

Book Reviews

Fine Ceramics. Edited by Shinroku Saito. Elsevier Applied Science, London, 1987, 352 pp. Price: £44.00, ISBN 0-444-01193-5.

Once in a while an unusual book appears and 'Fine Ceramics' can be described as such. In a relatively small volume of 352 pages it attempts and, on balance, succeeds in providing thumbnail sketches of aspects of the science and technology of the engineering ceramics considered to be of importance to the Japanese. As would be expected in a compilation made with the aid of an editorial board of six members and forty-seven contributors, the standard varies. It is refreshing however to report that in this case the editor has unified the book by dividing it into four sections, each preceded by an overview, which themselves give an insight into the Japanese attitude to engineering ceramics.

The first chapter on ceramic processing with an overview by Shigeharu Naka moves directly into exotic production methods such as high pressure synthesis and epitaxial growth without any recourse to the mundane, industrially-used processing techniques, such as solid-state sintering or liquid-phase densification. Again, shaping and forming, which are considered to be of economic importance in most industrial environments, are omitted entirely. Characterisation is the title of the second chapter, with the overview by Shin-ichi Shiresaki, and whereas the normal approach would be to list the technique and measurements utilised, the approach taken is to consider the importance of a phenomenon such as point defects or grain boundary phase and to characterise the phenomenon.

The third chapter on structural ceramics contains several articles on the

fabrication and properties of classes of materials such as oxides, silicon nitride and silicon carbide ceramics. They are complete in themselves, and are well written and informative. The final chapter on electronic ceramics covers a wide subject area, ranging from ceramic substrates through conventional electronic ceramics such as positive and negative temperature coefficient materials, semiconductors and sensors, to magnetic recording media.

The book is well produced, printed with clear diagrams and photomicrographs. Editing is generally good, taking into account the occasionally quaint English, and considering the number of contributors, it contains very few errors. However there are inconsistencies of units (e.g. thermal conductivity: $\text{W cm}^{-1} \text{K}^{-1}$ and $\text{W m}^{-1} \text{K}^{-1}$) in different articles.

It is a credit to the editor that the book is easy to read and contains a considerable amount of useful information as a lead-in to reading in greater depth. At a price of £44.00 it is likely to be restricted to libraries. The nature of the book makes it unsuitable for undergraduate or postgraduate courses, although it could be recommended as supplementary general reading.

R. S. Stevens

Defect Crystal Chemistry and its Applications. By R. J. D. Tilley. Blackie, 1986, pp. Price: £35.00, ISBN

Professor Tilley writes at the end of his book under conclusions: 'The level chosen has been introductory in nature, intended to provide a basis for further study.' Presumably the author intended the book to be read by experienced research workers about to enter the field, since the book itself is at an advanced level, well above that expected of an undergraduate text.

The book is divided into four parts, the first dealing with stoichiometric crystals, atomic mobility and the theory of diffusion. The exposition is clear and the text well planned but is not dissimilar to that found in other standard textbooks. The second and third parts of the book deal with non-stoichiometric materials containing ions with fixed valence and variable valence respectively. Defect chemistry is clearly discussed, leading on to a small section on applications which could usefully be expanded. An explanation of electronic conduction in non-stoichiometric solids, together with theories of conduction, colour centres and relevant thermodynamics then follows.

The most interesting chapters of the book are found in Part 4, where the structure of non-stoichiometric phases is explained in some detail and illustrated by means of transmission electron micrographs with accom-