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BOOK REVIEWS

Houben−Weyl: Methods of Organic Chemistry. Additional and Supplementary Volumes to the 4th Edition. Volume E 22A. Synthesis of Peptides and Peptidomimetics. Editor-in-Chief, Murray Goodman (San Diego, CA). Georg Thieme Verlag: Stuttgart and New York. 2002. xxviii + 902 pp. $1895.00. ISBN 3-13-219604-5.

This book is the first volume of four in the E22 series covering the essentials of peptide and peptidomimetic research. Its chapters are organized under the following headings: Scope of the Volumes (which delves into the history and general concepts of research in peptide synthesis), Protection of Functional Groups, Peptide Bond Formation, and Synthesis of Peptides. A general list of abbreviations and a table of abbreviations for amino acids complete the book.

JA025221E

10.1021/ja025221e

Science of Synthesis: Houben−Weyl Methods of Molecular Transformations. Volume 4. Organometallics: Compounds of Group 15 (As, Sb, Bi) and Silicon Compounds. Volume Editor: Ian Fleming (Cambridge, U.K.). Georg Thieme Verlag: Stuttgart and New York. 2002. xlvi + 1060 pp. $1740.00. ISBN 3-13-112171-8.

This volume devotes a chapter each to arsenic, antimony, and bismuth compounds and 42 chapters to the various silicon compounds used in organic synthesis. The reason for this, as explained in the preface, is because silicon plays a much larger role in the current practice of organic synthesis than do the group 15 elements. In addition, arsenic, antimony, and bismuth were well-covered in *Houben−Weyl* earlier, and there have been no significant advances since this earlier coverage. All chapters emphasize the synthesis of the compounds in question and most also cover the uses in synthesis of the different subclasses of compounds. A keyword index, an author index, and a list of abbreviations complete the volume.

JA0252227

10.1021/ja0252227

Organic Reactions. Volume 59. Editor-in-Chief: Larry E. Overman (University of California, Irvine). J. Wiley & Sons: New York. 2002. x + 742 pp. $125.00. ISBN 0-471-17655-9.

Each chapter published in the series *Organic Reactions* is devoted to a single reaction or phase of a reaction, which is selected on the basis of wide applicability. Volume 59 consists of one chapter, "Reductive Aminations of Carbonyl Compounds with Borohydride and Borane Reducing Agents". As with other volumes in the series, the book concludes with the following sections: Cumulative Chapter Titles by Volume; Author Index, Volumes 1−59; and Chapter and Topic Index, Volumes 1−59. This volume includes a brief description of the career of D. J. Cram.

JA025224R

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Science of Synthesis: Houben−Weyl Methods of Molecular Transformations. Volume 11. Hetarenes and Related Ring Systems: Five-Membered Hetarenes with One Chalcogen and One Additional Heteroatom. Volume Editor: Ernst Schaumann (Clausthal-Zellerfeld, Germany). Georg Thieme Verlag: Stuttgart and New York. 2002. lii + 1160 pp. $1740.00. ISBN 3-13-112261-7.

As the title suggests, this book covers the synthesis of five-membered hetarenes with one chalcogen and one additional heteroatom. Monocyclic rings are covered, as well as annulated derivatives, particularly benzoannulated systems, and other examples of arenoannulation and hetarenoannulation. There is also a chapter on the chemistry of tri- or tetraheterapetalenes. This volume concludes with a keyword index, an author index, and a list of abbreviations.

JA025223Z

10.1021/ja025223z

Metal Nanoparticles: Synthesis, Characterization, and Applications. Edited by Daniel L. Feldheim (North Carolina State University) and Colby A. Foss, Jr. (Georgetown University). Marcel Dekker, Inc.: New York and Basel. 2002. x+ 338 pp. $150.00. ISBN: 0-8247-0604-8

Although metal nanoparticles have found applications for centuries in paints and pigments, only recently have they demonstrated promise in the development of the next generation of electronic devices and chemical sensors. In the past few decades, a great deal of progress has been made in both the synthesis and characterization of these systems. The ultimate goal of much of this research is to understand how size, shape, and ordered assembly affect the electronic and optical properties of these materials. Moreover, the development of new techniques to study and control these factors is now just emerging to provide sophisticated tools for assembling and chemically tailoring material properties to meet particular applications. To this end, the editors of this book have gathered recent reviews from many of the leading researchers to provide a broad survey of progress over the past few years.

