\ \underline{228}, \ \underline{241} \end{array}$ + nitrous oxide Human myocardium + nitrous oxide Human placenta + nitrous oxide + nitrous oxide Human plasma Human red blood cells + nitrous oxide Human red cell membrane  $\frac{226}{226}, \frac{227}{227}, 241$   $\frac{226}{226}, \frac{227}{227}, 244$ + nitrous oxide Human umbilical cord + nitrous oxide Human uterine muscle + nitrous oxide Hydrobromic acid (ternary) 292 + nitric oxide + nitrous oxide 28, <u>40</u>, 41 Hydrochloric acid Hydrogen chloride (aqueous, ternary) 287, 290, 291, 334, 335 + nitric oxide

Hydroxide, potassium

see potassium hydroxide

## I

Iodide, potassium	see potassium iodide			
Iron bromide (aqueous) +	nitric oxide	<u>265</u> ,	<u>266</u> ,	274
Iron bromide (in aqueous +	hydrobromic acid) nitric oxide	<u>265</u> ,	<u>266</u> ,	292
Iron bromide (in ethanol	)			~~~
	nitric oxide	<u>265</u> ,	<u>266</u> ,	306
Iron chloride (aqueous) +	nitric oxide	<u>265</u> , 269, 283,	266, 271, 285,	268, 280, 304
Iron chloride (in aqueou	s hydrochloric acid)			
+	nitric oxide		<u>265</u> ,	<u>266</u> ,
			287,	291

G

Н

Iron chloride (in organic liquids) + nitric oxide  $\frac{265}{307}$ ,  $\frac{266}{309}$ , 310, 312, 313 Iron hydroxide (aqueous) + nitrous oxide 145 - 147 Iron iodide (aqueous) + nitric oxide 265, 266, 275 Iron iodide (in ethanol) + nitric oxide 265, 266, 308 Iron sulfate see sulfuric acid, iron (2+) salt; sulfuric acid, iron (3+) salt K see rabbit kidney Kidney L Lithium chloride (aqueous) + nitric oxide Lithium chloride (aqueous) + nitrous oxide 333  $\frac{32}{76}$  -  $\frac{39}{78}$ Lithium perchlorate see perchloric acid, lithium salt see sulfuric acid. Lithium sulfate lithium salt Liver see human fetal liver, rabbit liver see human fetal lung Lung Lung, human, homogenate see human lung homogenate М 64 Magnesium chloride (aqueous) + nitrous oxide 30, Magnesium nitrate see nitric acid, magnesium salt Magnesium sulfate see sulfuric acid, magnesium sal see sulfuric acid, magnesium salt Manganese chloride (aqueous) + nitric oxide 266, 330, 331 Manganous sulfate see sulfuric acid, manganese (2+) salt (1.1) 336, 346, 347 Methane, tetrachloro-Methane, tetrachloro-+ nitric oxide  $\overline{161}$ , 218 - 220 + nitrous oxide + nitrous oxide 161, 220 - 222 Methane, trichloro-+ nitric oxide <u>336</u>, 342 Methanol 160, 183 - 187 Methanol + nitrous oxide Methanol (aqueous) + nitrous oxide 117 319 Methanol (ternary) + nitric oxide see 1-butanol, 3-methy1-3-Methyl-1-butanol see acetic acid, methyl ester Methyl acetate Methyl salicylate see benzoic acid, 2-hydroxy-, methyl ester Monoethanolamine see ethanol, 2-aminosee rabbit muscle Muscle see dog myocardium Myocardium N Nickelous sulfate see sulfuric acid, nickel salt Nickel sulfate see sulfuric acid, nickel salt Nitric acid + nitric oxide 28, 40, 43 Nitric acid, aluminium salt (aqueous) 29, 30, 63 + nitrous oxide Nitric acid, ammonium salt (aqueous) 50, 51 29, + nitrous oxide Nitric acid, cadmium salt (aqueous) 29, 30, 54 + nitrous oxide Nitric acid, calcium salt (aqueous) 73 + nitrous oxide 31,

