Introduction To Glass Science And Technology Rsc Paperbacks

An Updated Edition of the Classic Text Polymers constitute the basis for the plastics, rubber, adhesives, fiber, and coating industries. The Fourth Edition of Introduction to Physical Polymer Science acknowledges the industrial success of polymers and the advancements made in the field while continuing to deliver the comprehensive introduction to polymer science that made its predecessors classic texts. The Fourth Edition continues its coverage of amorphous and crystalline materials, glass transitions, rubber elasticity, and mechanical behavior, and offers updated discussions of polymer blends, composites, and interfaces, as well as such basics as molecular weight determination. Thus, interrelationships among molecular structure, morphology, and mechanical behavior of polymers continue to provide much of the value of the book. Newly introduced topics include: * Nanocomposites, including carbon nanotubes and exfoliated montmorillonite clays * The structure, motions, and functions of DNA and proteins, as well as the interfaces of polymeric biomaterials with living organisms * The glass transition behavior of nano-thin plastic films In addition, new sections have been included on fire retardancy, friction and wear, optical tweezers, and more. Introduction to Physical Polymer Science, Fourth Edition provides both an essential introduction to the field as well as an entry point to the latest research and developments in polymer science and engineering, making it an indispensable text for chemistry, chemical engineering, materials science and engineering, and polymer science and engineering students and professionals.

Our civilization owes its most significant milestones to our use of materials. Metals gave us better agriculture and eventually the industrial revolution, silicon gave us the digital revolution, and we’re just beginning to see what carbon nanotubes will give us. Taking a fresh, interdisciplinary look at the field, Introduction to Materials Science and Engineering emphasizes the importance of materials to engineering applications and builds the basis needed to select, modify, or create materials to meet specific criteria. The most outstanding feature of this text is the author’s unique and engaging application-oriented approach. Beginning each chapter with a real-life example, an experiment, or several interesting facts, Yip-Wah Chung wields an expertly crafted treatment with which he entertains and motivates as much as he informs and educates. He links the discipline to the life sciences and includes modern developments such as nanomaterials, polymers, and thin films while working systematically from atomic bonding and analytical methods to crystalline, electronic, mechanical, and magnetic properties as well as ceramics, corrosion, and phase diagrams. Woven among the interesting examples, stories, and Chinese folk tales is a rigorous yet approachable mathematical and theoretical treatise. This makes Introduction to Materials Science and Engineering an effective tool for anyone needing a strong background in materials science for a broad variety of applications.

A comprehensive and up-to-date encyclopedia to the fabrication, nature, properties, uses, and history of glass The Encyclopedia of Glass Science, Technology, History, and Culture has been designed to satisfy the needs and curiosity of a broad audience interested in the most varied aspects of material that is as old as the universe. As described in over 100 chapters and illustrated with 1100 figures, the practical importance of glass has increased over the ages since it was first man-made four millennia ago. The old-age glass vessels and window and stained glass now coexist with new high-tech products that include for example optical fibers, thin films, metallic, bioactive and hybrid organic-inorganic glasses, amorphous ices or all-solid-state batteries. In the form of scholarly introductions, the Encyclopedia chapters have been written by 151 noted experts working in 23 countries. They present at a consistent level and in a self-consistent manner these industrial, technological, scientific, historical and cultural aspects. Addressing the most recent fundamental advances in glass science and technology, as well as rapidly developing topics such as extra-terrestrial or biogenic glasses, this important guide: Begins with industrial glassmaking Turns to glass structure and to physical, transport and chemical properties Deals with interactions with light, inorganic glass families and organically related glasses Considers a variety of environmental and energy issues And concludes with a long section on the history of glass as a material from Prehistory to modern glass science The Encyclopedia of Glass Science, Technology, History, and Culture has been written not only for glass scientists and engineers in academia and industry, but also for material scientists as well as for art and industry historians. It represents a must-have, comprehensive guide to the myriad aspects this truly outstanding state of matter.

An Introduction to Glass Science and Technology presents the fundamental topics in glass science and technology including glass formation, crystallisation and phase separation. A detailed discussion of glass structure models with emphasis on the oxygen balance model is also presented. This expanded second edition also includes new chapters on the compositions and properties of commercial glasses and thermal analysis of glasses and melts. Exercises are included at the end of the chapters. This introductory text is ideal for undergraduates in materials science, ceramics or inorganic chemistry. It will also be useful to the engineer or scientist seeking basic knowledge of the formation, properties and production of glass.

