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Foundations Of
Materials Science
And Engineering 5th
Edition

Building on the success of previous

Page 1/209

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editions, this book continues to provide engineers with a strong understanding of the three primary types of materials and composites, as well as the relationships that exist between the structural elements of materials and their properties. The relationships

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among processing, structure, properties, and performance components for steels, glass-ceramics, polymer fibers, and silicon semiconductors are explored throughout the chapters. The discussion of the construction of

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crystallographic directions in hexagonal unit cells is expanded. At the end of each chapter, engineers will also find revised summaries and new equation summaries to reexamine key concepts.

Do you ever wonder why size is so

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important at the scale of nanosystems?
Do you want to understand the
fundamental principles that govern the
properties of nanomaterials? Do you
want to establish a foundation for
working in the field of nanoscience and
nanotechnology? Then this book is

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written with you in mind. Foundations for Nanoscience and Nanotechnology provides some of the physical chemistry needed to understand why properties of small systems differ both from their constituent molecular entities and from the corresponding bulk matter. This is

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not a book about nanoscience and nanotechnology, but rather an exposition of basic knowledge required to understand these fields. The collection of topics makes it unique, and these topics include: The concept of quantum confinement and its

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consequences for electronic behaviour
(Part II) The importance of surface
thermodynamics for activity and
interactions of nanoscale systems (Part
III) The need to consider fluctuations
as well as mean properties in small
systems (Part IV) The interaction of

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light with matter and specific applications of spectroscopy and microscopy (Part V) This book is written for senior undergraduates or junior graduate students in science or engineering disciplines who wish to learn about or work in the areas of

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nanoscience and nanotechnology, but who do not have the requisite background in chemistry or physics. It may also be useful as a refresher or summary text for chemistry and physics students since the material is focused on those aspects of quantum

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mechanics, thermodynamics, and statistical mechanics that specifically relate to the size of objects.

To prepare materials engineers and scientists of the future, Foundations of Materials Science and Engineering, Sixth Edition is designed to present

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diverse topics in the field with appropriate breadth and depth. The strength of the book is in its balanced presentation of concepts in science of materials (basic knowledge) and engineering of materials (applied knowledge). The basic and applied

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concepts are inte → grated through concise textual explanations, relevant and stimulating imagery, detailed sample problems, electronic supplements, and homework problems. This textbook is therefore suitable for both an introductory course in

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materials at the sophomore level and a more advanced (junior/senior level) second course in materials science and engineering. The extensive media package available with the text provides tutorials and animations, as well as image files, case studies, FE

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Exam review questions, and a solutions manual and lecture PowerPoint files for instructors.

Dielectric Elastomers as Electromechanical Transducers provides a comprehensive and updated insight into dielectric elastomers; one of

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the most promising classes of polymer-based smart materials and technologies. This technology can be used in a very broad range of applications, from robotics and automation to the biomedical field. The need for improved transducer

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performance has resulted in considerable efforts towards the development of devices relying on materials with intrinsic transduction properties. These materials, often termed as “ smart or “ intelligent , include improved piezoelectrics and

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magnetostrictive or shape-memory materials. Emerging electromechanical transduction technologies, based on so-called ElectroActive Polymers (EAP), have gained considerable attention. EAP offer the potential for performance exceeding other smart

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materials, while retaining the cost and versatility inherent to polymer materials. Within the EAP family, “ dielectric elastomers , are of particular interest as they show good overall performance, simplicity of structure and robustness. Dielectric

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elastomer transducers are rapidly emerging as high-performance “pseudo-muscular actuators, useful for different kinds of tasks. Further, in addition to actuation, dielectric elastomers have also been shown to offer unique possibilities for improved

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generator and sensing devices.

