

Gmelin Handbook of Inorganic Chemistry. Sb. Organoantimony Compounds. Part 4. Compounds of Pentavalent Antimony with Three Sb-C Bonds. Springer, Berlin etc., 1986, xii + 250 pages. DM 1173.00 ISBN 3-540-93535-5.

The Gmelin Institute is now well into its programme of presenting comprehensive accounts of organometallic compounds over the whole range of the Periodic Table, and the volumes will make an important contribution to the further development of organometallic chemistry.

The number of organoantimony compounds now exceeds 3000. This fourth volume on such compounds is concerned with species of the types R_3SbX_2 and $R_3Sb=X$, where R denotes an organic group linked to antimony through carbon, and X denotes any group, inorganic or organic, linked to the antimony through an element other than carbon. The X atoms may be part of a ring system. For each compound the methods of preparation, reactions, and physical properties (including crystal structures where relevant) are outlined.

This survey, by M. Wieber, well maintains the standard of this fine series. A minor defect of the series is that the English sometimes leaves much to be desired. The overall standard in this volume is reasonably good, but there are minor irritations, which a few hours' editing by a British chemist could have removed; for example the form 'A is dropped into B' is regularly used, where what is meant is 'A is added dropwise to B'; the distinction is important, and a practising chemist failing to appreciate it could end up in disaster.

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Organic Syntheses by Oxidation with Metal Compounds, edited by W.J. Mijs and C.R.H.I. de Jonge, Plenum Press, 1986, xxv + 908 pages, US\$115.00 (20% higher outside North America), ISBN 0-306-41999-8.

The collection of reviews in this volume provides an extremely thorough account of the synthetic aspects of oxidations using metal compounds both as stoichiometric reagents and catalysts. Within each chapter the organisation is according to the type of substrate oxidised, clearly indicating that the book is intended primarily for the organic chemist, seeking to perform a particular transformation.

Chapter 1 (F. Freeman, 39 pages) details oxidation by vanadium compounds, considering both stoichiometric reactions and the interesting vanadium catalysed epoxidations of allylic alcohols. The chapter opens with the statement that IUPAC recommends the use of Va(V) for vanadium(V). Not only is this not strictly true, since it is only offered as an option, but it sits ill in a chapter in which, to give but two examples, "benzenamine" and "aniline" and "ethanoic" and "acetic" acids are used apparently at random. Chapter 2 (F. Freeman, 77 pages) considers oxochromium(VI) reagents, mostly of the type in which chromium(III) oxide has been combined with an organic nitrogen base. It is very useful in directing the synthetic chemist towards the appropriate choice among a range of apparently rather similar reagents. Chapters 3 (A.J. Fatiadi, 141 pages) and 4 (W.J. de Klein, 53

pages) deal respectively with active manganese(IV) oxide and manganese(III) ethanoate. Manganese(IV) oxide is probably one of the most important reagents to be used in heterogeneous oxidation reactions, and many of the processes in which both this and manganese(III) are involved proceed via radical mechanisms. Chapter 5 (F. Freeman, 56 pages) also discusses numerous radical oxidations, which is to be expected since cobalt(III) is an excellent one-electron acceptor, but a number of trimerisations of alkynes are also discussed in detail. Chapters 6 (M.V. George, 49 pages) and 8 (J.L. Courtney, 22 pages) on nickel(IV) oxide and ruthenium(VIII) oxide give valuable discussions, but contain little organometallic chemistry. Chapter 7 (C.R.H. de Jonge, 20 pages) gives an interesting account of oxidations catalysed by copper and cobalt-amine complexes, a number of which involve organocopper intermediates. Chapter 9, on oxidations using palladium compounds (S.F. Davidson and P.M. Maitlis, 31 pages) considers the Wacker and Heck reactions, and related processes, and gives useful examples. Carbonylation, oxidation and oxidative coupling of arenes are also described. Chapter 10 on silver carbonate on Celite oxidation (M. Fetizon et al., 64 pages) is notable for very well presented tables, as is Chapter 11 on cerium(IV) (T.-L. Ho, 62 pages). Osmium(VIII) oxide in Chapter 12 (H.S. Singh, 60 pages) is noted chiefly as a reagent or catalyst for *cis*-hydroxylation of alkenes; it would have been advantageous for this account to appear alongside that on ruthenium(VIII) oxide, since many of its reactions are rather similar. Chapter 13 (A. McKillop et al., 45 pages) concerning thallium(III) is written in a different style from the others, being initially subdivided by mechanism into reactions involving one or two-electron transfers. Lead(IV) tetraethanoate is treated in Chapter 14 (M.L. Mihailović et al., 75 pages) and organobismuth compounds in Chapter 15 (J.P. Kitchin, 20 pages). The final chapter (Y. Ogata et al., 37 pages) considers oxidations with metal compounds and peroxides, detailing both radical reactions and those involving metal peroxide intermediates in catalytic processes.

This book is well produced with only a limited number of typographic errors. The material is clearly presented, accessible and well referenced (over 4000 citations) with a useful and well organised index. Its utility is much enhanced by the inclusion of typical experimental procedures in each chapter; volumes of reviews are many, but those which provide practical guidance rather few. However, this book has taken much too long to appear, and a less polished presentation in a shorter time would have avoided the rather dated air that several chapters exhibit. Only three sections have any references after 1982 and nine have fewer than five citations after 1980. This results in significant gaps; for example, the Sharpless asymmetric epoxidation of allyl alcohols, now an indispensable tool in the synthetic chemist's armoury, does not appear at all. Additionally, many of these topics have been well reviewed elsewhere since the manuscripts for this work were completed. Modern technology makes such a delay close to inexcusable, and although this is a good book, at a reasonable cost on a per page basis, which will undoubtedly become a standard reference, it could easily have been excellent.