Nitric acid, copper salt (aqueous) + nitrous oxide 29, 30, 55 Nitric acid, iron (2+) salt (aqueous) + nitric oxide 265, 266, 286 Nitric acid, magnesium salt (aqueous) 30, + nitrous oxide 31 68, 69 Nitric acid, potassium salt (aqueous) + nitrous oxide 37, 107 - 110 Nitric acid, sodium salt (aqueous) + nitrous oxide 90, 35, 91 Nitric acid, zinc salt (aqueous) 29, 30, 53 + nitrous oxide + nitrous oxide Nitrogen dioxide 258 Nitrosyl chloride + nitric oxide 350 + nitrous oxide 171 Nonane 160, 1-Nonanol + nitrous oxide 204 0 Octane + nitrous oxide 160, 169 1-Octanol + nitrous oxide 203 Oil, olive see olive oil 256 Olive oil + nitrous oxide Ox blood see bovine blood Oxalıc acid see 1,2-ethandioic acid Ρ  $\frac{160}{163}, \frac{160}{163}, \frac{177}{164}$ Pentadecane + nitrous oxide + nitrous oxide Pentane 1,5-Pentanediol (aqueous) + nitrous oxide 127 Pentane, 2,2,4-trimethyl-+ nitrous oxide 160, 170 1-Pentanol + nitrous oxide 200 Perchloric acid (aqueous) + nitric oxide 334, 335 Perchloric acid, lithium salt (aqueous) 333 + nitric oxide Perchloric acid, sodium salt (aqueous) + nitric oxide 333 Periodic acid + nitrous oxide 40 Periodic acid, potassium salt (aqueous) + nitrous oxide 38, 111 29, 257 + nitrous oxide Petroleum + nitric oxide 333 Phosphate buffer 44, + nitrous oxide 40, 45 Phosphoric acid Phosphoric acid, disodium salt + nitrous oxide 92 35, Phosphoric acid, trisodium salt + nitrous oxide 35, 92 see human placenta Placenta see human plasma, human hyper-Plasma lipidemic plasma Potassium bromide (aqueous) 36, 101, 102 + nitrous oxide Potassium bicarbonate see carbonic acid, monopotassium salt Potassium carbonate see carbonic acid, dipotassium salt Potassium chloride (aqueous) 36, + nitrous oxide  $\frac{35}{96}$  -  $\frac{36}{100}$ 39, Potassium fluoride (aqueous) 95 + nitrous oxide 35, Potassium hydroxide (aqueous) + nitrous oxide 35, 94 Potassium iodide (aqueous) + nitrous oxide 37, 103, 104

see nitric acid, potassium salt Potassium nitrate Potassium periodate see periodic acid, potassium salt Potassium sulfate see sulfuric acid, potassium salt 1,2,3-Propanetriol (aqueous) + nitrous oxide 123 - 125 1,2,3-Propanetriol + nitrous oxide 185 116, 133, 134 Propanoic acid + nitrous oxide 1-Propanol (aqueous) 119, 120 + nitrous oxide + nitrous oxide 186, 192 2-Propanol (aqueous) + nitrous oxide 121 + nitrous oxide 186 2-Propanol, 1-amino-140 + nitrous oxide 2-Propanol, 1,1'-iminobis- (aqueous) + nitrous oxide 142 see 2-Propanol, 1-amino*iso*-Propanolamine 2-Propanone (ternary) + nitric oxide 310, 324 + nitrous oxide 160, 193-196 2-Propanone Propionic acid see propanoic acid Pyridine (ternary) + nitric oxide 310 + nitrous oxide 216, 217  $\begin{array}{c} \frac{226}{226}, \ \frac{227}{2}, \ 240\\ \frac{226}{226}, \ \frac{227}{2}, \ 240 \end{array}$ + nitrous oxide Rabbit blood Rabbit brain + nitrous oxide Rabbit heart + nitrous oxide Rabbit kidney + nitrous oxide Rabbit liver + nitrous oxide + nitrous oxide Rabbit muscle Rat abdominal muscle 226, 227, 247 + nitrous oxide Red blood cells see human red blood cells Red cell membrane see human red cell membrane Rubidium chloride (aqueous) + nitrous oxide 38, 113 see human fetal scalp 24, + nitrous oxide 23, 25. 26 Selenic acid, iron (2+) salt (in aqueous selenic acid) 265, 266, 295 + nitric oxide Selenic acid (ternary) + nitric oxide 295 Selenic acid, iron (2+) salt (aqueous) <u>265, 266, 296</u> + nitric oxide Selenic acid, iron (2+) salt (in aqueous ethanol soln.) 265, 266, 294 + nitric oxide Serum albumen (bovine) see bovine serum albumen  $\frac{226}{248} - \frac{227}{250}$ Serum albumen + nitrous oxide Silica (aqueous suspension) 149 + nitrous oxide 150, 151 Silicic acid + nitrous oxide see human fetal skeletal muscle Skeletal muscle see human fetal skin Sodium bicarbonate see carbonic acid, monosodium salt