Dielectric elastomer transduction is enabling an enormous range of new applications that were precluded to any other EAP or smart-material technology until recently. This book provides a comprehensive and updated

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insight into dielectric elastomer transduction, covering all its fundamental aspects. The book deals with transduction principles, basic materials properties, design of efficient device architectures, material and device modelling, along with

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applications. Concise and comprehensive treatment for practitioners and academics Guides the reader through the latest developments in electroactive-polymer-based technology Designed for ease of use with sections on fundamentals,

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materials, devices, models and
applications

Theoretical Foundations

Dynamics of Materials

An Investigation of Inorganic Materials

Dielectric Elastomers as

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Fundamentals of Materials Science and
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*Laser powder bed fusion of
metals is a technology that
makes use of a laser beam to
selectively melt metal
powder layer-by-layer in*

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order to fabricate complex geometries in high performance materials. The technology is currently transforming aerospace and biomedical manufacturing and its adoption is widening into other industries as

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well, including automotive, energy, and traditional manufacturing. With an increase in design freedom brought to bear by additive manufacturing, new opportunities are emerging for designs not possible

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previously and in material systems that now provide sufficient performance to be qualified in end-use mission-critical applications. After decades of research and development, laser powder bed fusion is now enabling a

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new era of digitally driven manufacturing. Fundamentals of Laser Powder Bed Fusion of Metals will provide the fundamental principles in a broad range of topics relating to metal laser powder bed fusion. The

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target audience includes new users, focusing on graduate and undergraduate students; however, this book can also serve as a reference for experienced users as well, including senior researchers and engineers in industry.

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The current best practices are discussed in detail, as well as the limitations, challenges, and potential research and commercial opportunities moving forward. Presents laser powder bed fusion

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*fundamentals, as well as
their inherent challenges
Provides an up-to-date
summary of this advancing
technology and its potential
Provides a comprehensive
textbook for universities,
as well as a reference for*

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*industry Acts as quick-
reference guide*

*Materials informatics: a
'hot topic' area in
materials science, aims to
combine traditionally bio-
led informatics with
computational methodologies,*

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*supporting more efficient
research by identifying
strategies for time- and
cost-effective analysis. The
discovery and maturation of
new materials has been
outpaced by the thicket of
data created by new*

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*combinatorial and high
throughput analytical
techniques. The elaboration
of this "quantitative
avalanche"—and the resulting
complex, multi-factor
analyses required to
understand it—means that*

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interest, investment, and research are revisiting informatics approaches as a solution. This work, from Krishna Rajan, the leading expert of the informatics approach to materials, seeks to break down the barriers

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between data management, quality standards, data mining, exchange, and storage and analysis, as a means of accelerating scientific research in materials science. This solutions-based reference

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synthesizes foundational physical, statistical, and mathematical content with emerging experimental and real-world applications, for interdisciplinary researchers and those new to the field. Identifies and

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*analyzes interdisciplinary
strategies (including
combinatorial and high
throughput approaches) that
accelerate materials
development cycle times and
reduces associated costs
Mathematical and*

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*computational analysis aids
formulation of new structure-
property correlations among
large, heterogeneous, and
distributed data sets
Practical examples,
computational tools, and
software analysis benefits*

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*rapid identification of
critical data and analysis
of theoretical needs for
future problems*

*Fundamentals of Materials
Science and Engineering
takes an integrated approach
to the sequence of topics -*

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*one specific structure,
characteristic, or property
type is covered in turn for
all three basic material
types: metals, ceramics, and
polymeric materials. This
presentation permits the
early introduction of non-*

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metals and supports the engineer's role in choosing materials based upon their characteristics. Using clear, concise terminology that is familiar to students, Fundamentals presents material at an

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appropriate level for both student comprehension and instructors who may not have a materials background.

Foundations of Biomaterials Engineering provides readers with an introduction to biomaterials engineering.

