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BOOK REVIEWS

Quaternary Stereocenters: Challenges and Solutions for Organic Synthesis. Edited by Jens Christoffers and Angelika Baro (Universität Stuttgart). Wiley-VCH Verlag GmbH & Co. KGA: Weinheim. 2005. xxiv + 336 pp. $170. ISBN 3-527-31107-6.

This monograph is a survey of the state-of-the-art in the formation of quaternary stereocenters, historically one of the most difficult problems in organic synthesis. The editors have assembled a diverse array of experts in this field to cover a broad range of topics. The book begins with a survey of approaches to controlling quaternary stereocenters in the context of the total synthesis of natural products. Arimoto and Uemura cover the topic with broad brush strokes, focusing on recent developments and stressing impressive achievements. The chapter serves as an excellent introduction to the topic and highlights the challenges that are addressed in the remainder of the book.

De Vries covers the area of quaternary stereocenters in an industrial context. This chapter provides an introduction to drugs containing quaternary stereocenters as well as approaches used to access these moieties. The latter however, as the author acknowledges in a summary, simply serves to highlight how current methods are lacking in solving this problem. In the next two chapters, Schetter and Mahrwald summarize the topic of aldol reactions that form quaternary stereocenters, and Christoffers and Baro provide an in-depth and blanket coverage of Michael and conjugate addition reactions that provide quaternary stereocenters, with both catalytic and stoichiometric methods highlighted.

Rearrangement and cycloaddition reactions are covered in chapters written by Pollex and Hiersemann, and Desimoni and Faita, respectively. Substrate control is the dominant theme in rearrangements with the Claisen rearrangement playing a prominent role. The chapter on cycloaddition is rich in catalytic methods, due to the power of the Diels−Alder reaction.

Cross-coupling type reactions are the focus of two chapters. Barriault and Sauer summarize advances in the Mizoroki−Heck reaction as applied to quaternary stereocenters and some applications to natural product synthesis. Braun addresses extensive efforts made in using allylic alkylation reactions to control such stereocenters. Sandwiched between these is a treatise by Yus on the alkylation of ketones and imines.

Maruoka and Ooi provide a thorough introduction to phase-transfer catalysis as a route to quaternary-substituted stereocenters that embodies some phenomenal successes. Radical chemistry is the subject of Sibi and Patil's chapter, with the bulk of the examples illustrating cyclizative methods, largely substrate controlled. The monograph concludes with a chapter on enzymatic methods written by Bornscheuer, Henke, and Pleiss. Not surprisingly, the focus is on kinetic resolutions.

This book is clearly timely and fills an important niche. The chemical practitioner will find it an excellent resource for approaches to their own specific problems. It also is a useful beginning point for students interested in the state-of-the-art of organic synthesis. The book is rife with impressive chemistry, but more than anything else, it succeeds at illuminating the depth of the problem. The subtitle is "Challenges and Solutions for Organic Synthesis"; as is made abundantly clear, the former currently outweighs the latter.

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Chromatographic Analysis of the Environment, 3rd Edition. Edited by Leo M. L. Nollet (Hogeschool Gent, Ghent, Belgium). CRC Press/Taylor & Francis Group: Boca Raton, FL. 2006. xx + 1298 pp. $249.95. ISBN 0-8247-2629-4.

This book is an update of the 1983 edition, although it differs in the philosophy of its organization. The first part (Chapters 1−5) covers methods for sample preparation, separation, and detection of the different environmental components, i.e., air, water, soil, and waste, as well as the importance of data processing. The second part (Chapters 6−32) covers the analysis of different elements in the environment, with particular attention paid to volatile organic carbons, peroxyacyl nitrates, and endocrine-disrupting chemicals. There are also many tables of data and figures to elucidate the text. A subject index completes the book.

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Dictionary of Carbohydrates with CD-ROM, 2nd Edition. Edited by Peter M. Collins (University of London). Chapman and Hall/CRC/Taylor & Francis Group: Boca Raton, FL. 2006. xxii + 1282 pp. $399.00. ISBN 0-8493-3829-8.

