

Cellular Solids Structure And Properties Cambridge Solid State Science Series By Gibson Lorna J Ashby Michael F 1999 Paperback

A practical handbook rather than merely a chemistry reference, Szycher's Handbook of Polyurethanes, Second Edition offers an easy-to-follow compilation of crucial new information on polyurethane technology, which is irreplaceable in a wide range of applications. This new edition of a bestseller is an invaluable reference for technologists, marketers, suppliers, and academicians who require cutting-edge, commercially valuable data on the most advanced uses for polyurethane, one of the most important and complex specialty polymers. Internationally recognized expert Dr. Michael Szycher updates his bestselling industry "bible" With seven entirely new chapters and five that are revised and updated, this book summarizes vital contents from U.S. patent literature—one of the most comprehensive sources of up-to-date technical information. These patents illustrate the most useful technology discovered by corporations, universities, and independent inventors. Because of the wealth of information they contain, this handbook features many full-text patents, which are carefully selected to best illustrate the complex principles involved in polyurethane chemistry and technology. Features of this landmark reference include: Hundreds of practical formulations Discussion of the polyurethane history, key terms, and commercial importance An in-depth survey of patent literature Useful stoichiometric calculations The latest "green" chemistry applications A complete assessment of medical-grade polyurethane technology Not biased toward any one supplier's expertise, this special reference uses a simplified language and layout and provides extensive study questions after each chapter. It presents rich technical and historical descriptions of all major polyurethanes and updated sections on medical and biological applications. These features help readers better understand developmental, chemical, application, and commercial aspects of the subject.

Metal foams are at the forefront of technological development for the automotive, aerospace, and other weight-dependent industries. They are formed by various methods, but the key facet of their manufacture is the inclusion of air or other gaseous pockets in the metal structure. The fact that gas pockets are present in their structure provides an obvious weight advantage over traditionally cast or machined solid metal components. The unique structure of metal foams also opens up more opportunities to improve on more complex methods of producing parts with space inclusions such as sand-casting. This guide provides information on the advantages metal foams possess, and the applications for which they may prove suitable. Offers a concise description of metal foams, their manufacture, and their advantages in industry Provides engineers with answers to pertinent questions surrounding metal foams Satisfies a major need in the market for information on the properties, performance, and applications of these materials

This book attempts to bring the essence of shell structures within the grasp of engineers. It tackles the fundamental question of how bending and stretching effects combine and interact in shell structures from a physical point of view; and shows that this approach leads to an understanding of the structural mechanics of shells in general.

The increasing importance of plastic materials in packaging makes it mandatory for everyone in this industry to command a basic understanding of the properties of the common packaging plastics.

Addresses a Growing Need for the Development of Cellular and Porous Materials in Industry Building blocks used by nature are motivating researchers to create bio-inspired cellular structures that can be used in the development of products for the plastic, food, and biomedical industry. Representing a unified effort by international experts, Biofoams: Science and Applications of Bio-Based Cellular and Porous Materials highlights the latest research and development of biofoams and porous systems, and specifically examines the aspects related to the formation of gas bubbles in drink and food. The book offers a detailed analysis of bio-polymers and foaming technologies, biodegradable and sustainable foams, biomedical foams, food foams, and bio-inspired foams. Explores the Generation of New Materials with Wide-Ranging Technological Applicability This book introduces the science, technologies, and applications related to the use of biopolymers and biomaterials in the development of porous structures. It presents topics that include bio-based polymers for the development of biodegradable and sustainable polymeric foams, foams in food, foams in biomedical applications, biohybrids, and bio-inspired cellular and porous systems. It also includes recent studies on the design of polymer-based composites and hybrid scaffolds, weighs in on the challenges related to the production of porous polymers, and presents relevant examples of cellular architecture present in nature. In addition, this book: Focuses on materials compatible with natural tissues Discusses the engineering of bio-inspired scaffolds with the ability to mimic living tissue Reveals how to use renewable resources to develop more sustainable lightweight materials Illustrates the state of the art of porous scaffold and process techniques A book dedicated to material science, Biofoams: Science and Applications of Bio-Based Cellular and Porous Materials focuses on food technology, polymers and composites, biomedical, and chemical engineering, and examines how the principles used in the creation of cellular structures can be applied in modern industry.