The main focus of the book is on metal particles for uses in areas other than catalysis. In agreement with most of the research

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10.1021/ja025221e CCC: $22.00

in this area, the majority of the pages of this volume are devoted to the discussion of noble metal nanoparticles. The book contains several excellent chapters that describe new developments in all essential areas of nanoscience, including synthesis, theory, characterization, and applications. However, one essential drawback is that some of the chapters present research solely from the authors' laboratories rather than from the larger community; however, this is partly due to the fact that many of the authors are the ones responsible for creating entirely new frontier areas of nanoscience research.

Intentionally or not, the editors have arranged this volume so that each of the chapters in the book is self-contained. No effort was made to interconnect chapters. Nonetheless, many chapters do complement each other nicely, because they cover different aspects of similar problems. This is particularly true for the chapters that deal primarily with the study of gold particles. Other chapters, while providing excellent reviews of a particular area, seem oddly out of place, an example being the chapter on catalytic transition metal clusters. One distracting aspect of this book is that the editors made little effort to format some of the sections—they appear to be hastily assembled with figures that are oddly sized or unnecessarily included.

On the whole, the book offers some outstanding reviews of metal nanoparticle research in the past decade and efficiently gathers these into one volume. Unfortunately, because the book is a collection of reviews from individual laboratories, the text reads more like a published conference proceeding rather than a comprehensive review of the field. The editors' overview provides some introduction to the area for the novice but provides little insight into how the different chapters are organized or how they complement one another. In summary, newcomers to the field will find good introductions to several key areas in metal nanoparticle research, but the largest audience for this book will be among specialists seeking reviews of the work of a particular research laboratory.

David A. Vanden Bout, *University of Texas at Austin*

JA015381A

10.1021/ja015381a

Optimization of Solid-Phase Combinatorial Synthesis. Edited by Bing Yan (ChemRx Advanced Technologies, South San Francisco, CA) and Anthony W. Czarnik (Sensors for Medicine and Science, Inc., Germantown, Maryland). Dekker: New York and Basel. 2002. xi + 385 pp. $175.00. ISBN 0-8247-0654-4.

This multiauthored book is focused on improving the quality of the combinatorial library by mainly describing, to quote the editors, "solid-phase synthesis optimization issues with solution-phase issues in mind ... ". Many real-world examples and case studies that cover both successful and unsuccessful technological approaches to optimizing such libraries are provided in the 15 chapters. Some of the topics covered include massively parallel and split-and-pool synthesis, a four-step approach to optimizing solid-phase combinatorial synthesis, and using solid-phase techniques to optimize solution-phase synthesis. Most of the chapters appear to be referenced through 1999, but a few of them have references as recent as 2000 and 2001.

JA0153924

10.1021/ja0153924

Carbohydrate Bioengineering: Interdisciplinary Approaches. Edited by Tuula T. Teeri (Royal Institute of Technology, Stockholm), Birte Svensson (Carlsberg Laboratory, Copenhagen), Harry J. Gilbert (University of Newcastle upon Tyne), and Ten Feizi (Imperial College, Harrow). Royal Society of Chemistry: Cambridge, U.K. 2002. x + 196 pp. $139.00. ISBN: 0-85404-826-X.

The chapters in this book are based upon oral presentations given at the 4th Carbohydrate Bioengineering Meeting in Stockholm in June 2001. The first section of the book presents the meeting's keynote lecture, which addresses the latest progress in glycosynthase research. The remaining chapters are organized under the following topics: Structure−Function Studies of Carbohydrate-Active Enzymes, Protein Engineering of Carbohydrate-Active Enzymes, Domain Structure and Engineering, Chemo-Enzymatic Carbohydrate Synthesis, Enzymology of Plant Cell Wall Carbohydrates, and Information Mining in Genomes and Glycomes. References are current up to 2001, but there is no index.

JA025235K

10.1021/ja025235k

Theoretical Biochemistry: Processes and Properties of Biological Systems. Theoretical and Computational Chemistry 9. Edited by Leif A. Eriksson (Uppsala University). Elsevier: Amsterdam. 2001. xiv + 704 pp. $372. ISBN: 0-444-50292-0.

