

**Interfacial Catalysis.** Edited by Alexander G. Volkov (Oakwood College, Huntsville, AL). Marcel Dekker, Inc.: New York, Basel. 2003. x + 674 pp. \$225.00. ISBN 0-8247-0839-3.

This reference book on interfacial catalysis at liquid interfaces presents the contributions of 38 different experts in the fields of nanochemistry, nanotechnology, catalysis, biochemistry, electrochemistry, and photochemistry. Its 23 chapters are organized under the following headings: Interfacial Phenomena; Phase Transfer Catalysis; Micellar Catalysis; Interfacial Biocatalysis and Membrane Catalysis; and Interfacial Photocatalysis. A general index completes the book.

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**Burger's Medicinal Chemistry & Drug Discovery, Sixth Edition, Volumes 1–6.** Edited by Donald J. Abraham (Virginia Commonwealth University). John Wiley & Sons, Inc.: Hoboken. 2003. 5568 pp. \$2100.00. ISBN 0-471-37032-0.

There are six volumes to this latest edition of *Burger's Medicinal Chemistry & Drug Discovery*: (1) Drug Discovery; (2) Drug Discovery and Drug Development; (3) Cardiovascular Agents and Endocrines; (4) Autocoids, Diagnostics, and Drugs from New Biology; (5) Chemotherapeutic Agents; and (6) Nervous System Agents. There is more than 50% new material in this edition, which covers such topics as proteomics, genomics, bioinformatics, combinatorial chemistry, high-throughput screening, blood substitutes, allosteric effectors as potential drugs, VCOX inhibitors, statins, high-throughput pharmacology, etc. An online version is also available.

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**Group 13 Chemistry: From Fundamentals to Applications.** Edited by Pamela J. Shapiro (University of Idaho) and David A. Atwood (University of Kentucky). American Chemical Society (Distributed by Oxford University Press): Washington, DC. 2002. xii + 300 pp. \$135.00. ISBN 0-8412-3785-9.

Although this book is based on two symposia sponsored by the Division of Inorganic Chemistry of the American Chemical Society, one at Pacificchem 2000 and the other at the 221st National ACS Meeting, in actuality it represents a general call for papers on group 13 chemistry; thus, authorship is not limited to conference participants. A wide variety of topics are presented and organized under the following headings: Fundamentals of Structure, Bonding, and Reactivity; Organic Synthesis and

Catalysis; New Materials and Clusters; and Aluminum Compounds: Biological and Environmental Aspects. Author and subject indexes complete the book.

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**Drug Design: Cutting Edge Approaches.** Edited by Darren R. Flower (The Edward Jenner Institute for Vaccine Research, Newbury, U.K.). Royal Society of Chemistry: Cambridge. 2002. x + 192 pp. \$109.00. ISBN 0-85404-816-2.

This book was developed from the meeting "Cutting Edge Approaches to Drug Design" held in March 2001 at the Scientific Societies Lecture Theater in London with the goal of presenting the latest techniques for using informatics in drug design. Some of the topics covered include strategies for modeling and bioinformatics, structural genomics and X-ray crystallography, and virtual screening.

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**Mass Spectrometry in Cancer Research.** By John Roboz (The Mount Sinai School of Medicine, New York). CRC Press LLC: Boca Raton, FL. 2002. xxii + 554 pp. \$159.95. ISBN 0-8493-0167-X.

Over the past decade, mass spectrometry has become a crucial technique in the study of virtually all biological problems, but none more so than cancer. What used to be a tool relegated exclusively to researchers who had spent years studying mass spectrometry is now increasingly being used by scientists who have little or no formal training in mass spectrometry. While this fact has allowed more researchers to utilize the power of mass spectrometry for a wider variety of problems, it has also created the need to educate them on the technology and specific applications of mass spectrometry for their fields. *Mass Spectrometry in Cancer Research* does just this for researchers in the title area.

