

Book Reviews*

Catalytic Asymmetric Synthesis. Second Edition. Edited by Iwao Ojima (State University of New York at Stony Brook). Wiley-VCH: Weinheim, New York, Chichester, Brisbane, Singapore, Toronto. 2000. xiv + 864 pp. \$125.00. ISBN 0-471-29805-0

This second edition provides updated and expanded coverage of this rapidly growing field since the first edition was published in 1993. An attempt has been made to cover all major asymmetric reaction types, and in my opinion the authors have been successful in this. Each chapter has been written by experts in the field, the format has been standardized such that many specific reactions are shown, and the text is thoroughly referenced. Many of the references are more recent than the first edition, yet an attempt—again, successful in my opinion—has been made to preserve the background and descriptions of the initial discovery of the major asymmetric reactions (e.g., the Sharpless asymmetric epoxidation). This book will be indispensable both to those who are doing asymmetric synthesis and to those who are developing new such processes.

Charles Garner, *Baylor University*

JA015216V

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Dictionary of Renewable Resources: Second, Revised and Enlarged Edition. Edited by Hans Zobelein (Schliersee, Germany). Wiley-VCH: Weinheim. 2001. xx + 408 pp. \$125.00. ISBN: 3-527-30114-3.

This book, like the first edition, lists the importance, standard technologies and derivatization processes, and major applications of renewable resources obtainable from plants and animals and of the substances derived from them. Each entry also defines the economic importance and possible future development of the resource, when applicable. Unlike the first edition, this edition offers keyword indexes in English, German, and French.

JA0153013

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CE and CEC Reviews 2001. Edited by Ziad El Rassi (Oklahoma State University). Wiley-VCH: Weinheim. 2001. x + 596 pp. \$80.00. ISBN: 3-527-30255-7.

All review articles on capillary electrophoresis (CE) and capillary electrochromatography (CEC) and related topics that were published in the journal *Electrophoresis* in the year 2000 are compiled in this book. The articles are organized under the following section headings: Overviews and Fundamental Aspects; Techniques, Methodologies, and Applications; Microfabrication, Miniaturization, and Capillary Array Electrophoresis; Stationary Phases, Pseudo-Stationary Phases, Separation Media, and Additives; Chiral Separation Principles and Applications; and Derivatization, Preconcentration, Detection, and Applications. The book ends with an author and a keywords index.

JA015302V

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Systematic Nomenclature of Organic Chemistry: A Directory to Comprehension and Application of Its Basic Principles. By D. Hellwinkel (Universität Heidelberg). Springer-Verlag: Berlin, Heidelberg, New York. 2001. vi + 228 pp. \$19.95. ISBN: 3-540-41138-0.

Dieter Hellwinkel has produced a brief but comprehensive introduction to the systematic nomenclature of organic compounds. Although familiarity with structure-based chemical nomenclature rules is essential for accurate communication among currently active researchers, as well as for understanding names that may have been generated more than a century ago, many chemists pay little attention to these guidelines. Using the current recommendations of The International Union of Pure and Applied Chemistry (IUPAC), Hellwinkel offers simple and concise

guidelines for producing systematic names, with comments on the Chemical Abstracts Service and Beilstein Institute variations of these rules.

The primary focus is on the nomenclature of simple organic molecules, but sections on the nomenclature of rings, carbohydrates, and organometallics are included. Brief discussions on the citation of stereochemistry and isotopic labels are also given. Acknowledging that computer programs have been developed to generate names from some structures, Hellwinkel provides an overview of the rules that serve as the foundation of these algorithms. Acquaintance with these rules provides for a better understanding of the computer-generated names and allows for a critical analysis of the output.

The book contains a comprehensive list of current references and will be suitable for undergraduate or graduate students of organic chemistry. Anyone who needs to create or interpret the names found in the primary or secondary literature would find this book to be useful.

Patton M. Giles, Jr., *Chemical Abstracts Service*

JA015293Q

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Surface and Colloid Science. Volume 16. Edited by Egon Matijevic (Clarkson University). Kluwer Academic/Plenum Publishers: New York, Boston, Dordrecht, London, Moscow. 2001. xiv + 408 pp. \$115.00. ISBN: 0-306-46456-X.

This book, the 16th volume of a well-respected series that has been edited by Professor Matijevic since 1969, is composed of three chapters on unrelated topics. Each chapter presents a thorough review and analysis of the literature on a fairly narrow topic.