With the completion of several genomes and the advent of massive new structural and functional genomics efforts, the time is right for a comprehensive update in the field of theoretical and computational biochemistry. This collection of reviews by recognized experts in many fields is an important contribution toward achieving this goal. The chapters cover a wide-range of applications, including metalloproteins, free radical chemistry and enzymology, enzyme-ligand interactions, drug design, general enzymology, and G-protein-coupled receptor (GPCR) modeling. The computational techniques range from empirical force-field-based calculations of large systems to high-level correlated ab initio and density functional theory (DFT) calculations of small molecules. Many chapters stress the importance of dynamics, and several promising new approaches for improving molecular dynamics simulations are presented.

Most of the chapters are well-written, although attentive readers will have no trouble spotting several grammatical or typographical errors. References for each chapter are extensive and generally include work up to the year 2000, but some chapters fall short of this by a year or two. Unfortunately, the chapter on GPCR modeling is in the latter category, thus missing all of the recent and exciting crystallographic data on rhodopsin. Graphics are often low-resolution but readable. Color graphics are used in only one chapter, but they would clarify and enhance

many details in other places. Although some chapters are amply illustrated, others could have used more graphics. The overall format, font size and style, and reference format vary from chapter to chapter, giving the book a "homemade quality" that is hard to reconcile with its price.

Despite the cosmetic limitations, the chapters are packed full of very good science. The authors are experts in computational and theoretical biochemistry, and the chapters are organized by application. Thus, the book as a whole would be easier to read by an experimental enzymologist, for example, than by a person developing new functionals. This organization leads to a certain amount of unavoidable redundancy in introductions to techniques. Researchers working on any of the applications covered in the book will find very stimulating chapters that do a fine job of demonstrating the power of combining theory with experiment. There is a heavy emphasis on radicals, so researchers in these areas should be especially pleased. Probably the best audience would be theoreticians wishing to expand their applications or students in computational biochemistry who want to learn how to approach new problems. Unfortunately, the index is not extensive enough to allow a development person easy access to topics of interest.

Some of the consistent pleasures of the book, found in almost every chapter, are the thoughtful and helpful descriptions about choice of models and level of theory. Anybody who has done a calculation on a biological molecule knows that there often exists a difficult balance between level of theory, size of the molecule (or fragment thereof), role of solvent, length of dynamics simulation, and available computational resources. And despite the fact that computational resources are better and cheaper than ever, this challenging balance still remains, but the problems available for study become more realistic. This book makes it apparent that computational power has reached a point at which theoretical approaches are important additions to almost any biochemical investigation.

Finally, this is more a "what is possible" than a "how to" book. Many of the methods and approaches covered require a significant amount of mathematical and theoretical background. Perhaps one day, some of the theoretical approaches will become as important and routine in experimental laboratories as gel electrophoresis. In the meantime, for people who can afford the $372.00, the material in this book should provide ample motivation for new collaborations between theoreticians and experimentalists.

Arthur S. Edison, *University of Florida*

JA015343R

10.1021/ja015343r

Signal Processing for Magnetic Resonance Imaging and Spectroscopy. Edited by Hong Yan (University of Sydney). Marcel Dekker, Inc.: New York and Basel. 2002. xx + 646 pp. ISBN 0-8247-0653-6.

This book, which is in the series *Signal Processing and Communications*, gives discussions of image analysis in magnetic resonance imaging. It is divided into three sections: (1) Image Reconstruction and Restoration, (2) Image Segmentation and Analysis, and (3) Spectroscopic Signal Processing. Many articles are written by specialists in image analysis, and some are quite mathematical as a result. The examples in the articles are almost exclusively from medical uses of the technique, rather than from chemistry, materials science, or engineering. In particular, I did not find any mention of published applications to analysis of polymer flow or orientation in materials, areas that might be of interest to chemists and engineers. Even when spectroscopic analysis is discussed, the materials are biological. In fact, the articles on time-domain spectroscopic quantification and multidimensional NMR spectroscopic signal processing seem somewhat out of place in a book that is focused so strongly on image processing in medical magnetic resonance.

In conclusion, the audience that is addressed is interested in the arcana of image-processing algorithms for medical experiments. This is not a book for a general audience interested in an introduction to imaging. For anyone interested in the computational aspects of imaging, I am sure this is a lucid presentation of the fundamentals and applications of a technique in use throughout the world.

Cecil Dybowski, *University of Delaware*

JA0252330

10.1021/ja0252330

Emulsions: Theory and Practice. Third Edition. by Paul Becher (Wilmington, DE). Oxford University Press (In Partnership with American Chemical Society): Oxford. 2001. x + 514 pp. $225.00. ISBN: 0-8412-3496-5.

