Book Reviews

Advances in DNA Sequence Specific Agents, Vol. 2. Edited by Laurence H. Hurley (University of Texas at Austin). JAI Press: London. 1996. x + 246 pp. $109.50. ISBN 1-55938-166-3.

This second volume in the series *Advances in DNA Sequence Specific Agents* is a compilation of well-referenced review articles aimed at scientists with interests in the molecular mechanisms for sequence recognition of DNA. The volume is divided into two parts. Part I contains four articles dealing with methods used to evaluate the molecular basis for DNA sequence specificity. Part II contains four articles on the sequence specificity of some DNA interactive drugs. The volume appears to have been well edited with good uniformity of style between articles.

The first article in part I is contributed by Luis A. Marky, Karen Alessi, and Dionisios Rentzeperis. It discusses the thermodynamic interpretation of physical binding data of ligands and their sequence specificity as determined by isothermal titration and differential scanning calorimetries. The next article, contributed by John O. Trent and Stephen Neidle, surveys the scope and limitations of the principle molecular modeling methods in current use and provides highlights on some of their applications to understanding drug−DNA interactions. The third article is contributed by Andrew H.-J. Wang. It covers X-ray crystallographic and NMR structural studies of anthracycline−DNA complexes and the implications for rational design of DNA specific anticancer drugs. The last article of part I is contributed by Don R. Phillips. It describes a transcriptional assay of drug−DNA interactions and its application to *in vitro* eukaryotic systems.

The first article of part II is contributed by the volume editor, Jonathan B. Chaires. It covers the molecular recognition of DNA by daunorubicin. The next article, contributed by David E. Graves, discusses the covalent interactions of ethidium and actinomycin D with nucleic acids as revealed by photoaffinity labeling. The third article is contributed by Nicholas Farrell. It discusses DNA binding of dinuclear platinum complexes. The last chapter of part II, contributed by Paul B. Hopkins, covers the DNA sequence selectivity of the pyrrole-derived, bifunctional alkylating agents.

There are over 500 references to the original literature with coverage through 1994. The treatment of all topics is uniformly good. This volume would be a valuable addition to the libraries of scientists with an interest in molecular mechanisms for sequence recognition of DNA.

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Desk Reference of Functional Polymers: Synthesis and Applications. Edited by Reza Arshady (Imperial College of Science, Technology & Medicine). ACS: Washington, DC. 1997. xviii + 820 pp. $194.95. ISBN 0-8412-3469-8.

This reference book contains 42 chapters by different authors that cover a broad mix of applied polymeric materials. The book is organized into five parts: General Synthetic Methods, Radiation Effects and Applications, Optoelectronic Properties and Applications, Chemical and Physicochemical Applications, and Biomedical Applications. The word "Functional" in the title of the book is synonymous with the word "practical", and should not be mistaken with the chemist's definition meaning functionality or substituent group. This book is not designed as a basic text that categorizes the different types of polymers in existence or their physical properties, but concentrates on those polymers that have current value in specialized practical applications, such as conducting polymers, polymeric stabilizers, metal-containing polymers, luminescent polymers, polymers produced by enzymatic reactions, or polymers used in acoustic wave technology, solar-energy devices, liquid crystals, and a variety of biomedical applications, just to name a few. For instance, one would not want to look up the structure, properties, syntheses, etc. for different types of common plastics, but the chapters on Ziegler−Natta polymerization or the photophysics of polymers describe broad facets of polymer chemistry that could be of general interest. Although the word "synthesis" is also in the title, the actual amount of experimental detail is limited. A large number of general synthetic schemes are given throughout the book, although use of the primary literature would be necessary to find exact synthetic methodology. Also, those people looking for very current citations in these areas will have to look elsewhere, since references at the end of each chapter typically end in 1992 or 1993 (a few in 1994), with the majority being older than this. This desk reference is predominantly for individuals who want to know more about the characterization and application of polymers that span chemistry, physics, life sciences, and related technologies. Contributions are made from research scientists around the world that illustrate the general principles of this subgroup of polymers. The book is a valuable resource that is quite diverse and interdisciplinary in nature.

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Microbeam and Nanobeam Analysis (Mikrochimica Acta, Supplement 13). Edited by D. Benoit (Beauchamp, France), J.-F. Bresse (CNET France Telecom, Bagneux, France), L. Van't dack (University of Antwerp (UIA), Antwerp-Wilrijk, Belgium), H. Werner (Waarle, The Netherlands), and J. Wernisch (Technische Universität, Wien, Austria). Springer-Verlag: Vienna and New York. 1996. xi + 643 pp. DM252.00. ISBN 3-211-82874-5.

