

## Book Reviews

*Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.*

**The structures of the elements.** By JERRY DONOHUE. Pp. 436, Figs. 276, Tables 147. Chichester: John Wiley, 1974. Price £12.00.

The interest of scientists dealing with chemical and biological aspects of solid-state physics has recently been directed towards the systematics of related compounds. This approach is greatly aided by new facilities which, by reducing the time of crystal-structure determination, allow structure elucidations of several related compounds in a relatively short period. The literature already abounds with crystal-structure data ready for the same purpose, but data are distributed over a great number of journals, some of which are not widely known. Therefore a work such as this which presents structural data in an arrangement which can serve as a convenient source for the study of systematics is much appreciated.

The present work is an excellent collection in which the author surveys the history of the description and structure determination of all elements, taken from literature sources from 1865 to the end of 1972. For the sake of completeness the author gives in chronological sequence all reported structure determinations, including those which later on may have been proved to have been erroneous. Thus from the book one gains complete knowledge of all the work done for each element.

The author deals with the elements in ten chapters subdivided according to the periodic table. Phase diagrams of the elements are given where necessary and crystalline modifications are described by the cell dimensions, space group and positional parameters of the atoms; bond distances, bond angles and non-bonded distances for molecular crystals are also given. Stress is laid on giving in each case all cell constants published in the literature. In many cases the temperature or pressure dependence of the lattice constants as well as the atomic volumes are given in diagrams. Coordination polyhedra and complexes of bonded atoms are well demonstrated by very clear drawings; those of boron and sulphur are especially attractive.

For a better understanding of results given in the literature, which are sometimes contradictory, the author first gives a short description of structure determinations and where there are several alternatives the most reliable one is indicated. All the information is well referenced.

The book is recommended by the author for use by graduate students in chemistry, metallurgy, physics and crystallography but it is to be highly recommended also to

anyone studying the behaviour of elements as they exist in different compounds. The systematically ordered data also help to reveal several as yet unsolved structural problems.

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**Surface and defect properties of solids. Vol. 3.** Senior reporters M. W. ROBERTS and J. M. THOMAS. Pp. viii + 201, Figs. 120, Tables 14. London: The Chemical Society, 1974. Price £6.50.

The third volume of the Chemical Society's series of *Specialist Periodical Reports on the Surface and Defect Properties of Solids* provides some readable and thought-provoking reviews on a wide variety of topics. There is a strong crystallographic flavour, with articles on *Crystallographic Shear and Non-Stoichiometry* (J. S. Anderson and R. J. D. Tilley), *Stress-Induced Martensitic Transformations and Twinning in Organic Molecular Crystals* (M. J. Bevis and P. S. Allan), and *The Geometry of Disinclinations in Crystals* (W. F. Harris). A timely account of *Appearance Potential Spectroscopy* (A. M. Bradshaw), a short review of *Some Aspects of the Nature and Reactivity of Adsorbed States of Unsaturated Hydrocarbons on Metal Catalysts* (G. Webb) and a fairly specialized description of preliminary applications of *Floating Spherical Gaussian Orbitals in the Solid State* (R. A. Suthers, J. W. Linnett and W. D. Erickson) complete the volume. The Chemical Society tradition of keeping mathematics down to a minimum and giving qualitative insight on the state of the art is amply maintained. Few workers could critically span the full range of research areas considered, but this is the kind of series that even in these inflationary times one might like to make part of one's personal library.

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