

the 1995 literature. The succeeding chapters are as follows:

“Formation of Metal-Ligand Multiple Bonds in Redox Reactions: The d^4-d^2 Redox Couple in Tungsten- and Molybdenum-Chlorophosphine Complexes and Related Systems” James M. Mayer (48 pp; 98 refs).

“Electronic Structure of Metal-Oxo Complexes” Vincent M. Miskowski, Harry B. Gray and Michael D. Hopkins (28 pp., 33 refs.).

“Excited-State Proton Transfer Reactions of Multiply-Bonded Ligands” Wentian Liu and H. Holden Thorp (22 pp., 64 refs.).

“Electrochemistry of High-Valent Oxo Complexes of Ruthenium, Osmium, and Rhenium” Chi-Ming Che and Vivian W.W. Yam (22 pp., 72 refs.).

“Conducting Metallic Complexes” Xiao-Zeng You and Yong Zhang (48 pp., 180 refs.).

There is a Subject Index (5 pages).

The book is clearly produced; the expertise of the authors is beyond question and the series is one to be welcomed.

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Perspectives on Bioinorganic Chemistry, R.W. Hay, J.R. Dilworth, and K.B. Nolan eds., Volume 3, ISBN 1-55938-642-8, pp. 304 + xi, JAI Press London, 1996, £69.50, US\$109.50.

The demands upon the chemist wishing to understand biological systems become greater every year. Reviews and review volumes become ever more necessary, and the editors of this series are to be congratulated on producing something both up-to-date enough and sufficiently different to warrant attention. It will probably represent the forefront of research for a relatively short time, but it will be useful as a summary of knowledge for considerably longer.

Chapter 1 by D.C. Weatherburn describes the structure and function of manganese-containing bio-molecules. Manganese is a rather unpopular element amongst inorganic chemists and yet it appears to be the essential metal in a large number of proteins and enzymes. Relatively few have been structurally characterised. This review summarises information on many of the manganese-containing systems, and includes more than one thousand literature references. Chapter 2, by Junhun Suh, is entitled “Repertoires of metal ions as Lewis acid catalysts in organic reactions”. This is a useful review that does not present any great detail on specific

metallo-enzymes, and contains material under some headings such as “Catalysis by binuclear metal ions” that are at first sight somewhat obscure. However, teachers should find this a valuable summary.

Chapter 4, by A. Messerschmidt, describes the copper enzyme ascorbate oxidase, and discusses its structure and function in considerable detail. The last two Chapters review rapidly developing and very important areas. T. Kiss and E. Farkas discuss the bioinorganic chemistry of aluminium, but very much from a classical point of view. For example, they present a lot of stability constant data and review briefly the effects of aluminium on metabolism, but they do not discuss detailed bioinorganic chemistry at the atomic level. Finally, A.R. Butler, F.W. Flitney, and P. Rhodes provide a brief review of nitric oxide in animal physiology. This is currently very useful, but is likely to date quite rapidly, so fast is this field expanding.

In summary, this is a useful book to dip into, and as a first resource in the areas it presents. It contains little organometallic chemistry, but should be available in libraries where many people will find it of value.

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The Molecular Chemistry of the Transition Elements, by F. Mathey and A. Sevin, ISBN 0-471-95687-2 (paperback), pp. 232 + x, John Wiley and Sons, Chichester, 1996, £18.99.

This book is intended as an introductory text in transition-metal organometallic chemistry. The students that the authors teach have a strong background in physics and mathematics and hence the approach differs from some others by its reliance on qualitative descriptions using frontier orbitals. As an introductory text, it is not intended to be comprehensive.

I compared this volume to two other popular texts, those by Elschenbroich and Salzer, and by Crabtree. Certainly the former is almost bereft of the theoretical discussions that occur throughout this book, but in contrast it contains much factual material on both transition and non-transition elements. The Crabtree book begins rather similarly, discussing types of ligand and then presents various classes of reaction. The current volume begins with a long discussion on ligands, orbitals and reaction types, and then presents what are termed the main functional groups in organometallic

chemistry. Commencing with hydrides, it then surveys carbonyls, the metal-carbon bond, alkyl, carbene, and carbyne complexes, π -coordination and the metal-metal bond (discussed almost entirely from a theoretical point of view with little hard chemistry), and finally a section on phosphanes and phosphorus ligands. The emphasis throughout is on generalisation and on analysis of mechanism and orbitals. These two chapters, 2 and 3, constitute the major part of the book. The final two, shorter chapters discuss applications of transition-metal organometallic compounds in organic synthesis and in homogeneous catalysis. There is an appendix on group theory and molecular orbitals, and each chapter has an extensive list of references, but there are no student exercises.

