possibility of derivation of the space groups from Lie groups as their discrete subgroups, as was done by Raghunathan (1972).

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Editorial note: A list of some twenty errata is supplied by the publishers with the book; a table listing other typographic errors is obtainable from the authors of this review.

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Diffusion in crystalline solids. Edited by G. E. MURCH and A. S. NOWICK. Pp. xv+482. New York: Academic Press, 1984. Price US $73.00.

This book focuses upon progress in diffusion research since about 1975, when the book *Diffusion in Solids: Recent Developments*, edited by A. S. Nowick and J. J. Burton, was published in the same series. It provides an update in an area where good textbooks and monographs have been missing for over a decade. As the editors state, a number of subjects have been selected that have reached a certain state of maturity - judged from a broad 'agreement on their scope and interpretation'.

The book contains eight chapters, each with a list of contents and references, one even with a list of symbols. The subject index is useful if information on specific materials is sought; some of the other entries do not serve the purpose of enlightening the reader on the subject.

In chapter 1, S. J. Rothman describes the experimental techniques for the measurement of tracer diffusion coefficients in solids, mainly inorganic materials. The reproducibility of a few percent reached by the sectioning technique is the result of a long, careful development.

Chapter 2 (by W. Frank, U. Gösele, H. Mehrer and A. Seeger) gives a detailed account of the mechanisms of diffusion in Si and Ge, including doping and oxidation effects on self- and foreign-atom diffusion.

In chapter 3, A. S. Nowick reports on the principles of atom transport in oxides of the fluorite structure, a relatively open structure which tolerates high levels of disorder (dopants and/or deviation from stoichiometry), with correspondingly complex diffusion properties.

Chapter 4, by H. Baker, deals with tracer diffusion in concentrated alloys, including intermetallic phases with the $B2$, $D0_3$ and $L1_2$ structures.

While chapters 2-4 are devoted to selected technologically important groups of materials, chapters 5 and 6 concentrate on special diffusion paths along dislocations and grain boundaries. A. D. Le Claire and A. Rabinovitch (chapter 5) describe the mathematics of the (continuum) analysis of diffusion in crystals containing dislocations, illustrated by some experimental results, while R. W. Balluffi (chapter 6, based on the 1982 Institute of Metals lecture) reviews the current knowledge of the structure of grain boundaries and experiments relevant to boundary diffusion, including the interplay of diffusional (atomic) and boundary motion.

Finally, chapters 7 and 8 report on Monte Carlo simulation of diffusion kinetics (G. E. Murch) and the statistical-mechanical treatment of point defect diffusion based on lattice dynamics calculations (G. Jacucci). These chapters illustrate the new developments which are possible with the use of large computers.

The book should be useful to all those who are interested in the current state of diffusion science.

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Creep of crystals. By J.-P. POIRIER. Pp. xiv+260. Cambridge Univ. Press, 1985. Price hardback £27.50, US$ 49.50; paperback £10.95, US$ 22.95.

Creep is the appearance of a plastic deformation (strain rate $\dot{\varepsilon}$) under the influence of an external stress σ at a given temperature T and a hydrostatic pressure P (which may all vary with time t). A general constitutive equation may read $\dot{\varepsilon} \equiv \dot{\varepsilon}(\sigma, y, T, P)$, where y is an internal state variable which may depend on ε, $\dot{\varepsilon}$, $\ddot{\varepsilon}$, ... and represents the microstructure of the sample produced along the total more or less complex deformation path. If y can be uniquely related to σ, $\dot{\varepsilon}$, T, P, then $\varepsilon(t)$ can be calculated, *i.e.* a mechanical equation of state exists. Geologists in particular, but also materials scientists, are interested in predicting $\varepsilon(t)$ for times t inaccessible in the laboratory and therefore much work is devoted to establishing the laws of plasticity where they can be observed in order to extrapolate with some reliability. The earth scientist is obviously in the most severe situation as characteristic time scales are in the range of millions of years.

Poirier's book appears in the Cambridge Earth Science Series but is equally useful for materials scientists as it