

Solution Of Dehoff Thermodynamics In Materials

Mass transfer along with separation processes is an area that is often quite challenging to master, as most volumes currently available complicate the learning by teaching mass transfer linked with heat transfer, rather than focusing on more relevant techniques. The second edition, Mass Transfer and Separation Processes: Principles and Applications presents a highly thoughtful and instructive introduction to this sophisticated material by teaching mass transfer and separation processes as unique though related entities. It demystify the subject, with this edition, the authorâ€ Avoids more complex separation processes Places a greater emphasis on the art of simplifying assumptions Conveys a greater sense of scale with the inclusion of numerous photos of actual installations and diagrams. A timely, applications-driven text in thermodynamics Materials Thermodynamics provides both students and professionals with the in-depth explanation they need to prepare for the real-world application of thermodynamic tools. Based upon an actual graduate-level, class-tested text covers the subject with a broader, more industry-oriented lens than can be found in any other resource available. This modern approach: Reflects changes rapidly occurring in society at large—from the impact of computers on the teaching of thermodynamics and engineering university programs to the use of approximations of higher order than the usual Bragg-Williams in solution-phase modeling Makes students aware of the practical problems in using thermodynamics Emphasizes that the calculation of the position of equilibrium in complex systems, even when properly defined, is not easy Relegates concepts like equilibrium constants, activity coefficients, free energy functions, and Gibbs-Duhem integrations to a relatively minor role Includes problems and exercises, as well as authoritative text is designed for students and professionals in materials science and engineering, particularly those in physical metallurgy, metallic materials, alloy design and processing, corrosion, oxidation, coatings, and high-temperature alloys. Problems in Metallurgical Thermodynamics and Kinetics provides an illustration of the calculations encountered in the study of metallurgical thermodynamics and kinetics, focusing on theoretical concepts and practical applications. The chapters of this book cover theories, including basic and applied numerical examples with solutions. Unsolved numerical examples drawn from a wide range of metallurgical processes are also provided at the end of each chapter. The topics discussed include the three laws of thermodynamics, fugacity, activity, and equilibrium constant; thermodynamics of electrochemical cells; and kinetics. This book is beneficial to undergraduate and postgraduate students in universities, polytechnics, and technical colleges.

Materials Thermodynamics

Bulk Metallic Glasses
Problems in Metallurgical Thermodynamics and Kinetics
Aerospace Alloys
Mechanics of Solids and Materials

This book provides a systematic and comprehensive description of high-entropy alloys (HEAs). The authors summarize key properties of HEAs from the perspective of both fundamental understanding and applications, which are supported by in-depth analyses. The book also contains computational modeling in tackling HEAs, which help elucidate the formation mechanisms and properties of HEAs from various length and time scales.

This book presents an up-to-date overview on the main classes of metallic materials currently used in aeronautical structures and propulsion engines and discusses other materials of potential interest for structural aerospace applications. The coverage encompasses light alloys such as aluminum-, magnesium-, and titanium-based alloys, including titanium aluminides; steels; superalloys; oxide dispersion strengthened alloys; refractory alloys; and related systems such as laminate composites. In each chapter, materials properties and relevant technological aspects, including processing, are presented. Individual chapters focus on coatings for gas turbine engines and hot corrosion of alloys and coatings. Readers will also find consideration of applications in aerospace-related fields. The book takes full account of the impact of energy saving and environmental issues on materials development, reflecting the major shifts that have occurred in the motivations guiding research efforts into the development of new materials systems. Aerospace Alloys will be a valuable reference for graduate students on materials science and engineering courses and will also provide useful information for engineers working in the aerospace, metallurgical, and energy production industries.

Publisher Description

CD-ROM contains: Dynamic phase diagram tool -- Over 30 animations of concepts from the text -- Photomicrographs from the text.

