Books section



ENSURING MEASUREMENT ACCURACY: VOLUME 1 AND 2 (ITC series NOM, Preoceedings IMEKO, Technical Committee Conference and Courses). Edited, by **T. Kemeny and K. Harvilla,** Published by IMEKO Secretariat and OMIK (1984). Total 647 pages.

The international measurement confederation IMEKO has the main objective to promote international exchange of scientific and technical information relating to measurement science and technology. In addition to conducting triennial world congress, technical committees organise training courses. A training program on metrology was arranged in Austrian Research Centre, Seiberstoff during 1984. These two volumes are the record of the lectures delivered during the inter regional training course on Metrology.

Both volumes indicate that an earnest endeavour has been made to cover all the aspects of the subjects chosen as complete as possible by the various lecturers. Volume 1 deals mainly with general metrology and radiation standards. Volume 2 is devoted to physical measurements and metrology.

In general metrology, the lecturs are developed in such a manner, that even a novice to the topic understands the importance of various aspects of metrology. Organisational details of various bodies like NPL, OIML, BIPM are given with special mention of national system for ensuring measurement tracebility and the legal aspects of metrology. These topics clearly bring out, the various tests any Industrial or Research establishement should perform and precautions to be taken in order to conform to the uniformity of measurement in the national and international level. These chapters form good reference material for scientists working in standardisation laboratories in Industrial organisations.

The second major portion of volume 1 is devoted to standardisation of Radiation Measurements. A detailed description of various instruments used for measurement of radiation, the radiation protection and need for standardisation are presented by various experts. The importance of radiation dosimentry and the use of correct instruments and designs for radiation bunks are clearly discussed. The place devoted to enumerate the methods, standards, protection and safety clearly indicates the importance of measurement. Radiation dosimetry occupies the key position as the methodologies are important in day to day safe operation of instruments in the life saving endeavours.

Volume 2 deals with measurement of physical parameters. The topics covered range from dimensional metrology to materials metrology, electrical and frequency standards.

The length and mass standards are discussed with reference to other standards in the world in the first two chapters. In the next two chapters, the authors effectively bring out the importance of force and hardness measurements. The various force and hardness measurement methods are discussed in an elaborate manner with the expected accuracy values for modern technology Shi Changyan has discussed in detail the different methods adopted for the realisation of standard hardness scales and for their dessemination to Industrial hardness testing machines by means of standard hardness block. These two chapters form very good reference material.

Temperature and heat flow play an important role in nature. In the measurement of tempe-

rature and heat flow, the basis of accuracy and uniformity is essential. The method, the new international practical temperature scale are well discussed by T Kovacs.

Lewisch discusses pressure mesurement in a clear manner with reference to specific examples like Tyre pressure gauge and Sphygmanometer and discusses the need for revision of OIML for technical requirement of these instruments. Boloni touches upon the need of pressure standards for the verification and calibration of pressure gauges. Prominent matering devices are described in the chapter on volume and flow measurement of gas. Only instruments with practical applications are discussed.

The importance of maintaining the units of basic electrical quantities is clearly brought out by Gottfried Slanar. The interconnection between various units and how new physical phenomena have changed the picture of derivation of basic electrical units is clearly brought out in this chapter. How the important phenomenon/Josephson effect' has been utilised in deriving additional accuracy in the measurement of volt has been discussed well. The last topic covered is an other important field in metrology, the measurement of time and frequency. Compared with other physical quantities, time and frequency can be measured with greater accuracies. This chapter is very informative.

The two volumes contain bibliography at the end of each topic. Line sketches, tables, graphs and photographs are given where ever needed. It forms a good reference book for workers in the field of instrumentation, metrology and engineering.

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TOPICS IN ORGANIC ELECTROCHEMISTRY, Edited by **Albert J. Fry and Wayne E. Britton**, Published by Plenum Press (1986)

Topics in organic electrochemistry aims to highlight a few areas in this vast field which has emerged as a result of the great strides in instrumentation and the commercial avilability of good electrochemical equipments. It also introduces the chemist in general to the advantages of using electrochemical technique and the joy of studying electrochemical phenomena. Vernon D. Parker deals with the very important topic of studying reaction mechanism using electrochemical techniques. After a brief introduction to the principles underlying elucidation of reaction mechanisms, use of specific analytical techniques such as cyclic voltammetry are described. A section on the use of theoretical working curves to analyse reaction pathways is followed by the description of the reaction order approach. The highlight of this article is the final section where case histories are discussed illustrating the combined use of the techniques described earlier.

Kotz has done an admirable job in summarising the work done in transition metal organic metallic electrochemistry. Understandably a considerable amount of space has been devoted to the electrochemistry of cyclopenta dienyl complexes. The section on electrochemically induced reactions is most welcome and gives the reader a glimps of the wealth of reactions accessible through electrochemistry.

Fox has given a good introduction to the subject of organic photoelectrochemistry. The reason for the prepondarance of photoelectrochemical oxidation over reductions is explained. Details of oxidation of a few organc functional groups using this technique is given.

The electrochemistry of some specific systems are described by Fry and Britton in chapters one and five respectively. These might make good reading for those interested in these and related systems.