This volume is derived from the Fourth Workshop of the European Microanalysis Society held in Saint Malo, France, in May 1995. The volume contains articles from 10 invited speakers and 50 contributed papers. The overall focus of the volume is the analysis of various solids related to material sciences and geosciences, although articles on organic and biological materials are also included. It is an excellent book, which provides numerous broad overviews of state-of-the-art instrumental techniques (as of 1995) and many insights into how to solve the nuts-and-bolts problems faced by analysts in research laboratories.

The papers from the 10 invited speakers are well-written summaries of currently important topics in microanalysis. These papers include thorough discussions of theoretical approaches, instrumental design, and analytical aspects associated with electron probe microanalysis, electron microscopy, synchrotron-induced X-ray fluorescence analysis, particle-induced X-ray emission, cathodoluminesence spectroscopy, tomographic atom-probe imaging, and secondary ion mass spectrometry. For the most part, these papers are written in the style of a tutorial and are well-referenced, with both seminal and recent citations. These papers should appeal to a broad audience of scientists and engineers, both specialists and nonspecialists, involved in the analysis of solid materials.

The 50 contributed papers tend to focus on specific analytical problems encountered by the authors. The major analytical techniques used in these studies are electron beam microanalysis and imaging, laser ablation inductively coupled plasma mass spectrometry, secondary ion mass spectrometry, scanning probe microscopy, X-ray diffraction, electron energy loss spectroscopy, auger spectroscopy, and X-ray fluorescence spectroscopy. Although the focus of each paper tends to be relatively narrow, these papers collectively contain a large amount of useful insight into specific and general analytical problems of crystalline materials, glasses, and thin films. There are a large number of high-quality papers that are well-written and well-referenced.

Overall, this volume is an excellent reference source for those involved in the microanalysis of various solids in the material science and, to a lesser extent, geoscience communities. It is not the best "stand alone" reference for those who might have the resources to buy only one book on the subject, but it will be an excellent addition to any library or laboratory reference shelf in which this volume serves as a complement to others.

Don Elthon, *University of Houston*

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*Unsigned book reviews are by the Book Review Editor.

Transition Metal Sulfur Chemistry: Biological and Industrial Significance. Edited by Edward I. Stiefel (Exxon Research & Engineering) and Kazuko Matsumoto (Waseda University). ACS: Washington, DC. 1996. xi + 358 pp. $109.95 ISBN 0-8412-3476-0.

The ageless usefulness of sulfur is indicated by the many ancient names for its common compounds. The above book begins with this idea, citing "brimstone" and *Lapis lazuli* as two examples, and then leads to its main purpose of celebrating the versatile reaction chemistry of sulfur with transition metals. The richness of transition metal sulfur chemistry spawned a symposium at the December 1995 International Chemical Congress of Pacific Basin Societies in Honolulu, HI. This book contains the essence of that symposium.

The theme of this volume is to herald the chemistry of transition metal sulfides which find use in the seemingly disparate fields of biology and industry. The dual goals of the editors are to present a broad coverage of both areas and to lay plain the connections between them. Both goals are successfully accomplished in this book.

The volume begins with a comprehensive overview (Chapter 1) by Stiefel. Chapter 1 is a valuable introduction to the many facets of transition metal sulfur chemistry—structure, redox reactivity, catalysis, synthesis—that provides an immediate appreciation for the "dazzling array of structurally and electronically interesting compounds". Following each section of background material is a preview of how each concept receives detailed discussion in the following chapters. The overview in Chapter 1 is amply referenced, both to papers reporting recent advances and to the older, yet historically significant, literature.

After the overview, 20 chapters cover the applications of transition metal sulfur chemistry in enzyme catalysis, biological electron transfer, small-molecule activation, and industrial heterogeneous catalysis as well as the model systems developed for each application. The success of theoretical approaches to understanding enzyme catalytic sites and related catalytic materials in industry is described in several chapters. Generally each chapter provides clear introductory material that is within easy grasp of a wide audience. The novice is thereby eased into each area, an important accomplishment given the breadth of topics covered in this volume. Most chapters cite recent literature from the last five years. The style is similar to other symposium volumes published by the ACS wherein the contributing authors weave their recent results into discussions of current problems. The book is nicely illustrated with figures clearly illustrating the variety of metal sulfide structures in addition to spectral data, graphs, and tables.

As anticipated by the editors, this volume will nicely serve both newcomers to the transition metal sulfide area and veterans of this research who may be curious about related chemistry in other fields. The value of this book is not limited to research. Chemistry courses ranging from first-year chemistry, through intermediate and advanced inorganic courses, to specialized seminars on bioinorganic chemistry, materials science, and spectroscopy would be enhanced by referring to the many contemporary examples from this book.

Sharon J. Nieter Burgmayer, *Bryn Mawr College*

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Advances in Nitrogen Heterocycles, Vol. 2. Edited by Christopher J. Moody (Loughborough University). JAI Press: Greenwich, CT. 1996. ix + 300 pp. $109.50. ISBN 0-7623-0056-6.