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With a strong focus on the essentials of materials science, the book also examines the physiological mechanisms of defense and repair, tissue engineering and the basics of biotechnology. An

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introductory section covers materials, their properties, processing and engineering methods. The second section, dedicated to Biomaterials and Biocompatibility, deals with issues related to the use and application of the

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*various classes of materials
in the biomedical field,
particularly within the
human body, the mechanisms
underlying the physiological
processes of defense and
repair, and the
phenomenology of the*

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interaction between the biological environment and biomaterials. The last part of the book addresses two areas of growing importance: Tissue Engineering and Biotechnology. This book is a valuable resource for

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*researchers, students and
all those looking for a
comprehensive and concise
introduction to biomaterials
engineering. Offers a one-
stop source for information
on the essentials of
biomaterials and engineering*

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*Useful as an introduction or
advanced reference on recent
advances in the biomaterials
field Developed by
experienced international
authors, incorporating
feedback and input from
existing customers*

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*The Science and Archaeology
of Materials*

*The Science and Engineering
of Materials, Enhanced, SI
Edition*

*A Standard Model for Ground-
and Excited-State Properties
Properties, Testing, and*

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CAD instructor and author James
Bethune teaches technical**

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drawing using AutoCAD 2020 as its drawing instrument. Taking a step-by-step approach, this textbook encourages students to work at their own pace and uses sample problems and illustrations to guide them through the powerful features of

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knowledge to realistic design situations. ANSI standards are discussed when appropriate, introducing students to the appropriate techniques and national standards. Illustrations and sample problems are provided in every chapter,

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fundamental principles
and applications From its
beginnings in metallurgy and
ceramics, materials science now
encompasses such high- tech
fields as**

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biomaterials, and
nanotechnology. Electronic
Materials Science presents the
fundamentals of the subject in a
detailed fashion for a
multidisciplinary audience.
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than an undergraduate textbook provides, this text benefits students and practitioners not only in electronics and optical materials science, but also in additional cutting-edge fields like polymers and biomaterials. Readers with a basic

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understanding of physical chemistry or physics will appreciate the text's sophisticated presentation of today's materials science. Instructive derivations of important formulae, usually omitted in an introductory text,

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are included here. This feature offers a useful glimpse into the foundations of how the discipline understands such topics as defects, phase equilibria, and mechanical properties. Additionally, concepts such as reciprocal space, electron

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experience in both arenas *
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semiconductors,
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Treating the subject with more depth than any other introductory text, Electronic Materials Science prepares graduate and upper-level undergraduate students for advanced topics in the discipline and gives scientists in associated

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disciplines a clear review of the field and its leading technologies.

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are presented, including a full chapter summarising essential mathematical background. Extensive appendices, including essential background on classical and quantum mechanics, electrostatics, statistical thermodynamics and linear

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**elasticity, provide the
background necessary to fully
engage with the fundamentals of
computational modelling.
Exercises, worked examples,
computer codes and discussions
of practical implementations
methods are all provided online**

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**giving students the hands-on
experience they need.**

The goal of this Volume

**"Conceptual Foundations of
Materials: A standard model for
ground- and excited-state
properties" is to present the
fundamentals of electronic**

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structure theory that are central to the understanding and prediction of materials phenomena and properties. The emphasis is on foundations and concepts. The Sections are designed to offer a broad and comprehensive perspective of

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the field. They cover the basic aspects of modern electronic structure approaches and highlight their applications to the structural (ground state, vibrational, dynamic and thermodynamic, etc.) and electronic (spectroscopic,

dielectric, magnetic, transport, etc.) properties of real materials including solids, clusters, liquids, and nanostructure materials. This framework also forms a basis for studies of emergent properties arising from low-energy electron correlations and

interactions such as the quantum Hall effects, superconductivity, and other cooperative phenomena. Although some of the basics and models for solids were developed in the early part of the last century by figures such as Bloch, Pauli, Fermi, and

Slater, the field of electronic structure theory went through a phenomenal growth during the past two decades, leading to new concepts, understandings, and predictive capabilities for determining the ground- and excited-state properties of real,

