

Book Reviews*

Annual Review of Materials Science. Volume 7. Edited by R. A. HUGGINS, R. H. BUBE, and R. W. ROBERTS. Annual Reviews Inc., Palo Alto, Calif. 1977. 537 pp. \$17.00 postpaid in U.S.A.

A group of 23 contributors provide 16 reviews on selected topics, under four rubrics: Structure; Preparation, Processing and Structural Changes; Properties and Phenomena; and Special Materials. Many of them are related to solid-state chemistry, coatings, or corrosion. The bibliographies are extensive, and the subject index is detailed.

Environmental Chemistry. Edited by J. O'M. BOCKRIS (Flinders University). Plenum Press, New York, N.Y. 1977. xi + 795 pp. \$49.50.

The extraordinarily productive author, Professor Bockris, has assembled a group of 18 collaborators to produce a book intended for the undergraduate student as the main user, but with some appeal to the general scientific public, and to professionals in the field. Unlike so many books composed of contributed chapters, this one has benefited from a substantial amount of interaction among the contributors, in order to avoid either repetition or serious omissions.

The topics are broad-ranging, from "Biochemical Control of Human Fertility" and "The Desalination of Water" to "Aerosol Production in the Atmosphere" and "Analytical Chemistry of Pollutants;" there are 23 chapters. Because the coverage is so broad, with topics that may be considered to be at the outer fringe of the subject, the treatment is necessarily abbreviated. Some topics are not mentioned at all, or are dismissed with the barest mention. There is no chapter on garbage disposal and its use as a source of fuel, although there is one on the chemistry of sewage purification. Coal is discussed in terms only of gasification to produce nonpolluting fuels; direct liquefaction is not mentioned.

This book represents a brave undertaking, and the result is very interesting and informative. Its use as an undergraduate textbook seems unlikely, however.

Time-Dependent Chemical Processes. By E. R. ROBINSON (Northeast London Polytechnic). Wiley/Halsted, New York, N.Y. 1975. vii + 370 pp. \$36.50.

The title of this book might lead the chemist to expect a treatment of time-dependent irreversible processes in chemistry. However, it deals mainly with chemical engineering simulation and optimization by means of computers.

Turbulence in Liquids. Edited by J. L. ZAKIN and G. K. PATTERSON. Science Press, Princeton, N.J. 1977. 366 pp. \$22.00.

This book contains the proceedings of the Fourth Biennial Symposium on the subject, held in 1975. It is primarily of interest to investigators in fluid mechanics, but two papers on the use of polarography to measure fluid flow and mass transfer have chemical interest.

Organophosphorus Chemistry. Volume 8. Edited by S. TRIPPETT (University of Leicester). The Chemical Society, London. 1977. xi + 289 pp. \$44.00.

Volumes in this series of Specialist Periodical Reports are always welcome additions and are extremely useful to those working in any area of phosphorus chemistry. The twelve chapters of this volume contain reviews (generally noncritical) of literature published between July 1975 and June 1976. Each chapter is well organized into smaller subject areas. Subject material is quite concise with typically one reference per sentence. The volume contains a complete author index but no subject index. The lack of a subject index is really no handicap because of the highly structured organization.

The twelve chapters are: Phosphines and Phosphonium Salts, (39 pp, 166 references); Quinquevalent Phosphorus Compounds (19 pp, 70 references); Halogenophosphines (21 pp, 117 references); Phosphine Oxides and Sulfides (13 pp, 72 references); Tervalent

Phosphorus Acids (18 pp, 82 references); Quinquevalent Phosphorus Acids (31 pp, 143 references); Phosphates and Phosphonates of Biochemical Interest (18 pp, 113 references); Nucleotides and Nucleic Acids (26 pp, 188 references); Ylides and Related Compounds (27 pp, 126 references); Phosphazenes (28 pp, 212 references); Photochemical, Radical and Deoxygenation Reactions (16 pp, 76 references); Physical Methods (28 pp, 229 references).

Synthetic organic chemists would find Chapter 9 useful in application of Wittig reagents. Biochemists and molecular biologists would find Chapters 7 and 8 useful in their work. Chapter 11 would be of interest to photochemists and Chapter 12 would be of interest to spectroscopists.

M. Gary Newton, *University of Georgia*

Molecular Spectroscopy. Edited by ALAN R. WEST (The British Petroleum Co. Ltd.). Heyden and Son Ltd., London. 1977. xx + 578 pp. \$60.00.

The 27 papers collected here were given at the Sixth Conference on Molecular Spectroscopy organized by The Institute of Petroleum, Hydrocarbon Research Group, and held at Durham in March/April 1976. The papers are more practical than theoretically oriented. They are grouped into the sections: Nuclear Magnetic Resonance I (instrumentation, pulse methods, low abundance nuclei, spin mapping), Nuclear Magnetic Resonance II (applications to biological problems and petroleum research), Infrared and Raman Spectroscopy (instrumentation, matrix isolated species, petroleum research), Electron Spectroscopy I (surfaces, chemical applications), Electron Spectroscopy II (photoelectron spectroscopy), Applied Spectroscopy I (gaseous molecular ions, kinetic spectroscopy of atmospheric reactions), and Applied Spectroscopy II (forensic and polymer science). The papers are generally well written and contain considerable breadth as well as detail. The collection as a whole gives a good overview of the current state of practical molecular spectroscopy. In many papers more than half the references cited are three years or less old; many 1976 references are included. An extensive subject index is provided. This book should be useful to both students and practitioners of molecular spectroscopy who wish to keep up with current developments in the field.

Richard J. Field, *University of Montana*

Trace Analysis. Spectroscopic Methods for Elements. Edited by J. D. WINEFORDNER (University of Florida). John Wiley & Sons, Inc., New York, N.Y. 1976. xii + 484 pp. \$24.95.

The book has an Introduction by J. D. Winefordner and chapters on Analytical Considerations by T. C. O'Haver; Chemical Aspects of Elemental Analysis by T. C. O'Haver; Spectroscopic Methods by J. D. Winefordner; Optical Instrumentation by R. C. Elser; Optical Atomic Spectroscopic Methods by C. Veillon; Optical Molecular Spectroscopic Methods by P. A. St. John; Fluorometric Methods for Traces of Elements by P. A. St. John; Nuclear Methods by M. L. Parsons; X-Ray Methods by M. L. Parsons; Spark Source Mass Spectrometry by R. C. Elser; Comparison of Spectroscopic Methods by J. D. Winefordner; and several appendices by J. D. Winefordner. The book is meant to be a reference source for those involved with trace analysis of elements in real samples. However, references are not numerous and not always up to date. Authors have given many tables of detection limits, sensitivities, precision, and accuracies of many methods. In some cases, there are too many; for example, tables of estimated limits of detection for neutron activation (thermal and fast) cover 43 pages of the book.

The book describes methodologies and instrumentation from a user viewpoint. Topics discussed in some detail include: sample preparation, discussion of errors, a review of the quantitative principles for each of the spectroscopic methods covered, and description of optical instrumentation.

The book may be of interest to technicians, researchers, and students involved in trace element analysis.

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* Unsigned book reviews are by the Book Review Editor.