This book covers much more interfacial science than the title would indicate, and for this reason, it has been a remarkably useful resource since the first edition in 1957 and the second in 1965 (which has remained in print). As in the previous editions, Dr. Becher has provided an overview of emulsion science that truly encompasses theory to practice. Therein lies the uniqueness and value of the expanded third edition. In concise, lucid text, the author describes the fundamentals of why and how emulsions form and are stabilized. As indicated, the scope of the subject matter is quite extensive; for example, it delves into basic principles of interfacial chemistry, particle-size analysis, and electrical double-layer theory, which are, of course, crucial to emulsion science but which could have easily been considered prerequisite knowledge. This book is neither an introductory survey nor a detailed treatise, but rather a bridge between them that provides the necessary resources to facilitate further study and inquiry. As such, it could be a stand-alone text for a college or graduate level course in colloid or interfacial chemistry. Unfortunately, the cost is probably prohibitive for such purposes.

Perhaps the strongest portion of the book is the multiple-chapter discussion (Chapters 4−8) of emulsion stability and instability, covering simple to advanced theories of emulsion stability in Chapters 4 (simple) and 5 (advanced), creaming, inversion, and ripening in Chapter 6, and emulsion instability in Chapters 7 (theory) and 8 (demulsification). By contrast, the weakest chapter is the last, Chapter 14, "Determination of the Properties of Emulsions", which should be of importance to most readers but is given a somewhat cursory treatment. More contemporary illustrations of some instrumentation could certainly have been used. In fact, this chapter might have worked better if it were placed after Chapter 3, "Physical Properties of

Emulsions", where it would have directly complemented the material in that chapter. In addition, this placement would have ushered in the series of chapters on emulsion stability and instability, where applications of the various methods of analysis could then be visualized and understood.

With regard to reference citations, there is a general lack of timeliness, which is duly acknowledged by the author in the preface. Nonetheless, I find them to be valuable resources. As is also indicated in the preface, terms and units are generally preserved in the form used in the citations. Although doing so may have facilitated preparation of the text, this may be inconvenient for some readers. On the other hand, a nice feature is the frequent definitions of useful terms, which should be especially appealing to newcomers in the field. Of particular note also are the footnotes and appendices, which provide factual and anecdotal information, along with delightful insights about the author. Last, the indexing is sufficiently detailed to be a useful portal of entry into the text.

All in all, the third edition of *Emulsions: Theory and Practice* should continue to be a unique and valuable resource for workers and students in all levels of emulsion research and applications science. In a time in which so many books are written by multiple authors, it is refreshing to read a coherent and focused chapter-by-chapter book that results from single authorship. This is an information-rich and comfortable book to use; as a single volume work in this field, it does not get much better.

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JA015364L

10.1021/ja015364l

Advances in Flavors and Fragrances: from the Sensation to the Synthesis. Edited by Karl A. D. Swift (Quest International, Ashford, Kent, U.K.). Royal Society of Chemistry: Cambridge, U.K. 2002. vii + 230 pp. $95.00. ISBN: 0-85404-821-9.

This book publishes 16 of the 20 papers presented at the 2001 RSC/SCI Flavors and Fragrances Conference that was held at the University of Warwick in May 2001. The chapters are organized under the following headings: Structure Activity Relationships, Analytical, Natural Products and Essential Oils, Organic and Bioorganic Chemistry, and Flavors/Foods. References are current up to 2001, and there is a subject index.

JA025234S

10.1021/ja025234s

Targets in Heterocyclic Systems: Chemistry and Properties. Volume 4 (2000). Reviews and Accounts on Heterocyclic Chemistry. Edited by Orazio A. Attanasi (University of Urbino) and Domenico Spinelli (University of Bologna). Italian Society of Chemistry: Rome. 2001. xviii + 440 pp. $69.95. ISBN: 88-86208-16-2.

This book features 14 chapters on "the synthesis and reactivity, as well as some medicinal and mass spectrometric properties, of different heterorings", to quote the Editors. A sampling of some of the chapter titles includes Multicomponent Reactions of Isocyanides and the Formation of Heterocycles, Cation-Dependent Pericyclic Reactions of Photochromic Crown Ethers, and Gas-Phase Structural Characterization of Isothiazole Dioxides. References are current through 2000.