"the present book will be of great value for both newcomers to the field and mature active researchers by serving as a coherent and timely introduction to some of the modern approaches, ideas, results, emerging understanding, and many open questions in this fascinating field of polymer glasses, supercooled liquids, and thin films" –Kenneth S. Schweizer, Morris Professor of Materials Science & Engineering, University of Illinois at Urbana-Champaign (from the Foreword) This book provides a timely and comprehensive overview of molecular level insights into polymer glasses in confined geometries and under deformation. Polymer glasses have become ubiquitous to our daily life, from the polycarbonate eyeglass lenses on the end of our nose to large acrylic glass panes holding water in aquarium tanks, with advantages over glass in that they are lightweight and easy to manufacture, while remaining transparent and rigid. The contents include an introduction to the field, as well as state of the art investigations. Chapters delve into studies of commonalities across different types of glass formers (polymers, small molecules, colloids, and granular materials), which have enabled microscopic and molecular level frameworks to be developed. The authors show how glass formers are modeled across different systems, thereby leading to treatments for polymer glasses with first-principle based approaches and molecular level detail. Readers across disciplines will benefit from this topical overview summarizing the key areas of polymer glasses, alongside an introduction to the main principles and approaches.

This is the second edition of the classic book An Introduction to Bioceramics which provides a comprehensive overview of all types of ceramic and glass materials that are used in medicine and dentistry. The enormous growth of the field of bioceramics is due to the recognition by the medical and dental community of the importance of bioactive materials to stimulate repair and regeneration of tissues. This edition includes 21 new chapters that document the science and especially the clinical applications of the new generation of bioceramics in the field of tissue

regeneration and repair. Important socioeconomic factors influencing the economics and availability of new medical treatments are covered with updates on regulatory procedures for new biomaterials, methods for technology transfer and ethical issues. The book contains 42 chapters that offer the only comprehensive treatment of the science, technology and clinical applications of all types of bioceramic materials used in medicine and dentistry. Each chapter is written by leaders in their specialized fields and is a thorough review of the subject matter, unlike many conference proceedings. All chapters have been edited to reflect the same writing style, making the book an easy read. The completeness of treatment of all types of bioceramics and their clinical applications makes the book unique in the field and invaluable to all readers.

Metallic Glass-Based Nanocomposites: Molecular Dynamics Study of Properties provides readers with an overview of the most commonly used tools for MD simulation of metallic glass composites and provides all the basic steps necessary for simulating any material on Materials Studio. After reading this book, readers will be able to model their own problems on this tool for predicting the properties of metallic glass composites. This book provides an introduction to metallic glasses with definitions and classifications, provides detailed explanations of various types of composites, reinforcements and matrices, and explores the basic mechanisms of reinforcement-MG interaction during mechanical loading. It explains various models for calculating the thermal conductivity of metallic glass composites and provides examples of molecular dynamics simulations. Aimed at students and researchers, this book caters to the needs of those working in the field of molecular dynamics (MD) simulation of metallic glass composites.

Non-equilibrium States and Glass Transitions in Foods: Processing Effects and Product Specific Implications presents the tactics needed to understand and control non-equilibrium states and glass transitions in food, an essential element in maintaining the shelf-life and quality of foods. After brief introductory chapters introduce the science behind non-equilibrium states and glass transitions in foods, the book details how glass transition temperature is affected by composition and the ways it influences processability and physico-chemical changes during the storage of foods, also exploring how these effects can be controlled. The second section looks at individual foods, highlighting the implications of non-equilibrium states and glass transitions within these foods. Maintaining and improving the quality of food is of upmost importance to food companies who have to ensure that the shelf life of their products is as long as possible. A large amount of research has been performed into glass transitions in food over the last few years, however there has not been a comprehensive review. This book fills that gap. Provides the only book on the market that covers non-equilibrium states and glass transitions in food from a practical standpoint Presents food industry professionals in the area of food quality with essential information on the effects of glass transitions and non-equilibrium states on the shelf life of specific products Edited by global leaders in glass transition technology in foods

