sufficiently widespread in industrial and laboratory practice.

The author gives maximum attention to the various different melt-growth processes (chapters 3–5). The Bridgman, Czochralski and other melt-growth methods are described in detail, covering both theory and practice. Typical examples of current use are given for each production method.

Chapters 6–8 are devoted to solution growth processes. Chapter 6 looks first at solvent and solutions and then at the main classes of low-temperature solution growth methods. It is a short, but very full, account of the general principles of solution growth. High-temperature solution growth of semiconductors and ionic materials is considered in chapter 7. This chapter is very compact and gives basic information on all available methods. Hydrothermal growth is discussed in chapter 8. The author looks first at the technology and then at the effects of processes parameters on the growth of crystals – quartz in particular. It should be noted that some particular methods of crystal growth from hydrothermal solutions are not reflected in this chapter; also, this chapter seems to omit the connection between the type of solvent used and the character and distribution of the defects that occur in the crystal.

Chapters 9 and 10 are concerned with the method of chemical vapour transport and other vapour transport methods, which have undergone sensational developments lately, connected with electronic requirements. Chapter 11 describes the growth of single crystals from solid phases, including solid-state epitaxy and growth in gels.

The final chapter deals with the problems of method selection and optimization.

The book has good illustrations and extensive and useful bibliographies at the end of each chapter.

On the whole, this is a nicely produced and readable book. It will be valuable to readers from many backgrounds who need to know about crystal growth.

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P-симметрия и ее дальнейшее развитие. А. М. Заморзаев, Ю. С. Карпова, А. П. Лунгу, А. Ф. Палистрант. **(*P*-symmetry and its further development.** By A. M. ZAMORZAEV, YU. S. KARPOVA, A. P. LUNGU and A. F. PALISTRANT.) Pp. 156. Kishinev: Shtiintsa, 1986. Price 1r 60k.

P-symmetry is one of the broadest generalizations of antisymmetry and colour symmetry. This account describes the progress made in this field during the past decade. It is a succinct review of the underlying mathematical ideas, although references are provided for physical applications.

The book is prepared with great care, giving a large amount of information in 156 pages of small format. It gives an impression of the ever-expanding frontiers of the symmetry concept to the general reader, but it is those few experts working on the general theory of symmetry who can truly benefit from this first-hand account by some of the pioneers of the field, Professor Zamorzaev and his school.

The book includes a list of 164 references.

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Rates of phase transformations. By R. H. DOREMUS. Pp. x+176. Orlando, Florida: Academic Press, 1985. Price US $29.00, £26.00.

This new book by Doremus fills a gap in the existing literature, as almost fifty years have passed since M. Volmer's famous first extensive treatment of the subject under essentially the same title *Kinetik der Phasenbildung* (strangely enough this important work is nowhere mentioned or referred to in Doremus' book).

I have read the book with much interest and pleasure. It serves well the demand for an introductory treatment of the subject for both the research scientist and the graduate student in many fields, *inter alia* crystallography, solid-state physics, crystal growth, metallurgy, physical chemistry, and chemical engineering. A brief introduction and Chapters 2 (*Diffusion and phase change*) and 3 (*Thermodynamics of interfaces*) serve as the basis for the eight chapters following. Chapters 4 and 5 deal with nucleation of liquid droplets from the vapour and nucleation from condensed phases. Unfortunately, the important atomistic nucleation theory is not dealt with. Bubble nucleation should also be covered briefly. In a future edition, Chapter 6 (*Phase separation of liquids*), only six pages long, should be extended to cover more extensively the important phase separation of partly immiscible liquids, a field in which considerable progress has been made during the last few years. Chapter 7 (*Crystal growth from the vapour*) follows more or less the usual treatment. One misses mention of the books by Strickland-Constable and by Faktor and Garrett and would certainly appreciate some reference to applications, *e.g.* to crystal-growth techniques. In Chapter 8 (*Solidification*) one would perhaps like to read more about dendritic growth, surface melting (Menzel, Nenov, Lacmann) and constitutional supercooling. Chapter 9 deals with crystal growth from solution. I feel it needs some extension to cover in more detail such important subjects as adsorption and its influence on crystal habit and combination of forms and Ostwald ripening (*e.g.* recent papers by Kahlweit). The book ends with Chapters 10 (*Grain growth*; missing some treatment of sintering) and 11 (*Precipitation in metals*). In a future edition one would like to have a chapter on the important field of electro-crystallization included.

