

Wakefield's *The Chemistry of Organolithium Compounds*, Kharasch and Reinmuth's *Grignard Reactions of Non-metallic Substances*, Neumann's *The Organic Chemistry of Tin*, Sawyer's *Organotin Compounds*, Lesbre, Mazerolles and Satgé's *The Organic Compounds of Germanium*, and Shapiro and Frey's *The Organic Compounds of Lead*.

The manuscript deserved better in-house editing to remove infelicities in the English and in the spelling of authors' names. A sentence such as 'Moreover, as a common sense on the organometallic compounds, generally, these compounds are largely liable' should not have got through into print, nor should names such as Busen (Bunsen), Wurts (Wurtz), Flankland (Frankland), Paluling (Pauling), Fryrs (Frye), Coats (Coates) and Kearly (Kealy).

For western chemists, the most valuable features of this book are likely to be two-fold. First, it gives a good account of the industrial application of organometallics in, for example, Ziegler and Ziegler-Natta chemistry, PVC stabilization, anti-knock behaviour, silicone polymers and anti-cancer drugs. Second, it gives a good coverage of the general Japanese literature of organometallic chemistry, including patents, which tends to be inaccessible to non-Japanese authors.

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### Reductions by the Aluminio- and Borohydrides in Organic Synthesis

J. Seyden-Penne

2nd edn. Wiley, Chichester, 1997

xiv + 224 pages. £60

ISBN 0-471-19036-5

This book is an update from the first edition, which was published in 1991. In the first edition there was an attempt at comprehensive coverage of the topic, but in the second edition any such attempt has been forced to be abandoned. Nevertheless, this second edition is packed with information, cites around 1200 references, and provides a very useful source for anyone contemplating a complex hydride reduction.

The book is organized into five chapters, followed by 11 pages of synoptic tables, then the references and a subject index.

Chapter 1 introduces the most commonly used reagents, indicates their stability and solubility characteristics and briefly describes their main applications. Chapters 2–5 present the reduction of the main functional groups, with reference to features of selectivity and compatibility.

Chapter 2 deals with cleavage of carbon–heteroatom

single bonds (halides, sulphonates, epoxides, alcohols, ethers, ammonium salts etc).

Chapter 3, the largest chapter with over 100 pages, deals with reduction of double bonds (other than C=C bonds). The bulk of the chapter (85 pages) concerns reductions of carbonyl compounds, including sections on different kinds of carbonyl compounds, asymmetric reductions and regioselectivity of the reduction of  $\alpha/\beta$ -unsaturated derivatives. The chapter also covers imines, enamines, nitrogen heterocycles and oximes/hydrazones.

Chapter 4 deals with reduction of triple bonds and Chapter 5 with other derivatives (nitro compounds, azides, organometallics, and sulphur, phosphorus, silicon and boron compounds).

The entry point for many will be the synoptic tables. Here it is possible to look up a class of compound and choose a precursor substrate; the table will provide a list of reagents for the transformation and section references indicating where the reactions are discussed. The appropriate sections in Chapters 2–5 will provide the detailed discussion of those reactions and Chapter 1 will give an outline of the characteristics of the chosen reagent. Thus, the book is ideal for identifying the most useful references for any given reduction.

Because it is so densely packed with information, the text is somewhat difficult to read. This is almost unavoidable if the coverage is to remain so full and the book so short (220 pages), and the difficulty is easily outweighed by the value of the work as a source of reference and information.

This book is an imperative purchase for all chemical libraries and for any individuals who make regular use of complex hydride reductions.

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### The Organic Chem Lab Survival Manual

James W. Zubrick

4th edn. Wiley-Interscience, New York, 1997

382 pages. £17.99

ISBN 0-471-12948-8

This book updates the third edition, reflecting some of the more recent changes in laboratory practice. In particular, the use of microscale laboratory equipment has been expanded further in this edition. Other influences such as the Internet, and elementary directions on how to access information from networks, are suggested.

The book is presented in 36 chapters; they are broadly grouped into key areas, namely safety, information recording and retrieval, basic equipment, standard techniques, and instrumentation in the laboratory. Two final chapters cover some basic theory.

