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BOOK REVIEWS

Understanding and Manipulating Excited-State Processes. Molecular and Supramolecular Photochemistry. Vol. 8. Edited by V. Ramamurthy (Tulane University) and Kirk S. Schanze (University of Florida). Marcel Dekker, Inc.: New York, Basel. 2001. xx + 758 pp. $195.00. ISBN: 0-8247-0579-3.

As explicitly noted by the editors in their preface, this is a rather odd collection of articles covering basic photochemistry as well as manipulation of excited-state processes via environmental control. There are successes and disappointments in both areas.

The first two chapters are extensive reviews on two related subjects: photocycloaddition of alkenes and alkynes to benzene (Cornelisse and de Haan) and larger varieties of photoadditions and photocycloadditions to benzene and polycyclic aromatic compounds (Mizuno et al.). Both are very well done. The extremely comprehensive Mizuno review alone contains almost 500 references, more than any other chapter in the book. A much shorter chapter by Orfanopoulos on singlet oxygen ene-sensitized photooxygenations nicely covers the history through early 2000 as well as the latest developments in this rather narrow area. A follow-up chapter by Lissi et al. on solvent and compartmentalization effects in singlet oxygen reactions introduces an environmental focus and summarizes the rather limited (86 references) but quite interesting research in this area; it convinced me that this subject has not received adequate attention. The chapter on "Microreactor-Controlled Product Selectivity in Organic Photochemical Reactions" by Tung et al. concerns a very broad subject focusing on photochemistry in zeolites, membranes, vesicles, etc., sections of which have been the subject of many excellent reviews in recent years. This chapter might have been an important contribution had it brought together related findings from many different laboratories in a critical manner. However, there is an excessive focus on the work from the authors' own laboratory, so that this review does not add appreciably to our knowledge in this extremely important field. In contrast, the chapter by Toda et al. on "Enantioselective Photoreactions in the Solid State", although short, is very well done and places this subject in proper perspective in the area of solid-state photochemistry. The following chapter by Vishnumurthy et al. on the photochemical behavior of coumarins and related systems in the crystalline state seems to me to be too narrowly focused to be particularly useful. Although "Supramolecular Photochemistry of Cyclodextrin Materials" by Ueno and Ikeda is again focused on a rather narrow area of supramolecular photochemistry, it is one that has attracted a lot of attention in recent years and should prove of greater general interest.

Kumar and Raju's chapter on "Photoactive Layered Materials: Assembly of Ions, Molecules, Metal Complexes and Proteins" is a major achievement, bringing together a plethora of work from many different areas that would not normally be discussed in one review. Important associations and connections are made that are very interesting and should be beneficial to people working in all of these fields. Mishra's chapter on fluorescence of singlet excited states of acids in organized media is again a rather specialized topic, not necessarily of general interest, but one that is treated very well. Returning to basic photochemistry, the book finishes on a high point with an excellent and comprehensive chapter by Mattay et al. on the photophysics and photochemistry of fullerenes that covers the literature in this field during the 10 years of its existence. This well-written review, citing more than 300 references, although particularly useful to people working in this rapidly developing area, hopefully will be of value to people working outside the fullerene field as well.

In summary, this book is rather a hodge-podge with respect to subject matter and quality. Although it deserves to be included in all major library collections, the volume will ultimately be useful mainly to people working in these particular fields of research. The editors' preface is particularly helpful in making connections and specific references in several of these areas to related articles that appeared in earlier volumes in this series. In most, but not all, cases, the literature references extend into 2000. The authors and the editors are to be particularly congratulated for the exceptional quality of the figures, tables, and chemical structures throughout the book.

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JA0153518

10.1021/ja0153518

Electrochemical Reactions and Mechanisms in Organic Chemistry. By James Grimshaw (The Queen's University of Belfast). Elsevier: Amsterdam and New York. 2000. xii + 401 pp. $251.50. ISBN 0-444-72007-3.

