



DIFFUSION IN CRYSTALLINE SOLIDS

(Materials Science and Technology Series)

G E Murch

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Diffusion in Crystalline Solids addresses some of the most active areas of research on diffusion in crystalline solids. Topics covered include measurement of tracer diffusion coefficients in solids, diffusion in silicon and germanium, atom transport in oxides of the fluorite structure, tracer diffusion in concentrated alloys, diffusion in dislocations, grain boundary diffusion mechanisms in metals, and the use of the Monte Carlo Method to simulate diffusion kinetics.

This book is made up of eight chapters and begins with an introduction to the measurement of diffusion coefficients with radioisotopes. The following three chapters consider diffusion in materials of substantial technological importance such as silicon and germanium. Atomic transport in oxides of the fluorite structure is described, and diffusion in concentrated alloys, including intermetallic compounds, is analyzed. The next two chapters delve into diffusion along short-circuiting paths, focusing on the effect of diffusion down dislocations on the form of the tracer concentration profile. The book also discusses the mechanisms of diffusion in grain boundaries in metals by invoking considerable work done on grain-boundary structure. The last two chapters are concerned with computer simulation, paying particular attention to machine calculations and the Monte Carlo method. The book concludes by exploring the fundamental atomic migration process and presenting some state-of-the-art calculations for defect energies and the topology of the saddle surface.

Students and researchers of material science will find this book extremely useful.



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