In the late 1990s, there was an explosion of research on ionic liquids and they are now a major topic of academic and industrial interest with numerous existing and potential applications. Since then, the number of scientific papers focusing on ionic liquids has risen exponentially, including a few edited multi-author books covering the latest advances in ionic liquids chemistry and several volumes of symposium proceedings. Much of the content in these books and volumes is written using technical jargon that only scientists at the cutting edge of ionic liquids research will understand and ionic liquids are hardly covered in most modern chemistry textbooks. This is the first single-author book on ionic liquids and the first introductory book on the topic. It is written in a clear, concise and consistent way. The book provides a useful introduction to ionic liquids for those readers who are not familiar with the topic. It is also wide ranging, embracing every aspect of the chemistry and applications of ionic liquids. The book draws extensively on the primary scientific literature to provide numerous examples of research on ionic liquids. These examples will enable the reader to become familiar with the key developments in ionic liquids chemistry over recent years. The book provides an introduction to: ionic liquids; their nomenclature; history; physical, chemical and biological properties; and their wide ranging uses and potential applications in catalysis, electrochemistry, inorganic chemistry, organic chemistry, analysis, biotechnology, green chemistry and clean technology. Notable and important chapters include "The Green Credentials of Ionic Liquids" and "Biotechnology." The chapter on "Applications" includes sections with brief descriptions of recent research on the development of ionic liquids: - for the construction of a liquid mirror for a moon telescope - for use as rocket propellants - for use as antimicrobial agents that combat MRSA - as active pharmaceutical ingredients and antiviral drugs - for embalming and tissue preservation Science students, researchers, teachers in academic institutions and chemists and other scientists in industry and government laboratories will find the book an invaluable introduction to one of the most rapidly advancing and exciting fields of science and technology today.

Over the past twenty-five years ceramics have become key materials in the development of many new technologies as scientists have been able to design these materials with new structures and properties. An understanding of the factors that influence their mechanical behavior and reliability is essential. This book will introduce the reader to current concepts in the field. It contains problems and exercises to help readers develop their skills. This is a comprehensive introduction to the mechanical properties of ceramics, and is designed primarily as a textbook for advanced undergraduates in materials science and engineering. It will also be of value as a supplementary text for more general courses and to industrial scientists and engineers involved in the development of ceramic-based products, materials selection and mechanical design.

A complete basic undergraduate course in modern optics for students in physics, technology, and engineering. The first half deals with classical physical optics; the second, quantum nature of light. Solutions.

Introduction to Carbon Science deals with various aspects of carbon science, from polymer science and prosthetics to crystallography, carbonization, spectroscopy, and surface science. Topics covered include the mechanisms of formation of isotropic and anisotropic carbons, physical properties of pitch relevant to the fabrication of carbon materials; kinetics and catalysis of carbon gasification; and porosity in carbons and graphites. Carbon fibers, cokes and composites, and coal to coke transformations are also discussed. This book is comprised of nine chapters and begins with an overview of the basic structural features of carbon materials, along with definitions of the various carbon forms encountered in carbon science. The principal techniques for studying the structure of solid carbons are also considered. The reader is then introduced to the mechanisms underlying the formation of isotropic and anisotropic carbons; the physicochemical changes that take place when pitch is pyrolyzed to carbon; and kinetics and catalysis of carbon gasification reactions. The following chapters explore various types of porosity in carbons and graphites; manufacture, properties, structure, and applications of carbon fibers; and mechanical properties of cokes and composites. This text concludes by describing the conversion of coal to coke. This monograph will be of interest to carbon scientists, technologists, and engineers, as well as those entering the field of carbon science for the first time.

Drawing on the authors’ extensive experience in the processing and disposal of waste, An Introduction to Nuclear Waste Immobilisation, Second Edition examines the gamut of nuclear waste issues from the natural level of radionuclides in the environment to geological disposal of waste-forms and their long-term behavior. It covers all-important aspects of processing and immobilization, including nuclear decay, regulations, new technologies and methods. Significant focus is given to the analysis of the various matrices used, especially cement and glass, with further discussion of other matrices such as bitumen. The

final chapter concentrates on the performance assessment of immobilizing materials and safety of disposal, providing a full range of the resources needed to understand and correctly immobilize nuclear waste. The fully revised second edition focuses on core technologies and has an integrated approach to immobilization and hazards Each chapter focuses on a different matrix used in nuclear waste immobilization: cement, bitumen, glass and new materials Keeps the most important issues surrounding nuclear waste - such as treatment schemes and technologies and disposal - at the forefront

This book investigates the effect of sintering temperature on willemite based glass-ceramic doped with different content of Er2O3. It is the first to report research on producing willemite by using waste materials and using trivalent erbium (Er3+) as a dopant. This book provides a survey of the literature on glass and glass-ceramic, while comprehensive experiments and analysis have been performed on the material used.

