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4.4. Polymer Morphology 4.5. Inorganic Glasses; 4.6. Ceramics: An Introduction; 4.7. Structure of Ceramics; 4.8. Cement and Concrete; 4.9. Perspective and Conclusion; Additional Reading; Questions and Problems; CHAPTER 5. THERMODYNAMICS OF SOLIDS; 5.1. Introduction; 5.2. Chemical Reactions; 5.3. Single-Component Systems; 5.4. Introduction to Binary Phase Diagrams; 5.5. Additional Phase Diagrams; 5.6. Structure and Composition of Phases; 5.7. Thermodynamics of Surfaces and Interfaces; 5.8. Thermodynamics of Point Defects; 5.9. Perspective and Conclusion; Additional Reading Questions and Problems CHAPTER 6. KINETICS OF MASS TRANSPORT AND PHASE TRANSFORMATIONS; 6.1. Introduction; 6.2. Macroscopic Diffusion Phenomena; 6.3. Atom Movements and Diffusion; 6.4. Nucleation; 6.5. Kinetics of Phase Transformations; 6.6. Generalized Solid-State Kinetics; 6.7. Perspective and Conclusion; Additional Reading; Questions and Problems; CHAPTER 7. MECHANICAL BEHAVIOR OF SOLIDS; 7.1. Introduction; 7.2. Elastic Behavior; 7.3. Plastic Deformation of Metals; 7.4. Role of Dislocations; 7.5. Mechanical Behavior of Polymers; 7.6. Mechanical Behavior of Ceramics and Glasses 7.7. Mechanical Testing of Materials 7.8. Perspective and Conclusion; Additional Reading; Questions and Problems; CHAPTER 8. MATERIALS PROCESSING AND FORMING OPERATIONS; 8.1. Introduction; 8.2. Solidification Processing of Metals; 8.3. Mechanical Forming Operations; 8.4. Powder Metallurgy; 8.5. Polymer Processing; 8.6. Forming Glass; 8.7. Processing of Ceramics; 8.8. Perspective and Conclusion; Additional Reading; Questions and Problems; CHAPTER 9. HOW ENGINEERING MATERIALS ARE STRENGTHENED AND TOUGHENED; 9.1. Introduction; 9.2. Heat Treatment of Steel
9.3. Ferrous and Nonferrous Alloys: Properties and Applications

Sommario/riassunto

Milton Ohring's *Engineering Materials Science* integrates the scientific nature and modern applications of all classes of engineering materials. This comprehensive, introductory textbook will provide undergraduate engineering students with the fundamental background needed to understand the science of structure-property relationships, as well as address the engineering concerns of materials selection in design, processing materials into useful products, and how material degrade and fail in service. Specific topics include: physical and electronic structure; thermodynamics and kinetics;