

Book reviews

The Early Transition Metals, by D.L. Kepert. Academic Press, London, 1972, x + 499 pp., £8.00 (\$25.00).

The volume under consideration represents the third monograph to appear in recent years giving an in-depth treatment of the systematic chemistry of the early transition elements. In contrast to the texts by Clark and by Fairbrother, however, which cover the chemistry of titanium and vanadium and of niobium and tantalum respectively, Kepert extends the area of review to include the chemistry of chromium, molybdenum and tungsten, in addition to that of the titanium and vanadium sub-groups. The text is divided into four chapters, the first of which is devoted to a general discussion of the features which, in the author's view, distinguish the chemistry of Groups, IV, V and VI of the transition elements from the remainder, namely the proclivity of these elements to form many complexes having high coordination number, the widespread occurrence of metal-metal bonded species among the lower valent halides and oxides, and the tendency among the higher valence states toward the formation of polymeric oxo-anions in aqueous solution. The three remaining chapters then each give a systematic coverage by oxidation state of the chemistry of the elements of these three groups, the primary emphasis being on the oxides, halides and oxy-halides and their adducts and complexes.

For the most part, these three chapters are well written and the author presents an extensive body of diversified material on the oxides, halides and related compounds in a logical and organised manner. The structural diagrams are an especially good feature here; they are very clearly drawn and help considerably in amplifying the text. The short review sections on the organometallic compounds of the three groups of elements (amounting to about thirty pages in total) on the other hand, are so brief as probably to be of very little interest or value to the practising chemist in this area. The compounds within a group are classified according to formal oxidation state (a doubtful procedure) rather than being treated together in one section, and the 'review' for many species, amounts to little more than noting a formula and an appropriate reference. As one might anticipate, most of the emphasis on organometallic aspects pertains to the compounds of Group VI. While the philosophy behind the inclusion of the opening chapter is sound, some of the discussion relating to high coordination numbers and metal-metal bonding and many of the examples cited, are not very relevant to the main purpose of the book and could well have been omitted.

There is a very extensive set of references presented alphabetically and numbering over 2400, in addition to the author and subject indices. Unfortunately, however, very few of the citations refer to work published later than 1969, so this has inevitably led to some factual errors for situations where more recent work has changed or modified earlier results;

for example, only the original structural data for chromous acetate is given and the comment made (page 32) that there may be a significant metal-metal interaction present. There are a few grammatical and typographical errors and Figures 127 and 128 appear to be upside down! However, these do not detract from the general usefulness of this volume to research workers in the area of the 'classical' chemistry of these groups of elements and to others who wish to expand their knowledge of these compounds and their chemistry from that given in the standard inorganic texts.

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Organometallic Compounds of the Group IV Elements (Ed. A.D. MacDiarmid), Vol. 2 (in two parts); *The Bond to Halogens and Halogenoids*, Dekker, New York 1972; *Part I*, xiv + 374 pages, U.S. \$34.50; *Part II*, xii + 234 pages, U.S. \$19.75.

This volume represents a further instalment of a series intended to provide a comprehensive account of organometallic compounds of silicon, germanium, tin and lead, and is concerned with compounds containing bonds to halogens or halogenoids. The separate chapters devoted to each of the elements, M, include sections on (a) the synthesis of the M-X bond, (b) cleavage of the M-X bond, and (c) the spectroscopic properties of the halides and halogenoids. Except for the chapter on silicon compounds, there is also in each case an account of complex formation by the halides and halogenoids. For the tin and lead compounds there are also important, if brief, accounts of toxicological properties.

Part I, by Charles H. Van Dyke, deals with derivatives of silicon. It appears to be an impressively thorough account, and in over 1250 numbered references some 1300 publications are cited. However, for a book appearing in the second half of 1972 there are fewer 1969 and 1970 references than one might have hoped; thus, for example, the account of the β -elimination reactions of β -chloroalkylsilicon compounds does not go beyond that given in 1968 in Vol. 1 Part 1, and so contains no reference to the revealing work on this interesting reaction which appeared in 1969 and 1970.

In Part II, J.J. Zuckermann deals with the germanium compounds in 71 pages with 538 references, H.C. Clark and R.J. Puddephatt with tin compounds in 76 pages with 493 references, and S.E. Cook, F.W. Frey and H. Shapiro with lead compounds in 49 pages with 287 references. (It is interesting that the account of the germanium compounds involves more references than that of the tin compounds.) The chapter on the tin compounds overlaps seriously with an account of organotin halides which also appeared during 1972 in another series from the same publishing house.

In the main the chapters offer direct presentations of reported results, with little in the way of analysis or comment; probably this is what most readers would wish, since