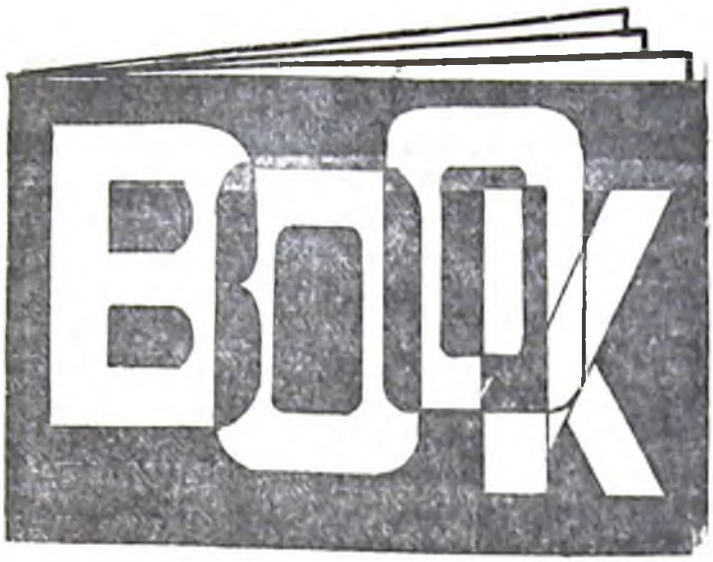


SECTION

BOOK RVIEWS

Trends in Electrochemistry : 1977, edited by J.O'm Bockris, D. A. J. Rand & B. J. Welch, published by Plenum Press, 227, West 17th Street, New York 10011, 408 Pages, S 42.00

This volume presents the edited proceedings of the fourth Australian Conference on Electrochemistry held in February 1976 at the Flinders University with the theme: Electrochemistry for a Future Society. There is an urgent need for minimising pollution and maximising the efficient utilisation of all available energy sources, and the Conference dealt with all aspects of Electrochemistry which may underlie parts of the new technology for the future state of affairs.

The volume opens up with the thought—provoking chapter on the Electrochemistry for a future society by Bockris. The second chapter, which covered the Bruno-Breyer Memorial Lecture by Bacon, deals with the development and practical application of fuel cells. Then comes the most important chapter on Electrochemistry and energy developments wherein five comprehensive articles are presented on such topics as electrochemistry in the solar economy (by A.J. Appleby) completing pathways towards large scale hydrogen production (J. O'm Bockris), power sources and some basic problems in Electrocrystallisation and passivity (by H. R. Thirsk), sodium-sulphur battery research (by M. W. Breiter), and electrochemical injection of ions into non-stoichiometric electrodes (by B. C. H. Steele). This is followed by three articles on surface and allied chemistry and four articles on advances in electrochemical techniques. Minerals sulphide electrochemistry forms the subject matter of Chapter VI. The book ends with a chapter on electrochemistry and metallurgy; this is also an excellent chapter containing four papers: Corrosion (by E. C. Potter) The effect of Oxide Films on cementation reactions (by G. A. Hope), I. M. Ritchie and J. E. Wajon), Electrowinning copper from chloride solutions (by K. J. Cathro) and improvements to the Hall-Heroult process for aluminium electrowinning (by K. Grjotheim, C. Krohn and H.Oye).

There is no doubt about the timeliness of this publication. The articles are all excellently presented and up to date. Indeed it is bound to impress anyone who cares to persue it.

—Prof· K. I. Vasu

2: Physical Chemistry: Enriching Topics from Colloid and Surface Chemistry, 1975 edited by H. Vow Olphen and Karol J. Mysels, published by Theorex, 8327 La Jolla Scenic Drive, California 92037,404 pages S6.50 for teachers & S7.50 for others.

Colloid and Surface Chemistry plays a key role in air and water pollution abatement technology, in the mineral processing techniques and in many areas of biological and medical sciences: in fact, a recent ECSI-IPM Conference on Surface Chemistry and Mineral Processing (April 1977) evoked a keen interest amongst chemical, geological, mining and metallurgical engineers. In addition to the technological importance, surface chemistry has its own inherent basic scientific importance.

