Principles of Ceramics Processing - James S. Reed

Introduction to the Principles of Ceramic Processing - James S. Reed

Ceramic Processing - Mohamed N. Rahaman

Ceramic and Glass Materials - James F. Shackelford

Ceramic Materials - C. Barry Carter

Physical Ceramics - Yet-Ming Chiang

Handbook of Ceramics Grinding and Polishing - Toshibo Doi

principles-of-ceramics-processing-2nd-edition
leading to improved quality control, lower failure rates, and cost savings. Covers the fundamentals of ceramics side-by-side with processing issues and machinery selection, making this book an invaluable guide for downstream sectors evaluating the use of ceramics, as well as those involved in the manufacturing of structural ceramics. Numerous case studies from a wide range of applications (automotive, aerospace, electronics, medical devices).

Ceramics and Composites Processing Methods - Narottam P. Bansal (2012-03-28) Examines the latest processing and fabrication methods. There is increasing interest in the application of advanced ceramic materials in diverse areas such as transportation, energy, environmental protection and remediation, communications, health, and aerospace. This book guides readers through a broad selection of key processing techniques for ceramics and their composites, enabling them to manufacture ceramic products and components with the properties needed for various industrial applications. With chapters contributed by internationally recognized experts in the field of ceramics, the book includes traditional fabrication routes as well as new and emerging approaches in order to meet the increasing demand for more reliable ceramic materials. Ceramics and Composites Processing Methods is divided into three sections: Densification, covering the fundamentals and practice of sintering, pulsed electric current sintering, and viscous phase sintering; Processing Chemical Methods, examining colloidal methods, sol-gel, gel casting, polymer processing, chemical vapor deposition, chemical vapor infiltration, reaction injection, and combustion synthesis; and Physical Methods, including directional solidification, solid-free-form fabrication, microwave processing, electrochemical deposition, and plasma spraying. Each chapter focuses on a particular processing method or approach. Collectively, these chapters offer readers comprehensive, state-of-the-art information on the many approaches, techniques, and methods for the processing and fabrication of advanced ceramics and ceramic composites. With its coverage of the latest processing methods, Ceramics and Composites Processing Methods is recommended for researchers and students in ceramics, materials science, structural materials, biomedical engineering, and nanotechnology.

Glass Ceramic Technology - Wolfram Holand (2012-06-08) Glass-ceramic materials share many properties with both glass and more traditional crystalline ceramics. This new edition examines the various types of glass-ceramic materials, the methods of their development, and their countless applications. With expanded sections on biomaterials and highly bioactive products (i.e., Bioglass and related glass ceramics), as well as the newest mechanisms for the development of dental ceramics and theories on the development of nano-sized glass-ceramics, there is a must-have guide for ceramic and materials engineers, managers, and designers in the ceramic and glass industry.

Principles of Polymer Engineering - N. G. McCrum (1997) The second edition of Principles of Polymer Engineering brings up-to-date coverage for undergraduates studying materials and polymer science. The opening chapters show why plastics and rubbers have such distinctive properties and how they are affected by temperature, strain rate, and other factors. The rest of the book concentrates on how these properties can be exploited to produce functional components within the constraints placed on them. The main changes for the second edition are a new chapter on environmental issues and substantially rewritten sections on yield and fracture and forming. To request a copy of the Solutions Manual, visit http://global.oup.com/uk/academic/physics/admin/solutions.

Ceramic Materials - C. Barry Carter (2007-10-23) Ceramic Materials: Science and Engineering is an up-to-date treatment of ceramic science, engineering, and applications in a single, integrated 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 and applied to produce functional components within the constraints placed on them. The main changes for the second edition are a new chapter on environmental issues and substantially rewritten sections on yield and fracture and forming. To request a copy of the Solutions Manual, visit http://global.oup.com/uk/academic/physics/admin/solutions.