Although not comprehensive in its treatment of either mass spectrometry or cancer research, that is not the focus of this book. There are several other texts that focus on each of these topics individually. *Mass Spectrometry in Cancer Research* describes the role that mass spectrometry can play in cancer research and is thus a very timely and valuable resource to its targeted audience: cancer researchers who are interested in utilizing mass spectrometry in their studies, and mass spectrometrists who are working in the field of cancer research. This text presents the fundamentals of both mass spectrometry and cancer, assuming no prior knowledge on the part of the reader, with numerous examples cited to demonstrate the presented concepts. This not only allows researchers trained in these two

fields to communicate effectively with one another, but it also provides an understanding of the types of analyses that can be performed and the contributions that mass spectrometry can make in the study of cancer.

The book is divided into six chapters, each subdivided into numerous subsections. There are two chapters dealing primarily with mass spectrometry fundamentals, one focusing on the biology of cancer, and three describing applications of mass spectrometry to problems in cancer research, including the analysis of carcinogens, the mechanism of action and analysis of anticancer agents and nutritional supplements, and methods for studying the biochemistry of cancer. The important area of cancer proteomics is discussed, as are the analyses for other biological compounds including lipids, oligonucleotides, and carbohydrates. The chapter on cancer fundamentals does not reference primary literature, but it does contain several references to books that address various aspects of cancer and where further information can be obtained. The other chapters are well-referenced with over 200 citations each, allowing the interested reader to find current primary literature relating to mass spectrometry applications in cancer research quickly.

*Mass Spectrometry in Cancer Research* is an excellent initial resource for researchers looking to apply mass spectrometric methods to problems in cancer, as well as a reference for those already working in these exciting fields. This text should be part of the library collection of any institution involved in the various aspects of cancer research.

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**Clathrochelates: Synthesis, Structure and Properties.** By Yan Z. Voloshin (Karpov Institute of Physical Chemistry), Nina A. Kostromina (Vernadskii Institute of General and Inorganic Chemistry), and Roland Krämer (Ruprecht-Karls-Universität). Elsevier: Amsterdam. 2002. xxi + 420 pp. \$185.00. ISBN 0-444-51223-3.

Clathrochelates, complexes in which a metal ion is encapsulated in a ligand cage, have been investigated for 35 years. The aim of this book is to summarize and analyze the body of literature generated during that period of time. In the interest of restricting their study to a manageable portion of the clathrochelate literature, the authors focus their effort primarily on the complexes formed from macropolycyclic polyamines and trisdioximes.

Following an introductory chapter that establishes basic definitions and classifies the many types of macropolycyclic ligands that are capable of encapsulating a metal ion, the authors thoroughly cover the synthesis, structural characterization, and chemical and physical properties of clathrochelates. The chapter on synthetic methods, which includes much information from journals that are not routinely available, presents an excellent compilation of the synthetic approaches that have been used to produce trisdioxime and polyamine clathrochelates.

The middle portion of the book focuses on the structure and reactivity of the complexes. Included are compilations of X-ray crystallographic data, as well as kinetic and mechanistic studies

of the formation and decomposition of these species. The electrochemical and photochemical properties of these complexes are also extensively covered.

The final two chapters of the text focus on the future directions of research in this field, including possible applications of existing complexes and possible synthetic routes to supermolecular species. In fact, the last chapter reads more like a section from a grant proposal than a chapter in a text, with numerous synthetic schemes presented as routes to novel species of clathrochelates that have yet to be synthesized.

In summary, this book is essentially an extended review article that should serve as a comprehensive text of reference for those already investigating clathrochelates or as a valuable entry point for anyone getting into this field.

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**Modern Arene Chemistry: Concepts, Synthesis, and Applications.** Edited by Didier Astruc (Université Bordeaux I). Wiley-VCH: Weinheim. 2002. xviii + 618 pp. \$135.00. ISBN 3-527-30489-4.

The vast literature concerning aromatic compounds spans a wide range of time and interconnects several subdisciplines of chemistry. This book succeeds in its attempt to present the current state-of-the-art of arene chemistry to the reader. In keeping with the book's subtitle, "Concepts, Synthesis, and Applications," there are 16 chapters on current research topics written by leaders in each field.