Ceramic Materials: Science and Engineering is an up-to-date treatment of ceramic science, engineering, and applications in a single, comprehensive text. Building on a foundation of crystal structures, phase equilibria, defects, and the mechanical properties of ceramic materials, students are shown how these materials are processed for a wide diversity of applications in today's society. Concepts such as how and why ions move, how ceramics interact with light and magnetic fields, and how they respond to temperature changes are discussed in the context of their applications. References to the art and history of ceramics are included throughout the text, and a chapter is devoted to ceramics as gemstones. This course-tested text now includes expanded chapters on the role of ceramics in industry and their impact on the environment as well as a chapter devoted to applications of ceramic materials in clean energy technologies. Also new are expanded sets of text-specific homework problems and other resources for instructors. The revised and updated Second Edition is further enhanced with color illustrations throughout the text.

This book presents a broad, general introduction to the processing of Sol-Gel technologies. This updated volume serves as a general handbook for researchers and students entering the field. This new edition provides updates in fields that have undergone rapid developments, such as Ceramics, Catalysis, Chromatropgraphy, biomaterials, glass science, and optics. It provides a simple, compact resource that can also be used in graduate-level materials science courses.

Glass Nanocomposites: Synthesis, Properties and Applications provides the latest information on a rapidly growing field of specialized materials, bringing light to new research findings that include a growing number of technologies and applications. With this growth, a new need for deep understanding of the synthesis methods, composite structure, processing and application of glass nanocomposites has emerged. In the book, world renowned experts in the field, Professors Karmakar, Rademann, and Stepanov, fill the knowledge gap, building a bridge between the areas of nanoscience, photonics, and glass technology. The book covers the fundamentals, synthesis, processing, material properties, structure property correlation, interpretation thereof, characterization, and a wide range of applications of glass nanocomposites in many different devices and branches of technology. Recent developments and future directions of all types of glass nanocomposites, such as metal-glasses (e.g., metal nanowire composites, nanoglass-mesoporous silica composites), semiconductor-glass and ceramic-glass nanocomposites, as well as oxide and non-oxide glasses, are also covered in great depth. Each chapter is logically structured in order to increase coherence, with each including question sets as exercises for a deeper understanding of the text. Provides comprehensive and up-to-date knowledge and literature review for both the oxide and non-oxide glass nanocomposites (i.e., practically all types of glass nanocomposites) Reviews a wide range of synthesis types, properties, characterization, and applications of diverse types of glass nanocomposites Presents future directions of glass nanocomposites for researchers and engineers, as well as question sets for use in university courses

Materials Science in Construction explains the science behind the properties and behaviour of construction's most fundamental materials (metals, cement and concrete, polymers, timber, bricks and blocks, glass and plaster). In particular, the critical factors affecting in situ materials are examined, such as deterioration and the behaviour and durability of materials under performance. An accessible, easy-to-follow approach makes this book ideal for all diploma and undergraduate students on construction-related courses taking a module in construction materials.

This introductory text is ideal for undergraduates and graduates presenting the fundamental topics in glass science and technology.

An accessible and wide-ranging introduction to the exciting and expanding field of archaeological science, for students, professionals and academics.

This book is renowned for being the book to own to understand lighting! This is better than all the other how to books on the market which just provide set examples for photographers to follow. Light Science and Magic provides photographers with a comprehensive theory of the nature and principles of light to allow individual photographers to use lighting to express their own creativity. It will show you in-depth how to light the most difficult subjects such as surfaces, metal, glass, liquids, extremes (black-on-black and white-on-white), and people. With more information specific for degital photographers, a brand new chapter on equipment, much more information on location lighting, and more on photographing people, you'll see why this is one of the only recommended books by www.strobist.com.

