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For courses in Civil Engineering Materials, Construction Materials, and Construction Methods and Materials offered in Civil, Environmental, or Construction engineering departments. This introduction gives students a basic understanding of the material selection process and the behavior of materials - a fundamental requirement for all civil and construction engineers performing design, construction, and maintenance. The authors cover the various materials used by civil and construction engineers in one useful reference, limiting the vast amount of information available to the introductory level, concentrating on current practices, and extracting information that is relevant to the general education of civil and construction engineers. A large number of experiments, figures, sample problems, test methods, and homework problems gives students opportunity for practice and review. Computational Materials Engineering is an advanced introduction to the computer-aided modeling of essential material properties and behavior, including the physical, thermal and chemical parameters, as well as the mathematical tools used to perform simulations. Its emphasis will be on crystalline materials, which includes all metals. The basis of Computational Materials Engineering allows scientists and engineers to create virtual simulations of material behavior and properties, to better understand how a particular material works and performs and then use that knowledge to design improvements for particular material applications. The text displays knowledge of software designers, materials scientists and engineers, and those involved in materials applications like mechanical engineers, civil engineers, electrical

engineers, and chemical engineers. Readers from students to practicing engineers to materials research scientists will find in this book a single source of the major elements that make up contemporary computer modeling of materials characteristics and behavior. The reader will gain an understanding of the underlying statistical and analytical tools that are the basis for modeling complex material interactions, including an understanding of computational thermodynamics and molecular kinetics; as well as various modeling systems. Finally, the book will offer the reader a variety of algorithms to use in solving typical modeling problems so that the theory presented herein can be put to real-world use. Balanced coverage of fundamentals of materials modeling, as well as more advanced aspects of modeling, such as modeling at all scales from the atomic to the molecular to the macro-material Concise, yet rigorous mathematical coverage of such analytical tools as the Potts type Monte Carlo method, cellular automata, phase field, dislocation dynamics and Finite Element Analysis in statistical and analytical modeling This title is intended for a first undergraduate course in materials science and engineering with an emphasis on mechanical and electrical properties. The text features numerous useful examples and exercises. It differs from some available texts in that it covers the materials of greatest interest in most undergraduate programs, leaving more specialized and advanced coverage for later course books. This volume begins with phases and phase diagrams. This is followed by a chapter on diffusion, which treats diffusion in multiphase systems as well as single phase systems. The next several chapters on mechanical behavior and failure should be of particular

interest to mechanical engineers. There are chapters on iron and steel and on nonferrous alloys followed by chapters on specific types of materials. There is an emphasis on manufacturing, including recycling, casting and welding, powder processing, solid forming, and more modern techniques including photolithography, vapor deposition and the use of lasers. This third edition of what has become a modern classic presents a lively overview of Materials Science which is ideal for students of Structural Engineering. It contains chapters on the structure of engineering materials, the determination of mechanical properties, metals and alloys, glasses and ceramics, organic polymeric materials and composite materials. It contains a section with thought-provoking questions as well as a series of useful appendices. Tabulated data in the body of the text, and the appendices, have been selected to increase the value of Materials for engineering as a permanent source of reference to readers throughout their professional lives. The second edition was awarded Choice's Outstanding Academic Title award in 2003. This third edition includes new information on emerging topics and updated reading lists. This fifth edition of a successful textbook continues to provide students with an introduction to the basic principles of materials science over a broad range of topics. The authors have revised and updated this edition to include many new applications and recently developed materials. The book is presented in three parts. The first section discusses the physics, chemistry, and internal structure of materials. The second part examines the mechanical properties of materials and their application in engineering situations. The final section presents the

electromagnetic properties of materials and their application. Each chapter begins with an outline of the relevance of its topics and ends with problems that require an understanding of the theory and some reasoning ability to resolve. These are followed by self-assessment questions, which test students' understanding of the principles of materials science and are designed to quickly cover the subject area of the chapter. This edition of Materials Science for Engineers includes an expanded treatment of many materials, particularly polymers, foams, composites and functional materials. Of the latter, superconductors and magnetics have received greater coverage to account for the considerable development in these fields in recent years. New sections on liquid crystals, superalloys, and organic semiconductors have also been added to provide a comprehensive overview of the field of materials science. Civil Engineering Materials: From Theory to Practice presents the state-of-the-art in civil engineering materials, including the fundamental theory of materials needed for civil engineering projects and unique insights from decades of large-scale construction in China. The title includes the latest advances in new materials and techniques for civil engineering, showing the relationship between composition, structure and properties, and covering ultra-high-performance concrete and self-compacting concrete developed in China. This book provides comprehensive coverage of the most commonly used, most advanced materials for use in civil engineering. This volume consists of eight chapters covering the fundamentals of materials, inorganic cementing materials, Portland cement concrete, bricks, blocks and building mortar, metal, wood, asphalt and polymers.

