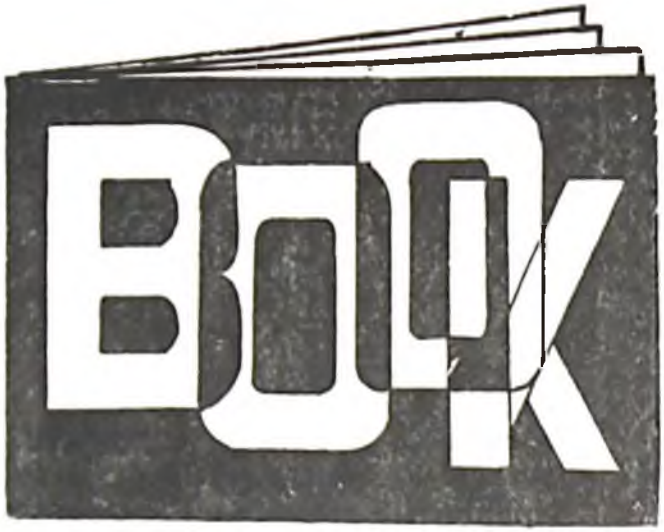


SECTION

BOOK REVIEWS

THE INTERPRETATION OF IONIC CONDUCTIVITY IN LIQUIDS

By Stuart I. Smedley, Plenum Press New York and London (1980) 195 pages

Solution electrochemistry was a field of intense activity during the first three decades of this century. This culminated in the Debye-Huckel Theory and onsager's treatment of conductance of electrolytes. These theories explained the behaviour of electrolytes quite elegantly at very low concentrations but failed miserably at medium and higher concentrations. It appears as if a feeling of exhaustion has overtaken the field and work on solutions electrochemistry went into the back ground for some time.

Interest has however been revived in the field again because new tools have become available to study the solutions. There is a new spurt of activity in solutions electrochemistry as can be seen from the number of books and monographs published during the last decade.

Conductance of different types of electrolytic solutions-conductance of concentrated solution in aqueous and nonaqueous solutions and ionic melts-are of great mportance to the technologist and a challenge to the theoritical chemist. The reports on these are spread widely. Here is an attempt to bring together in one monograph, the important features and interpretation of the phenomenon on relatively simple systems.

This book deals with ionic conductivity in dilute solutions, ionic conductivity in low temperature molten salts and concentrated solutions, electrical conductivity in ionic liquids at high temperatures, ionic conductivity in molecular liquids and partially ionized molten salts, and electrical conductivity in liquids of geological and industrial interest.

These topics were not available under one cover until now and the author has presented good amount of published data in the form of tables and graphs reproduced from original research publications. The book would hence be most useful to research workers in the field.

S. K. VIJAYALAKSHAMMA
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BIOELECTROCHEMISTRY

Proceedings of the U S.—Australia Joint Seminar on Bioelectrochemistry held in Pasadena, California during July 9-12 1979: *Edited by Hendrik Keyzer and Felix Gutmann, Plenum Press, New York and London* (1910) 434 *pages.*

The frontier of Electrochemistry and Biochemistry is an actively studied field. With the development

of highly sophisticated apparatus, new techniques and skills, Bioelectrochemistry is coming into its own, and has made most exciting scientific breakthrough. Bioelectrochemistry conferences, journals and texts are beginning to proliferate and to attract resarchers and scholars. So it is quite apt that U.S.-Australia co-operative science programme has sponsored a joint seminar and attracted leading and active workers-both pioneers and promising young workers-of the two countries and a limited number of workers from other countries.

The proceedings are presented in 3 sections. The first section (consisting of 7 papers) deals with Bioelectrochemistry of energy transduction and deal with transduction of light energy. The second section (consisting of 5 papers) deals with Biological charge transfer. One of the articles deal with electrochemical study of Drug interactions. The last ar icle of this series-Bioelectrochemistry, the living state and electronic conduction in proteins-is authored by Szent Gyorgi. The last section (of 5 papers) deals with biological interfaces and transport. Each of the papers ends in a long list of references End of each section records the long discussions that ensued. Biodata of the participating scientists form the last part of the book.

The editors must be congratulated for the fine Book they have brought out and this would be quite useful to a reference worker in the field and is a useful addition to any scientific library.

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IONIC HYDRATION IN CHEMISTRY AND BIOPHYSICS : *By B. E. Conway, Elsevier Scientific Company (1981) 774 Pages*

The subject of ionic hydration plays a major role in different fields of physical and inorganic chemistry. It is involved in chemical and electrochemical processes, their energetics, equilibria, mechanisms, structure and interactions in the double layer at the electrolyte, colloid and membrane interfaces. Aqueous solutions are basic for life process. For some years the importance of the role of ionic and nonelectrolyte hydration in biochemical and biophysical process has been recognized. Thus a close study of ion hydration in different situations is of basic importance.