An Introduction to Metallic Glasses and Amorphous Metals gives a background on the physics of materials, describing relevant experimental techniques. The book presents the necessary background in physics, thermodynamics, and the mechanics of solids, before moving on to cover elasticity, plasticity, fracture and the anelastic behavior of metallic glasses, relating these properties to chemical composition, atomic arrangement, microstructure, and methods of preparation. In addition, it compares the structure-property relationships specific to metallic glasses with polycrystalline metals and alloys and describes the properties and characteristics of metallic glasses. The general features and behavior of metallic glasses are also analyzed and summarized. The book includes full derivations of theory and equations and presents a compendium of experimental methods used in materials science to characterize and study metallic glasses and amorphous solids. The title is a comprehensive resource for any researcher interested in the materials science of metallic glasses and amorphous materials. Presents the fundamental materials science needed to understand amorphous metals, metallic glasses and alloys Details manufacturing techniques for metallic glasses Gives the mechanical properties of metallic glasses Illustrates concepts with detailed tables and graphs Contains a compendium of experimental methods for use with amorphous metals and metallic glasses

This book aims to describe in simple terms the new area of statistical mechanics known as spin-glasses, encompassing systems in which quenched disorder is the dominant factor. The book begins with a non-mathematical explanation of the problem, and the modern understanding of the physics of the spin-glass state is formulated in general terms. Next, the 'magic' of the replica symmetry breaking scheme is demonstrated and the physics behind it discussed. Recent experiments on real spin-glass materials are briefly described to demonstrate how this somewhat abstract physics can be studied in the laboratory. The final chapters of the book are devoted to statistical models of neural networks. The material here is self-contained and should be accessible to students with a basic knowledge of theoretical physics and statistical mechanics. It has been used for a one-term graduate lecture course at the Landau Institute for Theoretical Physics. Contents:The Ising Magnetic SystemsPhysics of the Spin Glass StateReplica MethodReplica Symmetry BreakingPhysics of Replica Symmetry BreakingReplica Symmetry Breaking Solution Near TcUltrametricityScaling in the Space of Spin Glass StatesExperimentsPartial AnnealingStatistical Models of Neural NetworksThe Hopfield ModelPartial Annealing in Neural NetworksOther Kinds of Neural NetworksAppendix: Stability of the Replica-Symmetric Solutions Readership: Researchers and graduate students in statistical mechanics and neural networks. keywords: “The book by Viktor Dotsenko in large parts presents the most important results of this research based on the replica method. Although these results have been presented systematically already elsewhere (for instance in the well-known book by Amit) their concise presentation makes the book self-contained and a

good introduction to the theoretical tools." Mathematics Abstracts

Explorations of the many ways of being material in the digital age. In his oracular 1995 book Being Digital, Nicholas Negroponte predicted that social relations, media, and commerce would move from the realm of "atoms to bits"—that human affairs would be increasingly untethered from the material world. And yet in 2019, an age dominated by the digital, we have not quite left the material world behind. In Being Material, artists and technologists explore the relationship of the digital to the material, demonstrating that processes that seem wholly immaterial function within material constraints. Digital technologies themselves, they remind us, are material things—constituted by atoms of gold, silver, silicon, copper, tin, tungsten, and more. The contributors explore five modes of being material: programmable, wearable, livable, invisible, and audible. Their contributions take the form of reports, manifestos, philosophical essays, and artist portfolios, among other configurations. The book's cover merges the possibilities of paper with those of the digital, featuring a bookmark-like card that, when "seen" by a smartphone, generates graphic arrangements that unlock films, music, and other dynamic content on the book's website. At once artist's book, digitally activated object, and collection of scholarship, this book both demonstrates and chronicles the many ways of being material. Contributors Christina Agapakis, Azra Akšamija, Sandy Alexandre, Dewa Alit, George Barbastathis, Maya Beiser, Marie-Pier Boucher, Benjamin H. Bratton, Hussein Chalayan, Jim Cybulski, Tal Danino, Deborah G. Douglas, Arnold Dreyblatt, M. Amah Edoh, Michelle Tolini Finamore, Team Foldscope and Global Foldscope community, Ben Fry, Victor Gama, Stefan Helmreich, Hyphen-Labs, Leila Kinney, Rebecca Konte, Winona LaDuke, Brendan Landis, Grace Leslie, Bill Maurer, Lucy McRae, Tom Özden-Schilling, Trevor Paglen, Lisa Parks, Nadya Peek, Claire Pentecost, Manu Prakash,Casey Reas, Pawe? Roma?czuk, Natasha D. Schüll, Nick Shapiro, Skylar Tibbits, Rebecca Uchill, Evan Ziporyn Book Design: E Roon Kang Electronics, interactions, and product designer: Marcelo Coelho

