

describes high-temperature deformation processes in metals, ceramics and minerals in the language and with the concepts developed mostly in the field of physical metallurgy. The crucial role of the development of the microstructure is thus not only squeezed into general phenomenological and thermodynamic relationships, but fully discussed in microscopic terms, *i.e.* dislocation motion and interaction, diffusion, grain boundary sliding, phase transformations *etc.* The most important models are clearly described and illustrated with examples for different types of material. In chapter 1, the rheological behaviour of solids is described in the form of constitutive equations which can be obtained in mechanical tests. Viscous behaviour, predominant at high temperatures, and the different types of creep are introduced for uniformly deformed samples; criteria for non-uniformity (*e.g.* shear localization) are also considered. Chapter 2 provides the necessary background in lattice defects - vacancies, dislocations, grain boundaries - and their mobility. Chapter 3 introduces the general phenomenological and thermodynamic formulation. In chapter 4, a concise and enlightening summary of dislocation creep models is presented, and it becomes clear that macroscopically observed creep laws can rarely provide key arguments in favour of any particular model: for a meaningful interpretation it is necessary to analyse the microstructure on all accessible scales. The effects of hydrostatic pressure and structural changes (polygonization and recrystallization) appearing at high temperatures are discussed in chapters 5 and 6, with particular emphasis on geological phenomena. Diffusion creep, superplasticity and transformation plasticity are presented in chapters 7 and 8, and chapter 9 gives a brief introduction to attempts to scale and classify materials properties in the form of deformation maps.

The unconventional interdisciplinary approach provides the reader with a very condensed but nevertheless clear and refreshing view of the very complex field of high-temperature plasticity. The book is intended for graduate and senior undergraduate students but can be recommended to anyone interested in high-temperature plasticity of crystalline materials. Up-to-date (1983) references and selected recommended texts for further reading are useful if more detailed information or insight is sought.

An unbiased colleague recently remarked that 'creep of crystals' seems a 'frightening idea'. Poirier's book could comfort him that creep has been around for quite some time and that it is challenging to deal with it.

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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.

Crystallographic computing 3: Data collection, structure determination, proteins, and databases. Edited by G. M. SHELDRICK, C. KRÜGER and R. GODDARD. Pp. ix + 314. Clarendon Press, Oxford, 1985. Price £25.00. A review of this book, by J. P. Glusker, has been published in the October 1986 issue of *Acta Crystallographica*, Section B, pages 522-524.

Theory of holors (A generalisation of tensors). By P. MOON and D. E. SPENCER. Pp. xix + 392. Cambridge University Press, 1986. Price £50.00.

Advances in X-ray analysis. Vol. 27. Edited by J. B. COHEN, J. C. RUSS, D. E. LEYDEN, C. S. BARRETT and P. K. PREDECKI. Pp. xviii + 579. New York: Plenum Press, 1984. Price US \$69.50. These volumes, appearing with great regularity, record the proceedings of the annual conferences held in Colorado, USA, on the applications of X-ray analysis (diffraction and spectrometry). This volume relates to the 32nd of these meetings, which took place in August 1983. It contains some 70 papers, all of interest, by some 130 authors. The previous two volumes were reviewed by Beukes [*Acta Cryst.* (1983). **A39**, 823-824] (Vol. 25) and Nittono [*Acta Cryst.* (1985). **A41**, 110-111] (Vol. 26).

Dynamical properties of solids. Vol. 5. Edited by G. K. HORTON and A. A. MARADUDIN. Pp. vii + 500. Amsterdam: North-Holland, 1984. Price US \$96.25, Dfl 250.00. This is the fifth volume of this continuing series, of which successive issues appear at very irregular intervals. Vols. 3 and 4 were published almost simultaneously six years ago and were reviewed then by Tegenfelt [*Acta Cryst.* (1980). **A38**, 751-752]. Since the first two volumes (on fundamentals and on applications of crystalline solids), the topics have become increasingly specialized. This volume has two parts, one on dynamical aspects of the Mössbauer effect, by B. Kolk, and the other on structural phase transitions in coupled systems, by Y. Yamada.

Polycrystalline semiconductors: physical properties and applications. Edited by G. HARBEKE. Pp. viii + 245. Berlin: Springer, 1985. Price DM 78.00. This book records the proceedings of the International School of Materials Science and Technology, which was held in Erice, Italy, in July 1984.