As the book is also intended to serve as a textbook, a future edition should avoid use of obsolete units (atm, kcal)

or spelling (mole, gm, sec) and duplicate use of symbols (X for coordinate and mol fraction, P for vapour pressure and probability of formation). As is quite common among US authors, far too little reference is given to European researchers. Even in an introductory text authors who have made outstanding contributions to the subject should not be missing (in the present case *inter alia* Stranski, Budevski, Kaishev, Hartman).

The book provides interesting reading, is well illustrated, and the quality of printing and binding is excellent. It can truly be recommended.

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Dislocations in solids. Edited by H. SUZUKI, T. NINOMIYA, K. SUMINO and S. TAKEUCHI. Pp. xviii+672. Utrecht: VNU Science Press, 1985. Price DM 265.00.

One of the less spectacular but nevertheless significant events of the year 1984 was the fiftieth anniversary of the recognition of the dislocation as the 'carrier' of plastic deformation in crystals. In 1934 Orowan, Polanyi and Taylor introduced the first correct models to account for the plastic properties of crystalline materials. The anniversary was marked by a number of conferences where pioneers and younger disciples of the field met in varying composition to 'celebrate', *i.e.* to present papers.

The Yamada Science Foundation has been a very active sponsor of international meetings in recent years. Topics and invited lectures are always very well selected, and the high standards of these conferences have found worldwide recognition. The ninth Yamada Conference, on 'Dislocations in Solids', was held in August 1984 in Tokyo. It was organized by the editors of these conference proceedings. Following the general routine pattern, camera-ready texts of 146 papers are presented in about 670 pages. There is an index of authors, which includes many of the leading experts in the field, but no attempt has been made to provide some guidance through the immense amount of information by a subject index.

The papers are generally of high quality and show that the refereeing process was taken seriously. The nine invited papers (F. R. N. Nabarro on historical aspects, K. Kawamura on long-range topological disorder, J. M. Galligan on dislocation 'flutter', T. Suzuki and H. Koizumi on quantum tunneling of dislocations, J. De Hosson on dislocation dynamics, H. Alexander, H. Gottschalk & C. Kisielowski-Kemmerich on the dislocation core structure in Si, R. Jones on electronic spectra of dislocations in Si and diamond, V. I. Nikitenko, L. M. Dedukh & V. K. Vlasko-Vlasov on dislocations and other defects in magnetics, D. R. Nelson on defects in amorphous materials) are well suited to broaden the view of the field.

The historical foundation of dislocations in solids has many facets. Nabarro draws attention to some very early experimental and theoretical investigations where the basic idea of a crystal dislocation was almost there ('tantalizingly close'). In retrospect, it seems an unbelievably long time from the turn of the century, when the elastic (continuum) theory for dislocations was available (Weingarten, Timpe, Volterra), until 1934, when the celebrated event occurred. In a concise and yet amusing way, Nabarro guides the reader through this story of close but not quite correct guesses and correct but (at the time) not verifiable ideas. We know today that etch pits due to dislocations ending on a crystal surface had already been observed in 1865, and the first known observations of a dislocation in the bulk (decorated, in rock salt) dates back to 1905. Nabarro illustrates how Prandtl, Dehlinger, Yamaguchi and others contributed important steps toward the concept of a crystal dislocation until the correct pattern finally emerged.

The other invited papers expand the view into the future as the material presented here is related to some of the most advanced experimental techniques and theoretical ideas in dislocation research. Though mostly written for specialists, they will give an impression of current activities to the non-specialist, too. The contributed papers (of four pages each) are mostly highly specialized research reports. They represent the bulk of the 15 chapters ranging from elastic theory and fracture to atomic structure, and covering dislocations in metals, semiconductors and ionic crystals as well as grain boundaries in crystalline materials and defects in amorphous structures.

The book will be useful to anyone who wants a quick reference guide to current topics in dislocations. Together with the other books produced in the wake of the 1984 celebrations it shows that dislocations have matured since 1934, but that many open questions also remain to be solved with today's and tomorrow's advanced techniques.

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Books Received

The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.

The physics of magnetic recording. By C. D. MEE. Pp. xvii+270. Amsterdam: North-Holland, 1986. Price Dfl 75.00. This book is in fact a reprinting of the book which originally was published in 1964.

Halide glasses for infrared fiberoptics; proceedings of a NATO workshop. Edited by R. M. ALMEIDA. Pp. xi+412. Dordrecht: Martinus Nijhoff, 1987. Price Dfl 195.00, US $85.50, £69.95.