Microstructure and Macroscopic Properties

Thermo-Fluid Behaviour of Periodic Cellular Metals

Lessons from Jamaica

Theory of Viscoelasticity

Advances on Mechanics, Design Engineering and Manufacturing

Scaffolds in Tissue EngineeringMaterials, Technologies and Clinical Applications

Mechanical Behavior of Materials

Thermo-Fluid Behaviour of Periodic Cellular Metals introduces the study of coupled thermo-fluid behaviour of cellular metals with periodic structure in response to thermal loads, which is an interdisciplinary research area that requires a concurrent-engineering approach. The book, for the first time, systematically adopts experimental, numerical, and analytical approaches, presents the fluid flow and heat transfer in periodic cellular metals under forced convection conditions, aiming to establish structure-property relationships for tailoring material structures to achieve properties and performance levels that are customized for defined multifunctional applications. The book, as a textbook and reference book, is intended for both academic and industrial people, including graduate students, researchers and engineers. Dr. Tian Jian Lu is a professor at the School of Aerospace, Xi'an Jiaotong University, Xi'an, China. Dr. Feng Xu is a professor at the Key Laboratory of Biomedical Information Engineering of Ministry of Education, School of Life Science and Technology, Xi'an Jiaotong University. Dr. Ting Wen is now an engineer at Shell Global Solutions Inc. Dr. Lu and Dr. Xu are also affiliated with Biomedical Engineering and Biomechanics Center, Xi'an Jiaotong University.

The book covers the state-of-the-art treatment in modelling and experimental investigation of the mechanical behaviour of cellular and porous materials. Starting from the continuum mechanical modelling, to the numerical simulation, several important questions related to applications such as the fracture and impact behaviour are covered.

This book discusses the recent crime and violence trends in the Caribbean highlighting its history and current challenges that continue to impede its development. Theoretical explanations are offered for the existing conditions and discussion of the need of a paradigm shift in policy development to combat the crime problem.

This accessible text presents a unified approach of treating the microstructure and effective properties of heterogeneous media. Part I deals with the quantitative characterization of the microstructure of heterogeneous via theoretical methods;

Part II treats a wide variety of effective properties of heterogeneous materials and how they are linked to the microstructure, accomplished by using rigorous methods.

Treatise on Materials Science and Technology, Volume 10: Properties of Solid Polymeric Materials, Part A covers knowledge in the critical areas of polymeric materials. The book provides a background in polymer structure and morphogenesis, and discusses rubberlike elasticity, a phenomenon thermodynamically unique to long-chain polymers. The text also describes the mechanics of anisotropie, oriented polymeric systems and of glassy polymers. The fatigue behavior in solid polymers and the electrical properties of solid polymers are also reviewed. The book further tackles the electron processes and electrical breakdown in polymers. The text concludes with a discussion of the role of the environment on the integrity of polymeric solids. Materials scientists, materials engineers, and graduate students taking related courses will find the book useful.

From Unavoidable Defects to Designed Cellular Materials

Engineering Materials 2

Drug-like Properties: Concepts, Structure Design and Methods

The Theory of Transport Phenomena in Solids

Porous Metals with Directional Pores

Structure and Properties

Beyond the Molecular Frontier

Cellular SolidsStructure and PropertiesCambridge University Press

This book gathers papers presented at the International Joint Conference on Mechanics, Design Engineering and Advanced Manufacturing (JCM 2016), held on 14-16 September, 2016, in Catania, Italy. It reports on cutting-edge topics in product design and integrated product and process design; innovative design; and computer-aided design. Further topics covered include virtual simulation and reverse engineering; additive manufacturing; product manufacturing; engineering methods in medicine and education; aeronautics and aerospace design and modeling. The book is divided into eight main sections, reflecting the focus and primary themes of the conference. The contributions presented here will not only provide researchers, engineers and experts in a range of information to support their daily work; they are also intended to stimulate new research directions, advanced applications of the methods discussed, and future interdisciplinary collaborations.

