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6 Strain Rate Effects and Creep 6.1 Introduction; 6.2 Yield Point Phenomenon and Strain Aging; 6.3 Ultrarapid Strain Phenomena; 6.4 Creep; 6.5 Deformation Mechanism Maps; 6.6 Superplasticity; 7 Deviations from Classic Crystallinity; 7.1 Introduction; 7.2 Nanocrystalline Metals; 7.3 Amorphous Metals; 7.4 Quasicrystalline Metals; 7.5 Radiation Damage in Metals; 8 Processing Methods; 8.1 Introduction; 8.2 Casting; 8.3 Powder Metallurgy; 8.4 Forming and Shaping; 8.5 Material Removal; 8.6 Joining; 8.7 Surface Modification; 9 Composites; 9.1 Introduction; 9.2 Composite Materials 9.3 Metal Matrix Composites 9.4 Manufacturing MMCs; 9.5 Mechanical Properties and Strengthening Mechanisms in MMCs; 9.6 Internal Stresses; 9.7 Stress Relaxation; 9.8 High-Temperature Behavior of MMCs; PART TWO; 10 Li, Na, K, Rb, Cs, and Fr; 10.1 Overview; 10.2 History, Properties, and Applications; 10.3 Sources; 10.4 Structure-Property Relations; 11 Be, Mg, Ca, Sr, Ba, and Ra; 11.1 Overview; 11.2 History and Properties; 11.3 Beryllium; 11.4 Magnesium; 11.5 Heavier Alkaline Metals; 12 Ti, Zr, and Hf; 12.1 Overview; 12.2 Titanium; 12.3 Zirconium; 12.4 Hafnium; 13 V, Nb, and Ta; 13.1 Overview 13.2 History and Properties 13.3 Vanadium; 13.4 Niobium; 13.5 Tantalum; 14 Cr, Mo, and W; 14.1 Overview; 14.2 Chromium; 14.3 Molybdenum; 14.4 Tungsten; 15 Mn, Tc, and Re; 15.1 Overview; 15.2 History and Properties; 15.3 Manganese; 15.4 Technetium; 15.5 Rhenium; 16 Co and Ni; 16.1 Overview; 16.2 Cobalt; 16.3 Nickel; 17 Ru, Rh, Pd, Os, Ir, and Pt; 17.1 Overview; 17.2 History, Properties, and Applications; 17.3 Toxicity; 17.4 Sources; 17.5 Structure-Property Relations; 18 Cu, Ag, and Au; 18.1 Overview; 18.2 Copper; 18.3 Silver; 18.4 Gold; 19 Zn, Cd, and Hg; 19.1 Overview; 19.2 Zinc; 19.3 Cadmium 19.4 Mercury

Sommario/riassunto

This junior/senior textbook presents fundamental concepts of structure property relations and a description of how these concepts apply to every metallic element except iron. Part One of the book describes general concepts of crystal structure, microstructure and related factors on the mechanical, thermal, magnetic and electronic properties of nonferrous metals, intermetallic compounds and metal matrix composites. Part Two discusses all the nonferrous metallic elements from two perspectives: First it explains how the concepts presented in Part One define the properties of a particular metal