The first key section on data recording and retrieval is basic and easy to follow, and offers sound advice to the beginner. Hard-copy information sources are listed (including advice on how to interpret this information), together with Internet addresses. The sections covering basic laboratory equipment start right at the beginning, describing items ranging from glass stoppers through to almost anything that more experienced students would come across in the laboratory, including rubber septums, syringes and how to look after them, and of course microscale equipment. Whilst some of this may seem elementary, there is also information that will be of use to the more experienced practical chemist.

The description of the standard techniques is detailed and the section on microscale column chromatography, a simple yet effective technique, is useful. The chapters covering instrumentation in the laboratory are brief, with a few reference tables, but they are adequate and have an emphasis on the preparation of samples and operation of equipment.

Overall, this is a very good laboratory manual guide that is easy to read. Zubrick has a light-hearted writing style and his sense of humour comes across very strongly. It is pitched at such a level that students with a range of abilities and backgrounds would find it useful and it is available at an affordable price.

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### **Progress in Inorganic Chemistry Volume 47**

K. D. Karlin (ed.)  
Wiley, New York, 1998  
945 pages excl. indexes. £125  
ISBN 0-471-24039-7

Articles in this Series are expected to be authoritative, specialized and topical, and the eight contributions to Volume 47 certainly conform. However, chemical review articles come in many types. At their most basic, they are compilations of published results, of considerable use to those seeking catalogues of detailed information about a specialist area. At the other extreme, they give a description of an area of research, showing its importance to its field and setting it in context with chemistry as a whole, and follow this with a selective, well-explained critique of the available data. The very best also include comments and/or suggestions not found in the original papers surveyed. The present contributions span almost the whole range; they are reviewed here in the order of appearance.

The first ('Terminal chalcogenido complexes of transition metals', by G. Parkin; 166 pages, 353 cited

references) is an in-depth treatment of compounds containing M=E bonds (E=O, S, Se, Te). The introduction gives statistics on publications in this field and an interesting discussion on bond orders and lengths. This is followed by group-by-group descriptions of the preparation, structure and reactions of the known compounds.

Chapter 2 ('Coordination chemistry of azacryptands', by J. Nelson, V. McKee and G. Morgan; 149 pages, 294 references) begins with a brief survey of the history of this type of ligand. A description of synthetic methods is followed by a concise summary of applications, actual and potential. Then comes a series of well-selected topics: small cages, templated cryptands, conformational aspects, Schiff-base cryptands, photoactive systems, solution studies, oxygen-uptake systems, anion-complexers. Generality, depth, breadth and detail are nicely balanced.

'Polyoxometallate complexes in organic oxidation chemistry' (R. Neumann; 53 pages, 195 references) gives a fascinating survey of the ways in which heterometals are incorporated into poly-molybdate and -tungstate clusters and the role of these materials as catalysts for atmospheric or peroxide oxidation of organics in aqueous media. Overall, the impression is given that they are useful in applications where their high specificity can be advantageous. Two principal applications are treated: the heterogeneous gas-phase preparation of methacrylic acid (with many references to patents) and mixed-metal systems for peroxide oxidation.

'Metal phosphonate chemistry' (A. Clearfield; 140 pages, 231 references) is a highly academic account, mainly focused on zirconium organophosphonates. Structures and spectroscopic and chemical investigations are reviewed. It appears that many of these systems may have (so far unrealized) potential for interesting applications.

Chapter 5 deals with the 'Oxidation of hydrazine in aqueous solution' (D. M. Stanbury, 51 pages, 193 references). It is a review of the literature on the mechanisms of reactions involving a wide variety of oxidants, both one- and two-electron agents, and correlates the mechanism and type of products (principally N<sub>2</sub> and/or NH<sub>3</sub>) with the nature of the oxidant. It was disappointing that only kinetic reaction schemes are given, with no indication of how the molecular and electronic rearrangements occur, and there is no clear statement as to why these reactions should have attracted so much interest.

On the other hand, 'Metal ion reconstituted hybrid haemoglobins' (B. Venkatesh, P. T. Manoharan and J. M. Rifkind; 121 pages, 332 references) is full of clear and critical explanations, both of the nature of the problems addressed and of the significance and method of interpretation of the wide range of techniques employed. The difficulty of unscrambling the factors responsible for co-operativity between the four metal atoms in O<sub>2</sub> binding and the need for variously modified tetramers are beautifully presented.

Then comes a survey entitled 'Three-coordinate complexes of "hard" ligands: advances in synthesis, structure