Cellular solids and porous metals have become some of the most promising lightweight multifunctional materials due to their superior combination of advanced properties mainly derived from their base material and cellular structure. They are used in a wide range of military applications. In contrast to other cellular materials, cellular metals are non-flammable, recyclable, extremely tough, and chemically stable and are excellent energy absorbers. The manuscripts of this Special Issue provide a representative insight in covering topics related to manufacturing, characterization, properties, specific challenges in transportation, and the description of structural features. For example, a presented strategy for the strengthening of Al-alloy foams is the addition of alloying elements to promote the formation of intermetallics (e.g., precipitation hardening). The incorporation of micro-sized and nano-sized reinforcement elements (e.g., carbon nanotubes and graphene oxide) into the metal bulk matrix to enhance the performance of the ductile cellular materials, such as nanocomposite foams, lattice materials, and hybrid foams and structures are also discussed (e.g., filled hollow structures, metal-polymer hybrid cellular structures).

This book reviews the recent development of fabrication methods and various properties of lotus-type porous metals and their applications. The nucleation and growth mechanism of the directional pores in metals are discussed in comparison with a model of casting techniques are introduced to produce not only metals and alloys but also intermetallic compounds, semiconductors, and ceramics: mold casting, continuous zone melting, and continuous casting. The latter has merits for mass production of lotus metal. Furthermore, anisotropic behavior of elastic, mechanical properties, thermal and electrical conductivity, magnetic properties, and biocompatibility are introduced as peculiar features of lotus metals.

In this new edition of their classic work on Cellular Solids, the authors have brought the book completely up to date, including new work on processing of metallic and ceramic foams and on the mechanical, electrical and acoustic properties of cellular solids presented on material property charts; two new case studies show how the charts are used for selection of foams in engineering design. Over 150 references appearing in the literature since the publication of the first edition are cited. The text summarizes the mechanical behaviour of cellular materials, and the ways in which they can be exploited in engineering design. Cellular solids include engineering honeycombs and foams (which can now be made from polymers, metals, ceramics and composites) as well as natural cancellous bone.

Cellular and Porous Materials in Structures and Processes

The Shifting Research Frontiers

Theory of Shell Structures

Bonding, Structure, and Structure-Property Relationships

Cellular Materials in Nature and Medicine

Composites And Metamaterials

Cellular Metals

Polymers are used in everything from nylon stockings to commercial aircraft to artificial heart valves, and they have a key role in addressing international competitiveness and other national issues. Polymer Science and Engineering explores the universe of polymers, describing their properties and wide-ranging potential, and presents the state of the science, with a hard look at downward trends in research support. Leading experts offer findings, recommendations, and research directions. Lively vignettes provide snapshots of polymers in everyday applications. The volume includes an overview of the use of polymers in such fields as medicine and biotechnology, information and communication, housing and construction, energy and transportation, national defense, and environmental protection. The committee looks at the various classes of polymers--plastics, fibers, composites, and other materials, as well as polymers used as membranes and coatings--and how their composition and specific methods of processing result in unparalleled usefulness. The reader can also learn the science behind the technology, including efforts to model polymer synthesis after nature's methods, and breakthroughs in characterizing polymer properties needed for twenty-first-century applications. This informative volume will be important to chemists, engineers, materials scientists, researchers, industrialists, and policymakers interested in the role of polymers, as well as to science and engineering educators and students.

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 is a classic text of its time in condensed matter physics.

This book is an excellent primer for students to learn about physical properties, particularly mechanical properties of heterogeneous and multiphase materials and the cultivation of physical insight. Written by a prominent author who pioneered many of the concepts, this book provides a comprehensive coverage of current topics in new heterogenous materials.Topics covered include:

Although plastics are extremely successful commercially, they would never reach acceptable performance standards either in properties or processing without the incorporation of additives. With the inclusion of additives, plastics can be used in a variety of areas competing directly with other materials, but there are still many challenges to overcome. Some additives are severely restricted by legislation, others interfere with each other-in short their effectiveness varies with circumstances. Plastics Additives explains these issues in an alphabetical format making them easily accessible to readers, enabling them to find specific information on a specific topic. Each additive is the subject of one or more articles, providing a succinct account of each given topic. An international group of experts in additive and polymer science, from many world class companies and institutes, explain the recent rapid changes in additive technology. They cover novel additives (scorch inhibitors, compatibilizers, surface-modified particulates etc.), the established varieties (antioxidants, biocides, antistatic agents, nucleating agents, fillers, fibres, impact modifiers, plasticizers) and many others, the articles also consider environmental concerns, interactions between additives and legislative change. With a quick reference guide and introductory articles that provide the non-specialist and newcomer with relevant information, this reference book is essential reading for anyone concerned with plastics and additives.

