

*Journal of Organometallic Chemistry*, 92 (1975) C21—C24  
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## Book reviews

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*Gmelin Handbuch der Anorganischen Chemie, Ergänzungswerk zur 8. Auflage, Band 15, Borverbindungen, Teil 2, Carborane 1*; edited by M. Becke-Goehring and K.-C. Buschbeck, Gmelin Institut für Anorganische Chemie und Grenzgebiete der Max Planck-Gesellschaft zur Förderung der Wissenschaften, Springer-Verlag, Berlin/Heidelberg/New York, 1974, x + 288 pages, DM 452, \$ 184.50.

Carboranes, as a completely new class of organometallic/inorganic compounds, are relative newcomers to the chemical arena. Although a few examples had found their way into the open literature a few years earlier, it was the declassification in 1963 of the research in this area which had been carried out in the United States and the appearance in the literature of some of the accumulated results in late 1963, as well as the almost simultaneous publication of the carborane research which had been carried out in the USSR, which "opened up" this field. In the intervening years there has been continually increasing activity in the area of carborane chemistry. In the United States, the most notable developments have been those associated with transition metal complexes of carboranes and metallocarboranes, while in the USSR the organic chemistry of the carboranes at carbon and at boron has been developed in great breadth. Carborane research has been carried out at such a brisk pace, spurred on for the most part by the promise of new, very thermally stable materials, in the period 1963-1973, that two Gmelin volumes will be required to cover this area.

The present volume takes us from the smallest carboranes ( $\text{CB}_5\text{H}_9$  and  $\text{C}_2\text{B}_3\text{H}_8$ ) through the medium-sized carboranes to the anionic species  $[\text{CB}_{10}\text{H}_{11}]^-$ . (The icosahedral carboranes, metallocarboranes and heterocarboranes will be covered in the next volume). As usual for all Gmelin volumes, the coverage is exhaustive and complete for the period covered. However, for some unexplained reason, the literature coverage for chapters 2-7, which deal with the individual compounds and their properties, and chapter 8, which deals with the NMR spectroscopy of the carboranes included in this book, is complete only through 1970. (Usually, new Gmelin volumes cover the literature completely through the year prior to the year of publication and often contain still more recent references.) Since a fast-moving field is involved here, it is unfortunate that this volume could not be more up-to-date.

Any discussion of carboranes would be inadequate without figures showing structures, and this volume is excellent in that respect with its 183 figures. Also useful for orientational purposes is the initial section listing pertinent books and review articles. The long (137 pages) sections devoted to

nomenclature and atom numbering systems are too much of a good thing. They are necessary; there is no argument about that, but a shorter section would have sufficed. To the outsider, that aspect of carborane chemistry is already quite confusing, and most non-German readers will not relish having to wade through 137 pages in German in order to use the Gmelin carborane volumes effectively. It might be easier to make do with empirical formulas (although, unfortunately, this volume does not have its own index) and the many useful figures.

An English translation of the preface and English translations of the chapter and section headings and table of contents facilitate the use of this book by those who are not at home in the German language. However, the lack of an English translation of the sections dealing with nomenclature, in the opinion of your reviewer, is a major deficiency of this volume.

The Gmelin boron project, as described in the preface, promises many more good things, and we look forward to further volumes of this series.

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

DIETMAR SEYFERTH

*The Interpretation of the Infrared Spectra of Organophosphorus Compounds;*  
by L.C. Thomas, Heyden and Son, London, 1974, ix + 276 pages, £ 7.50,  
\$20.50

"The primary object of this book is to show how, by application of the detailed group-frequency correlations which have been developed, it is possible to deduce much of the general molecular structure of an unknown organophosphorus compound on the basis of its infrared absorption spectrum alone." The author's statement adequately describes this book and he has to a striking degree achieved his objective. During the past decade, infrared techniques have been eclipsed by nuclear magnetic resonance spectroscopy for the elucidation of the structure of organophosphorus compounds. The availability of Dr. Thomas' book will help to restore a complementary balance between the two approaches and to correct the magnetic resonance bias of this reviewer and many other practitioners.

Dr. Thomas' approach is critical, comprehensive and thoroughly practical. Group frequency correlations and structural studies are emphasized; vibrational assignments and theoretical considerations receive minimal attention. Ambiguities and uncertainties in correlations and unresolved correlational problems are discussed critically; the necessary caveats are presented. Organization is by bond types (groups), but an adequate subject index allows easy access to specific classes of compounds. Numerous tables provide supporting data and compilations of characteristic group frequencies for all the known classes of organophosphorus compounds. Literature references are not exhaustive, but are selective, critically chosen, and current. A number of fully worked illustrations of spectrum analyses and structural determinations are presented. These