Ionic hydration can be examined from different angles and here is a comprehensive and uptodate coverage of the various aspects of ionic hydration. The last part of the book covers aspects of interest to biochemists.

The book consists of 34 chapters. The first few chapters deal with the elements of solvation, with a special reference to hydration. Chapter 6 introduces to the methods of study of solvation. Optical methods are discussed in three following chapters (Ir in ch 7, Raman in Ch 8 and magnetic resonance in ch 9).

Effects of hydration form the subject matter of next 10 chapters. Energetics of ion hydration and other processes in solution in chapter 11, solvation energy and surface potential in chapter 12, solvation effects in electrode process and homogeneous solution in chapter 13 ionic hydration, and dielectric behaviour of solution in chapter 14, ionic hydration energies in chapter 15, hydration of individual ions and specific ion-solvent interaction in chapter 16, hydration of proton in chapter 17, hydration effects in the concentration dependence of thermodynamic properties of electrolytic solution in chapter 18 and ion pairing and ionic hydration in chapter 19.

Chapter 20 deals with salting-out and slating in by electrolytic solution. Next 10 chapters deal with different aspects of solvation (steric effects in solvation in chapter 21, entropies in chapter 22, solute-solvent structure factors in chapter 23, hydrophobic interaction in chapter 24, electrostriction, partial molal volume and compressibility in chapter 25, isotopic effects in chapter 26, dynamic nature of solute–solvent interaction in chapter 27, solution and conductance in chapter 28. Chapter 29 discusses hydration numbers ; chapter 30 treats ionic solvation as acid-base interaction). After examining aqueous electrolytic solution for about 600 pages, chapter 31 runs for 6 pages and treats solvation in non aqueous media. The last 3 chapters deal with aspects of hydration that are of interest to biochemistry. Chapter 32 is an introduction to the application of the ideas dealt with in the preceeding pages ; chapter 33 deals with hydrated ions in active transport processes at cell membrane ; chapter 34 deals with hydration of polyions of synthetic and biological origin.

The book is comprehensive in its treatment. It treats tne subject from the basics. After a small introduction of 4 pages, the book starts with the basic in solvation, the structure of water molecule (chapter 2) liquid water (chapter 3) ionic radit determined from different techniques (chapter 4) and ionic solvation in gas phase (in chapter 5). Chapter 10 introduces the reader to basic electrostatics.

The book is a comprehensive account of solvation of ions or rather more specifically hydrated ion. It discusses different models proposed' its assumptions, and implications. This book is most useful to a student at an advanced level and research worker in the field.

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INTERNATIONAL MINERALS/METALS REVIEW *Second Edition McGraw-Hill Publications Company* The first annual edition of International Minerals/ Metals Review was reviewed in the January issue of 1980 of this Journal.

The present publication is an enlarged edition covering later part of 1979 and early 1980. While the first edition covered only 18 key countries the present edition covers 26 countries around the world. A new feature is the classification under different geographical areas. However data relating to India is lacking.

As in the previous edition the publishers have included fairly authoritative and exhaustive information on mineral resources metal production and related statistics. Considerable effort has been put in to collect the relevant statistics mostly through reports prepared by U. S. Embassy attaches and other reliable sources. However the publishers assume no legal responsibility for the accuracy of data.

At a glance one can obtain very valuable information on the mineral and metal production and growth of metallurgical industries in various countries.

The publication will be a very useful addition to any scientific library.

J. BALACHANDRA

CHEMISORPTION OF GASES ON METALS: *By F. C. Tomkins, Academic Press Inc. (London) Ltd.* 1978 *pp. xii-370 Price* £ 16.80/$ 34.75.

This book on 'Chemisorption of gases on metals' by Prof. F. C. Tomkins is aimed at providing an up-to-date information on the subject. It contains 27 chapters. First nine chapters deal with the thermodynamics and statistical thermodynamics of chemisorption and the kinetics of adsorption and desorption process. The next five chapters (Ch. 10-14) describe free electron theory of metals, electronic properties of metal surfaces and perturbation of surface electronic properties by chemisorption. Chapters 15-26 describe experimental tecniques used in the study of chemisorption. The techniques discussed are: Low energy electron diffraction (LEED), infra red spetra, field emission and field ion microscopy, electron microscopy (Auger, UV. X-ray photoelectron), ion neutralization and energy loss spectroscopy and appearance potential spetroscopy. The principles, experimental details and the application of each technique to the study of chemisorption have been discussed in the individual chapters. A brief account of modern theories of chemisorption and their relevance to electron spectroscopic results is given in chapter 26. The last chapter gives the present status of knowledge on chemisorption of CO, H_2 and N_2 to tungsten surface. On the whole the author has been successful in presenting a comprehensive account of chemisorption of gases on metals. This book, will be useful to the graduate, post-graduate students and research scientists working in the area of catalytic and surface properties of metals.

K. C. PATIL