

Book Reviews

Handbook of Polycyclic Aromatic Hydrocarbons. Edited by Alf Bjorseth. Marcel Dekker Inc., New York. 1983. ix + 744 pp. \$125.00.

The use of the word "Handbook" in the title is very misleading, for this book is not a handbook filled with tables containing the many physical and chemical properties of polycyclic aromatic hydrocarbons (PAH). This book is a state-of-the-art review of the sampling, sample handling, and sample analysis of polycyclic aromatic hydrocarbons. Each chapter is written by researchers who are authorities in their respective areas. There is a chapter discussing the physical and chemical properties of PAH's; however, information regarding the physical properties of PAH compounds is rather scant. There is also a surprising lack of thermodynamic data.

The chapters are for the most part very well written and well documented, containing 1931 references. The book contains a wealth of information and is invaluable to anyone interested in analyzing PAH in the environment using modern chromatographic, spectroscopic, and chemical techniques. Unfortunately, much of this valuable information is poorly indexed and difficult to find without reading through the text.

S. W. Cowley, *Colorado School of Mines*

Extended Linear Chain Compounds. Volume 3. Edited by J. S. Miller. Plenum Press, New York and London. 1983. xvii + 561 pp. \$55.00.

This third volume of a series—characteristically for this field—offers a side-by-side review of such diverse areas of research as electrochemical synthesis of conducting polymers and solid-state physics of $Hg_{3-4}AsF_6$ compounds or ferromagnetism and inorganic synthesis of chain compounds. As is apparent from the result, a large degree of freedom has been given to the authors to cover their fields of expertise, resulting in some overlaps. Most of the reviews blend well a theoretical background into their descriptive accounts. The overall outcome is very good: this series has become a valuable authoritative reference in this interdisciplinary field.

Miklos Kertesz, *Georgetown University*

New Comprehensive Biochemistry. Volume 6. The Chemistry of Enzyme Action. Series Editors A. Neuberger and L. L. M. Van Deenen. Volume Editor M. I. Page (The Polytechnic, Huddersfield). Elsevier Scientific Publishers, Amsterdam and New York. 1983. xiv + 568 pp. \$69.00.

This multiauthored treatise on chemical aspects of enzyme action is a component of "New Comprehensive Biochemistry", an idea resurrected from the 1960's when Elsevier published a series of volumes spanning many aspects of biochemistry. This book contains 15 chapters, individually written by authorities in the respective fields. The first third of the book deals with detailed considerations of the thermodynamics of enzyme catalysis, enzyme kinetics, isotope effects, and review of aspects of physical organic chemistry that may pertain to enzyme catalysis. The subject matter then progresses to specific examples of enzyme systems (reactions involving imine formation, pyridoxal phosphate-, folate-, and vitamin B_{12} -dependent reactions, and glycosyl transfer). Finally the book closes with three comprehensive chapters on reactions in micelles and on cyclodextrins and crown ethers as enzyme models.

The strength of the book is in its rigorous treatment of the topics chosen. The detailed general and theoretical considerations of the energetics of enzyme-substrate interactions are clear and a welcome addition to the literature on enzyme mechanisms. On the other hand, I find much of the book to be seriously dated, both in subject matter and in the literature that has been reviewed. For example, there is a 73-p chapter on free-energy correlations, Brønsted and Hammett relationships, Swain-Scott equations, and the like, certainly topics fundamental to physical organic chemistry but of limited applicability to the experimental enzymologist these days. This is to be contrasted with the scant attention that is given to the nature of enzymes as proteins: their active sites and the role of protein conformational transitions in enzymatic catalysis. There is a large chapter on mechanisms of pyridoxal phosphate-dependent enzymes, but it omits any mention of glycogen phosphorylase, a prominent enzyme that accounts for over one-half of the pyridoxal in the animal body. There is no consideration at all of major classes of enzyme reactions such as the phosphotransferases and synthetases, and therefore no discussion of recent developments in the study of their mechanisms such as NMR, positional isotope exchange, stereochemistry of phosphoryl transfer, and so forth. While the last three chapters contain more comprehensive reviews of the recent literature, this cannot be said of the remainder of the book. In the first 12 chapters, only 33% of

the 1215 references cited are later than 1975, and almost none are from the 1980's. The chapter on enzyme kinetics seems to be particularly dated, with a literature review that overlooks many important recent developments and instructive examples.