An Introduction to Materials Engineering and Science for Chemical and Materials Engineers - Brian S. Mitchell (2004-01-30) An Introduction to Materials Engineering and Science for Chemical and Materials Engineers provides a solid background in materials engineering and science for chemical and materials engineering students. This book organizes topics on two levels: by engineering subject area and by materials classes. It incorporates instructional objectives, active-learning principles, design-oriented problems, and web-based information and visualizations to provide a unique and educational experience for the student. Provides a foundation for understanding the structure and properties of materials such as ceramics, glasses, polymers, composites, bio-materials, as well as metals and alloys. Takes an integrated approach to the subject, rather than a "metal first" approach.

Ceramic Processing - Debashis Sarkar (2019-06-20) This book gives a comprehensive account on the processing techniques to synthesize the desired properties of both traditional and advanced ceramics. Offers exclusive and up-to-date information on industrial ceramic processing equipment and approaches and discusses actual industrial practices taking a product-oriented approach. It should serve as a text to answer the processing of ceramics and achieve targeted products in industrial environments.

Introduction to Glass Science and Technology - James E. Shelby (2015-11-06) 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 kept similar to the previous edition of the book, and due to space constraints, the text has been unable to cover all the topics in detail. The book avoids 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 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 information on 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.

Extrusion in Ceramics - Frank Händle (2009-08-12) Frank Händle's 1.1 What to Expect. For some time now, I have been toyng around with the idea of writing a book about "Ceramic Extrusion", because to my amazement I have been unable to locate a single existing, comprehensive rundown on the subject - much in contrast to, say, plastic extrusion and despite the fact that there are some outstanding contributions to be found among individual topics, such as those in textbooks by Reed [1], Krause [2], Bender/Handle [3] et al. By way of analogy to Woody Allen's wonderfully ironic movie entitled "Eve- thing You Always Wanted to Know about Sex", I originally intended to call this book "Everything You Always Wanted to Know about Ceramic Extrusion", but - for giving it some extra thought, I eventually decided on a somewhat soberer title. Nevertheless, my companion writers and I have done our best - considering our target group and their motives - not to revert to the kind of jargon that people use when they think the less understandable it sounds, the more scientific it appears. This book addresses all those who are looking for a lot or a little general or specific information about ceramic extrusion and its sundry aspects. We realize that most of our readers will not be perusing this book just for fun or out of intellectual curiosity, but because they hope to get some use out of it for their own endeavours.

Handbook of Advanced Ceramics - Shigeyuki Somiya (2003-09-17) A two-volume reference set for all ceramicists, both in research and working in industry. The only definitive reference covering the entire field of advanced ceramics from fundamental science and processing to application. Contributions from over 50 leading researchers from around the world. This new handbook will be an essential resource for ceramicists. It includes contributions from leading researchers around the world, and includes sections on: Basic Science of Advanced Ceramic, Functional Ceramics (electro-ceramics and optoelectro-ceramics) and engineering ceramics. Contributions from over 50 leading researchers from around the world.

Authors with experience in both research and industry...
Electrophoretic Deposition of Nanomaterials—James H. Dickerson 2011-09-18 This book provides a comprehensive overview of contemporary basic research, emerging technology, and commercial and industrial applications associated with the electrophoretic deposition of nanomaterials. This presentation of the subject includes an historical survey, the underlying theory of electrophoresis, dielectrophoresis, and the colloidal deposition of materials. This is followed by an assessment of the experimental equipment and procedures for electrophoretic and dielectrophoretic aggregation, manipulation, and deposition of nanoparticles, nanotubes, and other nanomaterials. Additional chapters explore the specific science and technology of electrophoretic film formation, using widely studied and application-driven nanomaterials, such as carbon nanotubes, luminous nanoparticles, and nano-ceramics. The concluding chapters explore industrial applications and procedures associated with electrophoretic deposition of nanomaterials.

