

Book Reviews

Photochemistry. Volume 15. A Specialist Periodical Report. Senior Reporter: D. Bryce-Smith (Department of Chemistry, University of Reading). Reporters: N. S. Allen, M. N. R. Ashfold, A. Cox, R. B. Cundall, A. Gilbert, A. Harriman, W. M. Horspool, and S. T. Read. The Royal Society of Chemistry: London. 1985. XX + 555 pp. £110.00 (\$197.00). ISBN 0-85186-135-0.

Volume 15 in the series has appeared and like its predecessors it offers a very broad base coverage of the literature in Photochemistry in a style of reporting which is crisp, concise, and readable. The period covered by the present review extends from July 1982 to June 1983 and the material is arranged in five main sections: Part I, dealing with Physical Aspects of Photochemistry; Part II, on the Photochemistry of Inorganic and Organometallic Compounds; Part III, which covers Organic Aspects of Photochemistry; Part IV, covering Polymer Photochemistry; and Part V, on the Photochemical Aspects of Solar Energy Conversion.

As in the past, coverage of the literature by the reporters is truly comprehensive (at least in the areas with which this reviewer is most familiar) and a case in point is the more than 4200 references cited.

Photochemistry is a far reaching and very broad discipline which extends into many diverse areas of chemistry and therefore it is virtually impossible for one to keep abreast of all the new developments in the field. SPR in this respect serves an extremely useful purpose. A few evenings spent browsing through this book in the areas which one does not follow closely provide a valuable update or an excellent overview of areas of research which one may wish to enter or simply keep informed on.

The production of such a high quality and comprehensive review is, however, not a simple task and the problems associated with it show up in the form of two potentially fatal drawbacks for the series: (a) the delay between publication and the end of the review period and (b) the cost of the volume. It is this reviewer's opinion that these could be appreciably reduced if the Society accepted a somewhat lower standard of publication. For instance, if the objective is to provide a comprehensive and critical report on the literature in Photochemistry within 1 year of the end of the review period, which is priced at a reasonable level for both institutions and individuals, then the type-setting system has to be abandoned for the more rapid and cheaper camera-ready copy system, and editing has to be virtually eliminated, as well as structure redrawing (here the use of micro-computers with word-processing and structure drawing software could be very advantageous). Finally, although an author index is useful to have, it is not essential to the objectives pursued (this should be left to on-line bibliographic systems) and should be eliminated; also, a softcover edition should be introduced for individual subscribers. It is this reviewer's opinion that these modifications are needed if this valuable series is to survive and that this course of action would be a far more acceptable means of attaining the objectives than a possible fragmentation of the Report into two or more parts.

D. Gravel, *Université de Montréal*

Glass Capillary Chromatography in Clinical Medicine and Pharmacology. Edited by Helvor Jaeger (L.A.B. Gesellschaft für pharmakologische Untersuchungen m.b.H. & Co.). Marcel Dekker, Inc.: New York. 1985. xi + 656 pp. \$99.75. ISBN 0-8247-7103-6.

Upon receiving this book for review, I was at first disappointed by the title. In the few short years since the nearly universal acceptance of fused-silica capillary columns, glass capillary columns have become the dinosaurs of GC. However, unlike the dinosaurs, the reasons for their rapid extinction are not mysterious. They offer virtually no advantages over their more robust and inert fused-silica progeny. It seemed unusual, then, to find a 1985 book with this subject as its title. Anticipating an account of an outdated technology, I was pleasantly surprised to find a well-edited, highly useful book on many aspects of capillary GC separations, and one in which some significant fraction of its content, perhaps 30%, does deal with fused-silica columns.

The book is written for the working scientist who uses capillary GC as a tool and not for the theorist. Nevertheless, Walter Jennings' introductory chapters are well written, accurate, and provide just enough background to help the reader with everyday equations, such as column performance checks, to obviate the need for other reference texts. Outside of the introductory chapters, the book contains no sections on troubleshooting, and only vestigial discussions of instrumental details, such as inlet liners, system deactivation, quantitation problems, improper setup problems, etc. A chapter on troubleshooting might have

strengthened the text here. However, in fairness to the stated purpose of the text, the reader needing this information is directed to other manuals on GC instrumentation.

The strong point of the book is the wealth of information available on the separation of a wide range of biological compounds. These include chapters on thyroid hormones, fatty acids, chiral hydroxy acids, amino acids, and steroids. These are universally well written and useful. Upon reading through this material, I was impressed by the many subtle points pertaining to various analyses which came across. This is the result of having so many excellent scientists contribute, each with many years of experience. It is a tribute to the Editor that the book remains highly readable, a virtue that all too many contributed volumes lack.

In summary, although much of the information presented was generated with use of glass-capillary columns, most of this is almost directly transferable to newer fused-silica technology. In a sense, this inertia is understandable. Fused-silica columns have been widely used for at most about 5 years. Just as the transfer of techniques from packed to open tubular GC took (too) many years, so will the re-generation of applications on fused-silica columns using bonded and cross-linked phases. Fortunately, this in no way detracts from an excellent, highly readable compendium of the application of capillary GC to Clinical Medicine and Pharmacology.

