

Book Reviews *

Chromatographic Enantioseparation. Methods and Applications. Second Edition. By Stig Allenmark (University of Gothenburg). Ellis Horwood: New York and London. 1991. 282 pp. \$100.00. ISBN 0-13-132978-2.

Once regarded as extraordinary, the chromatographic separation of enantiomers is rapidly becoming commonplace, as the number of books and reviews on the subject attests. Indeed, the appearance of the second edition of *Chromatographic Enantioseparation*, only four years after the original, indicates both the pace of progress and the author's desire to keep the book current.

The book is suitable both as a text for a graduate level course and as a convenient source of references to published work.

After a brief introduction, a short review of modern stereochemical concepts is given, followed by an overview of how enantiomeric purities and absolute configuration may be determined. Chapter four addresses basic chromatographic theory, the use of chiral derivatizing agents, and the use of gas and liquid chromatography to separate diastereomeric derivatives. Chapter five addresses the requirements of a chiral station phase, the types of intermolecular interactions involved, and the effects of temperature on the separation of enantiomers.

Chapters six and seven address the various types of chiral stationary phases used for gas and liquid chromatography. Data for the separation of the enantiomers of representative examples of various classes of compounds are presented in chapter eight, along with the use of these data to solve practical problems.

Preparative separations and the problems associated with the use of large sample loads are addressed in chapter nine. The book draws to a close with a discussion of future trends, some of which have by now come to be widely adopted (SFC, CZE), and concludes by presenting experimental procedures for the synthesis of a variety of chiral sorbents. This is useful, for not all these sorbents are commercially available and those which are tend to be expensive.

This reviewer is favorably impressed by Allenmark's objectivity and by an evident desire to have the book be as up to date as possible. Indeed, references to work published in 1991 are provided; not bad for a book published the same year. This is a book which will be referred to frequently by those having reason to separate enantiomers by chromatographic means.

William H. Pirkle, *University of Illinois*

Biological Magnetic Resonance. Volume 10. Carbohydrates and Nucleic Acids. Edited by L. J. Berliner (Ohio State University) and J. Reuben (Hercules Incorporated). Plenum: New York and London. 1992. xi + 290 pp. \$79.50. ISBN 0-306-44060-1.

The previous nine volumes in this series have presented over 50 review articles on a wide variety of topics related to applications of NMR and ESR spectroscopies to the study of biological systems. This most recent volume includes the first review of high resolution proton NMR studies of oligosaccharides to appear in this collection, as well as a chapter on the application of modern high resolution NMR techniques to studies of nucleic acids.

In the first chapter (200 pages) Kamerling and Vliegthart (Department of Bio-Organic Chemistry, Utrecht University) compile the results of an enormous number of ¹H-NMR spectroscopic studies of oligosaccharide-alditols that can be released from mucin O-glycoproteins. Most of the data come from the laboratory at Utrecht. The data provided for these structures are essentially the chemical shifts of those protons that can be unambiguously assigned and are diagnostic or indicative of specific structural elements in the oligosaccharide-alditols. In addition to extensive tables, a large number of spectra are presented. Although the reproductions of these are for the most part clear, the use of a magnifying glass will make detailed study of the spectra more pleasant. While this chapter will surely be of interest to those working in this area, its didactic value is limited.

David Wemmer (Department of Chemistry, University of California, Berkeley) uses the second chapter of the volume (70 pages) to provide a brisk review of modern techniques in high field (predominantly proton) NMR spectroscopy for making assignments of spectral features to specific nuclei of DNA and RNA fragments, the development of distance and angle constraints for these systems from NMR spectra, and the use of this information to generate structural models. The remainder of the chapter discusses a number of recent examples, including studies of conformations (bends, hairpins), mispairing of bases, triple strand

formation and the non-covalent interaction(s) of drugs with duplexes, examination of catalytic RNAs, and studies of protein-nucleic acid complexes. The scope of application of the methodologies described is limited to structures of less than about 15 kDa. This chapter, in conjunction with a recent review by Varani and Tinoco (*Q. Rev. Biophys.* 1991, 24, 479-532) provides an excellent summary of the current uses of high resolution NMR to obtain information about structure and dynamics of nucleic acid systems that fall within this scope, and both will be valuable to neophytes entering this area of research.