It is likely that this book may be of considerable value to students of chemical and thermodynamic aspects of enzymology and enzyme models, but I have the clear impression that it would have been a more appropriate contribution to Elsevier's original "Comprehensive Biochemistry" series of the 1960's.

William A. Bridger, *University of Alberta*

Quantum Chemistry. By R. Daudel (Sorbonne, Paris) and G. Leroy, D. Peeters, and M. Sana (Catholic University of Louvain). John Wiley & Sons, New York, 1983. XV + 558 pp. \$97.00.

The volume is essentially a significantly transformed second edition of "Quantum Chemistry", published in 1959 by R. Daudel, R. Lefebvre, and C. Moses. It is divided into three main sections: I. General Quantum Chemistry—containing an introduction to the basic concepts of quantum chemistry and in particular electronic structure theory; II. Methods and Applications of Quantum Chemistry—devoted almost entirely to electronic structure work; III. Going Further into the Nuclear Motions—including both bound and continuum dynamics. It is intended for an audience of graduate students and research workers in physics and chemistry.

A great variety of topics have been presented in a single volume. The chapters dealing with the Practice of Quantum Chemistry Calculations and Basic Concepts (of nuclear motion) are particularly well written. It is inevitable that, in a single volume, certain significant topics are going to be overlooked or given only a very short presentation. One then finds no mention of Thomas-Fermi theory or of pseudopotentials. Also, while classical trajectory methods for the analysis of collision processes are treated relatively thoroughly, quantum procedures are barely mentioned. The weakest section of the book is undoubtedly that which introduces the basic concepts of quantum chemistry. The view in this section is, in particular, distorted by the great emphasis given to "pet themes" of Loge and Bader partitioning.

I think that many will find "Quantum Chemistry" to be a useful volume. The presentation is, on the whole, clear and comprehensive. It is adequately indexed and referenced.

Larry Eno, *Clarkson University*

Modern Aspects of Electrochemistry. No. 15. Edited by Ralph E. White and J. O'M. Bockris (Texas A&M University) and B. E. Conway (University of Ottawa). Plenum Press, New York. 1983. xii + 362 pp.

This monograph continues the series of up-to-date reviews of subject areas falling within the general purview of electrochemistry. This particular volume contains very timely articles on electrolysis, photochemical water splitting, lithium batteries, and intercalation and a chapter dealing with some of the difficult theoretical problems that arise in the analysis of electrode processes.

The coverage of some of these chapters is rather exhaustive, although some of the subtopics are more definitely covered in other monographs. I refer in particular to some of the material on hydrogen storage in rechargeable metal hydrides. This material is included in the chapter on electrolysis and appears to pad what is otherwise a thorough, well-written, and very current article. This chapter and the following one on photochemical water splitting contain a nice balance of experimental details as well as theoretical analysis. The chapter on lithium batteries is a model of clarity and organization. Although well documented, the reader can get an excellent overview of the field without running to a number of specialized journals. This chapter is also an interesting history of a particular technology.

The chapter on intercalation does not seem to belong in this monograph, and the lattice gas treatment of intercalation is not sufficiently underpinned with discussion and analysis.

The last chapter dealing with Some Fundamental Aspects of Electrode Processes is flawed by grammatical errors and obscure analysis. It is opinionated and filled with platitudes. I cite only one of many sentences which illustrate this: "Finally, over emphasis on the use of continuum model in terms of the Born-Landau equation to electrode kinetics brings with it considerable difficulties in conforming to experiment and, thus, limits the progress in this field."

Robert E. Salomon, *Temple University*