

Gmelin Handbook of Inorganic Chemistry, 8th edit., *Boron Compounds. 3rd Supplement. Volume 2. Boron and Oxygen*; by G. Heller, Springer, Berlin, 1987, xvi + 186 pages. ISBN 3-540-93543-6 DM833.

Twenty volumes of Gmelin on boron chemistry were published between 1974 and 1979. The first and second supplements brought the literature closing date to 1980; the third supplement brings it to the end of 1984. Volume 2 covers boron-oxygen binary species, borates, boron-oxygen compounds containing hydrogen or organic groups (both those bound directly to boron and those bound to oxygen in alkoxy and phenoxy derivatives), peroxyboranes, hydrated borate ions, and borate minerals. The field is systematically and carefully summarised and, as always in Gmelin volumes, the printing and presentation are excellent.

In a survey such as this, covering only three or four years' publications, it becomes clear what aspects are of the greatest current interest, and what techniques currently provide the most new data. The largest sections cover boric acid, borates and perborates which have the greatest industrial significance. There is a great deal of work on the physical chemistry of these compounds particularly in relation to glass formation, catalysis, and buffering action. The number of structural determinations by X-ray diffraction is striking: it is clear that by combining three and four coordinate boron the range of structures based on boron-oxygen frameworks is immense. It is also striking that for small molecules many of the data in the literature now come from *ab initio* calculations rather than experimental measurements. Most of the work described in this volume is on compounds in which boron is bound only to oxygen. Compounds with B-C as well as B-O bonds have been much less well investigated: the book contains useful compilations of references to what has been done.

Coverage of a wide range of chemistry makes big demands on the author. He is to be congratulated on writing a clear account drawing on an astonishing range of primary sources.

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Gmelin Handbook of Inorganic Chemistry, 8th edition, *Organogallium Compounds, Part 1*; by J.-C. Maire, U. Krüerke, M. Mirbach, W. Petz and C. Siebert. Springer, Berlin, 1987, xiv + 514 pages. ISBN 3-540-93545-2, DM1998.

A quick check on some standard monographs on organometallic chemistry shows that organogallium compounds merited 2 pages in 1937, 7 in 1960 and 22 in 1970. Now we have a volume of 514 pages surveying the literature up to the end of 1984 with a few references to work published in 1985. The coverage is systematic and comprehensive and information is provided on over 1100 compounds. As usual in the Gmelin series, very careful attention has been given to detail and presentation. I have made a number of spot checks in areas where I am familiar with the original work and in every case the summaries given here are thorough and critical. The English is excellent and the diagrams admirably clear.

About 100 pages are devoted to triorganylgalliums, about 70 to organogallium halides, about 70 to organogallium compounds of oxygen, sulphur, and selenium, and about 50 to organogallium-nitrogen compounds. There is an astonishing number of complexes of gallium-containing pyrazolyl ligands $[\text{GaMe}_2(\text{N}_2\text{C}_3\text{H}_3)_2]^+$, $[\text{GaMe}_2(\text{N}_2\text{C}_3\text{H}_7)_2]^+$, and $[\text{GaMe}_2(\text{N}_2\text{C}_3\text{HR}_2)\text{X}(\text{CH}_2)_2\text{Y}]^+$ ($\text{X} = \text{O}, \text{S}, \text{NR}_2$ etc.); many of these have been characterised in considerable detail, and extensive spectroscopic and crystallographic data have been obtained. The volume concludes with a summary of the very recently discovered gallium(I)-arene complexes which are intermediate between true organometallic compounds and solvated cations. There are empirical formula and ligand formula indices: the latter enables all organogallium compounds with a particular carbon-containing ligand to be located.

The use of compounds such as gallium arsenide as semiconductors has led to a huge increase in research on organometallic precursors. This present volume is certainly the most comprehensive single reference for work up to 1985. It will presumably be widely consulted within wealthy corporations which are engaged in the production of high value products. Sadly, however, the price will ensure that this excellent book will not be widely available in libraries elsewhere.

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