Emphasising essential methods and universal principles, this textbook provides everything students need to understand the basics of simulating materials behaviour. All the key topics are covered from electronic structure methods to microstructural evolution, appendices provide crucial background material, and a wealth of practical resources are available online to complete the teaching package. Modelling is examined at a broad range of scales, from the atomic to the mesoscale, providing students with a solid foundation for future study and research. Detailed, accessible explanations of the fundamental equations underpinning materials modelling are presented, including a full chapter summarising essential mathematical background. Extensive appendices, including essential background on classical and quantum mechanics, electrostatics, statistical thermodynamics and linear elasticity, provide the background necessary to fully engage with the fundamentals of computational modelling. Exercises, worked examples, computer codes and discussions of practical implementations methods are all provided online giving students the hands-on experience they need.

In this book, some recent advances in glass science and technology are collected. In the first part, the structure and crystallization of innovative glass compositions are analysed. In the second part, innovative applications are described from the use of glass in optical devices and lasers to fibres in composites, micropatterned components in sensors and microdevices, beads in building walls and sealing in solid oxide fuel cells.

Glass technologists are fascinated by glass; explora tion as well as application of glass is expanding and the influx of documentation is bewildering. There were about 200 papers on just semi conduction in glasses in 1970 and one has to scan about 200 papers a month to sense the pulse of glass science. Yet there are many in industry and education in science or engineering who require or wish to have coher ent, comprehensive and contemporary information on this exciting material "glass. " The Tutorial Symposium offered as an Introduction to Glass Science in Alfred represents an earnest attempt to ful fill this need. It has been designed to provide both broad and technical instruction for participants and readers who are not specialists. Glass is not only a material but a condition of matter: the vitreous state. The topic, there fore, is introduced by a careful consideration of the nature of glass, or the vitreous state. The universality of the vitreous state is now generally recognized: not just a few, but very many structures can be obtained without appreciable crystallization. There is no restricted family of struc tures characteristic of glass formation: as long as crys tallization is avoided, every liquid will solidify to a non crystalline sUbstance. Structural analysis in each case is now to be postulated and has become increasingly successful. The Alfred "Introduction to Glass Science" offers a repre sentative overview of methods and results.

This new work is dedicated to glasses and their variants whichcan be used as biomaterials to repair diseased and damaged tissues.Bio-glasses are superior to other biomaterials in manyapplications, such as healing bone by signaling stem cells tobecome bone cells. Key features: First book on biomaterials to focus on bio-glasses Edited by a leading authority on bio-glasses trained by one ofits inventors, Dr Larry Hench Supported by the International Commission on Glass (ICG) Authored by members of the ICG Biomedical Glass Committee, withthe goal of creating a seamless textbook Written in an accessible style to facilitate rapid absorptionof information Covers all types of glasses, their properties and applications,and demonstrates how glass is an attractive improvement to currentprocedures Of interest to the biomedical as well as the materials sciencecommunity. The book covers all types of glasses: traditional glasses,bioactive glasses, sol-gel glasses, phosphate glasses,glass-ceramics, composites and hybrids. Alongside discussion on howbio-glasses are made, their properties, and the reasons for theiruse, the authors also cover their applications in dentistry, boneregeneration and tissue engineering and cancer treatment. Its solidguidance describes the steps needed to take a new material fromconcept to clinic, covering the essentials of patenting, scale-up,quality assurance and FDA approval.

When you look at fine connections, it's hard to say exactly what relation "Alice in Wonderland" has to this book, "Through the Looking-Glass," Oh, it's plainly the same girl, though she seems older, here, and some characters (like Tweedledum and Tweedledee) appear in both. But she doesn't get there the same way, and doesn't refer to her adventures in Wonderland so much as once. Oh well: maybe it's all a dream and she can't remember the last one -- or maybe the magic through the Looking-Glass has hold of her, just as it has hold of Humpty Dumpty, or the Walrus and the Carpenter.

This book provides a concise and inexpensive introduction for an undergraduate course in glass science and technology. The level of the book has deliberately been maintained at the introductory level to avoid confusion of the student by inclusion of more advanced material, and is unique in that its text is limited to the amount suitable for a one term course for students in materials science, ceramics or inorganic chemistry. The contents cover the fundamental topics of importance in glass science and technology, including glass formation, crystallization, phase separation and structure of glasses. Additional chapters discuss the most important properties of glasses, including discussion of physical, optical, electrical, chemical and mechanical properties. A final chapter provides an introduction to a number of methods used to form technical glasses, including glass sheet, bottles, insulation fibre, optical fibres and other common commercial products. In addition, the book contains discussion of the effects of phase separation and crystallization on the properties of glasses, which is neglected in other texts. Although intended primarily as a textbook, Introduction to Glass Science and Technology will also be invaluable to the engineer or scientist who desires more knowledge regarding the formation, properties and production of glass.

