

Book review

Gmelin Handbook of Inorganic Chemistry, 8th Edition, *New Supplement Series Vol. 28, Boron Compounds. Part 7, Boron Oxides, Boric Acids, Borates*, G. Helle volume author, 1975, x + 237 pages, DM 495, \$ 203, *Vol. 33, Boron Compounds. Part 8, Tetrahydroborate Ion and Derivatives*, M.K. Das, L.M. Frenzel, G. Heller, K. Niedenzu and H. Rieger, volume authors, 1976, x + 220 pages, DM 457, \$ 187.40, *Vol. 34, Boron Compounds. Part 9, Boron–Halogen Compounds*, Part 1, R.H. Cragg, H. List and A. Meller, volume authors, 1976, xvi + 332 pages, DM 667, \$ 273.50. K. Niedenzu and K.-C. Buschbeck, boron series editors, Gmelin Institut für Anorganische Chemie und Grenzgebiete der Max-Planck-Gesellschaft zur Förderung der Wissenschaften, Springer-Verlag, Berlin/Heidelberg/New York.

Inorganic chemists will welcome these three new additions to the Gmelin New Supplement boron series. The areas covered are quite varied. Part 7 deals with boron oxides and acids, borates and peroxyborates, an important area of boron chemistry but one which will be of only cursory interest to the readers of this journal. The material is well presented in the usual Gmelin style, with discussion of these compounds in the solid state and in solution.

Part 8, on the other hand, will be of interest and useful to organoboron and, more generally, to organometallic chemists, as well as to those specializing in the inorganic chemistry of boron. Covered in this volume is a rich diversity of anionic boron species including BH_4^- salts and mixed borohydride salts of type $[\text{BH}_n\text{Y}_{4-n}]^-$ ($n = 1-3$), with $\text{Y} = \text{CN}, \text{NC}, \text{SCN}, \text{N}_3, \text{F}, \text{OH}, \text{OR}, \text{NMe}_2$, and other wholly inorganic types such as $[\text{BF}_n(\text{OR})_{4-n}]^-$ ($n = 1-3$, $\text{R} = \text{H}$ or alkyl), $[\text{B}(\text{ClO}_4)_4]^-$, $[\text{B}(\text{HSO}_4)_4]^-$, $[\text{B}(\text{NO}_3)_4]^-$, $[\text{B}(\text{O}_2\text{CR})_4]^-$, etc. Salts with borate anions derived from vicinal diols and from polyols also are included. A major part of the book is devoted to borate salts containing boron–carbon bonds, e.g., BR_4^- , BH_3R^- , BR_3H^- , BR_2H^{2-} , $\text{BR}_n\text{X}_{4-n}^-$ ($n = 1-3$), BR_3CN^- , $\text{BR}_n(\text{OR}')_{4-n}^-$ ($n = 1-3$ with $\text{R}' = \text{H}$ or alkyl), BR_3NH_2^- , $\text{H}_3\text{BCO}_2^{2-}$, $\text{H}_3\text{BCO}_2\text{R}^-$, $\text{H}_3\text{BCONHR}^-$. The important tetraphenylborate ion requires 31 pages to cover its various salts, their solubilities, spectra, conductance values in diverse solvent systems, thermodynamic data, applications in analytical chemistry and its interesting π -arene donor ligand behavior. Those borate ions containing B–H bonds are reducing agents in organic and inorganic chemistry, and this aspect of their reactivity is well documented.

The survey of boron–halogen compounds is begun in Part 9 with coverage of inorganic halides of type HBX_2 and H_2BX , $\text{B}_2\text{H}_5\text{X}$, ROBX_2 and $(\text{RO})_2\text{BX}$, but over half of the volume, 240 of its 332 pages, is devoted to organohaloboranes, RBX_2 , R_2BX and $\text{RR}'\text{BX}$. This section begins with an excellent general discussion of this class of compounds covering physical and spectroscopic properties, preparative aspects, reactions and applications. Following this introduction comes the listing and discussion of individual compounds, with almost every-

thing known about each being presented and documented

These three new Gmelin boron volumes will be invaluable to the boron chemist. They are up-to-date, with literature coverage through the end of 1974 with some 1975 references included. They are complete in their coverage. All that one might wish to know about a given compound is there if it is available in the literature physical, spectroscopic and thermodynamic properties, preparations, reactions and applications. Most chapters in these three volumes are written in German, but those by Cragg in Part 9 and by Das, Niedenzu and Frenzel in Part 8 are in English. As usual, English translations of the preface, table of contents and chapter and section headings of each volume are provided.

The only major criticism which can be made is that these newest volumes of the boron series, like their predecessors, do not have compound or formula indexes. These would have been most useful, but it appears that we must wait until completion of the boron series for such indexes.

*Department of Chemistry,
Massachusetts Institute of Technology,
Cambridge, Massachusetts 02139 (U S A)*

DIETMAR SEYFERTH