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complex materials from first principles. For example, theory can now be used to predict the existence and properties of materials not previously realized in nature or in the laboratory. Computer experiments can be performed to examine the

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behavior of individual atoms in a particular process, to analyze the importance of different mechanisms, or just to see what happen if one varies the interactions and parameters in the simulation. Also, with ab initio calculations, one can

determine from first principles important interaction parameters which are needed in model studies of complex processes or highly correlated systems. Each time a new material or a novel form of a material is discovered, electronic structure theory

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**inevitably plays a fundamental
role in unraveling its properties.
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statistics and

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uncertainty analysis
with topical integration
throughout, this book
establishes a strong
foundation in
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practice problems,
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assessment. Extensive

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coverage of device
selection, test
procedures, measurement
system performance, and
result reporting and
analysis sets the field
for generalized

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traditional solid state
physics with
contemporary condensed
matter physics,
providing an up-to-date
introduction to the
major concepts that form

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the foundations of condensed materials. The main foundational principles are emphasized, providing students with the knowledge beginners in

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the field should understand. The book is structured in four parts and allows students to appreciate how the concepts in this broad area build upon each

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other to produce a cohesive whole as they work through the chapters. Illustrations work closely with the text to convey concepts and ideas visually,

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enhancing student
understanding of
difficult material, and
end-of-chapter exercises
varying in difficulty
allow students to put
into practice the theory

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they have covered in each chapter and reinforce new concepts. Updated and improved, this revised edition of Michel Barsoum's classic text Fundamentals of

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Ceramics presents
readers with an
exceptionally clear and
comprehensive
introduction to ceramic
science. Barsoum offers
introductory coverage of

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ceramics, their structures, and properties, with a distinct emphasis on solid state physics and chemistry. Key equations are derived from first

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principles to ensure a thorough understanding of the concepts involved. The book divides naturally into two parts. Chapters 1 to 9 consider bonding in

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ceramics and their resultant physical structures, and the electrical, thermal, and other properties that are dependent on bonding type. The second part

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(Chapters 11 to 16)
deals with those factors
that are determined by
microstructure, such as
fracture and fatigue,
and thermal, dielectric,
magnetic, and optical

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properties. Linking the two sections is Chapter 10, which describes sintering, grain growth, and the development of microstructure.

Fundamentals of Ceramics

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is ideally suited to senior undergraduate and graduate students of materials science and engineering and related subjects.

An introduction to the

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field of applied
ontology with examples
derived particularly
from biomedicine,
covering theoretical
components, design
practices, and practical

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applications. In the era of “big data,” science is increasingly information driven, and the potential for computers to store, manage, and integrate

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massive amounts of data
has given rise to such
new disciplinary fields
as biomedical
informatics. Applied
ontology offers a
strategy for the

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organization of
scientific information
in computer-tractable
form, drawing on
concepts not only from
computer and information
science but also from

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linguistics, logic, and philosophy. This book provides an introduction to the field of applied ontology that is of particular relevance to biomedicine, covering

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theoretical components
of ontologies, best
practices for ontology
design, and examples of
biomedical ontologies in
use. After defining an
ontology as a

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representation of the
types of entities in a
given domain, the book
distinguishes between
different kinds of
ontologies and
taxonomies, and shows

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how applied ontology
draws on more
traditional ideas from
metaphysics. It presents
the core features of the
Basic Formal Ontology
(BFO), now used by over

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one hundred ontology projects around the world, and offers examples of domain ontologies that utilize BFO. The book also describes Web Ontology

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Language (OWL), a common framework for Semantic Web technologies.