The last chapter on modified electrodes introduces the reader to yet another upcoming field in organic electrochemistry. The advantages of working with modified electrodes in photoelectrochemistry or electroorganic synthesis are enormous. These have been ably broughtout by Fujihira.

There are certainly other topics which one would have liked to see in such a book but what has been covered has been done well. We have no hesitation in recommending this book for all libraries and to anyone who needs an introduction to the topics covered by it.

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COMPUTATIONAL METHODS OF THE DETERMINATION OF FORMATION CONSTANTS:

By **David J. Leggett** in Modern Inorganic Chemistry, Series; ed. **John P. Fackler Jr.** Published by Plenum Press (1985) 478 pages

Inorganic metal complexes have been studied over a century. The early complexes were all separated in pure form and their properties and bonding have been studied. When a series of complexes are formed between a metal and a ligand, the resulting reaction product is an equilibrium mixture of more than one complex species. In most of these cases, saparation of individual complex is not a feasibility. However these different species have not only been identified but also some of their properties like the formation constant, spectral properties like wave length of maximum absorption and extinction coefficient at this wavelength have been calculated, thanks to the development of model of complex equilibria and elaborate graphical computation methods by Bjerrum and the refinements brought in by Rossotti, Rossotti and Sillen. Experiments needed are elaborate and computations are also time consuming.

Many a field using elaborate and time consuming methods of data processing have eagerly taken to the advances and refinements made in computers and computer softwear. Solution equilibria studies did not lag behind. The pioneer of the solution equilibria studies, Lars Gunnar Sillen, was the first (in 1961) to give a general computer programme for evaluation of formal constants from equilibrium data. Many programs have followed from several independent research groups since then.

Twentyfive years is sufficiently long time to take stock of the developments. This volume brings together and discuss programmes that span the life time of computer assisted determination of formation constants. Programs that are derived from LETAGROP (1961) and GAUSS - G/SCOGS (1962) families to newer members of SCOGS lineage and also the on going MINIQUAD series find a place in this book.

This book has 9 (Nine) chapters and the headings can give an idea of the coverage of the book. After an overview of the computational methods for data processing given by the editor, Josef Havel and Milan Meloun discuss stategies for solution equilibria studies with specific references to spectrophotometry. `MAGEC' a programe for the definite calibration of the glass electrode' by Peter M. May and David R. Williams SCOGS 2: a nonliner leastsquare programme for the evaluation of formation constants of metal complexes by D.D. Perrin and H. Stunzi and MINIQUAD and MIQUV: two approaches to computation of formation from Potentiometric data' by Alberto Vacca and Antonio Sabatini cover the studies using potentiometry. `SQUAD Stability Quotients from absorbance data' by David J. Leggert, `General computer programme for the determination of formation constants from various types of data' by Josef Hawel and Milan Meloun and PSEQUAD; a comprehensive programme for the evaluation of Potentiometric and or spectrophotometric equilibrium data using analytical derivatives' by C. Zekany and I Nagypal cover the other computational methods. The last chapter by Alex Avdeef is titled `STBLTY; Methods for construction and refinement of equilibrium methods'.

Different methods of study, data collection, programme and computation are discussed. Typical input data are also provided. A number of well tested programmes given here would be of great practical use; so this book would be very useful to research worker studying solution equilibria either by potentiometry and / or spectrophotometry and it should find a place in all good Scientific Libraries.

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VITREOUS ENAMELLING - A Guide to Enamelling Practice, K.A. Maskall and D. White, Pergamon Press. (1986) 112 pages

This book is a publication in the Pergamon Materials Engineering Practice Series and like other titles in the series, this also has been written with a view to provide all that necessary background that the practicing enamel engineer need to know. The subject of enamelling has been presented in 8 chapteres titled Introduction, Frits-Composition and Properties, Preparation of Frits, Metals for Enamelling, Preparation of Metals, Application and fussing of enamel, Enamelling reactions and new developments. The whole presentation is completed in about a hundred pages. As mentioned in the forward, this book is to serve the practicing engineer to obtain an overall understanding of the process or the layman to get an idea of the scope of the subject. In this respect the book is an excellent one. But a serious reader finds the

coverage rather superficial and lacking in depth. The list of references given at the end of each chapter comes in handly for such a reader. Chapter 2 and 3 on Frits is covered excellently while chapter 4 on metals for enamelling is woefully inadequate. Other chapters seem to perform the task very elegantly. There would have been added value to the book if a section had been devoted to testing, quality control and types of defects in enamel finishes. The book is a good addition to Engineering libraries and is a good source book for any one wishing to obtain a basic understanding of the Vitreous Enamelling Process.

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LECTURE NOTES IN CHEMISTRY: VOL. 39: ELECTROCHEMISTRY ON LIQUID/LIQUID INTERFACE by **P. Vanynek** Springer - Verlag, Heidelberg (1985) 106 pages.

The series " Lecture Notes in chemistry " Published by Springer Verlag aims to report new developments in chemical research and teaching at advanced level. This series include preliminary drafts of orginal papers and monographs, seminar work outs, lectures on a new field, or new angle on a classical field, reports of meetings of exceptional interest etc. The publication is intended to serve international community by compiling recent advances in chemistry in the fields of current interest in a quick and informal way.