Richard A. Hartwick, *Rutgers University*

Organometallic Compounds of Boron. By K. Smith (University College of Swansea). Chapman and Hall Ltd.: London. 1985. xi + 304 pp. \$40.00. ISBN 0-412-26-790X.

This is one of the first volumes in the series of chemistry sourcebooks to be published by Chapman and Hall which provide carefully tailored information to workers in specialized areas of chemistry. The information on boron compounds contained in this book is derived from the 1984 edition of the "Dictionary of Organometallic Compounds".

The entries in this sourcebook are arranged in order of molecular formula and each entry is numbered to assist in ready location. The entries are presented in the current form used in the "Dictionary of Organometallic Compounds". An entry includes the formula name, the CAS registry number, molecular weight, toxicity hazard (if known), physical properties, and references to the primary literature.

The volume is extremely well indexed. It contains a name index which lists every compound name, a molecular formula index, and a CAS registry number index. In addition to these three printed indexes, a graphical structure index precedes the section containing the entries, allowing a rapid visual location of compounds of interest.

In compiling this volume, the editor has included the primary literature up to mid-1983. Representative compounds of all important structural types are included (typically, the parent member of a series along with a selection of homologs). Also included are compounds with established uses in catalysis or synthetic procedures and compounds of particular chemical biological or historical interest. Some compounds which were not considered sufficiently important to justify separate entries are included as derivatives in the entries of other compounds. These include, for example, organic derivatives (in the classical sense), donor-acceptor complexes, salts of an anion or cation, and oligomeric compounds.

Organoboron compounds have proven to be an important class of organometallics. They are frequently used in organic syntheses, inorganic syntheses, and theoretical chemistry (structural theory). As a consequence, the literature covering the boranes is quite diverse. This volume will be of value to scientists by making the organoboron and boron hydride literature more accessible.

George W. Kabalka, *University of Tennessee*

Advances in Organometallic Chemistry. Volume 23. Edited by F. G. A. Stone and R. West. Academic Press, Inc.: New York. 1984. vii + 324 pp. \$65.00. ISBN 0-12-031123-2.

This volume continues the series' exposition of timely and significant advances in the field. The present work is a worthy addition to the collection and is recommended as a desk copy to individuals working or interested in the specific areas covered.

A thorough review of electron-transfer reactions of mononuclear organotransition metal complexes by N. G. Connelly and W. E. Geiger heads the volume. This should stimulate further activity in this area, which is relatively unexplored compared to knowledge of redox properties

of transition metal complexes, on the one hand, and those of organic compounds, on the other.

Redistribution reactions involving ligand interchange between organometallic complexes is next covered by P. E. Garrou. The article is well organized, starting with descriptions of the various experimental techniques employed, as well as ligand types involved in transfer (e.g., η^3 -allyl, cyclopentadienyl, halide, carbon monoxide, tetraphenyl cyclobutadiene, phosphine, hydride, alkyl, and others).

Striking a commendable balance with coverage of main group elements is a review of silyl, germyl, and stannyl derivatives of diazene (N_2H_2) by N. Wiberg. This includes their preparation, physical properties, thermolyses, hydrolyses, and other reactivities. The chapter concludes with an overview of bis(organyl)diazene compounds. Continuing in the main group area is a review on polarization transfer NMR for ^{29}Si describing the INEPT and DEPT techniques, by T. A. Blinka, B. J. Helman, and R. West. Exposition of these important new magnetic resonance techniques, as well as their application to ^{29}Si NMR are covered in this chapter.

The volume is concluded with an excellent and timely survey on complexes containing both C- and O-bonded metal carbonyls by C. P. Horwitz and D. F. Shriver. The formation, structure, and especially the reactivity of these complexes are discussed. This is of importance in understanding the transformation of this elemental chemical building block (CO) into various organic products.

Herbert D. Kaesz, University of California, Los Angeles

Liquid-Liquid Equilibrium and Extraction. A Literature Source Book. Supplement 1. By J. Wisniak and A. Tamir (Ben-Gurion University of the Negev). Elsevier Science Publishers B. V.: Amsterdam. 1985. xvii + 1275 pp. \$148.25. ISBN 0-444-42437-7.

A mushrooming dilemma for scientists and engineers is how to access the literature on complex systems which do not lend themselves to straightforward listings in *Chemical Abstracts*. The solvent-extraction literature is a case in point. Useful data for extraction equilibria exist in many forms in papers on analytical chemistry, thermodynamics, chemical processing, hydrometallurgical processing, nuclear processing, etc. Often the data are secondary ingredients of papers that are indexed in other ways.

The two-part series by this title, compiled by Wisniak and Tamir and published in 1980 and 1981, was a major contribution to researchers in the field of extraction. Twelve thousand extraction systems were included, covering the period 1900-1981. This first supplement volume provides 1200 more entries, covering the period 1981-1984, as well as some references that were overlooked in the original volumes. The authors are greatly to be commended for continuing this vital service and for the long hours that they have obviously put into scouring the literature.