Throughout, the book provides concrete recommendations for the design and construction

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of domain ontologies.
Fundamentals, Materials,
Devices, Models and
Applications of an
Emerging Electroactive
Polymer Technology
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Powder Bed Fusion of
Metals

Introduction to
Computational Materials
Science

Introduction to the
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Mathematics

This first systematic, authoritative and thorough treatment in one comprehensive volume presents the fundamentals and technologies of the topic, elucidating all aspects of ZnO materials and devices. Following an

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introduction, the authors look at the general properties of ZnO, as well as its growth, optical processes, doping and ZnO-based dilute magnetic semiconductors. Concluding sections treat bandgap engineering, processing and ZnO nanostructures and

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nanodevices. Of interest to device engineers, physicists, and semiconductor and solid state scientists in general.

Smith/Hashemi's Foundations of Materials Science and Engineering, 5/e provides an eminently readable

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and understandable overview of engineering materials for undergraduate students. This edition offers a fully revised chemistry chapter and a new chapter on biomaterials as well as a new taxonomy for homework problems that

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will help students and instructors gauge and set goals for student learning. Through concise explanations, numerous worked-out examples, a wealth of illustrations & photos, and a brand new set of online resources, the new edition provides the

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*questions, and a solutions manual and
lecture PowerPoint files for
instructors.*

*Dynamics of Materials: Experiments,
Models and Applications addresses the
basic laws of high velocity
flow/deformation and dynamic*

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failure of materials under dynamic loading. The book comprehensively covers different perspectives on volumetric law, including its macro-thermodynamic basis, solid physics basis, related dynamic experimental study, distortional law, including the

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rate-dependent macro-distortional law reflecting strain-rate effect, its micro-mechanism based on dislocation dynamics, and dynamic experimental research based on the stress wave theory. The final section covers dynamic failure in relation to dynamic

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damage evolution, including the unloading failure of a crack-free body, dynamics of cracks under high strain-rate, and more. Covers models for applications, along with the fundamentals of the mechanisms behind the models Tackles the

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difficult interdisciplinary nature of the subject, combining macroscopic continuum mechanics with thermodynamics and macro-mechanics expression with micro-physical mechanisms Provides a review of the latest experimental methods for

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the equation of state for solids under high pressure and the distortional law under high strain-rates of materials
Ultrasonic Nondestructive Testing of Materials: Theoretical Foundations
explores the mathematical foundations and emerging applications of this

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testing process, which is based on elastic wave propagation in isotropic and anisotropic solids. In covering ultrasonic nondestructive testing methods, the book emphasizes the engineering point of view, yet Foundations of Fluid Mechanics with

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Applications

Materials Science and Engineering

An Introduction

*Informatics for Materials Science and
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Experiments, Models and Applications

FOAM. This acronym has been

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used for over 70 years at Rensselaer to designate an upper-division course entitled, Foundations of Applied Mathematics. This course was started by George Handelman in 1956, when he came to Rensselaer

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from the Carnegie Institute of Technology. His objective was to closely integrate mathematical and physical reasoning, and in the process enable students to obtain a qualitative understanding of the world we

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live in. FOAM was soon taken over by a young faculty member, Lee Segel. About this time a similar course, Introduction to Applied Mathematics, was introduced by Chia-Chiao Lin at the Massachusetts Institute of

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Technology. Together Lin and Segel, with help from Handelman, produced one of the landmark textbooks in applied mathematics, *Mathematics Applied to - terministic Problems in the Natural Sciences*. This

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was originally published in 1974, and republished in 1988 by the Society for Industrial and Applied Mathematics, in their Classics Series. This textbook comes from the author teaching FOAM over the last few years. In this

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sense, it is an updated version of the Lin and Segel textbook.

This text is designed for the introductory, one semester course in materials science or as a reference for professional engineers. It addresses what is

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essential for all engineers to know about the relationship between structure and properties as affected by processing in order to obtain all-important required performance. The organization of topics reflects

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this key interrelationship, and presents those topics in an order appropriate for students in an introductory course to build their own mental construct or hierarchy. Modern advances in polymers, ceramics, crystals,

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composites, semiconductors, etc.
are discussed with an emphasis
on applications in industry.