Some production delay in getting this volume on the streets is apparent: the most recent citations in Wemmer's article are dated 1990, and with only a couple of exceptions, this is also true for the citations given in the Kamerling and Vliegthart chapter.

J. T. Gerig, *University of California, Santa Barbara*

The Chemistry of Organophosphorus Compounds. Phosphine Oxides, Sulphides, Selenides and Tellurides. Volume 2. Edited by Frank R. Hartley (Cranfield Institute of Technology). Interscience Publication, John Wiley & Sons: Chichester, New York, Brisbane, Toronto, and Singapore. 1992. xvi + 647 pp. \$360.00. ISBN 0-471-93056-3.

The *Chemistry of Functional Groups* series of volumes has built up a reputation for thoroughness and accuracy, and the present volume maintains those high standards. Phosphine chalcogenides are important not only to those who work in phosphorus chemistry but also as synthetic reagents, extractants, and ligands in coordination chemistry. The PO bonds in phosphine oxides serve as models for those in biologically vital phosphates. Hence the utility of this book.

The first chapter on structure and bonding by D. G. Gilheany (52 pp) should be required reading for chemists who invoke d-orbitals in bonding to phosphorus and other third period main group elements. A clear and complete review of recent theory and experiment, this chapter presents a consistent modern discussion of its subject with literature references through 1990 (as is the case for all the chapters). The succeeding chapters cover the following topics: Structure and Stereochemistry of Secondary and Tertiary Phosphine Chalcogenides (23 pp) by M. J. Gallagher; Electrochemistry of Organophosphorus (V) Compounds (59 pp) by K. S. V. Santhanam, which goes beyond the strict boundaries of the book's title by including electrochemistry of phosphazenes, metal complexes of phosphines, and phosphonium salts; Photochemistry of Phosphine Chalcogenides (31 pp) by M. Dankowski; Spectroscopy (UV-visible, vibrational, and NMR) of Phosphine Chalcogenides (25 pp) by G. Davidson; Methods of Preparation of Phosphine Chalcogenides (91 pp) by A. K. Bhattacharya and N. K. Roy; Chemical Properties and Reactions of Phosphine Chalcogenides (121 pp) by R. S. Edmundson; and Coordination Chemistry of Phosphine Chalcogenides and Their Analytical and Catalytic Applications (157 pp) by E. S. Lobana. There are comprehensive author and subject indexes. The editor and authors deserve our thanks for an excellent addition to a valuable series.

Harold Goldwhite, *California State University, Los Angeles*

Surfactant Aggregation. By John H. Clint (BP Research Centre). Blackie: Glasgow and London. 1992. xi + 283 pp. \$145.00. ISBN 0-216-92905-9.

Aggregation of surfactants (SURface ACTIVE ageNTS) into monolayers, micelles, vesicles, and other assemblies is a complex process governed by many different factors and is of importance in many different applications. The study of surfactant aggregation has fascinated researchers ever since the original postulate of the existence of "micelles" by McBain in the early part of this century. J. H. Clint has summarized both existing knowledge and recent literature on this topic in a very readable but nevertheless comprehensive text titled simply *Surfactant Aggregation*. The resulting monograph is written at a level suitable for beginning graduate students or advanced undergraduates but is equally useful to practicing researchers wishing to become acquainted with this still rapidly evolving field. The book is written as a combination of textbook and review. Selected references are presented as a bibliography rather than as a complete literature survey, but the choice is excellent. For each of the topics treated in individual chapters, the majority of references cover the last 10-12 years, closely following the revival of research interest in this field has experienced in this period.