Properties, Processing, Applications, and Regulations

Structure, Manufacturing, Properties and Applications

Polymer Science and Engineering

Fundamentals of Materials Science

Plastics Additives

Treatise on Materials Science and Technology

An A-Z reference

Rapidly Quenched Metals, Volume I covers the proceedings of the Fifth International Conference on Rapidly Quenched Metals, held in Wurzburg, Germany on September 3-7, 1984. The book focuses on amorphous and crystalline metals formed by rapid quench selection first covers the scope and trends of developments in rapid solidification technology, rapid solidification, and undercooling of liquid metals by rapid quenching. Discussions focus on experimental method, powders, strip, particulate production, consolidation systems. The text then examines the solidification of undercooled liquid alloys entrapped in solid: crystallization kinetics in undercooled droplets; and grain refinement in bulk undercooled alloys. The manuscript tackles the undercooling of niobium-germanium tube; influence of process parameters on the cooling rate of the meltspinning process; and the mechanism of ribbon formation in melt-spun copper and copper-zirconium. The formation and structure of thick sections of rapidly-solidified material by incremental production of ultrafine dispersions of rare earth oxides in Ti alloys using rapid solidification are also mentioned. The selection is a valuable reference for physicists, chemists, physical metallurgists, and engineers.

Integration of theoretical developments offers complete description of linear theory of viscoelastic behavior of materials, with theoretical formulations derived from continuum mechanics viewpoint and discussions of problem solving. 1982 edition.

An easy-to-read textbook linking together bond strength and the arrangement of atoms in space with the properties that they control.

Not only does this book provide a comprehensive review of current research advances in collagen structure and mechanics, it also explores this biological macromolecule's many applications in biomaterials and tissue engineering. Readers gain an understanding of the mechanical behavior of type I collagen and collagen-based tissues in vertebrates across all length scales, from the molecular (nano) to the organ (macro) level.

Of the thousands of novel compounds that a drug discovery project team invents and that bind to the therapeutic target, typically only a fraction of these have sufficient ADME/Tox properties to become a drug product. Understanding ADME/Tox is critical to its increasing importance in advancing high quality candidates to clinical studies and the processes of drug discovery. If the properties are weak, the candidate will have a high risk of failure or be less desirable as a drug product. This book is a tool and resource for preparing for, the selection and optimization process. The authors describe how properties affect in vivo pharmacological activity and impact in vitro assays. Individual drug-like properties are discussed from a practical point of view, such as solubility, permeability, with regard to fundamental understanding, applications of property data in drug discovery and examples of structural modifications that have achieved improved property performance. The authors also review various methods for the screening (high throughput (medium throughput) and in-depth (low throughput) analysis of drug properties. * Serves as an essential working handbook aimed at scientists and students in medicinal chemistry * Provides practical, step-by-step guidance on property fundamentals, effect relationships, and structure modification strategies * Discusses improvements in pharmacokinetics from a practical chemist's standpoint

The Structure and Properties of Water

Structure and Mechanics

From Basic Principles to Applications

From Molecules to Engineered Tissue

An Introduction to Fundamentals

Collagen

Rapidly Quenched Metals

Biomaterials: From Molecules to Engineered Tissue gives examples of the application areas of biomaterials involving molecules at one end of the spectrum and finished devices in the other. It covers molecular approaches as well as molecules functional in preparing and modifying biomaterials, medical devices and systems, tissue engineering and artificial organs. Chapters on biomedical informatics and ethics complement the design and production aspects with their contribution in informatics and ethical concerns of biomedical research. This is a reference book for the advanced graduate student eager to learn the biomaterials area and for all researchers working in medicine, pharmacy, engineering and basic sciences in universities, hospitals, and industry involved in biomaterials and biomedical device production.

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 the mechanical behavior of 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 extensive knowledge of materials. 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 help the student test their understanding. Further resources for this title, including lecture slides of select illustrations and solutions for exercises, are available online at www.cambridge.org/97800521866758.

This book covers all aspects of metal matrix composites, an important new class of materials.

Cellular solids include engineering honeycombs and foams (which can now be made from polymers, metals, ceramics, and composites) as well as natural materials, such as wood, cork, and cancellous bone. This new edition of a classic work details current understanding of the structure and mechanical behavior of cellular materials, and the ways in which they can be exploited in engineering design. Gibson and Ashby have brought the book completely up to date, including new work on processing of metallic and ceramic foams and on the mechanical, electrical and acoustic properties of cellular solids. Data for commercially available foams are presented on material property charts; two new case studies show how the charts are used for selection of foams in engineering design. Over 150 references appearing in the literature since the publication of the first edition are cited. It will be of interest to graduate students and researchers in materials science and engineering.