Advances in Therapy
Physical Metallurgy Principles
Kinetics in Materials Science and Engineering
Protective Relaying
International Series on Materials Science and Technology
Fundamentals and Applications

For many years, Protective Relaying: Principles and Applications has been the go-to text for gaining proficiency in the technological fundamentals of power system protection. Continuing in the bestselling tradition of the previous editions by the late J. Lewis Blackburn, the Fourth Edition retains the core concepts at the heart of power system analysis. Featuring refinements and additions to accommodate recent technological progress, the text: Explores developments in the creation of smarter, more flexible protective systems based on advances in the computational power of digital devices and the capabilities of communication systems that can be applied within the power grid Examines the regulations related to power system protection and how they impact the way protective relaying systems are designed, applied, set, and monitored Considers the evaluation of protective systems during system disturbances and describes the tools available for analysis Addresses the benefits and problems associated with applying microprocessor-based devices in protection schemes Contains an expanded discussion of inertia protection requirements at dispersed generation facilities Providing information on a mixture of old and new equipment, Protective Relaying: Principles and Applications, Fourth Edition reflects the present state of power systems currently in operation, making it a handy reference for practicing protection engineers. And yet its challenging end-of-chapter problems, coverage of the basic mathematical requirements for fault analysis, and real-world examples ensure engineering students receive a practical, effective education on protective systems. Plus, with the inclusion of a solutions manual and figure slides with qualifying course adoption, the Fourth Edition is ready-made for classroom implementation.

Emphasising basic concepts and the development of problem-solving skills, this is an introduction to the study of energy transformations for students of the biological sciences. Mathematical complexity is kept to a minimum.

** Covers all aspects of physical metallurgy and behavior of metals and alloys. * Presents the principles on which metallurgy is based. * Concepts such as heat affected zone and structure-property relationships are covered. * Principles of casting are clearly outlined in the chapter on solidification. * Advanced treatment on physical metallurgy provides specialized information on metals.*

This textbook provides students with a complete working knowledge of the properties of imperfections in crystalline solids. Readers will learn how to apply the fundamental principles of mechanics and thermodynamics to defect properties in materials science, gaining all the knowledge and tools needed to put this into practice in their own research. Beginning with an introduction to defects and a brief review of basic elasticity theory and statistical thermodynamics, the authors go on to guide the reader in a step-by-step way through point, line, and planar defects, with an emphasis on their structural, thermodynamic, and kinetic properties. Numerous end-of-chapter exercises enable students to put their knowledge into practice, and with solutions for instructors and MATLAB® programs available online, this is an essential text for advanced undergraduate and introductory graduate courses in crystal defects, as well as being ideal for self-study.

Thermodynamics of Materials

Heat Transfer

Mass Transfer and Separation Processes
Introduction to the Thermodynamics of Materials, Fifth Edition
Beyond Equilibrium Thermodynamics

Macroscopic and Microscopic Aspects

Thermodynamics in Materials Science, Second Edition is a clear presentation of how thermodynamic data is used to predict the behavior of a wide range of materials, a crucial component in the decision-making process for many materials science and engineering applications. This primary textbook accentuates the integration of principles, strategies, and thermochemical data to generate accurate “maps” of equilibrium states, such as phase diagrams, predominance diagrams, and Pourbaix corrosion diagrams. It also recommends which maps are best suited for specific real-world scenarios and thermodynamic problems. The second edition yet. Each chapter presents its subject matter consistently, based on the classification of thermodynamic systems, properties, and derivations that illustrate important relationships among variables for finding the conditions for equilibrium. Each chapter also contains a summary of important concepts and relationships as well as examples and sample problems that apply appropriate strategies for solving real-world problems. The up-to-date and complete coverage of thermodynamic data, laws, definitions, strategies, and tools in Thermodynamics in Materials Science, Second Edition provides students and practicing engineers a valuable guide for producing and applying maps of equilibrium states to everyday applications in materials sciences.

