

Book Reviews

Crystal Growth Technology. Hans J. Scheel and Tsuguo Fukuda Eds., John Wiley & Sons, Chichester, England. 2003. ISBN 0-471-49059-8. List price, \$210. 668 pages.

This volume consists of 29 selected review papers from the First International School on Crystal Growth Technology held in 1998. Topics include some of the fundamentals of crystal growth, methods of characterization, crystal machining, and the technology of growth of particular important materials. Emphasis is strongly on growth from high-temperature melts, with sparse coverage of film formation and growth from aqueous solutions. Articles on crystal machining have seldom, if ever, appeared in books on crystal growth and those included here are welcome additions.

As with any collection of articles by many authors, the emphasis, presentation, and coverage vary widely, ranging from excellent comprehensive reviews to previously unpublished and unrefereed results. The editing is first class, so that there are very few errors—grammatical, spelling, or content. The subject index is excellent and makes it easy to find related material. This is fortunate because, as might be expected in a multi-author work, the same material is often covered by more than one author, without cross-references. For example, the various aspects of growth of GaAs are covered in four articles, with some duplication. Two articles deal with CdTe growth and two with InP.

Only a few errors were noticed. The most troublesome was the discussion on segregation in article 4. To begin with, the fictitious stagnant film thickness is called “the diffusion boundary layer.” Although this is a common error in the crystal growth literature, it leads to a great deal of confusion because it does not really exist, it has

no relation to true hydrodynamic boundary layers, its value must be found by exact hydrodynamic calculations or experiment, and it frequently is a function of growth rate and position. Furthermore, the film thickness as defined in Figure 4.7 does not correspond to that used in the Burton, Prim, Slichter eq 4.4 on the preceding page, i.e., it is based on a linear concentration profile rather than an exponential one. The distribution coefficients used in eq 4.4 are defined differently from those in eq 4.5, and we were unable to confirm eq 4.5 from the reference cited. It was disappointing to see the century-old stagnant film equation of Nernst presented as eq 4.6, especially without any discussion of its many limitations, most notably the implicit assumption of vanishingly small concentration in the solution. The confusing discussion on segregation in article 4 is in sharp contrast to the accurate and clear presentation of this topic in article 6.

The Ga–As solid–liquid phase diagram shown as Figure 2.7 has two serious errors. First, the liquidus on the Ga side has infinite slope at small As concentration and does not even extend to pure Ga. Second, a maximum in the liquidus is shown for stoichiometric melt rather than for the congruently melting composition, which is slightly off stoichiometry. Similarly, the Ga–As phase diagram shown in Figure 14.5 does not show the liquidus reaching pure Ga, but does correctly show the same maximum temperatures for liquidus and solidus.

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