The book categorizes systems by the extracted solute. For each system referenced, the solvent and substrate components are identified, along with other salient features, such as coverage of a range of pH. Both the original literature reference and the *Chemical Abstracts* citation are provided. There is a cross-index categorized by solvent or extractant.

The assemblage of data gives a thorough and comprehensive coverage of extraction systems involving organic, metallic, and other inorganic solutes. There are extensive references to the non-English literature. An important data source that unfortunately is not included is the extensive system of U.S. government reports, which contain much information on solvent extraction for nuclear and related systems, in particular.

This book and its two precursors are necessary components of any research library for chemistry, and for chemical, nuclear, and metallurgical engineering.

C. Judson King, University of California, Berkeley

Handbook of Enzyme Biotechnology. Second Edition. Edited by Alan Wiseman. Ellis Horwood Ltd.: Chichester; John Wiley & Sons: New York. 1985. 457 pp. \$82.95. ISBN 0470-20153-3.

The first edition of this widely used handbook was published in 1975. It endeavored to summarize known principles and practices in the utilization of industrial enzymes. The Second Edition has kept the same

objective but is "almost completely rewritten and therefore virtually a new publication".

The book is organized into two main sections: Part A which discusses the theory and principles of enzyme use, and Part B which deals with the practical aspects of industrial usage of enzymes. The same author or authors cover a given topic in both Parts A and B.

For example, in Chapter 2, Part A, M. D. Scawen and J. Melling clearly outline the principles involved in the many techniques for protein isolation and purification, while in Chapter 2, Part B, they present a guide to the important points to be considered when undertaking large-scale enzyme purification. Their treatment of the subject is not intended to be comprehensive, rather only a discussion of those manufacturers and products with which the authors have had some experience. A short discussion on foam and bubble fractionation of proteins (apparently omitted) would have, however, helped provide for a more comprehensive overview of protein recovery techniques.

In Chapter 3, Part A, P. S. J. Cheetham reviews the principles of the science of enzymology (and biochemical reactors), including enzyme stability, inhibition of enzymes, and the kinetics of enzyme reactions, with the insight of an industrial practitioner. One interesting insight offers a challenge to the reader (p 115): "Despite their attractive features, fluidized [biocatalyst] beds have not achieved wide-spread use because they are costly to run and difficult to scaleup." He also assesses immobilization supports and methods. In Chapter 3, Part B, Cheetham enumerates the many applications of enzymes in industry, particularly the food industry. Names and addresses of many suppliers of industrial enzymes are listed. He discusses the use of enzymes in analysis, particularly in the form of enzyme probes. Also, an example of the use of genetic manipulation techniques is described. A particularly well-written and informative section on enzyme-based detergents (p 364) details the reasons why these alkaline proteases cannot be metallo-proteases and why present-day α -amylases are incompatible with bleaches.

Chapter 4, Part A, by J. F. Kennedy and C. A. White, contains a thorough introduction to principles of enzyme immobilization. They also review the types of bioreactors employed in this field. Chapter 4, Part B, deals largely with the chemistry of the various enzyme supports and bio-affinity procedures.

In Chapter 5, Part A, B. J. Gould and B. F. Rocks consider the principles underlying the use of purified enzymes in clinical chemistry for measurement of the concentration of chemical species in plasma and serum. An especially interesting section on enzyme immunoassays is included. Chapter 5, Part B, consists largely of tables listing the compounds amenable to this type of analysis, the biochemical reactions occurring, and the names and addresses of the suppliers (in the United Kingdom) of instruments and reagent kits for these analyses.

In summary, this is a fine, well-written, easy-to-use, and comprehensive book which we recommend to those who either use or produce enzymes.

George W. Malaney and Robert D. Tanner, Vanderbilt University

Introduction to Phase Equilibria in Ceramic Systems. By F. A. Hummel (State College, PA). Marcel Dekker: New York. 1984. x + 388 pp. \$39.75. ISBN 0-8247-7152-4.

This is a textbook intended to introduce undergraduate students of the materials sciences to phase equilibrium analysis. It is a practical guide in interpreting phase diagrams of the types pressure vs. temperature and composition vs. temperature. A very large number of hypothetical and real examples are used to illustrate various features of the diagrams of binary, ternary, and quaternary systems. Most are based on ceramic materials that are both of traditional and current interest. The author has preferred to describe the construction and use of phase diagrams in terms of thermochemical and diagrammatical rules rather than presenting detailed mathematical treatments. Particularly useful is the instruction on ternary systems, including methods in determining pseudo-binary and isothermal sections from ternary diagrams and in interpreting solid solutions. The author also briefly discusses experimental methods in constructing such diagrams and nonequilibrium and metastable situations. Most chapters end with an extensive list of references and a set of instructive problems.

William T. Petuskey, Arizona State University