Volume 2 of *Advances in Nitrogen Heterocycles* contains a short preface by the series editor (C. J. Moody), six chapters which focus on β-lactams, pyrroles, pyridoacridine alkaloids, and 1-acylpyridinium salts, and an index. With the exception of Chapter 4, remaining chapters contain a descriptive abstract and all have a section devoted to references.

Chapter 1 by P. R. Guzzo and M. J. Miller opens with a brief review of recent chiral methodology used in preparing the β-lactam ring. Also highlighted is the utility of *N*-hydroxy-β-lactams. The selective pattern of nucleophilic addition to the α-carbon is discussed as well as plausible mechanistic routes.

Chapter 2 by R. Neier focuses on porphobilinogen (PBG), a trisubstituted pyrrole. The synthesis of this unique pyrrole and its dedicated role in the biosynthesis of tetrapyrroles are covered. The synthetic approaches leading to PBG are reviewed, and the novel, preparative efforts conducted in Neier's laboratory to approximate the biosynthetic pathway leading to PBG are discussed. A portion of this chapter is devoted to the enzyme prophobilinogen synthase, its inhibition and mechanistic role in the bioformation of PBG.

Chapter 3 by C.-K. Sha piggybacks on Chapter 2 in that it too focuses on pyrrole. The role of pyrroles condensed with other heterocyclic systems and their synythetic utility is reviewed. Three novel reactions, *i.e.*, tandem intramolecular 1,3-dipolar cycloaddition and cycloreversion, phosphinimine−alkylidenemalonate cyclization, and retro-malonate addition, developed by the author in search of new preparative routes for natural products, are presented. A short section on the application of the retro-malonate addition reaction for the practical synthesis of dihydropyridazaines, pyridazines, and *o*-(dimethylamino)methylarenecarbonitriles is also included. Like Chapter 3, Chapter 4 by C. Janiak and N. Kuhn covers the chemistry of pyrrole. This chapter concentrates on metal complexes of the deprotonated pyrrole anion, namely, the azacyclopentadienyl anion. The stability, physicochemical properties, and syntheses of these complexes are presented. The authors provide a detailed review of this fascinating topic and include some recent advances made in this field.

The last two chapters center on different aspects of pyridine chemistry. Chapter 5 by A. M. Echavarren is devoted to the synthesis of pyridoacridine alkaloids, a family of heterocycles isolated from marine organisms. The synthetic approaches to this ring system involved cycloaddition of azadienes with quinolones and palladium-catalyzed cross-coupling reactions. Such methodology has led to the total synthesis of amphimedine and isoascididemin. Chapter 6 by D. L. Comins and S. P. Joseph covers the synthesis of 1-acyl-1,2-dihydropyridines and 1-acyl-2,3-dihydro-4-pyridones from 1-acylpyridinium salts. The use of these dihydropyridine synthons in the asymmetric preparation of piperidine, quinolizidine, indolizidine, and perhydroquinoline alkaloids are reviewed. The ease of preparation and their stability make the 1-acyldihydropyridines ideal intermediates in the synthesis of the aforementioned alkaloids.

This edition (Volume 2) of this series is extremely well-illustrated and remarkably free of errors. The references found in the six chapters are current. For those serious heterocyclic chemists, *Advances in Nitrogen Heterocycles* is a worthwhile investment. I highly recommend this volume and future issues for inclusion in your personal library.

Raymond P. Panzica, *University of Rhode Island*

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Handbook of Hydroxyacetophenones. By Robert Martin. Kluwer Academic: Dordrecht. 1997. xi + 532 pp. $272.00. ISBN 0-7923-4564-9.

Acylphenols or hydroxyacetophenones are used as the starting material for a large number of syntheses in organic chemistry. The dictionary covers over 1400 hydroxyacetophenones methodically classified under the official nomenclature of "ethanones" according to the International System (IUPAC) and the recommendations given in the Chemical Abstracts Collective Index (9CI) since 1972. For each compound described, the different protocols of synthesis are presented as well as the main physicochemical characteristics and references of spectroscopic data.

There are references, a molecular formula index, Chemical Abstracts registry numbers, a usual names index, and common abbreviations.

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The Physics of Polymers: Concepts for Understanding Their Structures and Behavior, Second Corrected Edition. By Gert R. Strobl (Albert-Ludwigs Universitat). Springer: Newark. 1997. $39.00. xi + 439 pp. ISBN 3-540-63203-4.

The first edition of this book was reviewed and published in the *Journal of the American Chemical Society* on April 23, 1997, Volume 119, No. 16. This second corrected edition is identical to the first edition except the author has corrected the "inevitable mistakes" which occurred. There is a glossary of symbols, figure references, bibliography, and subject index.

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