Skin

Sodium bromide (aqueous)

+ nitrous oxide

1-Propanol

2-Propanol

Pyridine

R

<u>S</u>

Scalp

Seawater

33,

85

```
see carbonic acid, disodium salt
Sodium carbonate
Sodium chloride (aqueous)
                                                            266, 332, 333
                  + nitric oxide
Sodium chloride (ternary)
                                                                 334, 335
                  + nitric oxide
Sodium chloride (aqueous)
                                                                        33,
                  + nitrous oxide
                                                            80 - 84.24\overline{1}
Sodium hydroxide (ternary)
                  + nitric oxide
                                                                 334, 335
                         see nitric acid, sodium salt
Sodium nitrate
Sodium perchlorate
                         see perchloric acid, sodium
                              salt
Sodium phosphate
                         see phosphoric acid, sodium
                              salt
                         see sulfuric acid, sodium salt
Sodium sulfate
Spleen
                          see human fetal spleen
Starch (aqueous colloidal)
                                                                 156, 157
                  + nitrous oxide
Strontium chloride (aqueous)
                                                             31,
                                                                  32, 74
                  + nitrous oxide
Sulfuric acid, ammonium salt (aqueous)
                                                                  29,
                  + nitrous oxide
                                                                       49
                                                                 350, 351
                  + nitric oxide
Sulfuric acid
Sulfuric acid (ternary)
                                                            289, 311, 317
                  + nitric oxide
                                                                 40,
Sulfuric acid
                  + nitrous oxide
                                                             28,
                                                                       42
Sulfuric acid (ternary)
                                                                  34,
                                                                        89
                  + nitrous oxide
Sulfuric acid, aluminium salt (aqueous)
                                                             29,
                                                                  30,
                                                                       62
                  + nitrous oxide
Sulfuric acid, ammonium salt (aqueous)
                                                                       278
                  + nitric oxide
Sulfuric acid, chromium salt (aqueous)
                                                                  30,
                                                                      61
                                                             29,
                  + nitrous oxide
Sulfuric acid, cobalt (2+) salt (aqueous)
                                                            266, 329, 331
                  + nitric oxide
Sulfuric acid, cobalt (2+) salt (aqueous)
                                                                  30,
                                                             29,
                                                                        57
                  + nitrous oxide
Sulfuric acid, copper (2+) salt (ternary)
                                                                 266, 317
                  + nitric oxide
Sulfuric acid, iron (2+) salt (aqueous)
                                                             29, 30,
                                                                        58
                  + nitrous oxide
Sulfuric acid, iron (3+) salt (aqueous)
                                                             29,
                                                                  30,
                                                                        59
                  + nitrous oxide
Sulfuric acid, iron (2+) salt (aqueous)
                                                            \frac{266}{278}, \frac{267}{279}, \frac{270}{281},
                  + nitric oxide
                                                            282, 284, 288,
293, 299 - 303,
305, 331
Sulfuric acid, iron (3+) salt (ternary)
                                                                 266, 311
                  + nitric oxide
Sulfuric acid, iron (2+) ammonium salt (aqueous)
                                                                 \frac{265}{272}, \frac{266}{273},
                  + nitric oxide
                                                            276, 277, 289,
                                                            290, 297, 298
Sulfuric acid, lithium salt (aqueous)
                                                                  32,
                                                                        79
                  + nitrous oxide
Sulfuric acid, magnesium salt (aqueous)
                                                             30, 65 - 67
                  + nitrous oxide
Sulfuric acid, manganese (2+) salt (aqueous)
                                                                  30,
                                                                        60
                                                             29,
                  + nitrous oxide
Sulfuric acid, nickel salt (aqueous)
                                                            266, 328, 331
                  + nitric oxide
Sulfuric acid, nickel salt (aqueous)
                                                             29,
                                                                  30,
                                                                        56
                  + nitrous oxide
Sulfuric acid, potassium salt (aqueous)
                                                             37, 105, 106
                  + nitrous oxide
Sulfuric acid, sodium salt (aqueous)
                                                            266, 278, 332
                  + nitric oxide
```

