

## Book Reviews \*

**Advances in Supramolecular Chemistry. Volume 2.** Edited by George W. Gokel (University of Miami). JAI Press: London. 1992. xi + 195 pp. \$78.50. ISBN 1-55938-329-1.

This is the second volume of a continuing series and maintains the high scientific standards set by the first volume. A broad range of topics is covered by authors from Germany, France, Japan, and Bulgaria. The current widespread interest in all aspects of supramolecular chemistry, a multidisciplinary field of ill-defined borders, has, not unexpectedly, stimulated similar attempts such as the projected series *Monographs in Supramolecular Chemistry*, edited by J. Fraser Stoddard (for a review of volume 1 of that series, see: *J. Am. Chem. Soc.* **1991**, *113*, 3628). A degree of redundancy is therefore to be expected in various reviews and monographs for such important areas as cyclodextrin chemistry.

The ambitious blueprint for the present volume has been well achieved, covering the following topics: Cyclodextrin Complexation of Amphiphilic Compounds (Angel E. Kaifer); Monolayer Lipid Membranes (MLMs) from Bolaamphiphiles (Jürgen-Hinrich Fuhrhop and Reinhard Bach); Accumulation of Unit-Binding Sites: Hydrogen Bonding Fixation in Multifunctional Polar Organic Molecules (Yasuhiro Aoyama); Thermal Fluctuations of Membranes (M. D. Mitov, J. F. Faucon, P. Méléard, and P. Bothorel); and Molecular Recognition in the Solid State (Fumio Toda). Many aspects of molecular recognition are recurrent themes, for both liquid and solid phases. A second major theme is the interactions of amphiphiles in monolayers, micelles, and cyclodextrin inclusion systems.

The huge field of cyclodextrin interactions is treated only from the viewpoint of their interactions with surfactants and lipids; amphiphilic cyclodextrins are also touched upon. The fascinating topic of bolaamphiphiles is treated with extensive detail. These compounds would seem to have an inevitably important place in the future construction of biomimetic systems. This may be especially true for polymerizable bolaamphiphiles intended for stable device design. Molecular recognition per se is more explicitly treated in the review dealing with multipoint hydrogen bonding interactions, wherein effects of structure, energetics, hydrophilic/hydrophobic interaction, and chirality are presented. The chapter dealing with thermal fluctuations in membranes is a formalistic and theoretical approach, but experimental aspects of vesicle preparation are presented, together with some results. The final chapter presents a large number of specific cases of molecular recognition in solids, an important but often slighted aspect of solid state chemistry. Again, enantioselective systems as known at present indicate the potential future importance of these systems for both fundamental studies and applied technology.

The present volume should provide valuable information for a wide cross section of interdisciplinary specialties, as a separate unit in itself; additionally, the prospect of a continuing annual series should eventually provide a most comprehensive and rich overview of the rapidly developing field of supramolecular chemistry.

R. A. Uphaus, *Iowa State University*

**Transition Metal Organometallics for Organic Synthesis.** By Francis J. McQuillin (University of Newcastle-upon-Tyne), David G. Parker (ICI), and G. Richard Stephenson (University of East Anglia). Cambridge University Press, Cambridge, U.K. 1991. xx + 594 pp. \$200.00. ISBN 0-521-33353-9.

This book covers a broad spectrum of organometallic reactions in the context of organic synthesis. The aim of the book is to provide insight into new synthetic methods which use transition metals.

After the introductory chapter, which discusses the reactivity properties of coordinated ligands, the book can be subdivided into four parts. The first part (6 chapters) presents reactions of alkene  $\pi$ -complexes. This includes rearrangement, oxidation, and nucleophilic addition reactions. This is followed by three chapters on reactions of  $\sigma$ -bound species as nucleophiles as well as in insertion and coupling reactions. Two chapters on organometallic cycloaddition reactions and metal carbene chemistry complete the discussion of organometallic reactions. In the final three chapters, some of the reactions presented in the previous chapters which have been used as a key step in a natural product synthesis are discussed. Commentary on the role of the organometallic reaction in the synthetic strategy is included.

In the presentation of the organometallic reactions, examples from actual synthetic pathways are used. The reactions are discussed in detail

in an attempt to make the reader aware of the scope and limitations for each one. The book is well referenced and has an excellent index.

Overall, the book is well written. It should be very useful as a reference book for the synthetic chemist. As a result of the organization of the book, one or more chapters could be used as a textbook for part of an advanced undergraduate or graduate course in synthetic organic chemistry or the entire book could be used in a more specialized course which focuses on metals in organic synthesis.