This highly readable, popular textbook for upper undergraduates and graduates comprehensively covers the fundamentals of crystallography and symmetry, applying these concepts to a large range of materials. New to this edition are more streamlined coverage of crystallography, additional coverage of magnetic point group symmetry and updated material on extraterrestrial minerals and rocks. New exercises at the end of chapters, plus over 500 additional exercises available online, allow students to check their understanding of key concepts and put into practice what they have learnt. Over 400 illustrations within the text help students visualise crystal structures and more abstract mathematical objects, supporting more difficult topics like point group symmetries. Historical and biographical sections add colour and interest by giving an insight into those who have contributed significantly to the field. Supplementary online material includes password-protected solutions, over 100 crystal structure data files, and Powerpoints of figures from the book.

This text offers an introduction to the properties and behaviour of soft matter. It begins with a treatment of the underlying principles, then discusses how the properties of certain substances and systems are treated within this framework.

Materials Kinetics: Transport and Rate Phenomena provides readers with a clear understanding of how physical-chemical principles are applied to fundamental kinetic processes. The book integrates advanced concepts with foundational knowledge and cutting-edge computational approaches, demonstrating how diffusion, morphological evolution, viscosity, relaxation and other kinetic phenomena can be applied to practical materials design problems across all classes of materials. The book starts with an overview of thermodynamics, discussing equilibrium, entropy, and irreversible processes. Subsequent chapters focus on analytical and numerical solutions of the diffusion equation, covering Fick’s laws, multicomponent diffusion, numerical solutions, atomic models, and diffusion in crystals, polymers, glasses, and polycrystalline materials. Dislocation and interfacial motion, kinetics of phase separation, viscosity, and advanced nucleation theories are examined next, followed by detailed analyses of glass transition and relaxation behavior. The book concludes with a series of chapters covering molecular dynamics, energy landscapes, broken ergodicity, chemical reaction kinetics, thermal and electrical conductivities, Monte Carlo simulation techniques, and master equations. Covers the full breadth of materials kinetics, including organic and inorganic materials, solids and liquids, theory and experiments, macroscopic and microscopic interpretations, and analytical and computational approaches Demonstrates how diffusion, viscosity microstructural evolution, relaxation, and other kinetic phenomena can be leveraged in the practical design of new materials Provides a seamless connection between thermodynamics and kinetics Includes practical exercises that reinforce key concepts at the end of each chapter

Thermal Management of Electronics
Extracorporeal Membrane Oxygenation
Electronic Properties of Materials
Polymer Interface and Adhesion
Computational Thermodynamics of Materials
Mechanical Behavior of Materials

Beyond Equilibrium Thermodynamics fills a niche in the market by providing a comprehensive introduction to a new, emerging topic in the field. The importance of non-equilibrium thermodynamics is addressed in order to fully understand how a system works, whether it is in a biological system like the brain or a system that develops plastic. In order to fully grasp the subject, the book clearly explains the physical concepts and mathematics involved, as well as presenting problems and solutions; over 200 exercises and answers are included. Engineers, scientists, and applied mathematicians can all use the book to address their problems in modelling, calculating, and understanding dynamic responses of materials.

Reflecting the fast pace of research in the field, the Second Edition of Bulk Metallic Glasses has been thoroughly updated and remains essential reading on the subject. It incorporates major advances in glass forming ability, corrosion behavior, and mechanical properties. Several of the newly proposed criteria to predict the glass-forming ability of alloys have been discussed. All other areas covered in this book have been updated, with special emphasis on topics where significant advances have occurred. These include processing of hierarchical surface structures and synthesis of nanophase composites using the chemical behavior of bulk metallic glasses and the development of novel bulk metallic glasses with high-strength and high-ductility and superelastic behavior. New topics such as high-entropy bulk metallic glasses, nanoporous alloys, novel nanocrystalline alloys, and soft magnetic glassy alloys with high saturation magnetization have also been discussed. Novel applications, such as metallic glassy screw bolts, surface coatings, hyperthermia glasses, ultra-thin mirrors and pressure sensors, mobile phone casing, and degradable biomedical materials, are described. Authored by the world’s foremost experts on bulk metallic glasses, this new edition endures as an indispensable reference and continues to be a one-stop resource on all aspects of bulk metallic glasses.