Describes the most commonly used civil engineering materials and updates on advanced materials Presents advanced materials and their applications in civil engineering Looks at engineering problems pragmatically from both a materials and civil engineering perspective Gives knowledge and guidance rooted in decades of experience in Chinese civil engineering projects Contextualises knowledge of civil engineering materials in infrastructure construction, including high-speed rail The Science and Engineering of Materials, Third Edition, continues the general theme of the earlier editions in providing an understanding of the relationship between structure, processing, and properties of materials. This text is intended for use by students of engineering rather than materials, at first degree level who have completed prerequisites in chemistry, physics, and mathematics. The author assumes these students will have had little or no exposure to engineering sciences such as statics, dynamics, and mechanics. The material presented here admittedly cannot and should not be covered in a one-semester course. By selecting the appropriate topics, however, the instructor can emphasise metals, provide a general overview of materials, concentrate on mechanical behaviour, or focus on physical properties. Additionally, the text provides the student with a useful reference for accompanying courses in manufacturing, design, or materials selection. In an introductory, survey text such as this, complex and comprehensive design problems cannot be realistically introduced because materials design and selection rely on many factors that come later in the student's curriculum. To introduce the student to elements of design, however, more than 100 examples dealing with materials

selection and design considerations are included in this edition. This text is designed for the introductory, one semester course in materials science or as a reference for professional engineers. It addresses what is 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 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, composites, semiconductors, etc. are discussed with an emphasis on applications in industry. This book presents the theoretical concepts of stress and strain, as well as the strengthening and fracture mechanisms of engineering materials in an accessible level for non-expert readers, but without losing scientific rigor. This volume fills the gap between the specialized books on mechanical behavior, physical metallurgy and material science and engineering books on strength of materials, structural design and materials failure. Therefore it is intended for college students and practicing engineers that are learning for the first time the mechanical behavior and failure of engineering materials or wish to deepen their understanding on these topics. The book includes specific topics seldom covered in other books, such as: how to determine a state of stress, the relation between stress definition and mechanical design, or the theory behind the methods included in industrial standards to assess defects or to determine fatigue life. The emphasis is put into the link between scientific knowledge and practical applications, including solved

problems of the main topics, such as stress and strain calculation. Mohr's Circle, yield criteria, fracture mechanics, fatigue and creep life prediction. The volume covers both the original findings in the field of mechanical behavior of engineering materials, and the most recent and widely accepted theories and techniques applied to this topic. At the beginning of some selected topics that by the author's judgement are transcendental for this field of study, the prime references are given, as well as a brief biographical semblance of those who were the pioneers or original contributors. Finally, the intention of this book is to be a textbook for undergraduate and graduate courses on Mechanical Behavior, Mechanical Metallurgy and Materials Science, as well as a consulting and/or training material for practicing engineers in industry that deal with mechanical design, materials selection, material processing, structural integrity assessment, and for researchers that incursion for the first time in the topics covered in this book. New Materials in Civil Engineering provides engineers and scientists with the tools and methods needed to meet the challenge of designing and constructing more resilient and sustainable infrastructures. This book is a valuable guide to the properties, selection criteria, products, applications, lifecycle and recyclability of advanced materials. It presents an A-to-Z approach to all types of materials, highlighting their key performance properties, principal characteristics and applications. Traditional materials covered include concrete, soil, steel, timber, fly ash, geosynthetic, fiber-reinforced concrete, smart materials, carbon fiber and reinforced polymers. In addition, the book covers nanotechnology and biotechnology in the development of new materials.