The book begins with a 19-page introduction by the editor. It includes a fascinating account of the history of benzene, aromaticity, and arene synthesis, which should be mandatory reading for any teacher of organic chemistry. The content of the chapters and research accomplishments of the authors are also outlined in this introduction. The editor has made a good attempt to identify connections between the various topics covered, but the wide diversity of current arene chemistry makes this task difficult. The topics of the chapters fall roughly into two categories: broadly useful synthetic methods and interesting or useful molecular structures composed of arene building blocks. Hence, the book is primarily of interest to two different groups of readers: synthetic organic chemists and those interested in fabricating useful molecular or supramolecular devices and materials.

The chapters dealing primarily with synthetic methodology include "The Suzuki Reaction with Arylboron Compounds in Arene Chemistry" by Suzuki, "Palladium-Catalyzed Amination of Aryl Halides and Sulfonates" by Hartwig, "The Chromium-Templated Carbene Benzannulation Approach to Densely-Functionalized Arenes (Dötz Reaction)" by Dötz and Stendel, Jr., "The Directed *ortho* Metalation Reaction — A Point of Departure for New Synthetic Aromatic Chemistry" by Hartung and Snieckus, "Oxidative Aryl-Coupling Reactions in Synthesis" by Lessene and Feldman, and "Oxidative Conversion of Arenols into *ortho*-Quinols and *ortho*-Quinone Monoketals — A Useful Tactic in Organic Synthesis" by Quideau. Most of these chapters are broad surveys of each field and present developments up to and including early 2002. Chapter 4 on the Buchwald–Hartwig

reaction is exceptional in that it covers this more recently developed method in a relatively long (ca. 60 pp), comprehensive review that includes 295 references through mid-2001. There are also four useful chapters dealing with synthetic activation of arenes via complexation: "Osmium- and Rhenium-Mediated Dearomatization Reactions with Arenes" by Valahovic, Keane, and Harman, "Arenetricarbonylchromium Complexes: *Ispo*, *Cine*, *Tele* Nucleophilic Aromatic Substitutions" by Rose-Munch and Rose, "Activation of Simple Arenes by the CpFe<sup>+</sup> Group and Applications to the Synthesis of Dendritic Molecular Batteries" by Astruc, Nlate, and Ruiz, and "Charge-Transfer Effects on Arene Structure and Reactivity" by Rosokha and Kochi. While some chapters also describe structural aspects, many key methods of arene synthesis are covered.

Several chapters describe synthetic access to specific classes of aromatic structures, such as "The Synthesis of Tris-Annulated Benzenes by Aldol Trimerization of Cyclic Ketones" by Boorum and Scott, "Oligounsaturated Five-Membered Carbocycles – Aromatic and Antiaromatic Compounds in the Same Family" by Haag and de Meijere, "From Acetylenes to Aromatics: Novel Routes – Novel Products" by Hopf, and "The AIDMET Reaction: Synthesis and Properties of Poly(dialkylparaphenylenethynylenes)" by Bunz. Two chapters strictly deal with structure and function of arene-derived molecular architectures: "Functional Conjugated Materials for Optonics and Electronics by Tetraethynylethylene Molecular Scaffolding" by Nielson and Diederich, and "Molecular Switching and Machines Using Arene Building Blocks" by Tseng and Stoddart. Taken together, these reviews by leading experts on the fabrication of arene-derived molecular structures and materials provide a broad, current overview of this field.

The individual chapters vary considerably in length, but all are well written and up-to-date. There is also a complete, 18-page index, including authors, compounds, name reactions, and general subjects, making this a valuable reference work. Given the nearly ubiquitous nature of arenes and the methodology for synthesizing them in organic chemistry, this book will prove a valuable addition to the personal collections of organic chemists and an essential acquisition for complete libraries in companies and academic institutions.

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**Annual Reports on NMR Spectroscopy. Volume 43.** Edited by G. A. Webb (University of Surrey). Academic Press: San Diego, London. 2001. x + 182 pp. \$119.95. ISBN 0-12-505343-6.

This volume of the continuing series of reviews on NMR spectroscopy covers three specialized areas of the technique: the study of motion in the solid state, line shapes and line shape-fitting methods, and solid-state NMR spectroscopy of low- $\gamma$  nuclei. The authors of these three sections are experts in these areas, and they provide generally useful and critical insights for researchers who are entering or active in these fields. In general, the reviews are timely and represent useful contributions; the presence of two chapters on solid-state NMR

spectroscopy makes this a particularly useful volume for NMR spectroscopists interested in solids.