A classroom-tested textbook providing a fundamental understandingof basic kinetic processes in materials This textbook, reflecting the hands-on teaching experience of its three authors, evolved from Massachusetts Institute of Technology’s first-year graduate curriculum in the Department of Materials Science and Engineering. It discusses key topics collectivelyrepresenting the basic kinetic processes that cause changes in thesisize, shape, composition, and atomistic structure of materials.Readers gain a deeper understanding of these kinetic processes andof the properties and applications of materials. Topics are introduced in a logical order, enabling students todevelop a solid foundation before advancing to more sophisticatedtopics. Kinetics of Materials begins with diffusion, offering adescription of the elementary manner in which atoms and moleculesmove around in solids and liquids. Next, the more complex motion ofdislocations and interfaces is addressed. Finally, still morecomplex kinetic phenomena, such as morphological evolution andphase transformations, are treated. Throughout the textbook, readers are instilled with an appreciationof the subject’s analytic foundations and, in many cases, theapproximations commonly used in the field. The authors offer manyextensive derivations of important results to help illuminate theirorigins. While the principal focus is on kinetic phenomena incrystalline materials, select phenomena in noncrystalline materialsare also discussed. In many cases, the principles involved apply toall materials. Exercises with accompanying solutions are provided throughoutKinetics of Materials, enabling readers to put their newfoundknowledge into practice. In addition, bibliographies are offeredwith each chapter, helping readers to investigate specializedtopics in greater detail. Several appendices presenting importantbackground material are also included. With its unique range of topics, progressive structure, andextensive exercises, this classroom-tested textbook provides anenriching learning experience for first-year graduate students.

A comprehensive introduction, examining both macroscopic and microscopic aspects of the subject, the book applies the theory of thermodynamics to a broad range of materials; from metals, ceramics and other inorganic materials to geological materials. Focusing on materials rather than the underlying mathematical concepts of the subject, this book will be ideal for the non-specialist requiring an introduction to the energetics and stability of materials. Macroscopic thermodynamic properties are linked to the underlying microscopic nature of the materials and trends in important properties are discussed. A unique approach covering both macroscopic and microscopic aspects of the subject Authors have worldwide reputations in this area Fills a gap in the market by featuring a wide range of real up-to-date examples and covering a large amount of materials

Structure and Bonding in Crystalline Materials

Materials Characterization

An Introduction to Crystallography, Diffraction and Symmetry

The Science and Design of Engineering Materials

Materials Kinetics

Introduction to Microscopic and Spectroscopic Methods

For courses in Signals and Systems offered in departments of Electrical Engineering. This book focuses on the mathematical analysis and design of analog signal processing using a just in time approach - new ideas and topics relevant to the narrative are introduced only when needed, and no chapters are stand alone. Topics are developed throughout the narrative, and individual ideas appear frequently as needed.

"In response to the growing economic and technological importance of polymers, ceramics, and semi-conductors, many materials science and engineering as they apply to all the classes of materials."--Back cover.

The field of additive manufacturing has seen explosive growth in recent years due largely in part to renewed interest from the manufacturing sector. Conceptually, additive manufacturing, or industrial 3D printing, is a way to build parts without using any part-specific tooling or dies from the computer-aided design (CAD) file of the part. Today, most engineered devices are 3D printed first to check their shape, size, and functionality before large-scale production. In addition, as the cost of 3D printers has come down significantly, and the printers’ reliability and part quality have improved, schools and universities have been investing in 3D printers to experience, explore, and innovate with these fascinating additive manufacturing technologies. Additive Manufacturing highlights the latest advancements in 3D printing and additive manufacturing technologies. Focusing on additive manufacturing applications rather than on core 3D printing technologies, this book: Introduces various additive manufacturing technologies based on their utilization in different classes of materials Discusses important application areas of additive manufacturing, including medicine, education, and the space industry Explores regulatory challenges associated with the emergence of additive manufacturing as a mature technological platform By showing how 3D printing and additive manufacturing technologies are currently used, Additive Manufacturing not only provides a valuable reference for veteran researchers and those entering this exciting field, but also encourages innovation in future additive manufacturing applications.