It is therefore commendable that the IUPAC Commission on Colloids and Surface Chemistry felt that the most realistic and practical way to promote wider attention to the field would be to present a collection of essays and laboratory experiments in colloid and chemistry to serve as interesting and enriching surface illustrations of the principles and concepts of physical chemistry, especially those leaning heavily on electrochemistry.

Beginning with an Introductory chapter, the book has the following sections; Molecular and Atomic Interactions, Structure of Solutions, Kinetics, Thermodynamics and Steady State Transport Processes, and the book ends with an appendix containing Evaluated Refereance Data Compilations, some Educational Articles in periodicals and Educational films and Loops. Altogether it is an excellent exposition of the theory and practical of the colloid and surface sciences. Modesty has compelled the editors to say that this is not an unified and balanced text book. The reviewer feels that it is much more than that, and not only physical chemists, but also other scientists and engineers will find enough useful material for their satisfaction—that too available at such a low price! The book forms an essential reading material for the specialist and the non-specialist alike.

—**Dr K. Elayaperumal,**
(BARC, BOMBAY)

3. **Electroanalytical Chemistry**: Vol. 10, 1977, Edited by Allen J.Bard, published by Marcel Dekker, In, 270, Madison Avenue, New York 10061, 320 pages, illustrated, $29.75.

This volume in the outstanding series on modern developments electroanalytical chemistry provides authoritative reviews on two important topics, one on the Techniques of Electrogenerated Chemiluminescence written by L.R. Faulkner and A. J. Bard and the other on Electron Spin Resonance and Electrochemistry by T.M. McKinney. The first is a short chapter written lucidly on an important area of current research and deals with all aspects of electron-transfer chemiluminescence—electrode reactions, transient techniques, steady state methods, magnetic field effects and interception techniques. The second chapter beings with a description of the ESR spectrometer and deals with the interpretation of ESR spectra and the generation of free redicals by electrochemical methods. It is an exhaustive and timely review on the topic.

There is a feeling of contentedness in reading the articles—experimental details are always given with the necessary theoritical considerations. All major libraries will be richer by the possession of this important volume.

—**Dr G. Prem Kumar**
(Comminco-Binani Zink Ltd).

4. **Flotation**, Volume 1 and 2, 1976, Proceedings of the A. M. Gaudin Memorial Flotation Symposium, edited by F. C. Fuerstenau, published by Americal Institute of Mining. Metallurgical and Petroleum Engineers Inc., New York, Vol.1 with index) 621 + 15 pages ; Vol.2 (with index) pages 625 to 1341 + 15,S

Flotation is one field where wonderful strides have been made in every phase of the field—fundamental aspects, kinetics, cell designs, circuits, operating controls (including X-ray analysis and Computer Control) and Plant practice. The Americal Institute of Mining, Metallurgical and Petroleum Engineers is therefore to be congratulated for holding the Second Symposium on Flotation. The editor has done an extra-ordinarily superb job of bringing out the proceedings of the Symposium in these two volumes in such a way that the book can be used as a text book for students as well as for reference by practicing flotation engineers and scientists.

The book begins with two lectures on the life and contributions of Antoine M. Gaudin. The second section presents six papers on fundamentals of non-metallic flotation; of these, the articles on "Some aspect of the Thermodynamics of Flotation", and "Flotation of Salt-type Minerals" are excellent expositions of the theory of flotation.

The fundamentals of sulfide flotation are covered in eight papers in Section 3. The articles on (a) Electrochemistry of Sulfide Flotation by Woods, (b) Electrokinetic Studies on Metal Sulfides and (3) The Chemistry of Activators, Deactivators and Depression in the Flotation of Zinc Sulfide are excellent ones. This section along with Section 4 on Flotation, Fundamentals forms a good reading material for any one who ventures into the field of flotation.

The second volume is perhaps what a practicing engineer would like most. It deals with a) Kinetics and Cell Design (Section 5 with 7 papers), b) Circuits and Operating Controls (Section 6with 5 papers) c) Plant Practice—Sulphide Minerals (Section 7 with 6 papers on copper concentrators and C Section 8 with 4 papers on Copper-Molybdenum-Lead-Zinc-Mineral Production) (d) Plant Practice-Non-metallic Minerals (Section 9, 3 papers), and (e) Environmental Considerations (Section 10).