Marie E. Krafft, *Florida State University*

**Trends in Applied Theoretical Chemistry.** Edited by Luis A. Montero (University of Havana) and Yves G. Smeyers (CSIC, Madrid). Kluwer. Boston. 1992. x + 214 pp. \$99.00. ISBN 0-7923-1745-9.

This book was developed from a symposium called *Molecules in Physics, Chemistry, and Biology*, which was held in Paris in 1986. After an introduction to the series by the series editor (William N. Lipscomb) and a preface by the editors, the book contains 11 chapters organized under the following headings: Atom-surface Interactions; Chemical Reaction Mechanisms; Molecular Structure and Properties; and Molecular Spectroscopy. There is a subject index.

**Gas-Phase Metal Reactions.** Edited by Arthur Fontijn (Rensselaer Polytechnic Institute). North Holland. Amsterdam, The Netherlands. 1992. x + 700 pp. \$168.50. ISBN 0-444-89070-X.

This book was developed from a symposium held by the Physical Chemistry Division of the American Chemical Society in New York in August 1991. After a preface by the editor, the book contains 28 chapters, an author index, and a subject index.

**Pesticide Waste Management. Technology and Regulation.** ACS Symposium Series 510. Edited by John B. Bourke (Cornell University), Allan S. Felsot (Illinois Natural History Survey), Thomas J. Gilding (National Agricultural Chemical Association), Janice King Jensen (U.S. Environmental Protection Agency), and James N. Seiber (University of California—Davis). American Chemical Society. Washington, D.C. 1992. xii + 274 pp. \$66.95. ISBN 0-8412-2480-3.

This book was developed from a symposium sponsored by the Division of Agrochemicals 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 editors, the book is organized under the following headings: Regulations; Containers; Rinsate Minimization and Reuse; and Current Disposal Technologies. There are indexes of authors, their affiliations, and subjects.

**Applied Polymer Analysis and Characterization. Volume II.** Edited by John Mitchell, Jr. Carl Hanser Verlag. Munich, Vienna, New York, Barcelona. 1992. xix + 461 pp. \$130.00. ISBN 0-19-520856-0.

This book has a unique organization among review books. The editor has taken on the task of writing reviews of recent literature, new instruments, and new books in the general area of polymer analysis and characterization. The remaining specialized reviews are divided into two sections titled *Advances in Analysis and Characterization* and *Approaches to Problem Solving*. Overall the book is quite worthwhile. The specialized sections are quite variable in their depth and breadth of coverage, but this is to be expected. I believe the book could have benefited greatly if the editor had encouraged all of the authors to have introductions that were tutorial in nature. As it is, some sections only have utility to researchers working in those specific fields. Fortunately, most of the authors have taken the broad approach.

In the advances section the reviews range from very general in nature such as the very informative (and recommended) reviews found in *Techniques for Measuring Polymer Diffusion and their Application to the Characterization of Branched Polymers* and *Conventional and New Test Modes in Polymer Melt Rheometry* to the very narrow reviews in *Structural Characterization of Synthetic Polymers and Copolymers by Fast Atom Bombardment Mass Spectrometry* and *Novel Detection Techniques for Microcolumn Chromatography*, which focus primarily

\*Unsigned book reviews are by the Book Review Editor.

on the author's work. Left out of the review on microcolumn chromatography was a general discussion of specialized detection techniques being developed, such as laser fluorescence. The review *Characterization of Polymers by Dielectric Spectroscopy* in the advances section also contains much informative and interesting material, but it is marred by so many errors, that should have been caught in proofreading, that it is annoying to read. The review *Polymer Microscopy* is a fascinating series of case studies using optical microscopy techniques to identify polymers. However, it should be emphasized that this review on polymer microscopy is focused on optical techniques, with no mention of electron, scanning tunneling, or atomic force microscopy.