Callister's Materials Science and
Engineering: An Introduction
promotes student understanding
of the three primary types of

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materials (metals, ceramics, and polymers) and composites, as well as the relationships that exist between the structural elements of materials and their properties. The 10th edition provides new or updated

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coverage on a number of topics, including: the Materials Paradigm and Materials Selection Charts, 3D printing and additive manufacturing, biomaterials, recycling issues and the Hall effect.

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Callister and Rethwisch's Fundamentals of Materials Science and Engineering 4th Edition continues to take the integrated approach to the organization of topics. That is, one specific structure,

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characteristic, or property type at a time is discussed for all three basic material types: metals, ceramics, and polymeric materials. This order of presentation allows for the early introduction of non-metals and

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supports the engineer's role in choosing materials based upon their characteristics. Also discussed are new, cutting-edge materials. Using clear, concise terminology that is familiar to students, Fundamentals

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presents material at an appropriate level for both student comprehension and instructors who may not have a materials background.

Fundamentals to Applications
Foundations of Biomaterials

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Engineering

Data-driven Discovery for
Accelerated Experimentation and
Application
Zinc Oxide

ISE EBook Online Access for
Foundations of Materials

Acces PDF Foundations Of Materials Science And Engineering 5th Edition Science and Engineering

Since the first development of lithium-ion batteries in the early 1990's, there have been tremendous advances in the science and technology of these electrochemical energy sources. At present, lithium batteries dominate the field of advanced power sources and have almost entirely

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replaced their bulkier and less energetic counterparts such as nickel-cadmium and nickel-metalhydride batteries; especially in portable electronic devices. But lithium batteries are still the object of continuing intense research aimed at making further improvements in performance and safety, at lower cost, so

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as to make them suitable for higher-power and more demanding applications such as electric vehicles. The research and development of new electrode materials, particularly for cathodes, having an improved electrochemical performance has always been a matter of changing focus. Thus, olivine, lithium

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iron phosphate, has attracted considerable attention in recent years as a safe, environmentally friendly, extremely stable and very promising cathode material.

Develop a thorough understanding of the relationships between structure, processing and the properties of

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materials with Askeland/Wright's THE SCIENCE AND ENGINEERING OF MATERIALS, ENHANCED, SI, 7th Edition. This comprehensive edition serves as a useful professional reference for current or future study in manufacturing, materials, design or materials selection. This science-based

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approach to materials engineering highlights how the structure of materials at various length scales gives rise to materials properties. You examine how the connection between structure and properties is key to innovating with materials, both in the synthesis of new materials as well as in new applications

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with existing materials. You also learn how time, loading and environment all impact materials -- a key concept that is often overlooked when using charts and databases to select materials. Trust this enhanced edition for insights into success in materials engineering today.

Important Notice: Media content

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referenced within the product description or the product text may not be available in the ebook version.

Collection of selected, peer reviewed papers from the 2014 International Conference on Materials Science and Engineering Technology (MSET 2014), June 28-29, 2014, Shanghai, China. The

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422 papers are grouped as follows:
Chapter 1: Polymers and Composites,
Chapter 2: Ceramics and Functional
Materials, Chapter 3: Films and
Membranes, Chapter 4: Nanomaterials
and Applied Nanotechnologies, Chapter
5: Materials for Energy Sources and
Energy Supply, Chapter 6: Chemical

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Physics, Chapter 7: Materials and Technologies in Microelectronics, Chapter 8: Biomaterials, Biotechnologies and Pharmaceuticals, Chapter 9: Materials and Technologies in Environmental Engineering, Chapter 10: Materials and Technologies of Chemical Industry, Chapter 11: Corrosion and Surface of

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Materials, Technologies of Coatings,
Chapter 12: Alloys and Steels,
Metallurgical Technologies, Chapter 13:
Building Materials and Technologies in
Construction, Chapter 14: Technologies
and Materials in Oil Industry, Chapter
15: Methods and Devices of
Measurements in Materials Engineering,