Sulfuric acid, s Sulfuric acid, s Sulfuric acid, z	odium salt (aqueous) + nitrous oxide odium salt (ternary) + nitrous oxide inc salt (aqueous) + nitrous oxide	$\frac{33}{86}' - \frac{34}{88}'$ $\frac{34}{52}$
<u>T</u> Tetradecane Toluene Tridecane Triethanolamine	<pre>+ nitrous oxide see benzene, methyl + nitrous oxide see ethanol, 2,2',2"-nitrilotris-</pre>	<u>160</u> , 176 <u>160</u> , 175
U Umbilical cord Undecane 1-Undecanol Urea (aqueous) Uterine muscle	see human umbilical cord + nitrous oxide + nitrous oxide + nitrous oxide see human uterine muscle	<u>160</u> , 173 205 135 - 137
<u>W</u> Water Water	+ nitric oxide + nitrous oxide	$\begin{array}{r} \frac{260}{262}, \ \frac{261}{264}, \\ 3 \ - \ 2^{\frac{1}{22}}, \ 2^{\frac{1}{24}} \end{array}$
Water (ternary) Water (ternary)	+ nitric oxide 3. + nitrous oxide	$\begin{array}{r} 265 - 267, \\ \hline 268 - 305, \\ 11, 314 - 318, \\ 328 - 335 \\ \underline{27 - 40}, \\ 41 - 159, \\ 248 - 255 \end{array}$

## x

M-xylene

see benzene, 1,3-dimethy1-

<u>z</u>

Zinc	nitrate	see	nitric a	acid,	zinc s	alt
Zinc	sulfate	see	sulfuri	c acid	, zinc	salt

REGISTRY Underlined page numbers ref	NUMBER INDEX fer to evaluation text
56-23-5 56-81-5 57-13-6 60-29-7 62-53-3	218-220, <u>336</u> ,346, 347 123-125,185 135-137 196, <u>336</u> ,344 214,215
64-17-5 64-18-6 64-19-7 67-56-1 67-63-0	118,185,186,188-191,294,306,307-310,312, 313,318,320,321,325-327, <u>336</u> ,343 128,322 132,206-208,323 117,183-187,319, <u>336</u> ,342 121,186
67-64-1 67-66-3 71-23-8 71-36-3 71-41-0	193-196,310,324 220-222 119,120,186,192 197 200
71-43-2 75-05-8 75-15-0 78-96-6 79-09-4	180-182, <u>336</u> ,339 <u>336</u> ,348 259 140 133,134
79-20-9 93-89-0 98-95-3 100-52-7 102-71-6	209 310 <u>336</u> ,349 <u>212</u> ,213 143
105-53-3 106-93-4 107-06-2 107-21-1 107-15-3	310 220,223,224 220 122 139
108-38-3 108-88-3 108-90-7 108-93-0 108-94-1	336,341 336,340 225 185,202 201
109-66-0 110-54-3 110-82-7 110-86-1 110-97-4	163,164 165,166, <u>336</u> ,337 179, <u>336</u> , <u>337</u> 216, <u>217</u> ,310 142
111-27-3 111-29-5 111-42-2 111-46-6 111-65-9	200 127 141 126 169
111-70-6 111-84-2 111-87-5 112-30-1 112-40-3	203 171 203 204 174