The most ambitious chapter, "Ionization Processes and Proton Binding in Polyprotic Systems: Small Molecules, Proteins, Interfaces, and Polyelectrolytes", is a collaborative effort by Borkovec, Jönsson, and Koper. This chapter is 230 pages long and has 398 references. Protonation of nearly every soluble or insoluble material with multiple protonation sites is thoroughly discussed. The chapter begins by covering basic definitions and concepts, such as measurement of pH and Debye–Hückel and Poisson–Boltzmann molecular models, and then explores increasingly complex systems capable of protonation, including monoprotic acids and bases, proteins, polyelectrolytes, and ionizable interfaces. A useful table of PZC values of various oxides and hydroxides is included under the latter topic. The chapter ends with an appendix titled "Electrostatics of Point Charges" that summarizes classical electrostatic field theory and two additional appendixes that describe statistical mechanical approaches using the Ising model and the affinity distribution method. Putting this information in appendixes keeps the chapter from becoming cluttered with detailed derivations. The authors not only give state-of-the-art information on experimental issues and theoretical development, but also offer keen insight into the directions in which researchers are moving to improve the field. This chapter will probably be the definitive discussion of the topic for a number of years.

Fukushima and Yamaguchi wrote the second chapter titled "Physical Chemistry of Cetyl Alcohol: Occurrence and Function of Liquid Crystals in O/W Creams". Commercial cetyl alcohol is widely used in the preparation of O/W emulsion-type cosmetics or pharmaceuticals. This chapter contains some very useful tables that list various nomenclatures used for cetyl alcohol by country, their dates of definition, and composition of material. Crystal structures, melting points, and transition points of higher alcohols and their mixtures in hydrated and anhydrous states are given in detail, and discussions of phase diagrams of ternary surfactant/alcohol/water systems, X-ray diffraction analysis, optical microscopy, viscosity, and other properties are also provided. The relationship between oil-in-water emulsion stability, the formation of liquid crystals and spherulites, and alcohol polymorphism are outlined, and a valuable literature survey on emulsions and interfacial films containing higher alcohols is included. The synergism of mixtures of alcohols in emulsion stability is emphasized in this chapter. Unfortunately, the references are dated, with one 1992 reference being the only post-1990 citation.

*Unsigned book reviews are by the Book Review Editor.

The third chapter in the book is "Combined Application of Radiochemical and Electrochemical Methods for the Investigation of Solid/Liquid Interfaces" by Varga, Hirschberg, Baradlai, and Nagy. In this chapter, the application of radiotracer and electrochemical methods in studies of sorption at solid/liquid interfaces is examined. The chapter starts with a thorough tabulation of experimental methods used to study metal surfaces, the interfacial region where specific adsorption occurs, and the bulk electrolyte solution next to the surface, putting the radiotracer techniques in perspective. Direct radiotracer methods are described. For example, one of the most valuable methods is "measuring after immersion", wherein the surface activity of samples in contact with the solution containing the radiolabeled adsorbate is measured. After subtracting the activity from the solution, adsorption can be deduced. Details of the methodology are given as well as recent progress, and results from selected systems are tabulated. Some areas of specific application that are covered include corrosion prevention and radioactive decontamination associated with cooling-water circuits of nuclear reactors. The literature survey is up-to-date on this quite narrow topic.

John F. Scamehorn, *University of Oklahoma*

JA015272W

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Encyclopedia of Chromatography. Edited by Jack Cazes (Florida Atlantic University). Marcel Dekker: New York, Basel. 2001. xxx + 928 pp. \$250.00. ISBN: 0-8247-0511-4.

This book contains over 300 chapters written by over 180 experts in the field of chromatography and should serve as a valuable resource for information on chromatographic techniques and methodologies. Some of the topics covered include high-performance liquid chromatography, thin-layer chromatography, gas chromatography, capillary electrophoresis, affinity chromatography, field-flow fractionation, counter-current chromatography, supercritical fluid chromatography, gel permeation chromatography, size-exclusion chromatography, and hyphenated techniques. Detailed references or suggested further readings are provided for each chapter.

JA015327U

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Scientific and Technical Acronyms, Symbols, and Abbreviations. By Uwe Erb (University of Toronto) and Harald Keller (Technical Translator and Writer, affiliation unknown). Wiley-Interscience: New York. 2001. xvi + 2100 pp. \$250.00. ISBN: 0-471-38802-5.