A physics book that covers the optical properties of quantum-confined semiconductor nanostructures from both the theoretical and experimental points of view together with technological applications. Topics to be reviewed include quantum confinement effects in semiconductors, optical adsorption and emission properties of group IV, III-V, II-VI semiconductors, deep-etched and self assembled quantum dots, nanoclusters, and laser applications in optoelectronics.

Photoelectronic Properties of Semiconductors

Electronic Properties of Crystalline Solids

An Introduction to Microstructures, Processing and Design

Electrons and Phonons

Second Edition

Biofoams

This book examines the fundamental physics underlying the rich complexity of photoelectronic properties of semiconductors, and discusses the models that are useful in describing these fundamentals.

This textbook offers a strong introduction to the fundamental concepts of materials science. It conveys the quintessence of this interdisciplinary field, distinguishing it from merely solid-state physics and solid-state chemistry, using metals as model systems to elucidate the relation between microstructure and materials properties. Mittemeijer's Fundamentals of Materials Science provides a consistent treatment of the subject matter with a special focus on the microstructure-property relationship. Richly illustrated and thoroughly referenced, it is the ideal adoption for an entire undergraduate, and even graduate, course of study in materials science and engineering. It delivers a solid background against which more specialized texts can be studied, covering the necessary breadth of key topics such as crystallography, structure defects, phase equilibria and transformations, diffusion and kinetics, and mechanical properties. The success of the first edition has led to this updated and extended second edition, featuring detailed discussion of electron microscopy, supermicroscopy and diffraction methods, an extended treatment of diffusion in solids, and a separate chapter on phase transformation kinetics. "In a lucid and masterly manner, the ways in which the microstructure can affect a host of basic phenomena in metals are described.... By consistently staying with the postulated topic of the microstructure - property relationship, this book occupies a singular position within the broad spectrum of comparable materials science literature ... it will also be of permanent value as a reference book for background refreshing, not least because of its unique annotated intermezzi; an ambitious, remarkable work." G. Petzow in International Journal of Materials Research. "The biggest strength of the book is the discussion of the structure-property relationships, which the author has accomplished admirably.... In a nutshell, the book should not be looked at as a quick 'cook book' type text, but as a serious, critical treatise for some significant time to come." G.S. Upadhyaya in Science of Sintering. "The role of lattice defects in deformation processes is clearly illustrated using excellent diagrams . Included are many footnotes, 'Intermezzos', 'Epilogues' and asides within the text from the author's experience. This soon becomes valued for the interesting insights into the subject and shows the human side of its history. Overall this book provides a refreshing treatment of this important subject and should prove a useful addition to the existing text books available to undergraduate and graduate students and researchers in the field of materials science." M. Davies in Materials World.

The authors have correlated many experimental observations and theoretical discussions from the scientific literature on water. Topics covered include the water molecule and forces between water molecules; the thermodynamic properties of steam; the structures of the ices; the thermodynamic, electrical, spectroscopic, and transport properties of the ices and of liquid water; hydrogen bonding in ice and water; and models for liquid water. The main emphasis of the book is on relating the properties of ice and water to their structures. Some background material in physical chemistry has been included in order to ensure that the material is accessible to readers in fields such as biology, biochemistry, and geology, as well as to chemists and physicists.

Chemistry and chemical engineering have changed significantly in the last decade. They have broadened their scope"into biology, nanotechnology, materials science, computation, and advanced methods of process systems engineering and control"so much that the programs in most chemistry and chemical engineering departments now barely resemble the classical notion of chemistry. Beyond the Molecular Frontier brings together research, discovery, and invention across the entire spectrum of the chemical sciences"from fundamental, molecular-level chemistry to large-scale chemical processing technology. This reflects the way the field has evolved, the synergy at universities between research and education in chemistry and chemical engineering, and the way chemists and chemical engineers work together in industry. The astonishing developments in science and engineering during the 20th century have made it possible to dream of new goals that might previously have been considered unthinkable. This book identifies the key opportunities and challenges for the chemical sciences, from basic research to societal needs and from terrorism defense to environmental protection, and it looks at the ways in which chemists and chemical engineers can work together to contribute to an improved future.