Modern Ceramic Engineering—David W. Richerson 2018-04-27 Since the publication of its Third Edition, there have been many notable advances in ceramic engineering. Modern Ceramic Engineering, Fourth Edition serves as an authoritative text and reference for both professionals and students seeking to understand key concepts of ceramics engineering by introducing the interrelationships among the structure, properties, processing, design concepts, and applications of advanced ceramics. Written in the same clear manner that made the previous editions so accessible, this latest edition has been expanded to include new information in almost every chapter, as well as two new chapters that present a variety of relevant case studies. The new edition now includes updated content on nanotechnology, the use of ceramics in integrated circuits, flash drives, and digital cameras, and the role of miniaturization that has made our modern digital devices possible, as well as information on electrochemical ceramics, updated discussions on LEDs, lasers and optical applications, and the role of ceramics in energy and pollution control technologies. It also highlights the increasing importance of modeling and simulation.

Ceramic Processing—R.A. Terpstra 2012-12-06 Ceramic Processing is the first comprehensive, stand alone, multi-authored book on advanced ceramic processing. It provides an overview of the important processing steps involved in the fabrication of advanced ceramics for structural and functional applications.

DeGarmo’s Materials and Processes in Manufacturing—Degarmo 2011-08-30 Now in its eleventh edition, DeGarmo’s Materials and Processes in Manufacturing has been a market-leading text on manufacturing and manufacturing processes courses for more than fifty years. Authors J. T. Black and Ron Kohser have continued this book’s long and distinguished tradition of exceedingly clear presentation and highly practical approach to materials and processes, presenting mathematical models and analytical equations only when they enhance the basic understanding of the material. Completely revised and updated to reflect all current practices, standards, and materials, the eleventh edition has new coverage of additive manufacturing, lean engineering, and processes related to ceramics, polymers, and plastics.

Handbook of Advanced Ceramics—David McKinney 2013-04-11

Ceramics Science and Technology, Synthesis and Processing—Ralf Riedel 2011-12-12 Although ceramics have been known to mankind literally for millennia, research has never ceased. Apart from the classic uses as a hull material in pottery, construction, and decoration, the latter half of the twentieth century saw an explosive growth of application fields, such as electrical and thermal insulators, wear-resistant bearings, surface coatings, lightweight armour, or aerospace materials. In addition to plain, hard solids, modern ceramics come in many new guises such as fabrics, ultrathin films, microstructures and hybrid composites. Built on the solid foundations laid down by the 20-volume series Materials Science and Technology, this 12-volume handbook presents the fundamentals of how electroceramics function are carefully introduced with their properties and applications also considered. Starting from elementary principles, the physical, chemical and mathematical background of the subject are discussed and wherever appropriate, a strong emphasis is placed on the relationship between microstructure and properties. The Second Edition has been fully revised and updated, building on the foundation of the earlier book to provide a concise text for all those working in the growing field of electroceramics. fully revised and updated to include the latest technological changes and developments in the field includes end of chapter problems and an extensive bibliography an Invaluable text for all Materials Science students, a useful reference for physicists, chemists and engineers involved in the area of electroceramics.

Improved Ceramics through New Measurements, Processing, and Standards—Minoru Matsu 2012-03-28 This new book presents new ceramic information in two parts. The first section presents state-of-the-art information on new measurement methods and characterization methods in the ceramic-manufacturing process including characterization of mechanical properties, microstructure, and machining techniques, as well as the status on the activity of standards in ceramics. The second part is a selection of peer reviewed research papers in this field. This volume will prove indispensable for academic, as well as industry researchers and for anyone seeking broader knowledge on the quality improvements through new measurements and processing technology.

Additive Manufacturing of High-performance Metals and Alloys—Igor Shishakov 2018-07-11 Freedoms in material choice based on combinatorial design, different directions of process optimization, and computational tools are a significant advantage of additive manufacturing technology. The combination of additive and information technologies enables rapid prototyping and rapid manufacturing models on the design stage, thereby significantly accelerating the design cycle in mechanical engineering. Modern and high-demand powder bed fusion and directed energy deposition methods allow obtaining functional complex shapes and functionally graded structures. Until now, the experimental parametric analysis remains as the main method during AM optimization. Therefore, an additional goal of this book is to introduce readers to new modeling and material’s optimization approaches in the rapidly changing world of additive manufacturing of high-performance metals and alloys.

