

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.

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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 synthetic 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 dihydropyridazines, pyridazines, and *o*-(dimethylamino)methylarene-carbonitriles 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.

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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 Universität). 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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