Explains the basic mathematics needed for a balanced understanding of finite element method theory and its implementation.

The Microstructure-Property Relationship Using Metals as Model Systems

from ADME to Toxicity Optimization

Properties of Solid Polymeric Materials

Science and Applications of Bio-Based Cellular and Porous Materials

Biomaterials

Random Heterogeneous Materials

Semiconductor Nanocrystals

Biomaterials are often designed to act as scaffolds, i.e., 3D porous templates that support and stimulate the growth of healthy tissue and then safely dissolve once they have performed their functions. This book provides a picture of the current state of the art in the field of scaffolds for tissue engineering, highlighting the potential associated to the latest scientific and technological advancements. The former part of the book focuses on the repair of "hard" tissues (primarily bone) by means of bioceramic/glass scaffolds, and the latter deals with the applications of polymeric scaffolds for regenerating "soft" tissues and structures including the peripheral nerve, heart, gastric mucosa and pancreas. Special emphasis is given to the challenges associated to scaffold manufacturing, biomimetic properties and cell-scaffold interactions.

Voids in Materials treats voids of different shapes and forms in various materials, and examines their effects on material properties. The book covers the origins of voids in materials, how they are sometimes introduced in the form of hollow spheres, and the resultant properties of materials containing voids. There are many books that focus on foams (which intentionally incorporate voids into materials) and that cover voids incidental to or unwanted in the fabrication of non-porous materials. In fact, all materials have voids. This book starts from the premise that voids are pervasive in all material on some level. It goes beyond foams to provide a comprehensive overview of voids, a central reference for scientists and engineers to use for the effect of voids in materials. Includes 3D renderings of void geometries Explains how and why voids are introduced into materials across the length scales; from nanometer-scale voids up to macro-scale voids Provides a continuous picture of how material properties change as the volume fraction of voids increases, and the implications for product design

Proceedings of the 20th International Congress on Theoretical and Applied Mechanics, held in Chicago, USA, 27 August-2 September 2000

Describes the structure and mechanics of a wide range of cellular materials in botany, zoology, and medicine.

Cellular ceramics are a specific class of porous materials which includes among others foams, honeycombs, connected fibers, robocast structures and assembled hollow spheres. Because of their particular structure, cellular ceramics display a wide variety of specific properties which make them indispensable for various engineering applications. An increasing number of patents, scientific literature and international conferences devoted to cellular materials testifies to a rapidly growing interest of the technical community in this topic. New applications for cellular ceramics are constantly being put under development. The book, authored by leading experts in this emerging field, gives an overview of the main aspects related to the processing of diverse cellular ceramic structures, methods of structural and properties characterisation and well established industrial, novel and potential applications. It is an introduction to newcomers in this research area and allows students to obtain an in-depth knowledge of basic and practical aspects of this fascinating class of advanced materials.

Crime and Violence in the Caribbean

Cellular Ceramics

Finite Element Method for Solids and Structures

Materials Engineering

Metal Foams: A Design Guide

Plastics Packaging

Cellular Solids

Electronic Properties of Crystalline Solids: An Introduction to Fundamentals discusses courses in the electronic properties of solids taught in the Department of Materials Science and Engineering at Stanford University. The book starts with a brief review of classical wave mechanics, discussing concept of waves and their role in the interactions of electrons, phonons, and photons. The book covers the free electron model for metals, and the origin, derivation, and properties of allowed and forbidden energy bands for electrons in crystalline materials. It also examines transport phenomena and optical effects in crystalline materials, including electrical conductivity, scattering phenomena, thermal conductivity, Hall and thermoelectric effects, magnetoresistance, optical absorption, photoconductivity, and other photoelectronic effects in both ideal and real materials. This book is intended for upper-level undergraduates in a science major, or for first- or second-year graduate students with an interest in the scientific basis for our understanding of properties of materials.

Challenges for Chemistry and Chemical Engineering

Proceedings of the International Joint Conference on Mechanics, Design Engineering & Advanced Manufacturing (JCM 2016), 14-16 September, 2016, Catania, Italy

Szycher's Handbook of Polyurethanes, Second Edition

Fabrication, Properties and Applications

Mechanics for a New Millennium

A Concise Approach

An Introduction to Metal Matrix Composites