Electroceramics—A. J. Mousson 2003-09-12 Electroceramics, Materials, Properties, Applications, Second Edition provides a comprehensive treatment of the many aspects of ceramics and their electrical applications. The fundamentals of how electroceramics function are carefully introduced with their properties and applications also considered. Starting from elementary principles, the physical, chemical and mathematical background of the subject are discussed and wherever appropriate, a strong emphasis is placed on the relationship between microstructure and properties. The Second Edition has been fully revised and updated, building on the foundation of the earlier book to provide a concise text for all those working in the growing field of electroceramics. fully revised and updated to include the latest technological changes and developments in the field includes end of chapter problems and an extensive bibliography an Invaluable text for all Materials Science students, a useful reference for physicists, chemists and engineers involved in the area of electroceramics.

Handbook of Chemical Vapor Deposition—Hugh O. Pierson 2012-12-02 Handbook of Chemical Vapor Deposition: Principles, Technology and Applications provides information pertinent to the fundamental aspects of chemical vapor deposition. This book discusses the applications of chemical vapor deposition, which is a relatively flexible technology that can accommodate many variations. Organized into 12 chapters, this book begins with an overview of the theoretical examination of the chemical vapor deposition process. This text then describes the major chemical reactions and reviews the chemical vapor deposition systems and equipment used in research and production. Other chapters consider the materials deposited by chemical vapor deposition. This book discusses as well the potential applications of chemical vapor deposition in semiconductors and electronics. The final chapter deals with thin implantation as a major process in the fabrication of semiconductors. This book is a valuable resource for scientists, engineers, and students. Production and marketing managers and suppliers of equipment, materials, and services will also find this book useful.

Additive Manufacturing of High-performance Metals and Alloys—Igor Shishakov 2018-07-11 Freedoms in material choice based on combinatorial design, different directions of process optimization, and computational tools are a significant advantage of additive manufacturing technology. The combination of additive and information technologies enables rapid prototyping and rapid manufacturing models on the design stage, thereby significantly accelerating the design cycle in mechanical engineering. Modern and high-demand powder bed fusion and directed energy deposition methods allow obtaining functional complex shapes and functionally graded structures. Until now, the experimental parametric analysis remains as the main method during AM optimization. Therefore, an additional goal of this book is to introduce readers to new modeling and material’s optimization approaches in the rapidly changing world of additive manufacturing of high-performance metals and alloys.

Electroceramics—A. J. Mousson 2003-09-12 Electroceramics, Materials, Properties, Applications, Second Edition provides a comprehensive treatment of the many aspects of ceramics and their electrical applications. The fundamentals of how electroceramics function are carefully introduced with their properties and applications also considered. Starting from elementary principles, the physical, chemical and mathematical background of the subject are discussed and wherever appropriate, a strong emphasis is placed on the relationship between microstructure and properties. The Second Edition has been fully revised and updated, building on the foundation of the earlier book to provide a concise text for all those working in the growing field of electroceramics. fully revised and updated to include the latest technological changes and developments in the field includes end of chapter problems and an extensive bibliography an Invaluable text for all Materials Science students, a useful reference for physicists, chemists and engineers involved in the area of electroceramics.

Improved Ceramics through New Measurements, Processing, and Standards—Minoru Matsu 2012-03-28 This new book presents new ceramic information in two parts. The first section presents state-of-the-art information on new measurement methods and characterization methods in the ceramic-manufacturing process including characterization of mechanical properties, microstructure, and machining techniques, as well as the status on the activity of standards in ceramics. The second part is a selection of peer reviewed research papers in this field. This volume will prove indispensable for academic, as well as industry researchers and for anyone seeking broader knowledge on the quality improvements through new measurements and processing technology.