In summary, this book does present a new approach to the subject of transition-metal organometallic chemistry. The emphasis on theory imposes a unity and implies a maturity of the subject which earlier texts sometimes lack. Nevertheless, I have the reservations about detailed accuracy, exemplified below.

So why do I have some reservations? The first brief chapter disturbed me, for pedantic reasons. Nickel tetracarbonyl is presented both as $\text{Ni}(\text{CO})_4$ and $[\text{Ni}(\text{CO})_4]$ on the very first page, and a charge is denoted by +1, which is a number, and not by $1+$, which indicates one unit of positive charge. At the beginning of chapter 2, there is a "Modern Periodic Table" in which the titanium group, for example, is designated IVA, and not 4, which is even more modern. A casual glance shows the use of the formalism μ^n for a bridging indicator and not the IUPAC recommended μ_n . Why are non-SI units tolerated in what is intended to be a text book? I checked the two index references to one of my favourite subjects, nitrogenase. One referred to biological nitrogen fixation by plants, which does not, as far as I know, occur, and the other directed me to a page of chapter references. Why do the authors use the term "coordinated ligand"? To be fair, infelicities of this kind do not occur throughout, but I approach the rest of the book with some apprehension! A text book should be as far as possible without inconsistencies. And finally, why use such a quixotic title? Is not TiCl_4 molecular? Is there not a reasonable chance that $\text{Na}_2[\text{Co}(\text{CO})_4]$ is ionic? Surely a more accurate and descriptive title could have been found? There is much of value in this book, but I recommend that any potential buyers check first that the book meets adequately the demands that their teaching will place upon it.

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Topics in Current Chemistry Volume 179 Organolanthanoid Chemistry: Synthesis, Structure, Catalysis. Springer, Berlin etc., 1996. pages x + 285. DM 215.00. ISBN 3-540-61009-X.

The volume contains the following five articles covering the literature to mid-1995.

Features of Organolanthanide Complexes

R. Anwander and W.A. Herrmann

This first article provides an excellent introduction to the general properties and chemical behaviour of the lanthanide elements. Topics discussed include ionic radii, Lewis acidity, bond disruption enthalpies, the preparation of anhydrous starting materials, ligand design, molecular structure and bonding. Three tables of some fifty review articles are provided along with over two hundred references.

Lanthanide Amides

R. Anwander

Some 300 references are cited in the second article which concentrates on lanthanide-N bonded derivatives. In addition to alkyl, aryl and silyl substituted amide ligands, pyrrole, pyrazoyl, polypyrazolylborate and macrocyclic ligands such as phthalocyanine and porphyrin ligands are also discussed. Both the synthesis and structural properties of these complexes are presented. While the six sections covering these ligands are excellent the seventh which deals with their applications is less well researched.

Rare Earth Complexes with Heteroallylic Ligands

F.T. Edelmann

As a possible alternative to the ubiquitous cyclopentadienyl based ligands the author presents a review of the use of bulky heteroallylic ligands. For the most part the N centered benzamidates are discussed though diiminosulfonates, diiminophosphinates, diphosphinomethanides and alkoxyisilylamides are also presented. This article concentrates on the synthesis and structural aspects of these systems are quite thoroughly researched.

Routes to Monomeric Lanthanide Alkoxides

R. Anwander

This article deals with synthetic routes to and structures associated with "monomeric, mononuclear, monolanthanide alkoxides, enolates, siloxides and aryloxides". The article includes reports on Ln(II), Ln(III) and Ce(IV) systems. Initially attention is given to Ln derivatives of the alkoxides derived from the tritox $\{-\text{OC}(\text{CH}_3)_3\}$ and related ligand systems. In the case of the aryloxides, the author also includes Ln complexes of some of their fluorinated derivatives. Ligands containing pendant coordinating groups are also well covered.