Covers a variety of materials, including fly ash, geosynthetic, fiber-reinforced concrete, smart materials, carbon fiber reinforced polymer and waste materials Provides a “one-stop resource of information for the latest materials and practical applications Includes a variety of different use case studies

Essentials of Civil Engineering Materials provides students with a foundational guide to the types of materials used in civil engineering, as well as how these materials behave under the conditions for which they were designed and a basic understanding of the science of the materials. This critical knowledge prepares students to carefully consider and confidently select the best materials for the design, construction, and maintenance of future projects. The text begins by introducing the basic requirements of engineering materials, material properties and standards, experimental design, economic factors, and the issue of sustainability. Additional chapters explore the mechanical principles of materials, composite models and viscoelasticity, and material chemistry. Students read about various types of materials, including metals, steel, aggregates and cementitious materials, and wood. The book concludes with a chapter dedicated to the topic of sustainability. Each chapter includes closing remarks to summarize the key concepts of the chapter and problems to help students retain important learnings. Essentials of Civil Engineering Materials is an ideal resource for introductory courses in civil engineering. Steven W. Cranford is the editor-in-chief of Matter, a journal for groundbreaking research and reviews in materials science. Kathryn E. Schulte Grahame is the interim associate director and an associate teaching professor in the First Year

Engineering Program at Northeastern University. Matthew J. Eckelman is an associate professor and the associate chair for research in the Department of Civil & Environmental Engineering at Northeastern University. Craig M. Shillaber is an assistant teaching professor in the Department of Civil & Environmental Engineering at Northeastern University. This introductory text is intended to provide undergraduate engineering students with the background needed to understand the science of structure-property relationships, as well as address the engineering concerns of materials selection in design. A computer diskette is included. Provides a thorough explanation of the basic properties of materials; of how these can be controlled by processing; of how materials are formed, joined and finished; and of the chain of reasoning that leads to a successful choice of material for a particular application. The materials covered are grouped into four classes: metals, ceramics, polymers and composites. Each class is studied in turn, identifying the families of materials in the class, the microstructural features, the processes or treatments used to obtain a particular structure and their design applications. The text is supplemented by practical case studies and example problems with answers, and a valuable programmed learning course on phase diagrams. This new edition of J. E. Gordon's classic introduction to the properties of materials used in engineering answers some fundamental and fascinating questions about how the material world around us functions. In particular, Gordon focuses on so-called strong materials, such as metals, wood, ceramics, glass, and bone. For each material in question, Gordon explains the unique physical and chemical basis for its

inherent structural qualities in irrepressibly fresh and simple terms. He also shows how an in-depth understanding of these materials' intrinsic strengths (and weaknesses) guides our engineering choices, allowing us to build the structures that support our modern society. Philip Ball's new introduction describes Gordon's career and the impact of his innovations in materials research, while also discussing how the field has evolved since Gordon wrote this enduring example of first-rate scientific communication. The construction of buildings and structures relies on having a thorough understanding of building materials. Without this knowledge it would not be possible to build safe, efficient and long-lasting buildings, structures and dwellings. Building materials in civil engineering provides an overview of the complete range of building materials available to civil engineers and all those involved in the building and construction industries. The book begins with an introductory chapter describing the basic properties of building materials. Further chapters cover the basic properties of building materials, air hardening cement materials, cement, concrete, building mortar, wall and roof materials, construction steel, wood, waterproof materials, building plastics, heat-insulating materials and sound-absorbing materials and finishing materials. Each chapter includes a series of questions, allowing readers to test the knowledge they have gained. A detailed appendix gives information on the testing of building materials. With its distinguished editor and eminent editorial committee, Building materials in civil engineering is a standard introductory reference book on the complete range of building materials. It is aimed at students of civil engineering, construction

engineering and allied courses including water supply and drainage engineering. It also serves as a source of essential background information for engineers and professionals in the civil engineering and construction sector. Provides an overview of the complete range of building materials available to civil engineers and all those involved in the building and construction industries Explores the basic properties of building materials featuring air hardening cement materials, wall and roof materials and sound-absorbing materials Each chapter includes a series of questions, allowing readers to test the knowledge they have gained In this vivid and comprehensible introduction to materials science, the author expands the modern 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 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 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 also its consequences for the material properties. This excellent book makes materials science more transparent. A detailed account of various applications and uses of transparent ceramics and the future of the industry In Transparent Ceramics: Materials, Engineering, and Applications, readers will discover the necessary foundation for understanding transparent ceramics (TCs) and the technical and economic factors that determine the

