

prehensive coverage of over 400 references and for compilation of extensive tables of thermodynamic and kinetic data related to formation and migration of defects.

At first glance the price seems a bit high for a book of only 268 pages of text, but it should be noted that small print and a terse style have made it possible to succinctly summarize an enormous amount of material. The casual reader may not find this volume to be very useful. However anyone who is genuinely concerned with the topics covered in this book will find it to be a veritable goldmine of information and a good investment.

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Vapour growth & epitaxy (Proceedings of 2nd International Conference on Vapour Growth & Epitaxy – Israel May 1972). Edited by G. W. CULLEN, E. KALDIS, R. L. PARKER and M. SCHIEBER. Pp. xii + 382. Figs. 316, Tables 72. Amsterdam: North Holland, 1972. Price f 130 00 (about US \$ 47.30).

This collection of nearly fifty papers reprinted from the *Journal of Crystal Growth* constitutes about half of the scientific contributions presented to the Second International Conference on Vapour Growth and Epitaxy held in Jerusalem 1972, and covers both theoretical and many practical aspects of the growth of a wide variety of single crystals and thin films.

The section dealing with crystal growth is largely concerned with studies of compound semiconductors and metal oxides. Substantial attention has been focused on growth by chemical transport; the growth of europium sulphide using high-pressure temperature techniques and the use of plasma for chemical transport of carbon are two apparently fruitful technical innovations described here. The importance of understanding the thermodynamics of the processes involved in chemical transport is borne out by the proportion of papers devoted to the problem. The diversity of crystalline materials and growth methods illustrated in this selection of papers goes some way to satisfying the ever-pressing needs for exotic and increasingly pure single crystals. In the area of thin-film growth the technique of liquid-phase epitaxy appears to be an appropriate and recently dependable method of growing a variety of garnets. The ability to conveniently control the lattice constant by substitution of variable amounts of the rare earth in the melt shows the method to possess enormous potential. Although the method seems to have so far developed by a rather empirical route, efforts which are being made to understand the heat and mass flow processes involved should aid prediction of the most suitable growth conditions.

To get back to fundamentals, the more theoretical aspects of nucleation and growth kinetics are well reviewed in an invited paper by J. P. Hirth showing that a comparison of

some fairly recent experiments with predictions made by capillarity-based nucleation theories regarding the eventual degree of epitaxy lends much support to this type of model. Although perhaps a stage removed from the practical situation of nucleation on solid surfaces, there is Hoare's elegant study of the structural configurations of small clusters of atoms based on total potential energy considerations. The interesting possibility that small atom clusters may in some cases exist in abnormal lattice forms appears to tangle still further our comprehension of the already complicated phenomenon of epitaxy.

All in all, this book contains a diverse and well balanced collection of very relevant papers with a fittingly well produced large number of diagrams and photographs. A worthy addition to the previous volume published in what may be anticipated is a continuing series.

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Tensors and group theory for the physical properties of crystals. By W. A. WOOSTER. Pp. x + 344. Figs. 136, Tables 44. Oxford: Clarendon Press, 1973. Price £7.00

When a textbook is written by a teacher of experience and some renown then expectations are high; with this book these expectations are fully realized.

The first part of the book proceeds by easy progression from very simple ideas of symmetry, beautifully illustrated, to the point group and then develops the idea of the second-order tensor. Then there follow a number of chapters devoted to physical properties and their relationship to the symmetry of crystals. Such properties include conductivity, thermal expansion, glide twinning, stress and strain, the piezoelectric effect, the elastic properties of crystals and photoelasticity.

In part II group theory is developed in a relatively painless way and related to space groups. While the average crystallographer is well acquainted with space groups it is usually in a visual form but here the less familiar theoretical background is presented in a way which makes it all seem so easy – and even interesting! Finally there are chapters on: Brillouin zones, the numbers of constants required to define a crystal's physical properties, vibrations of molecules and radicals (excellent illustrations here) and infrared and Raman spectra.

There are numbers of well-formulated problems interspersed with each chapter together with answers in outline form.

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