The first section, entitled *Solid-State NMR Studies of Molecular Motion*, is well written and provides excellent critical insight into recent studies of dynamics in a range of materials, including polymers, host–guest complexes, inorganic materials, and biological macromolecules, among others. The author, Duer, does an excellent job of describing the main tools used in this area of NMR spectroscopy, ranging from powder line shape analyses on through relaxation time measurements and multidimensional exchange NMR. Several examples from the recent literature (her review spans 1994–1999) are described in detail to permit new and seasoned researchers alike to understand the theoretical background and application of NMR experiments for dynamics in solids. Use of both traditional <sup>2</sup>H NMR and more recent <sup>13</sup>C NMR line shapes in deciphering motional modes is explained well, as is the increasingly common method of introducing magic angle spinning to improve both the resolution and the sensitivity of the resulting spectra. Relaxation techniques are highlighted briefly, illustrating the wealth of information available in <sup>2</sup>H NMR when anisotropies in both T<sub>1Z</sub> (spin–lattice relaxation of Zeeman order) and T<sub>1Q</sub> (spin–lattice relaxation of quadrupolar order) are characterized jointly. A large part of the review focuses on the recent application of multidimensional exchange NMR experiments to decipher increasingly complex types of motion, in particular, in polymers. Some of the beneficial aspects of the multidimensional exchange approach are its "model-free" nature and adaptability through use of filtering techniques to focus on specific types of motion. There are extensive illustrations of the pulse sequences used, and a comprehensive citation list for the period under review is included.

The second section deals with NMR line shapes and line shape-fitting procedures. Although the theory presented has application to all areas of NMR spectroscopy, this will be of most interest to those involved in MRS or in vivo NMR spectroscopy, because many of the applications and examples cited are from that field of research. The section begins with an excellent mathematical introduction to the different types of line shapes that are encountered in NMR spectroscopy, although the sections on powder and quadrupolar line shapes are a bit limited, but not really an element of the review. The authors, Higinbotham and Marshall, have surveyed the literature over a fairly extensive period (1970–2000) to depict the development of approaches to fitting NMR line shapes using methods as rigorous as possible. Nonlinear least squares, linear prediction, and maximum entropy methods, among others, are discussed in terms of how they treat the data and may be suited to particular types of spectral fitting. They make a compelling case that spectra with poor sensitivity, such as those encountered routinely in MRS, are best approached by techniques that use both time-domain and frequency-domain data in the fitting. Most of the applications reviewed are to multicomponent spectra obtained with poor sensitivity and background or baseline problems, which provides an interesting contrast to more traditional high-resolution NMR spectra of pure compounds or limited reaction mixtures familiar to chemists.

The final section is a review of recent progress in solid-state NMR spectroscopy of low- $\gamma$  nuclei, which the author, M. E. Smith, defines (correctly, in my mind) as nuclei that resonate

below that of  $^{15}\text{N}$ , the normal lower-limit in most broadband solid-state NMR probes. In this comprehensive review of the literature up to March 2000, techniques applied to and results available for the relevant nuclei are concisely summarized. The author makes a point to suggest appropriate references and “setup” samples for first attempts at any of these nuclei and provides important information concerning lengths of contact times for cross-polarization to these nuclei. This review is timely, as the increasing availability of high magnetic field NMR spectrometers dedicated to solids makes research involving these difficult nuclei more tractable, if not attractive. Anyone contemplating expanding their “repertoire” of nuclei to include any of these traditionally unfavorable ones should consult this review for helpful first steps in acquiring their spectra. Others who may have been discouraged by the insensitivity of these

nuclei in the past would do well to revisit those attempts after considering this review.

Overall, this is another excellent contribution to the ongoing series of Annual Reports. The reviews are well written, cover their respective areas of the literature quite well, and provide some critical insight into approaches taken and possible future extensions. It is particularly well suited to solid-state NMR groups because two of the three sections comprise important areas of this field that have seen significant changes over the past few years, a period covered in both of these reviews.

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