112-42-5	205
112-53-8	205
123-51-3	185,198,199
124-18-5	172
141-43-5	138
	ATA AAC ALC
141-78-6	310, 336, 345
142-82-5	167,168
143-08-8	204
144-55-8	35,93
144-62-7	129-131
000 1 4 <i>6</i>	20.110
298-14-6	$\frac{38}{34}$ , 112
302-17-0	144
497-19-8	<u>35,93</u>
540-84-1	170
544-76-3	1/8
594-09-7	39 112
628-63-7	208,210,211
620-50-5	175
629-59-4	176
629-62-9	177
029-02-9	1,,,
1120-21-4	173
1303-33-9	145,148
1309-33-7	145-147
1310-58-3	35,94
1342-98-2	150,151
2696-92-6	351
3251-23-8	$\frac{29}{30}, \frac{30}{30}, \frac{51}{51}$
6484-52-2	29,50,51
7447-39-4	<u>266</u> , 314, 315, 318-320, 322-324, 326, 327
7447-40-7	35, 36, 39, 96-100
7447-41-8	32, 39, 76-78
7447-41-0	30 65-67
7559-70-4	35,00
7501-54-0	35,92
7631-86-9	149
,001 00 )	219
7631-99-4	<u>35</u> ,90,91
7647-01-0	28,40,287,290,291,314
7647-14-5	<del>33,80</del> -84,266,332,334,335
7647-15-6	33,85
7647-17-8	<u>38,39</u> ,114-115
7664-28-2	20 40 44 45 251 252
7004-30-2	27,40,44,45,351,352 20 34 40 43 00 300 311 317
7691-11-0	20, 34, 40, 42, 07, 287, 311, 31/
/001-11-V 7607-37-3	20 10 13
7705-09-0	20, 30, 33
//05-06-0	200, 312-313
7720-78-7	29,30,58,265,266,270,279,281,282,284,288
	293,299-303,305,331
7732-18-5	<u>1,2,3-22,27-40,41-159,241,248-255,260</u> ,
	$\overline{261}$ , 262-2 $\overline{64}$ , $\overline{265}$ , 267, 268-305, 311, 31 $\overline{4-3}$ 18,
	328-335
7733-02-0	52
7757-79-1	<u>37,38,107-110</u>
7757-82-6	<u>33-35</u> ,86-89, <u>266</u> ,278,332

7758-02-3 7758-94-3 7773-01-5 7778-80-5 7779-88-6	36,101,102 265,266,268,269,271,280,283,285,287,291, 304,307,309,310 266,330,331 37,105,106 29,30,53
7783-08-6 7783-20-2 7783-86-0 7785-87-7 7786-30-3	295 29,49 265,266,275,308 29,30,60 30,64
7786-81-4 7789-23-3 7785-45-9 7789-46-0 7790-21-8	29,30,56,266,328,331 39,95 266,316,321,325 265,266,274,292,306 38,111
7791-11-9 10024-97-2 10028-22-5 10035-10-6 10043-01-3	$\frac{38,113}{1-259}$ $\frac{29,30}{292}, \frac{59}{292}, \frac{266}{311}$ $\frac{29}{292}, \frac{30}{292}, 62$
10043-02-4 10043-52-4 10045-89-3 10101-53-8 10102-43-9	265,266,278 31,70-72 265,266,272,273,276,277,289,290,297,298 29,30,61 259-351
10102-44-0 10124-37-5 10124-43-3 10325-94-7 10361-37-2	258 31,73 29,30,57, <u>266</u> ,329,331 29, <u>30</u> ,54 32,75
10377-48-7 10377-60-3 10476-85-4 12124-97-9 12125-02-9	$\frac{32}{30}, \frac{79}{31}, \frac{31}{32}, 79$ $\frac{31}{31}, \frac{32}{32}, 74$ $\frac{29}{29}, 46, 47$
13444-71-8 13473-90-0 14013-86-6	$\frac{40}{29}, \frac{30}{265}, \frac{63}{266}, \frac{286}{286}$

