Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (R. O. Gould, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, Scotland). As far as practicable books will be reviewed in a country different from that of publication.

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Basic solid state chemistry. By ANTHONY R. WEST. Pp. x + 415. Chichester, New York: John Wiley, 1988. Price £50.00 hardback, £13.50 paperback.

The book is essentially a compacted version of Professor West's earlier volume *Solid State Chemistry and its Applications*. His rewrite rectifies the only serious criticism one could have of the earlier text: its length. Now reduced to 415 pages, the author has succeeded in retaining the essence of his book, while making its pedagogic strategy more apparent – to underscore the fascinating relationships that exist between atomic level structure and bulk properties in the solid state.

The eight chapters (reduced from 21), with accompanying questions, are now more equal in length; making the book ideally suitable for course work. It leads off with two chapters which lay the foundations of solid state chemistry. First, the often 'heavy' subject of symmetry and structure types in ordered solids, acquires an unusual freshness in West's approach, through his skilful use of illustrations. There then follows a well planned chapter on bonding in solids, where we are led through the 'basics' by a reassuringly secure hand. Quite rightly, crystallography and diffraction techniques get their own chapter. Here, a timely allusion to high-T_c superconductors brings it home that these exciting new materials also involve basic crystallographic concepts alongside other (for the moment) less spectacular materials. Chapter 4 reviews other important techniques for the identification, and structure/property characterization of solids. The pace is here drawn up almost to the point of simply referring to some of the methods in passing. The author is, however, quick to recommend supporting literature in these cases.

Half way through the book, we are steered gently into the real world of defect structures, through a sensitive treatment of basic thermodynamic principles. West makes this transition deceptively simply – a hallmark of his masterly technique which we find throughout the book. There then follows a delightfully succinct chapter on the interpretation of phase diagrams: a judicious choice of examples brings enlightenment to this often dark area for students coming from backgrounds other than basic chemistry courses. The final two chapters focus on structural aspects of the three dominant areas: electrical, magnetic and optical materials. It is again exciting to see high-temperature superconductors dealt with in considerable detail. This serves the additional valuable purpose of helping to make the vast amount of literature now being produced in this subject more readily accessible to an ever younger public.

To summarize: Professor West is to be congratulated on producing a text at the right level and with the right approach to render it an ideal course book for undergraduate studies in Solid State Chemistry and Materials Science. The book has no pretentions of completeness, but conveys a good feeling for current trends. It can, therefore, also be recommended to more experienced researchers to help brush away accumulated cobwebs. It will be several years before the book finds its equal.

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Crystal chemistry. By HOWARD W. JAFFEE. Pp. xii + 336. Cambridge: Cambridge University Press, 1989. Price £55.00 or $75.00. (Part I of this book available as **Introduction to crystal chemistry.** Pp. xi + 161. Price £15.00 or $24.95 paperback.)

This is a curious book since it discusses topics that seem almost to have been dragged up from the past. It is divided into two distinct sections. In the first, Dr Jaffe goes over familiar territory to any crystal chemist, namely chemical bonding and Pauling's rules. It has been so long since I saw a book dealing with these topics that I thought how refreshing it was to be reminded about them. Pauling's rules, in particular, seem hardly to be known by new students of crystallography, and I think that this book should be required reading if only for this part. I was amused by one passage that I have to share with you. At the end of a chapter on crystal chemistry of the ionic bond is the statement "Pauling's more recent electroneutrality concept states that no atom ever carries a positive charge greater than unity; any greater amount of charge becomes neutralized by transfer of anionic electrons to the cation. *This is a good place to close our discussion of ionic radii* (my italics)"! I would love to know what was missed out.

A particularly unusual and useful feature is the extensive discussion of refractivity and its importance in determining the refractive index properties of minerals. After an explanation of the basic ideas, the second section of the book describes the structures and refractivities of numerous mineral species so that it forms a handy reference book. All in all this is an interesting book which should be useful to student and researcher alike.

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