After the usual introduction chapter on surfactants, surface activity, and hydrophobic interactions, the author presents a chapter describing

*Unsigned book reviews are by the Book Review Editor.

the necessary background theory of adsorption at interfaces, followed by chapters on monolayers, LB-films, micelles and mixed micelles, surfactant phase behaviour, vesicles, liposomes and gels, adsorption at the solid-liquid interface, microemulsions, and finally bilayers, foams, and (macro)emulsions. Many of the chapters contain sections describing the results of modern experimental methods used in this field, such as QELS, SANS, and NMR. Equally useful but more conventional techniques including the measurement of thermodynamic properties, transport properties, and phase equilibria are also covered. Dr. Clint has presented the colloid and surface science community with a very valuable book that can well be used as the basis for a modern course in colloid science, covering the diverse field of surfactant aggregation, with the more traditional topics of double layer theory and colloid stability as required additional reading.

Jan C. T. Kwak, *Dalhousie University*

Scanning Tunneling Microscopy I. General Principles and Applications to Clean and Adsorbate-Covered Surfaces. Edited by H.-J. Güntherodt and R. Wiesendanger (University of Basel). Springer-Verlag: Berlin and Heidelberg. 1992. xii + 246 pp. \$59.00. ISBN 3-540-54308-2.

This volume reviews the state of the art of scanning tunneling microscopy (STM). Six chapters, written by leading researchers in the field, describe in considerable detail different areas to which STM has been applied. This book therefore is a good reference for researchers who need to know how STM has contributed to their field. The book contains over 150 STM images, so the reader can understand the analysis of the authors while directly seeing the original data. In addition, there are over 1300 references, so these reviews can act as a stepping stone to the original literature.

After introductory chapters by the editors and H. Rohrer, Y. Kuk (Chapter 3) examines how STM has contributed to the determination of atomic arrangement of metals in addition to discussing STM artifacts for one practicing in this field. In Chapter 4, J. Wintterlin and R. J. Behm concentrate on how information from STM complements other surface science techniques used to study adsorbate-covered metal surfaces and reactions on metal surfaces. R. Hamers (Chapter 5) shows in detail how STM has been used to determine the atomic structure of a variety of reconstructed semiconductor surfaces. R. Wiesendanger and D. Anselmetti write on layered materials in Chapter 6. STM's ability to measure electronic structure allows charge density waves to be imaged and defects in them to be detected. Molecular imaging is discussed in Chapter 7 by S. Chiang. STM can resolve somewhat the internal molecular structure, so adsorption sites on the surface and molecular orientation with respect to other adsorbates can be determined for some molecules.

Chapter 8 by P. J. M. van Bentum and H. van Kempen reviews STM on superconductors. The STM studies on these materials remain inconclusive and differ somewhat from research group to research group. The authors attribute this to sample preparation. However, STM studies on layered superconductors give excellent information about flux lattices.

Reading this book gives one a sense of the wide variety of problems to which STM has been applied. The message imparted in Chapters 4 and 7, which are the most relevant to chemists, is that directly seeing the adsorbates and molecules can give insight into their behavior on surfaces.

Howard Mizes, *Xerox Corporation*

Current Trends in Sonochemistry. Edited by Gareth J. Price (University of Bath). Royal Society of Chemistry: Cambridge, England. 1992. viii + 184 pp. £39.50. ISBN 0-85186-365-5.

This book was developed from the Sonochemistry Symposium at the Royal Society of Chemistry Annual Congress held in Manchester on April 13-16, 1992. After an introductory chapter by the editor, this book contains 12 more chapters in typescript form and a short subject index.

Concise Encyclopedia of Materials Characterization. Edited by Robert W. Cahn FRS (University of Cambridge) and Eric Lifshin (General Electric Corporate Research and Development). Pergamon Press: New York. 1993. xxvii + 642 pp. \$300.00. ISBN 0-08-040603-3.

This book is part of a continuing series of supplementary volumes to the main work of the *Encyclopedia of Materials Science and Engineering*. This book covers techniques for investigation and determination of the composition, degree of perfection, microstructure, and physical and mechanical characteristics of materials. The articles are listed in

alphabetical order and are cross referenced to the other articles in the encyclopedia. It also contains a forward by the chairman of the advisory board, an executive editor's preface, an editors' preface, a guide to use of the encyclopedia, an introduction to investigation and characterization of materials, a list of contributors, and a subject index.