14013-86-6 15857-43-9 18939-61-2

 $\frac{263}{265}, \frac{260}{266}, 294-296}{266}, 317.$ 

## AUTHOR INDEX

ABRAMENKOV, A. ANDO, N. ARMOR, J. N. ASAI, S. ASSALI, N. S. BECKLAKE, M. R. BERENGARTEN, M. G. BORGSTEDT, H. H. BROOMELL, H. T. BUTT, M. A. CAMPBELL, D. CAMPOS CARLES, A. CANDER, L. CARIUS, L. CAUQUIL, G. CHRISTOFORIDES, C. COOK, E. V. CREIGHTON, H. J. M. CUBINA, J. M. CULLEN, S. C. DANCKWERTS, P. V. DIAZ, J. M. DOTY, V. EGER, E. I. ESAKA, N. EVANS, D. E. FAULCONER, A. FINDLAY, A. FLOOK, V. FURMER, I. E. GANZ, S. N. GAY, J. GEFFCKEN, G. GERRARD, W. GILLIES, A. J. GNIEWOSZ, S. GORBOVITSKALYA, T. I. GORDON, V. GOTTLIEB-BILLROTH, H. GRIFFITH, W. P. HARGIS, B. HARMEL, M. H. HASBROUCK, J. D. HATTOX, J. S. HAUNSCHILD, H. HEDLEY-WHITE, J. HIKITA, H. HORIUTT, J. HOWELL, O. R. HSU, H. HUFNER, G. HUTTNER, F. ISHIKAWA, H. ITO, Y. JAHRSTORTER, M.

95, 115 51, 64, 72, 104, 110 264, 333-335 17, 93 244 238, 239 116, 179, 182 13 232, 242 20, 139-143 163, 185, 196, 208, 220 247 243 188, 343 202 15 231 6, 146, 148-150, 152, 156, 158, 229, 248, 251, 254, 255 241, 245, 246 231 16, 112, 120, 122, 123, 126, 127 120, 122, 123, 126, 127 11, 234 14, 236, 237 17, 93 240 233 6, 7, 146-153, 156-159, 229, 248, 251-255 240 166, 179, 182 299-301 268-273 4, 41-43, 46, 77, 94, 97, 102, 103, 113, 114, 145 265-267, 351 13 257 78, 100 66, 70, 74, 76, 79, 80, 86, 96, 105 256 312, 313, 326, 327 11, 234 232, 242 12, 235 233 293, 297, 298 15 17, 93 180, 195, 209, 218, 225 7, 147, 151, 153, 157, 159, 252, 253 163, 185, 196, 208, 220 281, 282, 328-330 288-291, 310 17, 93 18, 19, 117-119, 121, 128, 131, 132, 134, 186 9, 47-50, 52-63, 65, 68, 71, 73, 75, 83, 85, 87, 91, 92, 98, 101,