Innovative Processsing and Synthesis of Ceramics, Glasses, and
Comprehensive Membrane Science and Engineering-Enrico Drioli 2010-07-09 This multivolume work covers all aspects of membrane science and technology - from basic phenomena to advanced applications and future perspectives. Modern membrane engineering is critical to the development of process-intensification strategies and to the stimulation of industrial growth. The work presents researchers and industrial managers with an indispensable tool toward achieving these aims. Covers membrane science theory and economics, as well as applications ranging from chemical purification and natural gas enrichment to potable water. Includes contributions and case studies from internationally recognized experts and from up-and-coming researchers working in this multi-billion dollar field. Takes a unique, multidisciplinary approach that stimulates research in hybrid technologies for current (and future) life-saving applications (artificial organs, drug delivery)

An Introduction to Ceramics and Refractories-A. O. Surendranathan 2014-12-10 All Refractories Are Ceramics but Not All Ceramics Are Refractories Ceramics and refractories cover a wide range of fields and applications, and their relevance can be traced as far back as 24,000 BC to the first man-made piece of earthenware, and as recently as the late 1900s when ceramics and ceramic matrix composites were developed to withstand ultra-high temperatures. Beginning with a detailed history of ceramics, An Introduction to Ceramics and Refractories examines every aspect of ceramics and refractories, and explores the connection between them. The book establishes ceramics as a class of materials with high functional points, introduces the fundamentals of refractories and ceramics, and also addresses several applications for each. Understand Ceramic Properties and Refractory Behavior The book details applications for natural and synthetic ceramics, as well as traditional and engineering applications. It focuses on the various thermal and thermo-mechanical properties of ceramics, classifies refractories, describes the principles of thermal management applied to refractories, and highlights new developments and applications in the ceramic and refractory fields. It also presents end-of-chapter problems and a relevant case study. Divided into three sections, this text: Introduces and details the applications of ceramics and refractories Discusses the selection of materials and the two stages in selection Describes the phase equilibria in ceramic and refractory systems Outlines the three important systems: unary, binary, and ternary Considers corrosion of ceramics and refractories, failures in ceramics and refractories, and the design aspects Addresses bonding, structures of ceramics, defects in ceramics, and ceramics’ microstructures Covers the production of ceramic powders starting from the raw materials Explains four forming methods Highlights three types of thermal treatments Defines mechanical properties, and thermal and thermo-mechanical properties Classifies materials and designates classes Addressing topics that include corrosion, applications, thermal properties, and types of refractories, An Introduction to Ceramics and Refractories provides you with a basic knowledge of the fundamentals of refractories and ceramics, and presents a clear connection between refractory behavior and ceramic properties to the practicing engineer.

Nanocrystalline Ceramics-Debashis Sarkar 2018-09-03 This book discusses fundamentals of nanocrystalline ceramics involving functional, structural and high-temperature materials, provides both solved numerical problems and unsolved problems to enable the reader to envisage the correlation between synthesis process and properties in the perspective of new material development. It serves as a concise text to answer the basics and achieve research goals for academia and industry. Key Features Deals with basic strategy on data interpretation for nanocrystalline ceramics Proposes to bridge the gap between the nano and bulk properties of nanostructured ceramics Discusses brief schematics and equations to understand the different properties of nano to bulk ceramics Presents modes of data acquisition and interpretation through statistical module and solved numerical Includes unsolved numerical based on properties, data acquisition and interpretation

Fundamental Biomaterials: Ceramics-Sahu Thomas 2018-02-16 Fundamental Biomaterials: Ceramics provides current information on ceramics and their conversion from base materials to medical devices. Initial chapters review biomaterial applications and types of ceramics, with subsequent sections focusing on the properties of ceramics, and on corrosion, degradation and wear of ceramic biomaterials. The book is ideal for researchers and professionals in the development stages of design, but is also helpful to medical researchers who need to understand and communicate the requirements of a biomaterial for a specific application. This title is the second in a three volume set, with each reviewing the most important and commonly used classes of biomaterials and providing comprehensive information on material properties, behavior in biocompatible environments. In addition, with the recent introduction of a number of interdisciplinary bio-related undergraduate and graduate programs, this book will be an appropriate reference volume for large number of students at undergraduate and post graduate levels. Provides current information on findings and developments of ceramics and their conversion from base materials to medical devices. Includes analyses of the types of ceramics and a discussion of a range of biomedical applications and essential properties, including information on corrosion, degradation and wear, and lifetime prediction of ceramic biomaterials. Explores both the theoretical and practical aspects of ceramics in biomaterials

