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Additional Information Questions and Problems; Materials Selection and Design Problems; Chapter 4: Diffusion and Kinetics of Materials; WHAT IS KINETICS OF MATERIALS AND WHY IS IT IMPORTANT?; HOW DO ATOMIC MOVEMENTS RESULT IN DIFFUSION?; WHAT FACTORS AFFECT DIFFUSION?; WHAT RULES GOVERN DIFFUSION?; WHAT EXAMPLES OF INDUSTRIAL APPLICATIONS OF DIFFUSION AND ITS KINETICS CAN BE IDENTIFIED?; Summary; Additional Information. Questions and Problems.; Materials Selection and Design Problems; Part Two: Physical & Mechanical Metallurgy; Chapter 5: Microstructural Characterization and Design

WHAT ARE SOLID-SOLUTIONS, PHASES, & MICROCONSTITUENTS? WHAT IS MICROSTRUCTURAL CHARACTERIZATION AND WHY IS IT IMPORTANT? HOW CAN WE PREPARE AND EXAMINE A METALLOGRAPHIC SAMPLE?; HOW CAN WE CHARACTERIZE MICROSTRUCTURE BY USING ELECTRON MICROSCOPES?; HOW CAN WE QUANTITATIVELY ANALYZE MICROSTRUCTURES?; HOW CAN WE DESIGN MICROSTRUCTURE FOR ENGINEERING APPLICATIONS?; Summary; Additional Information; Materials Selection and Design Problems; Chapter 6: Phase Diagrams and Alloy Systems; WHAT IS THE BASIS OF PHASE DIAGRAMS?; HOW DO ALLOYS FORM?; WHAT ARE PHASE-TRANSFORMATION REACTIONS? HOW CAN WE REPRESENT VARIOUS ALLOY SYSTEMS IN PHASE DIAGRAMS? HOW CAN WE REPRESENT ISOMORPHOUS ALLOYS IN PHASE DIAGRAMS?; HOW CAN WE REPRESENT EUTECTIC ALLOYS IN PHASE DIAGRAMS?; HOW CAN WE REPRESENT PERITECTIC ALLOYS IN PHASE DIAGRAMS? WHAT EXAMPLES OF COMPLEX PHASE DIAGRAMS CAN WE IDENTIFY?; Summary; Additional Information. Questions and Problems; Materials Selection and Design Problems; Chapter 7: Designing Alloys Using a Controlled Strengthening Mechanism; HOW ARE ALLOYS STRENGTHENED AND TOUGHENED?; WHAT ARE EXAMPLES OF APPLICATIONS OF STRENGTHENED ALLOYS?; Applications. Summary Additional Information

Sommario/riassunto

The uniqueness of the title of this book, Materials Science and Design for Engineers, already indicates that the authors - professionals having over 30 years of experience in the fields of materials science and engineering - are here tackling the rarely-discussed topic of the science of materials as directly related to the domain of design in engineering applications. This comprehensive textbook has now filled that gap in the engineering literature. Review from Book News Inc.: This textbook is intended for engineering students taking their first course in materials science and engineering. The