This book provides in alphabetical order the words and phrases of approximately 200 000 scientific and technical acronyms, symbols, and abbreviations. Explanatory information is also provided by using parentheses to categorize, specify, or define an entry and square brackets to explain where an entry is most commonly encountered or to provide alternate forms of the abbreviation or acronym. An appendix that contains various reference tables, such as tables of the Greek alphabet and mathematical symbols and signs, completes the book.

JA0153262

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Progress in Heterocyclic Chemistry. Volume 12. Edited by Gordon W. Gribble (Dartmouth College) and Thomas L. Gilchrist (University of Liverpool). Pergamon (an Imprint of Elsevier Science): Amsterdam, New York. 2000. x + 376 pp. \$231.50. ISBN: 0-08-043882-2.

This book reviews the most important work published on heterocyclic ring systems—from three- to eight-membered systems and larger—during 1999, with some earlier material presented where appropriate. Three specialized reviews, "Boron Heterocycles as Platforms for Building New Bioactive Agents", "Heterocyclic Phosphorus Ylides", and "Palladium Chemistry in Pyridine Alkaloid Synthesis" are also included.

JA0153130

10.1021/ja0153130

Photonic Crystals and Light Localization in the 21st Century. Edited by Costas M. Soukoulis (Iowa State University). Kluwer Academic Publishers: Dordrecht, Boston, London. 2001. xii + 606 pp. \$191.00. ISBN: 0-7923-6947-5.

This book was derived from the papers presented at the NATO Advanced Study Institute meeting on Photonic Crystals and Light Localization held in Crete in June 2000 and covers the latest theoretical and experimental studies of photonic crystals, light localization, and random lasers. The chapters are organized into the following sections: Photonic Crystals: Introduction; Photonic Crystals: Fabrication and Application; Photonic Crystals: Fabrication by Self Organization; Photonic Crystals: Applications; Photonic Crystals: Metallic Structures; Random Lasers; Localization of Light; and Photonic Crystals and Nonlinearities. References as recent as 2000 are included.

JA0153114

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Metabolic Maps. Pesticides, Environmentally Relevant Molecules, Biologically Active Molecules. By Hiroyasu Aizawa (HRCI Hiro Research Consultancy Inc., Tokyo, Japan). Academic Press: San Diego. 2001. xiv + 330 pp. \$119.95. ISBN: 0-12-045605-2.

This book provides degradation and metabolic profiles of pesticides, pharmaceuticals, natural products, and compounds of environmental or toxicological concern in a variety of environmental systems. For each compound, 3D chemical structures, predicted physicochemical parameters, log *P* and SMILES chemical notations are given. The literature references have been updated since the publication of the previous edition, entitled *Metabolic Maps of Pesticides Volume 2*.

JA015308K

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Chemical Sciences in the 20th Century: Bridging Boundaries. Edited by Carsten Reinhardt (Universität Regensburg). Wiley-VCH: Weinheim. 2001. xviii + 282 pp. \$75.00. ISBN: 3-527-30271-9.

This book traces the development of the discipline of chemistry as an "interconnected patchwork of scientific specialties" throughout the 20th century. The chapters are organized into three parts: "Theoretical Chemistry and Quantum Chemistry", which links chemistry to quantum physics and mathematics; "From Radiochemistry to Nuclear Chemistry and Cosmochemistry", which covers its connection to nuclear physics, astronomy, and the geological sciences; and "Solid State Chemistry and Biotechnology", which relates chemistry to solid state physics, biology, and technology. An overview chapter on the history of organic chemistry and the development of physical organic chemistry, physical instrumentation and organic chemistry, and bioorganic chemistry precedes these three sections.