The Approaches to Problem Solving section leads off with *Electrochemical Processes at Polymer-Coated Electrodes*. This review is primarily an organized list of current journal articles with very terse descriptions of ongoing work. This is illustrated by the absence of any figures and only 17 pages of text to cover 387 references. The following review, *Methods for the Investigation of the Kinetics of Polyheteroarylene Formation*, is a better introduction to the field and a well written article. The review on polyanion-polycation complexes, *Analytical Characterization of Symplex Formation and Symplex Structure*, covers an interesting polymeric structure about which little is really known. If one is interested in polyelectrolytes, this review provides some thought provoking possibilities. Polymeric liquid crystals have many potential uses, and *Investigation of Polymer Liquid Crystals by Infrared Spectroscopy* is a small introduction to the field. However, no discussion of the unique material properties of polymer liquid crystals is given to motivate the reader. A lengthy introduction to the use of fillers is given in *Analysis of Transition Temperatures in Polymer-Filler Systems*. The introductory discussion of fillers is actually longer than the discussion of transition temperatures in filled systems, but this seems reasonable because our current understanding of the controlling factors is quite limited. Similar to the first review in this section, *Analysis and Characterization of Cellulose and its Derivatives* is primarily an organized listing of references (8 pages of text, no figures, 251 references). It is primarily of use to researchers working in the field. Finally, an introductory review is given in *Application of Elemental Analysis for the Characterization of Polymers*. This review also demonstrates the usefulness of elemental analysis for the determination of copolymer and blend composition, which is not as familiar an application of elemental analysis.

N. E. Schlotter, *Electronic Concepts, Inc.*

**Structure Reports for 1984. Volume 51b. Organic Compounds.** Edited by G. Ferguson (University of Guelph). Kluwer Academic Publishers, Dordrecht, Boston, and London. 1992. 2094 pp. \$375.00. ISBN 0-7923-1758-0.

*Structure Reports* is one of the few reference materials that allows easy access to a vast amount of crystallographic data. This series includes inorganic (Part A) as well as organic and organometallic (Part B) compounds from 1913 to the present. Even though this review addresses only a small section of the series (i.e., organic and organometallic structures published during 1984), the description presented here applies to the entire *Structure Reports* series.

The entries in Part B of *Structure Reports* are arranged by chemical classification that progresses from aliphatic compounds to compounds with inorganic ions that have organic counter ions. Structural information can also be located using the index (subject, formula, author, and chemical classification) provided at the end of the series. For each entry the information content varies greatly. In the general case the entry contains a reference, molecular diagram, and unit cell parameters. However, some entries include cell parameters, atomic coordinates, bond distances and angles, selected torsional angles, and a stereoview of the structure while others only provide a reference. For the most part, this inconsistency results from variation in the extent of data in the original publications from which *Structure Reports* is compiled. It would have been helpful to have a standard format for each entry, but this lack is certainly understandable considering the vast amount of information being tabulated. *Structure Reports* is an invaluable tool for the structural scientists. The high price of the series puts it beyond the reach of most individuals, but it certainly deserves a place in all scientific research libraries.

Kraig A. Wheeler, *The University of Texas at Austin*

**Photochemistry in Organized and Constrained Media.** Edited by V. Ramamurthy (E. I. du Pont de Nemours and Company). VCH. New York. 1991. xvi + 875 pp. \$135.00. ISBN 0-895-73775-2.

In his forward to *Photochemistry and Organized and Constrained Media*, George Hammond lists some of the reasons for studying

photoreactions in organized media: the use of rigid orientation to promote or discourage specific reactions of excited states; the inhibition of diffusion; and the prolongation of the lifetimes of interesting species by preserving a long-lived transient at room temperature or above within a secure molecular nest. In addition, Hammond cites the rising interest in materials science and in relevant methods to probe supramolecular properties. This fine book, edited by V. Ramamurthy, addresses all of these concerns and more.

The book contains nineteen chapters, including contributions from some of the world's most respected scientists working in this area. Each chapter focuses on some aspect of how changes in the microenvironment can influence photochemistry in restricted spaces, organized assemblies, solids, host-guest complexes, etc. Several chapters also include discussions of photoreactions occurring on the surfaces of silica, alumina, or other fractal porous materials, such as zeolites or irradiated semiconductor surfaces. Details are presented on the special methodology needed to conduct photophysical analyses of lifetime distributions in heterogeneous systems, with illustrations being offered for photochemical processes in liquid crystals, Langmuir-Blodgett assemblies, and supramolecular complexes in solution or organized biological media such as proteins. The final chapter deals with practical applications of organized media in nonlinear optics, as ordered materials for various hosts, and in electro-photography.

The book is striking in the high uniform quality of the contributions. Each chapter is clearly presented and quite adequately documented, even if several authors focus on developments in their own laboratories. Although the target audience is for specialists in photochemistry, readers with graduate level training in organic or physical chemistry will easily find many important discussions to interest them in this well prepared and reasonably comprehensive review.

Marye Anne Fox, *University of Texas at Austin*

**Environmental Remediation. Removing Organic and Metal Ion Pollutants.** ACS Symposium Series 509. Edited by G. F. Vandegrift (Argonne National Laboratory), D. T. Reed (Argonne National Laboratory), and I. R. Tasker (National Institute for Petroleum and Energy Research). American Chemical Society. Washington, DC. 1992. xii + 276 pp. \$66.95. ISBN 0-8412-2479-X.