The reviewer feels that the value of such an important Symposium Compilation would have been enhanced considerably if a discussion section has been included at the end of each paper and if the same units are uniformly used in all the articles, the latter point is important if we consider these as text books for the students.

There is no doubt that these valumes are excellently brought out in bound form and will go a long wayin

helping all those engaged in teaching and research as well as the practicing engineers. The book has clearly brought out the important role that electrochemistry plays in flotation processes.

—Dr Y. V. R. K. Prasad.
(IISc Bangalore)

5. Theory of Metal Oxidation, Volume I Fundamentals, 1976 by A. T. Fromhold Jr.. Published by North Holland Publishing Company, Amesterdam, New York and Oxfort, S. 67.50

In this book, Prof. Fromhold an outstanding Researcher in the field of Metal Oxidation presents a scholarly account of the theory of Metal Oxidation. The entire subject matter is based on a new approch to the integration of coupled transport equations which will be of great value for both the theoretical and experimental workers in this field.

The book contains twelve chapters divided into four parts. The part-I comprising 1 to 6 chapters is devoted to the fundamentals of metal oxidation theory, covering the relevant thermodynamic and transport properties of defect oxides, formulation and application steady state methods and the theories on metal oxidation.

Chapters 7, 8 and 9 constitute part II and the Chapter 7 is considered to be the focal point of the entire book for it is in this chapter the steady-state coupled currents approach is developed in greater detail and the basic theory presented in earlier chapters is interpreted in the light of steady-state coupled currents approach. The scope and applications of the author's new method if fully demonstrated in this chapter.

Chapters 10 and 11 grouped as Part-III present complete evaluations of the growth of the oxide layer, where the electron transport is covered by electron tunneling and by the thermoinic emission respectively. These chapters are self-consistant in that they can be read independently without much extensive reference to the earlier chapters. The universal growth laws, universal curves and universal tables for various limiting cases presented in these chapters should be of great value for experimentalists in treating new data.

Finally the Part-IV containing only one Chapter-Chapter 12-highlights a numerical evaluation of growth kinetics by ionic and electron transport mechanisms including the space charge effects. The effect of space charge in modifying the growth behaviour is very lucidly presented in this chapter.

Thus Prof. Fromhold in the first volume expounds a comprehensive account on the theory of metal oxidation in a very lucid and logical fashion, The treatise will be of great value for students interested to acquire a sound knowledge on metal oxidation. theoretical and experimental researchers in metal oxidation and materials scientist who are primarily interested in developing high temperature corrosion resistance alloys. The treatise therefore should find a place in all the libraries throughout the World.

—Dr G. N. K. Iyengar
(IISc., Bangalore)

6. Symposium on Lead and Zinc Batteries: 272 pages Price Rs. 100/—Edited Proceedings of the Symposium organised in New Delhi,, Dec.74 by the Indian Lead Zinc Information Centre, No.7 Shopping Centre, Block B-6, Safdarjung Enclave, New Delhi-110011

The Symposium on Lead and Zinc Batteries was arranged during 10th and 11th December 1974 to coincide lead Power 74 celebrations and made valuable contribu tions. In six technical session twenty one technical papers werepresented.

The first session was on processes and techniques wherein four papers were presented on lead batteries. The second session was devoted to electric vehicles with five contributed papers. The development and future prospects of such power source to meet the energy crisis have been discussed.

The future of the battery industry was the theme of the third session discussion the likely future developments in the manufacturing field. Research and developmental work in the battery performance and mechanism was covered in the fourth session in five papers. Reclamation of leadscrap and its utilisation which is an important field of developmental work was discussed by Dr R. D. Semmens in the fifth session. The last session was devoted to the Zinc batteries with papers presented on Porous Zinc electrodes, Silver oxide zinc battery and a literature survey on Zinc batteries.

Each session has been followed by a lively discussion The dicssusion has been incorporated in the edited proceedings. The Proceedings are a valuable contribution to the current literature on lead and zinc batteries and will be an useful addition to Scientific technical libraries and to battery munufacturers as well.

—J. Balachandran
(IISc Bangalore)