overall worth of TCs. This book provides readers with a thorough history of TCs, as well as a detailed account of the materials, engineering and applications of TC in its various forms; fabrication and characterization specifics are also described. With this book, researchers, engineers, and students find a definitive guide to past and present use cases, and a glimpse into the future of TC materials. The book covers a variety of TC topics, including: ● The methods employed for materials produced in a transparent state ● Detailed applications of TCs for use in lasers, IR domes, armor-windows, and various medical prosthetics ● A review of traditionally used transparent materials that highlights the benefits of TCs ● Theoretical science and engineering theories presented in correlation with learned data ● A look at past, present, and future use-cases of TCs This insightful guide to ceramics that can be fabricated into bulk transparent parts will serve as a must-read for professionals in the industry, as well as students looking to gain a more thorough understanding of the field. This book provides an invaluable reference of materials engineering written for a broad audience in an engaging, effective way. Several stories explain how perseverance and organized research helps to discover new processes for making important materials and how new materials with unmatched properties are theoretically conceived, tested in the laboratory, mass produced and deployed for the benefit of all. This book provides a welcome introduction to how advances are made in the world of materials that sustain and define our contemporary standard of living. Suitable for trained materials scientists and the educated layman with an appreciation of engineering, the book will be especially

appealing to the young materials engineer, for whom it will serve as a long-term reference due to its clear and rigorous illustration of the field's essential features. Primarily Written For The Students Of Civil Engineering And Practising Engineers Involved In The Testing Of Building Materials, The Manual Describes In Straight-Forward And Systematic Manner The Testing Of Engineering Materials. Each Test Given In The Manual Outlines The Objectives, Theory, Apparatus Requirements, Procedures, Precautions, Questions For Discussion And Observations And Calculations. For All The Tests Specified, The Procedure Is Based On The Relevant Indian Standard Code Of Practice Which Is The Usual Accepted Method Of Performing The Tests. The Manual Can Be Used By Students And Field Engineers For Keeping The Record Of Tests Performed In The Laboratory. Since Each Test Requires A Different Reference Of The Indian Standard Codes, It May Not Be Practically Feasible In The Field Conditions And Therefore This Manual Comes Quite Handy For These Situations. It Will Be Invaluable And Indispensable Manual For Imparting Effective Instructions To Diploma And Under Graduate Level Students As Also To Field Engineers. A concise, accessible, and up-to-date introduction to solid state physics Solid state physics is the foundation of many of today's technologies including LEDs, MOSFET transistors, solar cells, lasers, digital cameras, data storage and processing. Introduction to Solid State Physics for Materials Engineers offers a guide to basic concepts and provides an accessible framework for understanding this highly application-relevant branch of science for materials engineers. The text links the fundamentals of solid state physics to modern

materials, such as graphene, photonic and metamaterials, superconducting magnets, high-temperature superconductors and topological insulators. Written by a noted expert and experienced instructor, the book contains numerous worked examples throughout to help the reader gain a thorough understanding of the concepts and information presented. The text covers a wide range of relevant topics, including propagation of electron and acoustic waves in crystals, electrical conductivity in metals and semiconductors, light interaction with metals, semiconductors and dielectrics, thermoelectricity, cooperative phenomena in electron systems, ferroelectricity as a cooperative phenomenon, and more. This important book: Provides a big picture view of solid state physics Contains examples of basic concepts and applications Offers a highly accessible text that fosters real understanding Presents a wealth of helpful worked examples Written for students of materials science, engineering, chemistry and physics, **Introduction to Solid State Physics for Materials Engineers** is an important guide to help foster an understanding of solid state physics. This renowned text has provided many thousands of students with an easily accessible introduction to the wide ranging subject area of materials engineering and manufacturing processes for over thirty years. Avoiding the excessive technical jargon and mathematical complexity so often found in textbooks for this subject, and retaining the practical down-to-earth approach for which this book is noted, **Materials for Engineers and Technicians** is now thoroughly updated and fully in line with current syllabus requirements. Offering a comprehensive guide to materials used by engineers,