This book was developed from a symposium sponsored by the Division of Industrial and Engineering Chemistry (201st National Meeting of the ACS) in Atlanta on April 14-19, 1991. After the preface by the editors, there are 18 chapters organized under the following headings: Groundwater and Soil Decontamination; Waste Treatment and Avoidance; and Future Directions. There are indexes of authors, affiliations, and subjects.

**Chromatography of Pharmaceuticals. Natural, Synthetic, and Recombinant Products.** ACS Symposium Series 512. Edited by Satinder Ahuja (Ciba-Geigy Corporation). American Chemical Society. Washington, DC. 1992. x + 212 pp. \$59.95. ISBN 0-8412-2498-6.

This book was developed from a symposium sponsored by the Division of Analytical Chemistry of the American Chemical Society at the Fourth Chemical Congress of North America (202nd National Meeting of the ACS) in New York on August 25-30, 1991. After a preface by the editor, the book contains 15 chapters, an author index, an affiliation index, and a subject index.

**Emerging Technologies in Plastics Recycling.** ACS Symposium Series 513. Edited by Gerald D. Andrews and Pallatheri M. Subramanian (E. I. du Pont de Nemours and Company). American Chemical Society. Washington, DC. 1992. xii + 322 pp. \$79.95. ISBN 0-8412-2499-4.

This book was developed from a symposium sponsored by the Division of Polymer Chemistry of the American Chemical Society at the Polymer Technology Conference held in Philadelphia, Pennsylvania, June 3-5, 1991. After a preface by the editors, the book contains 23 chapters organized under the following headings: Overview of Recycling Technology; Stabilizers, Additives, and Characterization; Polymer Recovery; and Blends and Applications. There are indexes of authors, their affiliations, and subjects.

**Transuranium Elements. A Half Century.** Edited by L. R. Morss (Argonne National Laboratory) and J. Fuger (Joint Research Centre, Commission of the European Communities). American Chemical Society. Washington, DC. 1992. xxiv + 568 pp. \$99.95. ISBN 0-8412-2219-3.

This book, which is dedicated to Glenn T. Seaborg, was developed from a symposium sponsored by the Divisions of Nuclear Chemistry and Technology, the History of Chemistry, and Inorganic Chemistry of the American Chemical Society (200th ACS National Meeting) held in Washington, DC, August 26–30, 1990. After a preface by the editors, the book contains 51 chapters organized under the following headings: Introduction; Historical Viewpoints; Spectroscopy, Photophysics, and Photochemistry; Chemistry; Separations and Thermodynamics; Materials Physics; Materials Chemistry; and Analytical Chemistry. There is an appendix of papers presented at the symposium but not included in the book and a subject index.

**Nickel and Human Health. Current Perspectives. Advances in Environmental Science and Technology. Volume 25.** Edited by Evert Nieboer (McMaster University) and Jerome O. Nriagu (National Water Research Institute). John Wiley and Sons. New York. 1992. xiv + 680 pp. \$120.00. ISBN 0-471-50076-3.

This book was developed by contributors to IUPAC's Fourth International Conference on Nickel Metabolism and Toxicology held at Helsinki, Finland, September 5–9, 1988. After an introduction to the series by the series editor Jerome O. Nriagu and the preface by the editors, the book contains 50 chapters and a subject index.

**Secondary Ion Mass Spectrometry SIMS VIII.** Edited by A. Benninghoven, K. T. F. Janssen, J. Tumpner, and H. W. Werner. John Wiley and Sons. New York. 1992. xxvi + 918 pp. \$260.00. ISBN 0-471-93064-4.

This book was developed from the Proceedings of the Eighth International Conference on Secondary Ion Mass Spectrometry (SIMS VIII) sponsored by the International Congress Centre RAI in Amsterdam, The Netherlands, on September 15–20, 1991. After a preface by the editors, there are 211 chapters organized under the following headings: Fundamentals; Quantification; Instrumentation; Surface Analysis; Depth Profiling; Imaging; Postionization; Combined and/or Related Techniques; Applications of Biology, Isotopic Analysis-Geology, Polymers-Organics, and Semiconductors; and Morrison Symposium. This book also contains a list of contributors, an index of reviewers, and an index of chairpersons.

**Nonlinear Optics. Fundamentals, Materials, and Devices.** Edited by S. Miyata (Tokyo University of Agriculture and Technology). Elsevier. Amsterdam, The Netherlands. 1992. xviii + 536 pp. \$143.00. ISBN 0-444-89304-0.