Extracorporeal membrane oxygenation (ECMO), despite a long and troubled history, is very rapidly evolving into a therapy that can be safely and effectively applied across the world in patients experiencing acute cardiac and/or pulmonary failure. As experiences grow, there is a better understanding of nuances of the importance of teamwork, therapy guidelines and protocols, patient selection, and understanding the functional aspects of pump-circuit technology as it interfaces with human biology. The challenges in managing these very sick and complex patients cannot be understated. The goal of this text is to provide a framework for the development and successful growth of a program. Authors from Centers of Excellence Worldwide have shared their experiences in the full spectrum in dealing with this evolving field.

Kinetics of Materials

Grain Boundary Migration in Metals

Principles and Applications, Fourth Edition

Thermodynamics, Kinetics, Applications, Second Edition

High-Entropy Alloys

Additive Manufacturing

Thermodynamics in Materials ScienceCRC Press

The continuing trend toward miniaturization and high power density electronics results in a growing interdependency between different fields of engineering. In particular, thermal management has become essential to the design and manufacturing of most electronic systems.

Heat Transfer: Thermal Management of Electronics details how engineers can use intelligent thermal design to prevent heat-related failures, increase the life expectancy of the system, and reduce emitted noise, energy consumption, cost, and time to market. Appropriate thermal management can also create a significant market differentiation, compared to similar systems. Since there are more design flexibilities in the earlier stages of product design, it would be productive to keep the thermal design in mind as early as the concept and feasibility phase. The author first provides the basic knowledge necessary to understand and solve simple electronic cooling problems. He then delves into more detail about heat transfer fundamentals to give the reader a deeper understanding of the physics of heat transfer. Next, he describes experimental and numerical techniques and tools that are used in a typical thermal design process. The book concludes with a chapter on some advanced cooling methods. With its comprehensive coverage of thermal design, this book can help all engineers to develop the necessary expertise in thermal management of electronics and move a step closer to being a multidisciplinary engineer.

Integrates fundamental concepts with experimental data and practical applications, including worked examples and end-of-chapter problems.

This book covers state-of-the-art techniques commonly used in modern materials characterization. Two important aspects of characterization, materials structures and chemical analysis, are included. Widely used techniques, such as metallography (light microscopy), X-ray diffraction, transmission and scanning electron microscopy, are described. In addition, the book introduces advanced techniques, including scanning probe microscopy. The second half of the book accordingly presents techniques such as X-ray energy dispersive spectroscopy (commonly equipped in the scanning electron microscope), fluorescence X-ray spectroscopy, and popular surface analysis techniques (XPS and SIMS). Finally, vibrational spectroscopy (FTIR and Raman) and thermal analysis are also covered.

Thermodynamics in Materials Science

A Short Course

Soft Condensed Matter

Structure of Materials

Statistical Thermodynamics in Biology, Chemistry, Physics, and Nanoscience

Chemical Thermodynamics of Materials

This book provides a comprehensive exposition of the theory of equilibrium thermodynamics and statistical mechanics at a level suitable for well-prepared undergraduate students. The fundamental message of the book is that all results in equilibrium thermodynamics and statistical mechanics follow from a single unprovable axiom — namely, the principle of equal a priori probabilities — combined with elementary probability theory, elementary classical mechanics, and elementary quantum mechanics. Molecular Driving Forces, Second Edition E-book is an introductory statistical thermodynamics text that describes the principles and forces that drive chemical and biological processes. It demonstrates how the complex behaviors of molecules can result from a few simple physical processes, and how simple models provide surprisingly accurate insights into the workings of the molecular world. Widely adopted in its First Edition, Molecular Driving Forces is regarded by teachers and students as an accessible textbook that illuminates underlying principles and concepts. The Second Edition includes two brand new chapters: (1) "Microscopic Dynamics" introduces single molecule experiments; and (2) "Molecular Machines" considers how nanoscale machines and engines work. "The Logic of Thermodynamics" has been expanded to its own chapter and now covers heat, work, processes, pathways, and cycles. New practical applications, examples, and end-of-chapter questions are integrated throughout the revised and updated text, exploring topics in biology, environmental and energy science, and nanotechnology. Written in a clear and reader-friendly style, the book provides an excellent introduction to the subject for novices while remaining a valuable resource for experts.

