

1. Record Nr.	UNINA9910786750203321
Autore	Huda Zainul
Titolo	Materials science and design for engineers // Zainul Huda and Robert Bulpett
Pubbl/distr/stampa	Zurich-Durnten, Switzerland ; ; Enfield, New Hampshire : , : Trans Tech Publications, , [2012] ©2012
ISBN	3-03826-380-X
Descrizione fisica	1 online resource (512 p.)
Collana	Materials science foundations, , 1422-3597 ; ; volume 74
Disciplina	620.11
Soggetti	Materials science Engineering design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Materials Science and Design for Engineers; About the Authors; Preface; Contents in Brief; Table of Contents; Table of Contents; Part One: Fundamentals of Materials Science & Engineering; Chapter 1: Introduction; WHY STUDY MATERIALS SCIENCE AND DESIGN?; WHAT PROPERTIES DETERMINE PERFORMANCE OF A MATERIAL?; WHAT CHOICES ARE AVAILABLE IN MATERIALS?; WHAT ARE RECENT ADVANCES IN MATERIALS SCIENCE AND DESIGN?; WHAT IS THE IMPORTANCE OF MATERIALS IN TODAY'S SOCIETY?; Summary; Additional Information. Questions and Problems; Chapter 2: Atomic Bonding and Structure of Materials Materials Selection and Design ProblemsHOW ARE ATOMS ARRANGED IN METALS AND MATERIALS?; HOW ARE CRYSTALLOGRAPHIC SYSTEMS IMPORTANT IN THE REAL WORLD?; HOW ARE CRYSTALS PROPERTIES DETERMINED?; HOW ARE CRYSTALS FORMED IN METALS?; Summary; Additional Information. Questions and Problems; Materials Selection and Design Problems; Chapter 3: Crystal Imperfections, Deformation and Metal Forming; WHAT IMPERFECTIONS EXIST IN REAL CRYSTALS?; HOW DO DISLOCATIONS INFLUENCE PLASTIC DEFORMATION?; WHY ARE BCC AND FCC METALS DUCTILE WHEREAS HCP METALS ARE NOT?; HOW CAN WE WORK WITH METALS?; Summary Additional InformationQuestions 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 DIAGRAM?; 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

---