JA025231F

10.1021/ja025231f

Dendrimers IV: Metal Coordination, Self-Assembly, Catalysis. Topics in Current Chemistry, Volume 217. Edited by F. Vögtle and C. A. Schalley (Universität Bonn, Germany). Springer-Verlag: Berlin, Heidelberg, New York. 2001. xii + 244 pp. $159.00. ISBN 3-540-42095-9.

This book completes a four-volume series dedicated to the science of synthetic hyperbranched and perfectly branched (dendritic) macromolecules—a dynamic and rapidly expanding research topic that holds great promise for many important theoretical studies and practical applications. Fritz Vögtle, the editor of the series, is often associated with the (re)discovery and continuous experimental development of three-dimensional macromolecular growth without cross-linking. He has also coproduced several excellent reviews, monograph chapters, and a book on the same subject. The current text is an integrated part of a tetralogy and, consequently, lacks the universal coverage necessary for the single-volume survey. Without a distinct unifying theme, the material is loosely related to dendrimer synthesis and a few of its potential applications. The book is divided into six sections, each written by leading experts in the corresponding research area.

The book starts with an interesting and detailed review by Chow and co-workers, who discuss the use of ether linkages in the convergent and divergent construction of dendrimers. The authors employ a unique unified approach to present different dendritic oligoethers that contain both aliphatic and aromatic subunits. Good chemical stability, interesting chemical properties, and physical behavior are characteristic features of these materials, and certainly their potential for applications would be rather broad.

The next section by Hirsch and Vostrowsky describes the incorporation of carbon-rich fragments into dendritic frameworks. Fullerenes are intrinsic branching units as a result of their symmetry and numerous reactive centers. Availability and marginal solubility of these compounds were certainly early limiting factors for their widespread use in dendrimer construction. With the advances in fullerene synthesis and chemical modification, one can expect a rapid growth of research that would utilize these molecules not only as the central dendrimer core and carriers of the branching functions, but as the actual branching units as well.

Zimmermann and Lawless, the coauthors of the third chapter in the book, faced a difficult task to review the supramolecular aspects of dendrimer construction and properties, a subject already presented in two other chapters in previous volumes of the series. The main strength of this chapter is the discussion of dendrimer formation through self-assembly. Its treatment of host−guest phenomena, interfacial behavior, and surface modification, however, is somewhat brief, missing important recent developments of notable significance for the biomedical and biotechnological application of dendrimers and their hybrids.

The theme of dendritic construction through supramolecular methods continues in the fourth chapter, which is devoted to metallodendrimers. Despite the fact that these materials have been partially discussed in the previous volumes, Reinhoudt and coauthors are able to deliver an authoritative and comprehensive review not only of the major building principles, but of many fine details that define the use of transition metals as suitable dendritic construction blocks as well.

The book also contains a review on dendritic catalysts written by van Koten and co-workers. Numerous anchoring groups at the periphery and nanosize cavities in the interior make dendritic and hyperbranched macromolecules highly attractive catalytic carriers with interesting size-selective and biomimetic functions. This group performed one of the first studies of metal-containing dendrimers as homogeneous catalysts in organic reactions, and their review almost completely covers every aspect of the specific influence of the branched (dendritic) architecture on the catalytic process. Regrettably, the discussion is limited to divergent systems, and the use of monodendrons and dendrimers in polymerization catalysis is completely ignored.

The final chapter of the volume, by Röckendorf and Lindhorst, summarizes the rapidly expanding research that uses oligosaccharides as building blocks in highly and perfectly branched macromolecular constructs. It is amazing that the hyperbranched structure of many natural carbohydrates was recognized rather early, but their integration into dendrimer-like architectures is only beginning to make notable progress. The authors rightfully note the inherent nonuniformity in the glycoconjugates expressed by different cell lines as one of the major obstacles in their widespread synthetic application and trace potential strategies for the further development of glycodendrimers of theoretical and practical importance for various biological processes and applications.

The book has definite value as an important information source for the dendrimer research areas covered therein. The editors and the authors of the individual chapters should be credited and congratulated for their comprehensive treatment of a significant amount of literature, and for their clear presentation of synthetic pathways and emerging applications. The whole tetralogy devoted to the synthesis and properties of highly branched synthetic macromolecules will certainly become a useful reference both for the beginners and the veterans in this dynamically developing field.

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