JA015307S

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Metal Ions in Biological Systems. Volume 38. Probing of Proteins by Metal Ions and Their Low-Molecular-Weight Complexes. Edited by Astrid Sigel and Helmut Sigel (University of Basel, Switzerland). Dekker: New York and Basel. 2001. xlviii + 690 pp. \$250. ISBN 0-8247-0289-1

The objective of this volume is to present timely reviews of the current literature describing the use of metal ions and their low-molecular-weight complexes to probe the structure of proteins and, to a somewhat lesser extent, the use of metal complexes as models for the active site of metallo-enzymes. In the first chapter, an excellent introduction is provided that presents the fundamentals of the peptide bond, its interactions with metal ions, and the energetics and linear free energy relationships (LFERs) associated with metal coordination and peptide bond hydrolysis. The next seven chapters treat different aspects of metal ion and metal complex involvement in peptide hydrolysis and cleavage reactions, followed by four chapters that deal with the role of metal ions in protein footprinting, cross-linking, and oxidation. Another chapter is devoted to metal-ion-derivatized peptides for electrochemical detection, and the last two chapters present a discussion of the use of low-molecular-weight complexes of Zn, Cu, and Fe as synthetic models that mimic the structure and function of

active sites in metallo-proteins. The referencing is complete and timely overall. A slight detraction, but not serious enough to prevent purchase, is the uneven chapter depth and breadth. The last chapter, which covers Cu and Fe models and includes an emphasis on a supramolecular approach to mimic biological electron transfer and oxygen activation, is almost 200 pages long with over 800 references. The remaining 14 chapters have an average length of 30 pages.

The scope of this volume is such that it achieves the editors' objectives. The book can be used both as a critical review and as a guide to the literature, as well as a reference for methods or approaches available to study the interactions of metals and their complexes with proteins. This volume is recommended to those interested in the pedagogical and experimental approach to (i) understanding the mechanism of peptide hydrolysis that may clarify the role of metal ions in active sites of proteases; (ii) selective peptide cleavage for protein sequencing; (iii) footprinting to study protein conformations, peptide linkage accessibility, and macromolecular surface architecture and mapping; (iv) the semisynthesis of proteins by recombination of protein fragments; (v) the interactions between proteins and redox active metal probes for sensing and structural applications; and (vi) the design and use of model complexes for peptide hydrolysis, electron transfer, and oxygen activation.

This volume continues the long and excellent tradition established by the *Metal Ions in Biological Systems* series. Volume 38 is a must for all chemistry, biology, and medical libraries and should be on the personal bookshelves of biological and inorganic chemists interested in the topics described above.

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JA015248I

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Asymmetric Oxidation Reactions. Edited by Tsutomu Katsuki (Kyushu University). Oxford University Press: Oxford. 2001. Xviii + 244 pp. \$125.00. ISBN: 0-19-850201-X.

This 10th volume in the *Practical Approaches in Chemistry* series maintains the high standard set in prior editions by serving as a useful reference to contemporary topics of research and by providing detailed technical guidance in the form of representative experimental protocols.

This particular issue presents an excellent range of reviews that capture key developments in the field of asymmetric oxidation chemistry and should appeal to a broad readership with interests in asymmetric synthesis and enantioselective catalysis. Each chapter faithfully provides key references, is clearly presented and copiously illustrated.

The volume is partitioned into five chapters: (I) Oxidation of the C–H Bond, (II) Oxidation of the C=C Bond, (III) Oxidation of Carbonyl Compounds, (IV) Oxidation of Heteroatoms, and (V) Oxidation Using a Biocatalyst. Each chapter is composed of one or more reviews authored by internationally renowned experts in the field. Rather than presenting an exhaustive list of recent citations, narratives develop an historical perspective whereby key conceptual and technical advances are introduced. An accurate depiction of the state-of-the-art is galvanized by explicit discussions of scope and limitation for each method as a function of substrate. This approach should be especially useful to newcomers, who are sure to benefit from concise overviews of specialized fields of research.

The foremost distinguishing characteristic of this series involves the provision of detailed step-by-step experimental procedures, which are presented in conjunction with each discussion. Indeed, this volume may be viewed as a practical guide for those directly engaged in research "at the bench". For each transformation, a list of required reagents and equipment is given, along with schematic depictions of reaction assemblies, precautions for the handling of each laboratory material, and assorted recommendations, for example, choice of solvent. In many cases, experimental procedures for the synthesis of the reagent/catalyst are also given.

In summary, this volume presents an excellent overview of the field of asymmetric oxidation. Attendant experimental procedures allow the reader to assess the applicability of a given method toward their particular research challenge, making this book an indispensable "how-to" manual for chemists actively participating in research. Withstanding occasional English usage errors, the text is relatively free of mistakes. This volume represents an important contribution to the field and should be considered an essential addition to the modern research library or personal collection.

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