106, 108, 111, 137

(cont.) JAY, B. E. JOOSTEN, G. E. H. KAWASHIRO, T. KENTON, F. H. KETY, S. S. KITO, S. KLEMENC, A. KNOPP, W. KOBE, K. A. KOHLSCHUTTER, V. KONIG, J. KOZAM, R. L. KREITUS, I. KUMUZAWA, H. KUNERTH, W. KUTSCHEROFF, M. LADDHA, S. S. LANDAU, S. M. LEWIS, J. LINCKH, E. LUKAS, D. S. MAKRANCZY, J. MAMON, L. I. MANCHOT, W. MAPLESON, W. W. MARKHAM, A. E. MCKETTA, J. J. Jr. MEGYERY-BALOG, K. MEYER, K. H. MUNSON, E. S. ORCUTT, F. S. OSTIGUY, G. L. PATYI, I. PIIPER, J. PINGREE, H. POLOVCHENKO, V. I. PONOMAREV, YU. L. POZIN, M. E. PRICE, B. A. REIMLINGER, S. RHODE, O. B. RICCOBINI, L. ROCKER, A. W. ROSS, M. ROTH, W. RUSZ, L. SAARI, J. M. SADA, E.

11, 234 16, 112 247 89 232, 242 18, 19, 51, 64, 72, 104, 110, 117-119, 121, 128, 131, 132, 134, 138, 186 339, 346, 349 5, 90, 107, 133, 144 10, 67, 69, 84, 88, 89, 99, 109 283-287, 314-316, 319-324, 332 351 241, 245, 246 78, 95, 100, 115 20, 139-143 8, 183, 184, 189, 190, 193, 194, 198, 199, 206, 207, 210-217, 221-224 283-287, 314-316, 319-324, 332 120, 122, 123, 126, 127 241, 245, 246 312, 313, 326, 327 294-296 241, 245, 246 164-166, 168, 169, 171-179, 182, 187, 191, 192, 197, 200, 201, 203-205 299-301 9, 47-50, 52-63, 65, 68, 71, 73, 75, 83, 85, 87, 91, 92, 98, 101, 106, 108, 111, 137, 276-280, 288-298, 309-311, 317, 318, 325, 351 240 10, 67, 69, 84, 88, 99, 109 167, 170, 181, 219, 259 164, 165, 168, 169, 171-178, 187, 191, 192, 197, 200, 201, 203-205 256 14, 236, 237 230 238, 239 164-166, 168, 169, 171-179, 182, 201 247 11, 234 305 302-304 302-304 21, 22, 25, 26 351 232, 242 342 258 244 3, 44, 45, 81, 82, 124, 125, 129, 130, 135, 136 164, 165, 168, 169, 171-178, 187, 191, 192, 197, 200, 201, 203-205 233 18-20, 51, 64, 72, 104, 110, 117-119, 121, 128, 131, 132, 134, 138-143, 186

(cont.)

AUTHOR INDEX

230

166, 179, 182 14, 236, 237

14, 236, 237

SADILENKO, A. S. SAIDMAN, L. J. SEEVERS, M. H. SEVERINGHAUS, J. W. SHAW, A. W. SHKOL'NIKOVA, R. I. SIEBECK, R. SKVORTSOV, G. A. SPITZER-NEUMANN, E. STEPANOVA, Z. G. SVETLOVA, G. M. SY, W. P.

TARAT, F. YA. TERESHCHENKO, L. YA. THOMAS, V. TSIKLIS, D. S.

USHER, F. L.

VOSPER, A. J.

WALFISZ, A. WEISS, R. F. WILKINSON, G. WILSON, R. H. WINKLER, L. W.

YEN, L. O.

ZECHENTMAYER, K. ZEPTER, H.

ZUBOV, V. V.

338, 340, 341, 344, 345, 347, 348 154, 155, 249, 250 228 305 339, 346, 349 166, 179, 182 337 12, 235 302-304 302-304 274, 275, 306-308 337 263, 331 338, 340, 341, 344, 345, 347, 349 257 21, 22, 25, 26 312, 313, 326, 327 11, 234 262 167, 170, 181, 219, 259

276-280, 309 9, 47-50, 52-63, 65, 68, 71, 73, 75, 83, 85, 87, 91, 92, 98, 101, 106, 108, 111, 137 302-304