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Chapter 16: Technologies and Equipment for Manufacturing and Processing of Materials, Chapter 17: Research in Area of Applied Materials, Chapter 18: General Mechanical Engineering, Chapter 19: Mechatronics, Control and Automation, Chapter 20: Power Engineering, Chapter 21:

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Electronic Engineering, Chapter 22: Measurements, Data and Signal Processing, Computational Methods and Algorithms, Chapter 23: Communication and Information Technologies, Chapter 24: Product Design and Engineering Management, Chapter 25: Geophysical Research and Resources

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Nanoscale science, engineering, and technology—commonly referred to collectively as nanotechnology—is believed by many to offer extraordinary economic and societal benefits.

Nanotechnology is generally defined as the ability to create and use materials, devices, and systems with unique

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properties at the scale of approximately 1 to 100 nm. Nanotechnology offers society the promise of major benefits, but also raises questions of potential adverse effects. The first volume covers pore size in carbon-based nano-adsorbents, resulting in materials that exhibit unique sorptive properties with a general view of

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the recent activities on the study of pore structure control. The collection of topics in volume 2 reflects the diversity of recent advances in nanoelements formation and interactions in nanosystems with a broad perspective that will be useful for scientists and engineers as the use of nanotechnology in the consumer and

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industrial sectors is expected to increase significantly in the future. And the third volume discusses important issues and trends related to research strategy in mechanics of carbon nanotubes.

Foundations for Nanoscience and
Nanotechnology

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Engineering

Physical Foundations of Materials
Science

Engineering Graphics with AutoCAD
2020

Electronic Materials Science

**Materials Science and
Engineering: An Introduction**

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promotes student
understanding of the three
primary types of materials
(metals, ceramics, and
polymers) and composites, as
well as the relationships
that exist between the
structural elements of

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materials and their
properties.

Physical Foundations of
Materials Science Springer
Science & Business Media
Biomimetics in Materials
Science provides a
comprehensive theoretical

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and practical review of biomimetic materials with self-healing, self-lubricating and self-cleaning properties. These three topics are closely related and constitute rapidly developing areas of

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study. The field of self-healing materials requires a new conceptual understanding of this biomimetic technology, which is in contrast to traditional engineering processes such as wear and fatigue.

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Biomimetics in Materials Science is the first monograph to be devoted to these materials. A new theoretical framework for these processes is presented based on the concept of multi-scale structure of

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entropy and non-equilibrium thermodynamics, together with a detailed review of the available technology. The latter includes experimental, modeling, and simulation results obtained on self-

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healing/lubricating/cleaning materials since their emergence in the past decade.

In this vivid and comprehensible introduction to materials science, the author expands the modern

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concepts of metal physics to
formulate basic theory
applicable to other
engineering materials, such
as ceramics and polymers.
Written for engineering
students and working
engineers with little

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previous knowledge of solid-state physics, this textbook enables the reader to study more specialized and fundamental literature of materials science. Dozens of illustrative photographs, many of them transmission

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electron microscopy images, plus line drawings, aid developing a firm appreciation of this complex topic. Hard-to-grasp terms such as "textures" are lucidly explained - not only the phenomenon itself, but

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also its consequences for
the material properties.
This excellent book makes
materials science more
transparent.