Callister’s Materials Science and Engineering-William D. Callister, Jr. 2020-02-05 Callister’s Materials Science and Engineering: An Introduction promotes student understanding of the three primary types of materials (metals, ceramics, and polymers) and composites, as well as the relationships that exist between the structural elements of materials and their properties. The 10th edition provides new or updated coverage on a number of topics, including: the Materials Paradigm and Materials Selection Charts, 3D printing and additive manufacturing, biomaterials, recycling issues and the Hall effect.

Lightweight Materials-Flake C. Campbell 2012

Ceramic Materials-Philippe Boch 2010-01-05

Introduction to the Principles of Ceramic Processing-James Stalford Reed 1989

Fundamentals of Ceramics-Michel Barsoum 2019-12-12 Fundamentals of Ceramics presents readers with an exceptionally clear and comprehensive introduction to ceramic science. This Second Edition updates problems and adds more worked examples, as well as adding new chapter sections on Computational Materials Science and Case Studies. The Computational Materials Science sections describe how today density functional theory and molecular dynamics calculations can shed valuable light on properties, especially ones that are not easy to measure or visualize otherwise such as surface energies, elastic constants, point defect energies, phonon modes, etc. The Case Studies sections focus more on applications, such as solid oxide fuel cells, optical fibers, alumina forming materials, ultra-strong and thin glasses, glass-ceramics, strong and tough ceramics, fiber-reinforced ceramic matrix composites, thermal barrier coatings, the space shuttle tiles, electrochemical impedance spectroscopy, two-dimensional solids, field-assisted and microwave sintering, colossal magnetoresistance, among others.

Ultra-High Temperature Ceramics-William G. Fahrenholtz 2014-10-10 The very first comprehensive book to focus on ultra-high-temperature ceramic materials in more than 20 years Ultra-High Temperature Ceramics are a family of compounds that display an unusual combination of properties, including extremely high melting temperatures (>3000°C), high hardness, and good chemical stability and strength at high temperatures. Typical UHTC materials are the carbides, nitrides, and borides of transition metals, but the Group IV compounds (Ti, Zr, Hf) plus TaC are generally considered to be the main focus of research due to their superior melting temperatures and stable high-melting temperature oxide that forms in situ. Rather than focusing on the latest scientific results, Ultra-High Temperature Ceramics:Materials for Extreme Environment Applications broadly and technically combines the historical and state-of-the-art on the processing, densification, properties, and performance of oxide and carbide ceramics. In reviewing the historic studies and recent progress in the field, Ultra-High Temperature Ceramics:Materials for Extreme Environment Applications provides: Original reviews of research conducted in the 1960s and 70s Content on electronic structure, synthesis, powder processing, and...
densification, property measurement, and characterization of boride and carbide ceramics. Emphasis on materials for hypersonic aerospace applications such as wing leading edges and propulsion components for vehicles traveling faster than Mach 5. Information on materials used in extreme environments associated with high-speed cutting tools and nuclear power generation. Contributions are based on presentations by leading research groups at the conference “Ultra-High Temperature Ceramics: Materials for Extreme Environment Applications II” held May 13-19, 2012 in Hernstein, Austria. Bringing together disparate researchers from academia, government, and industry in a singular forum, the meeting cultivated didactic discussions and efforts between bench researchers, designers, and engineers in assaying results in a broader context and moving the technology forward toward near- and long-term use. This book is useful for furnace manufacturers, aerospace manufacturers that may be pursuing hypersonic technology, researchers studying any aspect of boride and carbide ceramics, and practitioners of high-temperature structural ceramics.