Accompanying CD-ROM contains ... "computer tests and laboratories."--CD-ROM label.

Thermodynamics Kept Simple - A Molecular Approach: What is the Driving Force in the World of Molecules? offers a truly unique way of teaching and thinking about basic thermodynamics that helps students overcome common conceptual problems. For example, the book explains the concept of entropy from the perspective of probabilities of various molecule

What is the Driving Force in the World of Molecules?

Thermodynamics Kept Simple - A Molecular Approach

Principles and Applications, Second Edition

Thermodynamics and Kinetics in Materials Science

Imperfections in Crystalline Solids

Thermodynamics in Materials Science, Second Edition

A major goal of materials science is to create new engineering materials and optimize their cost and performance. Understanding how adjacent materials behave at their borders is an essential part of this process. Grain boundaries are the longest-known crystal defects, but although they were discovered in the mid-eighteenth century, until quite recently, we did not understand them very well. Even now, scientists are still searching for the best ways to comprehensively characterize a material's microstructure—and accurately predict its evolution and behavior. Fills the gap between the physics of grain boundary motion and its engineering practicality Like the popular first edition, Grain Boundary Migration in Metals: Thermodynamics, Kinetics, Applications, Second Edition focuses extensively on the thermodynamics, kinetics, and applications involved with individual grain boundary migration in metals. However, this new volume adds a decade's worth of new developments in research and methods. It offers an up-to-date overview of current knowledge of the grain boundary migration process, and it details how migration influences microstructural evolution, including the recrystallization process and the creation of new materials. The authors rely on well-defined geometry and crystallography to address key topics such as grain growth, textures, and the properties and behavior of grain boundaries, particularly the nonlinear interaction of boundary elements. This invaluable second edition: Covers the latest techniques and computer simulations used in the study of single-grain boundary motion and grain boundary systems with junctions Provides the latest experimental data of grain boundary free volume measurements and offers the first measurements of grain boundary junction line tension Includes new problems with solutions As a solid foundation on which you can build your understanding of the migration phenomenon, this book should be required reading for researchers in areas such as interface physics and materials science of microstructure evolution and property control. It will also be vastly useful to any professional engaged in metals production and/or the heat treatment of metals and alloys.

It is quite satisfying for an author to learn that his brainchild has been favorably accepted by students as well as by professors and thus seems to serve some useful purpose. This horizontally integrated text on the electronic properties of metals, alloys, semiconductors, insulators, ceramics, and polymeric materials has been adopted by many universities in the United States as well as abroad, probably because of the relative ease with which the material can be understood. The book has now gone through several re-printing cycles (among them a few pirate prints in Asian countries). I am grateful to all readers for their acceptance and for the many encouraging comments which have been received. I have thought very carefully about possible changes for the second edition. There is, of course, always room for improvement. Thus, some rewording, deletions, and additions have been made here and there. I withstood, however, the temptation to expand considerably the book by adding completely new subjects. Nevertheless, a few pages on recent developments needed to be inserted. Among them are, naturally, the discussion of ceramic (high-temperature) superconductors, and certain elements of the rapidly expanding field of optoelectronics. Further, I felt that the readers might be interested in learning some more practical applications which result from the physical concepts which have been treated here.

Polymer Interface and Adhesion provides the critical basis for further advancement in this field. Combining the principles of interfacial science, rheology, stress analysis, and fracture mechanics, the book teaches a new approach to the analysis of long-standing problems such as: how is the interface formed; what are its physical and mechanical properties; and how does the interface modify the stress field and fracture strength of the material. The book offers many outstanding features, including extensive listings of pertinent references, exhaustive tabulations of the interfacial properties of polymers, critical reviews of the many conflicting theories, and complete discussions of coupling agents, adhesion promotion, and surface modifications. Emphasis is placed on physical concepts and mechanisms, using clear, understandable mathematics. Polymer Interface and Adhesion promotes a more thorough understanding of the physical, mechanical, and adhesive properties of multiphase, polymer systems. Polymer scientists and engineers, surface chemists, materials scientists, rheologists, as well as chemical and mechanical engineers interested in the research, development or industrial applications of polymers, plastics, fibers, coatings, adhesives, and composites need this important new source book.