Using findings from the latest information in developmental psychology, neuroscience and education, this book debunks the assumed differences between male and female brain function and reveals the brain's remarkable plasticity and the influence of culture on identity. Reprint.

Nano-Glass Ceramics: Processing, Properties and Applications provides comprehensive coverage of synthesis and processing methods, properties and applications of the most important types of nano-glass ceramics, from a unique material science perspective. Emphasis is placed on the experimental and practical aspects of the subject while covering the theoretical and practical aspects and presenting, numerous examples and details of experimental methods. In the discussing the many varied applications of nano-glass ceramics, consideration is given to both, the fields of applications in which the materials are firmly established and the fields where great promise exists for their future exploitation. The methods of investigation adopted by researchers in the various stages of synthesis, nucleation, processing and characterization of glass ceramics are discussed with a focus on the more novel methods and the state of the art in developing nanostructured glass ceramics. Comprehensive coverage of nanostructured glass ceramics with a materials science approach. The first book of this kind Applications-oriented approach, covering current and future applications in numerous fields such as Biomedicine and Electronics Explains the correlations between synthesis parameters, properties and applications guiding R&D researchers and engineers to choose the right material and increase cost-effectiveness

This unique book provides the optics designer and user with the latest advances on materials used as optical elements in systems and devices—in one convenient volume. Presenting fundamental performance requirements, basic characteristics, principles of fabrication, possibilities for new or modified optical materials, and key characterization data, this outstanding source facilitates optical materials selection and application. Comprehensive and thorough, this reference offers a broad review of old and new optical materials such as glasses, crystalline materials, plastics, and coatings... contains specific optical and characterization information useful for preliminary calculations ... and explains processes used to manufacture optical materials, giving insight into possible modifications of materials caused by process variations. Plus, this practical text includes a glossary of terms for a basic understanding, numerous illustrations for a clear perspective, and references for easy access to related material. This single-source volume is ideal for optical system/device designers and developers; design and development engineers; materials engineers; physical measurements engineers; test engineers, optics designers, and optics engineers; professional seminars; and undergraduate- and graduate-level students in optical and materials sciences courses.

Introduction to Glass Science and TechnologyRoyal Society of Chemistry

This book contains a detailed and self-contained presentation of the replica theory of infinite range spin glasses. The authors also explain recent theoretical developments, paying particular attention to new applications in the study of optimization theory and neural networks. About two-thirds of the book are a collection of the most interesting and pedagogical articles on the subject.

Describes and interrelates the following processes: cooperative alpha processes in a cold liquid, structural relaxation in the glass near Tg, the Johari-Goldstein beta process, the Williams-Götze process in a warm liquid, fast nonactivated cage rattling and boson peak, and ultraslow Fischer modes.

Discusses the Structure and Properties of Materials and How These Materials Are Used in Diverse Applications Building on undergraduate students’ backgrounds in mathematics, science, and engineering, Introduction to the Physics and Chemistry of Materials provides the foundation needed for more advanced work in materials science. Ideal for a two-semester course, the text focuses on chemical bonding, crystal structure, mechanical properties, phase transformations, and materials processing for the first semester. The material for the second semester covers thermal, electronic, photonic, optical, and magnetic properties of materials. Requiring no prior experience in modern physics and quantum mechanics, the book introduces quantum concepts and wave mechanics through a simple derivation of the Schrödinger equation, the electron-in-a-box problem, and the wave functions of the hydrogen atom. The author also presents a historical perspective on the development of the materials science field. He discusses the Bose–Einstein, Maxwell–Boltzmann, Planck, and Fermi–Dirac distribution functions, before moving on to the various properties and applications of materials. With detailed derivations of important equations, this applications-oriented text examines the structure and properties of materials, such as heavy metal glasses and superconductors. It also explores recent developments in organics electronics, polymer light-emitting diodes, superconductivity, and more.

Copyright: a61b2dbc1c096cde375c07ff466c95ea