This book was developed from the Fifth Toyota Conference held in Nisshin, Aichi Prefecture, Japan, October 6–9, 1991. After a preface by the editor, the book contains 55 chapters organized under the following headings: Fundamentals; Characterization; Materials; and Devices. The book also contains an author and a subject index.

**Lignocellulosics. Science, Technology, Development and Use.** Edited by J. F. Kennedy (University of Birmingham), G. O. Phillips (North East Wales Institute of Higher Education), and P. A. Williams (North East Wales Institute of Higher Education). Ellis Horwood. New York. 1992. xviii + 877 pp. \$79.95. ISBN 0-13-544511-6.

This book was developed from the proceedings of the annual Cellucon Conferences held in Bratislava, Czechoslovakia, and represents a collaborative effort between Eastern European and other world scientists. After an introduction and overview, this book contains 92 chapters in typescript form, organized under the following headings: Biodegradation of Wood Components; Pulp and Paper; Chemistry of Cellulose and Lignin and Their Derivatives; and Wood, Composites and Protections and Conversion Technologies. There is also a subject index.

**Growth of Crystals. Volume 18.** Edited by E. I. Givargizov and S. A. Grinberg (Russian Academy of Sciences). Plenum. New York. 1992. viii + 212 pp. \$95.00. ISBN 0-306-18118-5.

This book was developed from the Seventh All-Union Conference on the Growth of Crystals and the Symposium on Molecular-Beam Epitaxy held in Moscow in November 1988. After a preface by the editors, this book contains 17 chapters organized under the following headings: Processes on Growth Surfaces; Molecular-Beam Epitaxy; Growth of Crystals and Films from Solutions and Fluxes; and Growth of Crystals from the Melt.

**Thirteenth International Conference on Raman Spectroscopy.** Edited by W. Kiefer (University of Würzburg), M. Cardona (Max Plank Institute), G. Schaack (University of Würzburg), F. W. Schneider (University of Würzburg), and H. W. Schrötter (University of Munich). J. Wiley and Sons: New York. 1992. 1 + 1130 pp. \$325.00. ISBN 0-471-93335-X.

This book was developed from the symposium of the XIIIth International Conference of Raman Spectroscopy held in Würzburg from August 31–September 4, 1992. After a preface by the authors, this book contains summaries of the Plenary Lectures, the abstracts of 24 Invited Papers, 36 Discussion Papers, and 473 poster contributions organized under the following headings: Raman Theory; Resonance Raman Spectroscopy; Time-Resolved Raman Scattering, Transient Species; Non-linear Raman Spectroscopy; Vibrational Analysis and Molecular Structure; Band Shapes, Dynamics; Band Intensities; Biological Systems; Macromolecules and Polymers; Surface and Interfacial Phenomena, SERS; Inorganic Materials, Matrices; the Solid State; Semiconductors and Semiconductor Microstructures; Superconductors; Phase Transitions, Effects of Temperature and Pressure; Low Dimensional and Amorphous Solids; Industrial and Medical Applications; Raman Microscopy; and New Techniques. There is an author index but no subject index.

**Clean Energy from Waste and Coal. ACS Symposium Series 515.** Edited by M. Rashid Khan (Texaco, Inc.). American Chemical Society: Washington, DC. 1993. xii + 300 pp. \$84.95. ISBN 0-8412-2514-1.

This book was developed from the symposium sponsored by the Division of Fuel Chemistry of the American Chemical Society (202nd National Meeting) held in New York on August 25–30, 1991. After a preface by the editors, there are 22 chapters organized under the following headings: Municipal Solid Waste and Biomass; Polymers, Plastics, and Tires; Sewage and Industrial Sludge; Metals Emissions Characterization and Control Technologies; Metals Emissions Control Using Sorbents; Ash and Slag Utilization; and Technology Development. The book contains author, affiliation, and subject indexes.

**Carbohydrate Antigens. ACS Symposium Series 519.** Edited by Per J. Garegg (University of Stockholm) and Alf A. Lindberg (Karolinska Institute). American Chemical Society: Washington, DC. 1993. xii + 184 pp. \$49.95. ISBN 0-8412-2531-1.

This book was developed from the symposium sponsored by the Division of Carbohydrate Chemistry of the American Chemical Society (202nd National Meeting of the ACS) held in New York on August 25–30, 1991. This book is dedicated to the memory of Michael Heidelberger, who died at the age of 103 just before the symposium at which he was scheduled to speak. After a preface by the editors, there are 12 chapters and author, affiliation, and subject indexes.