Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.

Acta Cryst. (1979). B35, 793

Structural chemistry of layer-type phases. By F. HULLIGER. Pp. ix + 392. Dordrecht, Holland: Reidel, 1977. Price Dfl 105.00, $39.50.

The present volume is the last in a series of five volumes encompassing the important subject of the physics and chemistry of materials with layered structures. It is edited by Levy and written by Hulliger, who have contributed significantly to this field.

Structural aspects are basic to the understanding of physico-chemical properties of materials; however, a detailed consideration of these for layered structures in a single volume is a gigantic task. The author has successfully completed this painstaking job of an almost exhaustive compilation of useful data for materials scientists, chemists, physicists, crystallographers as well as industrialists. Crystal structures of around 1700 elements, alloys and compounds have been given. 1060 references, most of them recent, have also been cited. The treatment is simple, concise and precise; therefore, a wide spectrum of readers ranging from the intelligent layman and research students to researchers and crystallographers would be attracted.

The volume has been divided into four chapters. It begins with the geometrical derivation of layer-type structures followed by a detailed description and discussion of various structures in subsequent chapters. The description is meticulous and appealing. However, the inclusion of the factors affecting crystal structures and limitations imposed upon them by thermodynamic and kinetic considerations would have enhanced the credibility of the treatment. A confirmed researcher and crystallographer may be disappointed at being presented with only factual information with little or no comment on the how and why of the occurrence of the various structures. Furthermore, the author has claimed that the structure types and their occurrence are discussed in relation to the electronic properties of the constituent elements. How far this objective has been achieved is anybody's guess.

In conclusion, it may be stated that this volume, embodying relevant crystallographic data in conjunction with a description of various layer-type structures, will serve as an extremely useful bibliography for crystallographers and researchers in the fields of chemistry, physics and materials science. Also the simplistic treatment will help to arouse the interest of non-specialists and beginners and will probably result in the induction of more workers into the field of crystallography and materials science.

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Boron and refractory borides. Edited by V. I. MATKOVICH. Pp. x + 656. Berlin, Heidelberg, New York: Springer-Verlag, 1977. Price DM 180, US $79.20.

This book is remarkable not only for the interest of its subject matter but also for the spread of nationalities of its authors. This feature is due to its being produced after the International Symposium of Boron, which was held in Tbilisi, USSR, in 1972. It is a collection of 34 review articles written by the specialists present at that meeting. Of the 52 authors, 40% are Russian, 30% American, and the remainder European.

The subject matter of these articles ranges very widely: from the purely theoretical to the frankly empirical. The theoretical sections discuss the nature of the bonding and electronic structure, crystal structures and structural relationships (which are particularly interesting for the crystallographic reader), electrical properties and crystal chemistry. The practically oriented articles deal with applications of metallic borides, such as their use for resistant coatings on metal surfaces; for thermionic emitters; neutron absorbants; super-hard elements in armour; continuous filaments (of B, B_4C, BN) for yarn; and so on. Between these, there are numerous papers describing the preparation and detailed characteristics of innumerable borides. This includes the special case of boron itself – not by any means the simplest of the borides. The longest single contribution (64 pp., by R. Naslain of France), on crystal chemistry, is devoted mainly to the numerous methods of preparation of the various allotropes of this element.

Boron is indeed a unique element. Many of its properties are not yet understood. Its hydrides and their derivatives are already an enormous subject in themselves; they do not figure at all in this book. Here, however, the range of unexpected structures, and problems, of the refractory compounds of boron appears to be an even larger topic, extremely challenging for the experimentalists, and no less so for the theoreticians. This book has the merit of bringing many theoretical insights, much experimental ingenuity and an assortment of interesting applications together in a single volume. It is a pity it is so expensive.

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