Advances in Mass Spectrometry. Volume 12. Edited by P. G. Kistemaker (Institute for Atomic and Molecular Physics) and N. M. M. Nibberig (University of Amsterdam). Elsevier: Amsterdam, The Netherlands. 1992. xxii + 950 pp. \$281.50. ISBN 0-444-88871-3.

This book was developed from the 12th International Mass Spectrometry Conference held in Amsterdam on August 26-30, 1992. After a preface by the editors and the welcoming and opening addresses, there are 32 papers, a section of titles and authors of posters presented, and an author index.

Hazardous Waste Management III. ACS Symposium Series 518. Edited by D. William Tedder (Georgia Institute of Technology) and Frederick G. Pohland (University of Pittsburgh). American Chemical Society: Washington, D.C. 1993. xii + 466 pp. \$119.95. ISBN 0-8412-2530-3.

This book was developed from the Industrial and Engineering Chemistry Special Symposium sponsored by the Division of Industrial and Engineering Chemistry, Inc., of the American Chemical Society held in Atlanta on October 1-3, 1991. After a preface by the editors, there are 22 chapters organized under the following headings: Physical and Chemical Wastewater Treatment; Biological Treatment; Soil Remediation and Treatment; Treatment of Volatile Compounds; and Selected Mixed-Waste Treatment Applications. There are author, affiliation, and subject indexes.

Polymeric Delivery Systems. Properties and Applications. ACS Symposium Series 520. Edited by Magda A. El-Nokaly (Procter and Gamble Co.), David M. Piatt (Procter and Gamble Co.), and Bonnie A. Charpentier (Syntex Research). American Chemical Society: Washington, DC. 1993. xii + 412 pp. \$99.95. ISBN 0-8412-2624-5.

This book was developed from a symposium sponsored by the Division of Cellulose, Paper, and Textile Chemistry and by the Biotechnology Secretariat at the 203rd National Meeting of the American Chemical Society held in San Francisco on April 5-10, 1992. After a preface by the editors, there are 28 chapters of current work in delivery systems as it applies to drugs, cosmetics, foods, and herbicides. There are also author, affiliation, and subject indexes.

Chromatography of Polymers: Characterization by SEC and FFF. ACS Symposium Series 521. Edited by Theodore Provder (Glidden Co.). American Chemical Society: Washington, DC. 1993. xiv + 338 pp. \$94.95. ISBN 0-8412-2625-3.

This book was developed from a symposium sponsored by the Divisions of Polymeric Materials: Science and Engineering, Inc., and Analytical Chemistry of the American Chemical Society at the Fourth Chemical Congress of North America (202nd National Meeting of the ACS) held in New York on August 25-30, 1991. After a preface by the editor, there are 22 chapters organized under the following headings: Field-Flow Fractionation; Size Exclusion Chromatography: Fundamental Considerations; Size-Exclusion Chromatography: Viscometry Detection; Size-Exclusion Chromatography: High-Temperature, Ionic, and Natural Polymer Applications. There are author, affiliation, and subject indexes.

Pesticides in Urban Environments. Fate and Significance. ACS Symposium Series 522. Edited by Kenneth D. Racke (Dow/Elanco) and Anne R. Leslie (U.S. Environmental Protection Agency). American Chemical Society: Washington, DC. 1992. xii + 378 pp. \$94.95. ISBN 0-8412-2627-X.

This book was developed from a symposium sponsored by the Division of Agrochemicals at the 203rd National Meeting of the ACS held in San Francisco on April 5-10, 1992. After a preface by the editors, there are 30 chapters organized under the following headings: Pests and Pesticides in Urban Environments; Dissipation of Pesticides in Urban Environments; Mobility of Pesticides in Urban Environments; Urban Pesticides and Humans; and Urban Pesticides and Nontarget Animals. There are author, affiliation, and subject indexes.