This new edition of *Dictionary of Carbohydrates* expands upon the original one to cover 24 000 compounds. Earlier entries have also been revised to include new information and to sharpen the presentation. The classes of compounds covered include parent monosaccharides and their important derivatives; modified monosaccharides; disaccharides; tri-, oligo-, and polysaccharides; alditols and cyclitols; nucleosides; glycoside antibiotics and related compounds; and other glycosides. Each entry provides the name and synonyms, CAS registry numbers, structural formulas, molecular formula and weight, physical data, spectroscopic data, hazard and toxicity information, and references. A name index and a type of compound index complete

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the book. A CD ROM is also included to allow for fast and efficient searches of the book's contents.

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Modern Aspects of Main Group Chemistry. ACS Symposium Series 917. Edited by Michael Lattman (Southern Methodist University) and Richard Kemp (University of New Mexico and Sandia National Labs). American Chemical Society: Washington, DC. 2006 (Distributed by Oxford University Press). xvi + 464 pp. $174.50. ISBN 0-84-123926-6.

This book is based on a symposium of the same name held in Anaheim, CA in late March/early April 2004. Both the symposium and the book were dedicated to Professor Alan Cowley on the occasion of his 70th birthday and in honor of his many achievements in main group chemistry. There are 30 chapters, which are grouped under the following headings: Unusual Oxidation States and Bonding; Coordination Chemistry; and Materials, Polymers, and Other Applications. An author index and a subject index complete the book.

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Organic Photochemistry and Photophysics. Molecular and Supramolecular Photochemistry, Volume 14. Edited by Vaidhyanathan Ramamurthy (University of Miami) and Kirk S. Schanze (University of Florida). CRC Press/Taylor & Francis: Boca Raton, FL. 2006. xii + 300 pp. $169.95. ISBN 0-8493-7608-4.

Ramamurthy and Schanze have edited another excellent book in the series *Molecular and Supramolecular Photochemistry*. This volume contains seven chapters on the photochemistry and photophysics of aromatic, azoalkane, thiocarbonyl, and porphyrin compounds. Each chapter provides a concise and thoroughly referenced review of a specific field within organic photochemistry, which should be of great interest to numerous chemists.

In the opening chapter, Burdzinski and co-workers describe the photophysics of derivatives of azulenes, thioketones, and porphyrins. What these compounds have in common is that their upper excited states are relatively long-lived, making it possible to measure their photophysical properties. The theory of radiative and radiationless transitions is also explained in relation to relaxation rates of highly excited states. In the next chapter, Tobita and Shizuka review the fundamentals of proton transfer in the excited state of some aromatic compounds. The latest advancements in spectroscopy have made it possible to observe ultrafast proton-transfer reactions of excited states directly, thereby yielding interesting new insights into this area of photochemistry. In Chapter 3, Pischel and Nau provide an excellent survey of the photoreactivity and photophysics of n,π^*-excited azoalkanes and ketones. This chapter is written in a straightforward manner that makes it easy to appreciate the photochemistry of azoalkanes and how and why their photochemistry differs from ketones. In the following chapter, Fagnoni and Albini reveal the most recent developments in nucleophilic substitution reactions of excited aromatics. The authors emphasize the synthetic significance of photonucleophilic substitution and the various types of bonds it can produce. These reactions are a significant environmentally friendly alternative to the use of metallic catalysts to functionalize aromatic compounds. A description of single electron-transfer-promoted photocyclization of silicon-substituted phthalimides based on results from the laboratories of Yoon and Mariano is the topic of Chapter 5. The authors discuss both the synthetic strategies that have been developed for the preparation of phthalimide derivatives and the mechanism of single electron-transfer photocyclization. In Chapter 6, Yasuda and co-workers give detailed examples of photoamination of various substrates with ammonia or amines. Most of the amination reactions discussed are based on photoinduced electron transfer. In the final chapter of the book, Armitage portrays the construction of chromophore aggregates with DNA surfaces. The author describes the discovery of DNA-templated aggregation of cyanine dyes and then elegantly reviews the construction and physical properties of various cyanine dyes and assemblies of porphyrin derivatives with DNA.

In summary, Volume 14 of *Molecular and Supramolecular Photochemistry* is a reference that should be useful to experts in the field for an in-depth survey of the recent literature. As most of the chapters include a concise introduction, the book can also serve as an excellent resource for graduate students or anyone who is new to the fields of organic photochemistry and photophysics.

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