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Autore	Pelleg Joshua
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Descrizione fisica	1 online resource (XXII, 448 p. 365 illus., 50 illus. in color.)
Collana	Solid Mechanics and Its Applications, , 0925-0042 ; ; 221
Disciplina	530.415
Soggetti	Materials science Mechanics Mechanics, Applied Solid state physics Characterization and Evaluation of Materials Solid Mechanics Solid State Physics
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Nota di contenuto	Part A Fundamentals of Diffusion -- 1 Macroscopic Diffusion -- 2 Microscopic (or Atomic) Diffusion -- 3 Defects in Materials -- 4 Mechanism of Diffusion -- 5 Self Diffusion, Solute Diffusion, Diffusion in Ionic Crystals and Correlation Effects -- 6 Interdiffusion -- 7 Diffusion in Grain Boundaries -- 8 Diffusion in Dislocations -- 9 Experimental Methods and Procedures -- 10 Empirical Rules -- Part B Diffusion in Ceramics (Experimental) -- 11 Diffusion in Alumina Single Crystals -- 12 Diffusion in Silicon Carbide (Carborundum) -- 13 Diffusion in MgO (Magnesia or Periclase) -- 14 Diffusion in ZrO2 (Zirconia) Single Crystals -- 15 Diffusion in Si3N4 Single Crystals -- Index.
Sommario/riassunto	This textbook provides an introduction to changes that occur in solids such as ceramics, mainly at high temperatures, which are diffusion controlled, as well as presenting research data. Such changes are related to the kinetics of various reactions such as precipitation, oxidation and phase transformations, but are also related to some mechanical changes, such as creep. The book is composed of two

parts, beginning with a look at the basics of diffusion according to Fick's Laws. Solutions of Fick's second law for constant D , diffusion in grain boundaries and dislocations are presented along with a look at the atomistic approach for the random motion of atoms. In the second part, the author discusses diffusion in several technologically important ceramics. The ceramics selected are monolithic single phase ones, including: Al_2O_3 , SiC , MgO , ZrO_2 and Si_3N_4 . Of these, three refer to oxide ceramics (alumina, magnesia and zirconia). Carbide based ceramics are represented by the technologically very important Si-carbide and nitride based ceramics are represented by Si-nitride which has been important in high temperature ceramics and gas turbine applications. The author presents a clear, concise and relatively comprehensive treatment of diffusion in ceramics for use by those at an advanced undergraduate level and beyond. It supports understanding of the basic behavior of materials and how to relate observed physical properties to microscopic understanding. The book also provides researchers with a handy collation of data relating to diffusion in ceramics and supports a fundamental understanding of atomic movements.
