for this can be understood from a remark made on the first page of the chapter: 'We shall assume that the reader has a depth of knowledge of the electron structure and valence theory that can be obtained by reading any of the many introductory text books on inorganic and theoretical chemistry'. But the bibliography of the chapter lists several books which are themselves not easy reading. Here is a place where the authors, in future editions, might well amplify the treatments given in their references.

After the chapter on crystal chemistry, the book continues with one on crystal physics. The authors begin their introduction to tensors by using the example of diffusion in an anisotropic medium. They continue with a discussion of thermal expansion and show how it is related to the crystal structure, using quartz as an example. The use of physical (and some chemical) properties in the determination of point-group symmetry is also treated. This chapter gives a relatively easy introduction to crystal physics and some properties of tensors.

The chapter on general physical properties is followed by one devoted specifically to crystal optics as studied with the aid of the polarizing microscope. Although this subject has been treated in many books it is worth having again in this book, partly because it is an excellent treatment and partly because this useful technique is unknown to many chemists, and this book is a place where they may well encounter it. Its inclusion at this place in *Crystalline solids* therefore serves a useful purpose for those who, unlike many mineralogists, have not received any training in this field.

The next four chapters, which are grouped together as Part II of the present volume, begin with a chapter on thermodynamics as applied to crystals. This is a simple introduction in which the various thermodynamic equations are presented in a relatively palatable way. The importance of the use of the enthalpy function in dealing with condensed phases is explained on the second page. The chapter includes discussions of Clapeyron's relation, polymorphic transformations, phases with variable compositions, chemical potential, ideal and non-ideal solid solutions, and has another look at order–disorder, this time from a statistical mechanics viewpoint. The last topic, Gibbs's phase rule, leads directly into the next chapter, the interpretation of phase diagrams. This topic, usually taught to mineralogists in courses in petrology, is well treated and contains a wealth of material relevant to crystal science.

The last two chapters deal with certain aspects of experimental crystal chemistry. The first of these deals with the analysis of the chemical compositions of crystals. This is treated along modern lines and includes, for example, electron-probe microanalysis, which has proven so useful in understanding the complicated compositions of minerals. Other topics are separation techniques, classical chemical methods, optical emission spectrometry, atomic absorption spectrometry and Mössbauer spectrometry.

The final chapter is concerned with a description of some experimental methods in mineral synthesis, including syntheses at high pressures and temperatures. This chapter is not as extensive as it might be. Some methods commonly used in the manufacture of crystals in industry, such as the Czochralski method, the flux method and zone refining, are not mentioned.

The book is profusely illustrated. Most of the illustrations are good. A minor irritation, especially in Chapter 2, is the crude representation of ellipses (these can be neatly drawn with an ellipsograph, or even more easily with the aid of a set of elliptical stencils). The use of large black squares to represent points in the reciprocal lattice detracts from some diagrams.

The five pages of bibliography and the nine pages of index are hopelessly inadequate for a book of this kind. Both sections should be enlarged in an subsequent edition.

This large book is available at a reasonable price, so that it can be expected to find its way into many personal libraries. The reviewer is of the opinion that Chapters 10 through 16 are especially useful for the purpose of giving a perspective view of the range of crystal science to those crystallographers who have spent most of their time in the restricted field of crystal-structure analysis.

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Silicon carbide – 1973. (Proceedings of the Third International Conference, Florida, 1973.) Edited by R. C. MARSHALL, J. W. FAUST JR & C. E. RYAN. Pp. xii + 692, Figs. and plates 423, Tables 53. Columbia: Univ. of South Carolina Press, 1974. Price $25.00.

Though the growth of silicon carbide has been studied for many years, it was only 16 years ago that a paper presented at a solid-state conference in Brussels, on the growth properties and potential of single-crystal SiC, was received with considerable enthusiasm. So much so that in the following April a full conference was devoted to the material. It was not until 1968, when many of the technical problems were realized, that a further conference was devoted to SiC. The many advances that have been made since then are reflected in this collection of the 75 papers presented at the 1973 Miami Conference.

Although SiC was at first regarded solely as a semiconductor of considerable potential in the device field, its possible applications now range far, exploiting its refractory nature, chemical inertness, high tensile strength and high forbidden energy gap. The editors have accordingly arranged the conference papers into five distinct sections. Part I is devoted to the growth of SiC by various techniques associated with potential applications. Six papers each are devoted to epitaxic growth and vapour-phase deposition; a further paper describes new techniques. Both Laue and oscillation techniques are used to illustrate crystal quality and this section will be of interest to inorganic crystallographers. Other papers deal with growth kinetics and inclusion problems.

Part II is devoted to the study of polytypes which were discovered over sixty years ago. They are believed to be formed by molecular complexity at high growth temperatures. The use of etch pits to show up some polytypes is discussed and an atlas of the Laue patterns of known polytypes given. Other papers discuss solid-state transformations and evidence for a new 21-layer trigonal polytype.

The third part, concerned with physical properties, begins with a complete review of optical studies followed by

papers on band structure calculations for polytypes. These are followed by reviews of both photo- and cathodo-luminescence of polytypes.

The last two parts are devoted to non-electronic and electronic applications. The first group utilize the high tensile strength and moduli of SiC and include armour plating and the use of fibres with strengths as high as 4700 MN m^{-2}. Other papers relate to the corrosion resistance of SiC when used as resistive heating elements. The last part deals with electronic applications, particularly as light-emitting diodes with brightnesses between 10 and 100 nits and with spectral emission in the blue to red. SiC cold cathodes with emissions of 200 μA cm^{-2} are also fully discussed. Further papers discuss materials such as Be_3P_2, Be_3C and Si_3N_4 which might develop into more useful materials than SiC.

Solid-state physicists with an interest in new materials with diverse applications will find this collection of papers of considerable interest. The book has been offset without reduction in size and is therefore a tome of massive dimensions, but one which should be read.

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Interatomic potentials and simulation of lattice defects. Edited by PIERRE C. GEHLEN, JOE R. BEELER JR and ROBERT I. JAFFEE. Pp.xx+782. New York: Plenum, 1972. Price $46.00.

This report of a Batelle Institute Colloquium provides good insight into the relation of interatomic potentials to crystal defect properties. The participants include many distinguished contributors to the field, and their papers cover the fundamental nature of interatomic forces and applications to point defects, dislocations, stacking faults and surfaces. Reports of the Agenda Discussions on topics such as *Computer Techniques* and *Critical Issues* convey nicely the state of the art in the early 1970's. Pages 761–762 contain impassioned pleas for better X-ray Bragg intensity data on pure metals in order to obtain improved charge distributions, and for further X-ray and electron diffuse scattering intensities in disordered systems. Perhaps the crystallographic community ought to have been more strongly represented at the conference.

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