Ultrasonic Nondestructive
Testing of Materials
Foundations of

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Nanotechnology - Three
Volume Set

Materials Science and
Engineering Technology
An Introduction for Students
of Physics and Materials
Science

Fundamentals, Materials and

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Device Technology

The Science and Archaeology of Materials is set to become the definitive work in the archaeology of materials. Henderson's highly illustrated work is an accessible and fascinating textbook which will be

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essential reading for all practical archaeologists. With clear sections on a wide range of materials including ceramics, glass, metals and stone, this work examines the very foundations of archaeological study. Anyone interested in ancient

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technologies, especially those involving high temperatures, kilns and furnaces will be able to follow in each chapter how raw materials are refined, transformed and shaped into objects. This description is then followed by appropriate case studies

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which provide a new chronological and geographical example of how scientific and archaeological aspects can and do interact. They include:

- *Roman pale green and highly decorated glass
- *17th Century glass in Britain and Europe
- *the effect of

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the introduction of the wheel on
pottery technology *the technology
of Celadon ceramics *early copper
metallurgy in the Middle East
*chemical analysis and lead isotope
analysis of British Bronzes *early
copper alloy metallurgy in Thailand

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*the chemical analysis of obsidian
and its distribution *the origins of
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shows how archaeology and science
intersect and feed off each other.
Modern scientific techniques have
provided data which, when set

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within a fully integrated archaeological context, have the potential of contributing to mainstream archaeology. This holistic approach generates a range of connections which benefits both areas and will enrich archaeological

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study in the future.

The study of materials is a major field of research that supports and drives innovation in technology.

Using modern scientific techniques, materials scientists and engineers explore and manipulate materials,

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and create new ones with remarkable strength and extraordinary optical and electrical properties. In this Very Short Introduction, Christopher Hall looks at a wide range of materials, from steel, wood, and rubber, to gold,

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silicon, and graphene, describing how materials are used, how their properties arise from their internal structure, and how useful and novel things are made from them. He concludes by looking at how the global scale of materials

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The properties of materials provide

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key information regarding their appropriateness for a product and how they will function in service. The Third Edition provides a relevant discussion and vital examples of the fundamentals of materials science so that these details can be applied in

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real-world situations. Horath effectively combines principles and theory with practical applications used in today's machines, devices, structures, and consumer products. The basic premises of materials science and mechanical behavior are

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explored as they relate to all types of materials: ferrous and nonferrous metals; polymers and elastomers; wood and wood products; ceramics and glass; cement, concrete, and asphalt; composites; adhesives and coatings; fuels and lubricants; and

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smart materials. Valuable and insightful coverage of the destructive and nondestructive evaluation of material properties builds the groundwork for inspection processes and testing techniques, such as tensile, creep, compression, shear,

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bend or flexure, hardness, impact, and fatigue. Laboratory exercises and reference materials are included for hands-on learning in a supervised environment, which promotes a perceptive understanding of why we study and test materials

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and develop skills in industry-sanctioned testing procedures, data collection, reporting and graphing, and determining additional appropriate tests.

This textbook presents the basic concepts and methods of fluid

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mechanics, including Lagrangian and Eulerian descriptions, tensors of stresses and strains, continuity, momentum, energy, thermodynamics laws, and similarity theory. The models and their solutions are presented within a

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context of the mechanics of multiphase media. The treatment fully utilizes the computer algebra and software system Mathematica® to both develop concepts and help the reader to master modern methods of solving problems in fluid

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Lithium Iron Phosphate: A
Promising Cathode-Active Material
for Lithium Secondary Batteries

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***Callister and
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***of Materials Science and
Engineering 4th Edition
continues to take the
integrated approach to
the organization of
topics. That is, one
specific structure,***

***characteristic, or
property type at a time
is discussed for all
three basic material
types – metals,
ceramics, and polymeric
materials. This order of***

***presentation allows for
the early introduction
of non-metals and
supports the engineer's
role in choosing
materials based upon
their characteristics.***

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***Also discussed are new,
cutting-edge materials.
Using clear, concise
terminology that is
familiar to students,
Fundamentals presents
material at an***

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***appropriate level for
both student
comprehension and
instructors who may not
have a materials
background.***

Building Ontologies with

Page 207/209

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***Basic Formal Ontology
Theory and Design for
Mechanical Measurements
Self-Healing, Self-
Lubricating, and Self-
Cleaning Materials
Conceptual Foundations***

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