



Elements of Materials Science and Engineering (6th Edition)

By Van Vlack, L. H.

Prentice Hall, 1989. Book Condition: New. Brand New, Unread Copy in Perfect Condition. A+ Customer Service! Summary: 1. Introduction to Materials Science and Engineering. Materials and Civilization. Materials and Engineering. Structure/Properties/Performance. Types of Materials. Summary. Key Words. Practice Problems. Test Problems. 2. Atomic Bonding and Coordination Engineering. Individual Atoms and Ions. Molecules. Macromolecules (Polymers). Three-Dimensional Bonding. Interatomic Distances. Generalizations Based on Atomic Bonding. Summary. Key Words. Practice Problems. Test Problems. 3. Crystals (Atomic Order). Crystalline Phases. Cubic Structures. Noncubic Structures. Polymorphism. Unit-Cell Geometry. Crystal Directions. Crystal Planes. X-Ray Diffraction (optional). Summary. Key Words. Practice Problems. Test Problems. 4. Disorder in Solid Phases. Imperfections in Crystalline Solids. Noncrystalline Materials. Order and Disorder in Polymers. Solid Solutions. Solid Solutions in Ceramic and Metallic Compounds. Solid Solutions in Polymers (Copolymers). Summary. Key Words. Practice Problems. Test Problems. 5. Phase Equilibria. Introduction Phase Diagrams (Qualitative). Chemical Compositions of Equilibrated Phases. Quantities of Phases in Equilibrated Mixtures. Invariant Reactions. Selected Phase Diagrams. Summary. Key Words. Practice Problems. Test Problems. 6. Reaction Rates. Deferred Reactions. Segregation During Solidification (optional). Nucleation. Atomic Vibrations (optional). Atomic Diffusion. Summary. Key Words. Practice Problems. Test Problems. 7. Microstructures. Single-Phase Materials. Phase Distribution (Precipitates). Phase Distribution (Eutectoid Decomposition). Modification of Microstructures....



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Materials science, the study of the properties of solid materials and how those properties are determined by a material's composition and structure. It grew out of an amalgam of solid-state physics, metallurgy, and chemistry, since the rich variety of materials properties cannot be understood. Professor of Chemical Engineering, University of Delaware, Newark; former Director, Center for Composite Materials. Author of Concepts of Fiber-Resin Composites. See Article History. Materials science, the study of the properties of solid materials and how those properties are determined by a material's composition and structure. Chapter 1: Introduction to Materials Science and Engineering Chapter 2: Atomic Bonding and Coordination Chapter 3: Crystals (atomic order) Chapter 4: Disorder in solid phases Chapter 5: Phase Equilibria Chapter 6: Reaction rates Chapter 7: Microstructures Chapter 8: Deformation and Fracture Chapter 9: Shaping Strengthening and Toughening Processes. Bronze is an alloy (a metal made up of more than one element), copper + < 25% of tin + other elements. Bronze: can be hammered or cast into a variety of shapes, can be made harder by alloying, corrode only slowly after a surface oxide film forms. Historical. The Iron Age began about 3000 years ago and continues today.

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