This text describes the mathematical formulation and proof of the unified mechanics theory (UMT) which is based on the unification of Newton's laws and the laws of thermodynamics. It also presents formulations and experimental verifications of the theory for thermal, mechanical, electrical, corrosion, chemical and fatigue loads, and it discusses why the original universal laws of motion proposed by Isaac Newton in 1687 are incomplete. The author provides concrete examples, such as how Newton's second law, $F = ma$, gives the initial acceleration of a soccer ball kicked by a player, but does not tell us how and when the ball would come to a stop. Over the course of Introduction to Unified Mechanics Theory, Dr. Basaran illustrates that Newtonian mechanics does not account for the thermodynamic changes happening in a system over its usable lifetime. And in this context, this book explains how to design a system to perform its intended functions safely over its usable life time and predicts the expected lifetime of the system without using empirical models, a process currently done using Newtonian mechanics and empirical degradation/failure/fatigue models which are curve-fit to test data. Written as a textbook suitable for upper-level undergraduate mechanics courses, as well as first year graduate level courses, this book is the result of over 25 years of scientific activity with the contribution of dozens of scientists from around the world including USA, Russia, Ukraine, Belarus, Spain, China, India and the U.K.

Thermodynamics And Statistical Mechanics

Solutions Manual for Thermodynamics in Materials Science, Second Edition

Analog Signals and Systems

Biological Thermodynamics

Transport and Rate Phenomena

Introduction to Unified Mechanics Theory with Applications

"A pedagogical gem.... Professor Readey replaces 'black-box' explanations with detailed, insightful derivations. A wealth of practical application examples and exercise problems complement the exhaustive coverage of kinetics for all material classes." –Prof. Connecticut "Prof. Readey gives a grand tour of the kinetics of materials suitable for experimentalists and modellers.... In an easy-to-read and entertaining style, this book leads the reader to fundamental, model-based understanding of kinetic processes, fabrication and application of commercially-important soft (polymers, biomaterials), hard (ceramics, metals) and composite materials. It is a must-have for anyone who really wants to understand how to make materials and how they will behave in service." College London, Fellow of the Royal Academy of Engineering "A much needed text filling the gap between an introductory course in materials science and advanced materials-specific kinetics courses. Ideal for the undergraduate interested in an in-depth study." –Prof. Mark E. Eberhart, Colorado School of Mines This book provides an in-depth introduction to the most important kinetic concepts in materials science, engineering, and processing. All types of materials are addressed, including metals, ceramics, polymers, biomaterials, and composites. The expert author with decades of teaching and practical experience gives a lively and accessible overview, explaining the principles that determine how long it takes to change material properties and make new and better materials. A broad range of topics extending from the heat treatment of steels, the processing of silicon integrated microchips, and the production of cement, to the movement of drugs through the human body. The author explicitly avoids "black box" equations, providing clear explanations.

A balanced mechanics-materials approach and coverage of the latest developments in biomaterials and electronic materials, the new edition of this popular text is the most thorough and modern book available for upper-level undergraduate courses on materials. To ensure that the student gains a thorough understanding the authors present the fundamental mechanisms that operate at micro- and nano-meter level across a wide-range of materials, in a way that is mathematically simple and requires no advanced mathematics. This integrated approach provides a conceptual presentation that shows how the microstructure of a material controls its mechanical behavior, and this is reinforced through extensive use of micrographs and illustrations. New worked examples and exercises are included. Further resources for this title, including lecture slides of select illustrations and solutions for exercises, are available online at www.cambridge.org/97800521866758.

This 2006 book combines modern and traditional solid mechanics topics in a coherent theoretical framework.

Molecular Driving Forces