

Diffusion in Ceramics

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Abstrak

This textbook is unique at present, since no other book on this subject currently exists. It is composed of two parts: Part I on the Fundamentals of Diffusion and Part II on Diffusion in Ceramics (Experimental).

Part I is quite general, explaining the basics of diffusion as first presented in a scholarly manner by Adolf Fick, in whose steps diffusion researchers the world over have been walking for decades. Following his fundamental laws of diffusion, progress has been made in the field by internationally distinguished theoreticians and experimentalists. Undoubtedly, the current stage in understanding of diffusion was reached as the result of precise measurements of diffusion coefficients in corroboration of basic theories. Although most of the experiments were initially performed on 'well-behaved' metals, such as the noble metals, later diffusion coefficient measurements extended to other metals and alloys and then to all solids, including ceramics. In order to understand lattice diffusion and to avoid the contribution of short-circuit diffusion (mainly in grain boundaries), single crystals were used alongside polycrystalline solids.