their applications and selection in a single volume, the fourth edition focuses on applications and selection - reflecting the increased emphasis on this aspect of materials engineering now seen within current vocational and university courses. Materials properties and relevance to particular uses are addressed in detail from the outset, with all subsequent chapters linking back to these essential concepts. Detailed discussion of examples of materials, and additional applications of processes have been incorporated throughout the text, with expanded sections addressing the causes of failure as this relates to material selection. Updated sections in the fourth edition provide a wider ranging discussion of titanium, printed-circuit-board materials and production, silicon chip production, and the applications and forms of modern composite materials. This new edition has been matched closely to the relevant units of the BTEC Higher National Engineering program, as well as catering fully for the requirements of a Level 3 audience. Students of BTEC Nationals will find that the new edition structure covers all the essential topics required for their courses in the early chapters (chapters 1 - 8). Those students following higher level qualifications (HNC / D Engineering, and first year undergraduate Engineering Materials modules within Mechanical, Manufacturing Systems and also Electrical & Electronic Engineering degree courses) will find additional more advanced topics are addressed in the second half of the book. In addition to meeting the requirements of vocational and undergraduate engineering syllabuses, this text will also prove a valuable desktop reference for professional engineers working in product design, who require a quick source of information on materials and

manufacturing processes. Synthetic Engineering Materials and Nanotechnology covers the latest research and developments of synthetic processes, materials, applications and technologies. In addition, innovations in synthetic engineering materials techniques are analyzed. Each chapter addresses key concepts, properties and applications of important categories of synthetic materials, including metals alloys, polymers, composites, rubbers, oils and foams. Advances in nanomaterials produced by synthetic engineering methods are also considered, including ceramic, carbon, metal oxide, composite, and membrane-derived nanomaterials. The primary synthetic engineering materials techniques covered include thermo-mechanical, chemical, physiochemical, electrochemical, bottom-up, hybrid and biological methods. This book is suitable for early career researchers in academia and R&D in areas such as materials science and engineering, mechanical engineering and chemical engineering. Provides the fundamentals on materials produced through synthetic engineering methods, including their properties, experimental and characterization techniques, and applications Reviews the advances of synthetic engineering methods for nanomaterials applications, including electrospinning, atomic layer deposition, ion implantation, bottom-up, hybrid strategies, and more Includes numerous, real-world examples and case studies to apply the fundamental concepts to experiments and real-world applications MATERIALS SCIENCE AND ENGINEERING PROPERTIES is primarily aimed at mechanical and aerospace engineering students, building on actual science fundamentals before building them into engineering

applications. Even though the book focuses on mechanical properties of materials, it also includes a chapter on materials selection, making it extremely useful to civil engineers as well. The purpose of this textbook is to provide students with a materials science and engineering text that offers a sufficient scientific basis that engineering properties of materials can be understood by students. In addition to the introductory chapters on materials science, there are chapters on mechanical properties, how to make strong solids, mechanical properties of engineering materials, the effects of temperature and time on mechanical properties, electrochemical effects on materials including corrosion, electroprocessing, batteries, and fuel cells, fracture and fatigue, composite materials, material selection, and experimental methods in material science. In addition, there are appendices on the web site that contain the derivations of equations and advanced subjects related to the written textbook, and chapters on electrical, magnetic, and photonic properties of materials. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. The finite element method is often used for numerical computation in the applied sciences. It makes a major contribution to the range of numerical methods used in the simulation of systems and irregular domains, and its importance today has made it an important subject of study for all engineering students. While treatments of the method itself can be found in many traditional finite element books, Finite Element Modeling for Materials Engineers Using MATLAB® combines the finite element method with MATLAB to offer materials engineers a fast and code-

free way of modeling for many materials processes. **Finite Element Modeling for Materials Engineers Using MATLAB®** covers such topics as: developing a weak formulation as a prelude to obtaining the finite element equation, interpolation functions, derivation of elemental equations, and use of the Partial Differential Equation Toolbox™. Exercises are given based on each example and m-files based on the examples are freely available to readers online. Researchers, advanced undergraduate and postgraduate students, and practitioners in the fields of materials and metallurgy will find **Finite Element Modeling for Materials Engineers Using MATLAB®** a useful guide to using MATLAB for engineering analysis and decision-making. **Nanotechnology and Functional Materials for Engineers** focuses on key essentials and examples across the spectrum of nanomaterials as applied by engineers, including nanosensors, smart nanomaterials, nanopolymers, and nanotubes. Chapters cover their synthesis and characteristics, production methods, and applications, with specific sections exploring nanoelectronics and electro-optic nanotechnology, nanostructures, and nanodevices. This book is a valuable resource for interdisciplinary researchers who want to learn more about how nanomaterials are used in different types of engineering, including electrical, chemical, and biomedical. Offers in-depth information on a variety of nanomaterials and how they are used for different engineering applications Provides an overview of current research and suggests how this will impact future applications Explores how the unique properties of different nanomaterials make them particularly suitable for specific applications A one-stop desk