This is the first book-length treatment of electrochemical transformations of organic compounds that we have seen since the book by A. J. Fry (1972) and the longer multiauthor volume edited by M. M. Baizer (1973). Although mechanisms are mentioned in the title, less introduction to using electrochemistry to probe reaction mechanisms is given than in the earlier books, and somebody looking for such information would be better served by Savéant's recent treatment in *Adv. Phys. Org. Chem.* **2000**, *35*, 117−192. All potentials mentioned in the book are given in Volts vs aqueous sce, but how this was achieved is not stated for most cases. A few conversions from other reference electrodes to sce appear in Table 1.1, p 4, which has obvious misprints in descriptions of the electrodes for three of seven cases, mentions only three solvents, omits most commonly used reference electrodes, and gives a 1948 reference for more information. The 1984 IUPAC recommendation that potentials in nonaqueous solvents be reported versus the ferrocene or bis(biphenyl)chromium as internal standards is not mentioned.

The body of this book consists of 10 chapters separately covering the oxidation and reduction of various compound

classes, such as aromatics, alkenes, and carbonyl compounds, mainly showing synthetic transformations as specific starting materials and the products to which they were converted. About 5% of the ~1670 references given are 1996 and after, and 16% 1990 and after, suggesting that using electrochemistry for compound preparation is becoming less popular. The later references are skewed toward mechanistic, rather than preparative, work. Regrettably, there is no author index, and the 4.5-page subject index does not locate very much that should be located when using it. The $0.60/page price is outrageous for this monograph.

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JA015344J

10.1021/ja015344j

Hydrazine and Its Derivatives: Preparation, Properties, Applications, 2nd ed. Volumes 1 and 2. By Eckart W. Schmidt (HazMat, Bellevue, WA). Wiley-Interscience: New York, Chichester, Weinheim, Brisbane, Singapore, and Toronto. 2001. lix + xii + 2122 pp. $350.00. ISBN 0-471-41553-7.

This monumental two-volume work covers in its more than 2000 pages all aspects of hydrazine chemistry. It represents a welcome update of the 1st edition, published in 1984. Sadly, it is already out of date, however; as noted in the preface, the results added in this version were published between 1983 and 1995, and indeed, no references subsequent in 1995 seem to have been included.

The work is heavily biased toward hydrazine itself. This is already evident from the first chapter in which 120 of the 150 pages devoted to "preparative methods for hydrazine derivatives" are concerned with the preparation of unsubstituted hydrazine itself.

The second chapter deals in detail with the physical properties of hydrazine (134 pages). There follows an overview of the reactions of hydrazine in some detail, together with those of some derivatives (113 pages) and, in detail, the chemical properties of hydrazinium salts (55 pages). Analytical methods for the estimation of hydrazine are presented thoroughly (112 pages).

A major feature of the work is its detailed account (424 pages) of how hydrazine should be handled. This will be particularly relevant to chemical engineers, because it covers safety procedures, toxicity, explosion hazards, and environmental effects. The decomposition and combustion of hydrazine is also well-covered (164 pages).

The chapter on applications of hydrazine and its derivatives is again heavily slanted toward the parent subject, with 312 out of 366 pages being devoted to hydrazine itself. Major topics include the importance of hydrazine as a propellant (monopropellant, bipropellant, solid propellant) and its use in fuel cells and water treatment. Applications of hydrazine derivatives as pesticides and in polymer chemistry, photography, and pharmaceuticals are dealt with, as well.

The work is concluded with a comprehensive list of references arranged in alphabetical order by author and usefully provides the title of the article in addition to the authors and journal reference.

These books will undoubtedly be indispensable to those who are concerned with the manufacture and use of hydrazine on a large scale. They also contain much interesting and useful information on hydrazine derivatives and will be consulted by many others who use hydrazine in smaller quantities.

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JA0153666

10.1021/ja0153666