Current volume is the 35th volume and deals with studies on liquid/liquid interfaces. Electrochemical studies on Interfaces between two Immiscible Electrolyte solutions (ITIMES) is attracting more and more attention during recent years. The motivation for study of liquid/liquid interfaces is both of theoretical and practical interest. A charge transfer across ITIMES has an important role in nature and in applications designed by man. The suggested applications of this field are in the studies of: Ion transfer process across the biological membranes; behaviour of Ion Selectie Electrodes with liquid membranes and similar sensors; extraction processes; phase transfer catalysis; electroanalytical techniques.

The earlier investigations in this field consisted of the study of equilibrium potential diference between water and nonaqeous media in the presence of different electrolytes. Studies on the effect of passing electric current across the liquid/liquid interface, polarization studies, properties of liquid/liquid interfacial double layer, electroadsorption,. mechanical Interfacial movment came later. Chronopotantiometry, polarography, cyclic voltammetry, impedance measurement are some of the important experimental techniques used in these studies.

After the first introductory chapter giving brief history and current status of the field, the theory, experimental techniquees double layer studies, polarization aspects are discussed in subsequent chapters. The analytical aspect of L/L electrochemistry of biologically important molecules is detailed in the chapter "mediated properties". The last two chapters are on Impedance measruements and phase transfer catalysis.

The book is well produced and is an excellent review on the subject. It will serve as a reference book to those starting work in this field or who is actively engaged in research. The exhaustive list of references has enhanced the usefulness of this booklet. This book can be very useful to a library cataering tc electrochemistry,

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OFFICIAL METHODS OF ANALYSIS OF THE ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS, Edited by **Sidney Williams,** (Forteenth Edition). Publised by the Association of official Analytical Chemists, INC, 1111, North Nineteenth Street, Sutte 210, Arlongton, Virginia 22209 U.S.A. (1984) 1141 pages

Association of official Analytical chemists, (AOAC) USA, is an independent international association engaged in methods of analysis for foods, drugs, feeds, fertilizers, pesticides, water, sugar products, cosmetics, forensic materials etc. AOAC coordinates the development, testing and validation of these methods. It requires an interlaboratory collabirative study before the method can be approved as official. Eligible organisations vote for the approval of the methods and then the approved methods are published in Official Methods of Analysis.

Chemists, Microbiologists and other scientists in government, industry, university, R & D

Organisations depend on official methods of analysis of the AOAC. The reliability and uniformity of each AOAC analytical method has been demonstrated by thorough testing in interlaboratory collaborative studies, including international organizations like ISO (International Organisation for Standardization), IDF (International Dairy Federation) and CIPAC (Collaborative International Pesticides Analytical Council)

Such a large compendium includes methods of analysis of agricultural limiting materials, fertilizers, disinfectants, hazardous substances, pesticide formulation, animal feed, beverages cocoa, tea, coffee, dairy products, eggs, fish, flavours, food additives, fruits, meat, nuts & nut products, oils & fats, spices, condiments, colour additives, Water, sugar cosmetics, drugs, including illicit drugs, vitamines, miscellaneous materials etc. The methods include forensic science, microbiological, microchemical etc. Detection & radioactive toxicology etc are also included. This publication contains more than 1700 methods. The method describes step by step use of reagents and apparatus. With a view to accomodating capabilities of various laboratories, alternative methods are often provided. This publication is revised every five years and is supplemented between editions by four annual updates which are included in the original price.

In this edition (14th) new techniques have been included. Liquid chromotography, inductively coupled plasma emission spectroscopy and hydrophobic grid membrane filter have been added. In addition a number of new methods have been added in some chapters, same methods have been shifted form one chapter to the other and rearranged. The publishers hope to get the data on computer tape in the near future to avoid corrections.

In this publication a good reference at the end of each method, descriptive titles, enlarged index, and chemical and common names of drugs and pesticides are included. In one volume, this publication contains methods of analysis of a variety of materials. This voulme is very useful to research as well as industrial and public analytical laboratories and should find a place in all libraries catering to developmental work in fields like organic, inorganic, pharmaceutical, food, pesticide, etc for guidance and reference.

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CRYSTAL GROWTH PROCESSES, by **J.C. Brice** Blackis and Son Limited, Glasgow and distributed in U.S.A. by Halsted Press (1986) 298 pages.

This book has covered most of the large scale methods for Crystal Growth, in a relatively small volume. The chapter on basic concepts is very well written and covers general aspects of solids, phase diagrams, kinetics of Crystal Growth and a General approach to the problem of Crystal Growth. Each important process of Crystal Growth has been described in detail, covering both theory and practice. The few common basic principles involved in an apparently diverse procedures has been brought out. The text is profusely, illustrated with data from standard sources, including patents. The concluding chapter on selection and optimisation methods emphasizes the compromises between user and grower. Research workers in various fields, with practically no prior knowledge of crystal Growth techniques will find the book a very useful source on all current large-scale crystal growth methods.

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