reference, for engineers involved in the use of engineered materials across engineering and electronics, this book will not gather dust on the shelf. It brings together the essential professional reference content from leading international contributors in the field. Material ranges from basic to advanced topics, including materials and process selection and explanations of properties of metals, ceramics, plastics and composites. This is the only book to cover the most recent developments in applied quantum theory and their use in modeling materials properties. It describes new approaches to modeling disordered alloys and focuses on those approaches that combine the most efficient quantum-level theories of random alloys with the most sophisticated numerical techniques. In doing so, it establishes a theoretical insight into the electronic structure of complex materials such as stainless steels, Hume-Rothery alloys and silicates. An Introduction to Materials Engineering and Science for Chemical and Materials Engineers provides a solid background in materials engineering and science for chemical and materials engineering students. This book: Organizes topics on two levels; by engineering subject area and by materials class. Incorporates instructional objectives, active-learning principles, design-oriented problems, and web-based information and visualization to provide a unique educational experience for the student. Provides a foundation for understanding the structure and properties of materials such as ceramics/glass, polymers, composites, bio-materials, as well as metals and alloys. Takes an integrated approach to the subject, rather than a "metals first" approach. Civil Engineering Materials explains why construction materials behave the way

they do. It covers the construction materials content for undergraduate courses in civil engineering and related subjects and serves as a valuable reference for professionals working in the construction industry. The book concentrates on demonstrating methods to obtain, analyse and use information rather than focusing on presenting large amounts of data. Beginning with basic properties of materials, it moves on to more complex areas such as the theory of concrete durability and corrosion of steel. Discusses the broad scope of traditional, emerging, and non-structural materials Explains what material properties such as specific heat, thermal conductivity and electrical resistivity are and how they can be used to calculate the performance of construction materials. Contains numerous worked examples with detailed solutions that provide precise references to the relevant equations in the text. Includes a detailed section on how to write reports as well as a full section on how to use and interpret publications, giving students and early career professionals valuable practical guidance. This Text Provides A Balanced And Current Treatment Of The Full Spectrum Of Engineering Materials, Covering All The Physical Properties, Applications And Relevant Properties Associated With The Subject. It Explores All The Major Categories Of Materials While Offering Detailed Examinations Of A Wide Range Of New Materials With High-Tech Applications. Presents an overview of various materials, such as conducting materials, semiconductors, magnetic materials, optical materials, dielectric materials, superconductors, thermoelectric materials and ionic materials. This title includes chapters on thin film electronic materials, organic

electronic materials and nanostructured materials. Designed for the general engineering student, Introduction to Engineering Materials, Second Edition focuses on materials basics and provides a solid foundation for the non-materials major to understand the properties and limitations of materials. Easy to read and understand, it teaches the beginning engineer what to look for in a particular material, offers examples of materials usage, and presents a balanced view of theory and science alongside the practical and technical applications of material science. Completely revised and updated, this second edition describes the fundamental science needed to classify and choose materials based on the limitations of their properties in terms of temperature, strength, ductility, corrosion, and physical behavior. The authors emphasize materials processing, selection, and property measurement methods, and take a comparative look at the mechanical properties of various classes of materials. Chapters include discussions of atomic structure and bonds, imperfections in crystalline materials, ceramics, polymers, composites, electronic materials, environmental degradation, materials selection, optical materials, and semiconductor processing. Filled with case studies to bring industrial applications into perspective with the material being discussed, the text also includes a pictorial approach to illustrate the fabrication of a composite. Consolidating relevant topics into a logical teaching sequence, Introduction to Engineering Materials, Second Edition provides a concise source of useful information that can be easily translated to the working environment and prepares the new engineer to make educated materials selections in future industrial applications. A

broad ranging, low level text for engineering students. Written in Ray Higgins' entertaining style, this new edition has been extensively updated, and the sections on polymers, ceramics and composites re-written in expanded form.

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