Int. J. High Technology Ceramics 3 (1987) 79–80

Book Review

Kinetics and Mass Transport in Silicate and Oxide Systems (Materials Science Forum, Vol. 7). Edited by R. Freer and P. F. Dennis. Trans Tech Publications, Aedermannsdorf, Switzerland, 1986, 340 pp. Price: US$70·00, ISBN 0-87849-539-8.

This volume is the proceedings of a meeting held in London in September 1984, sponsored jointly by the Mineralogical Society of Great Britain, the British Institute of Ceramics, the Institute of Physics, and the Polar Solids Discussion Group of the Royal Society of Chemistry. The intention of the organisers in planning this meeting was to provide an interdisciplinary forum for all workers interested in mass transport and related kinetic processes in oxide and silicate systems. The six invited review lectures provided a framework for the volume, which includes 25 other refereed contributions.

The volume is divided into sections, each prefaced by a review paper, matching the inter-related themes of the meeting. The first set of papers deal with structural characterisations of silicates and other oxides using a range of techniques including NMR and neutron diffraction, and with the application of beta-autoradiography as a method of mineral identification and location. Collectively, these provide a good overview of the usefulness in this area of some modern experimental systems. The section dealing with kinetic studies is the longest and contains 11 papers. Reports are provided of studies into a broad spectrum of minerals, for example: kaolinite, magnesite, feldspar and cordierite. Most refer to laboratory experiments, but there are also good accounts of observations and theoretical work on geological

Int. J. High Technology Ceramics (3) (1987)—

processes. The next largest section is headed 'Mass transport processes', although the distinction between this and 'Kinetics' is a fine one. Most papers here describe work on the determination of diffusion coefficients, or on processes having diffusion as the rate controlling step. Techniques for following mass transport in oxides, described in the introductory review paper, include A.C. impedance measurements, and SIMS. Other contributions deal with oxygen and cation diffusion in a range of solid and molten silicates and oxides. In other sections, the practical applications of the understanding of mass transport processes are covered in relation to the diverse problems of oxidation, corrosion and glass-making. More theoretically inclined work, generally computer supported, on crystal structures and mass transport processes is also reported, to complete the balance of the presentations.

In all, the papers in this unusual volume provide a fascinating and stimulating insight into a very wide range of subjects and experimental techniques, having a common theme. The artificiality of many of the disciplinary divisions in the field of inorganic solid (and liquid) state processes is clearly revealed. The volume will repay careful reading, not least for its very useful overview papers. It is reproduced from the authors' camera-ready copy but the quality, including that of the figures and micrographs, is generally very high.

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