

# Handbook Of Refractory Carbides Nitrides Properties Characteristics Processing And Apps Materials Science And Process Technology

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**Titanium Alloys 2017** - Mark  
T. Whittaker 2018-10-18  
This book is a printed edition of

the Special Issue "Titanium  
Alloys 2017" that was  
published in Metals

*Production, Properties, and Applications of High Temperature Coatings*

Pakseresht, Amir Hossein

2018-01-12

Heat resistant layers are meant to withstand high temperatures while also protecting against all types of corrosion and oxidation. Therefore, the microstructure and behavior of such layers is essential in understanding the functionality of these materials in order to make improvements.

*Production, Properties, and Applications of High Temperature Coatings* is a critical academic publication which examines the methods of creation, characteristics, and behavior of materials used in heat resistant layers. Featuring coverage on a wide range of topics such as, thermal spray methods, sol-gel coatings, and surface nanoengineering, this book is geared toward students, academicians, engineers, and researchers seeking relevant research on the methodology and materials for producing effective heat resistant layers.

*Laser Surface Engineering*

Jonathan R. Lawrence

2014-10-02

Lasers can alter the surface composition and properties of materials in a highly controllable way, which makes them efficient and cost-effective tools for surface engineering. This book provides an overview of the different techniques, the laser-material interactions and the advantages and disadvantages for different applications. Part one looks at laser heat treatment, part two covers laser additive manufacturing such as laser-enhanced electroplating, and part three discusses laser micromachining, structuring and surface modification. Chemical and biological applications of laser surface engineering are explored in part four, including ways to improve the surface corrosion properties of metals. Provides an overview of thermal surface treatments using lasers, including the treatment of steels, light metal alloys, polycrystalline silicon and

technical ceramics Addresses the development of new metallic materials, innovations in laser cladding and direct metal deposition, and the fabrication of tuneable micro- and nano-scale surface structures Chapters also cover laser structuring, surface modification, and the chemical and biological applications of laser surface engineering

### **Chemical Vapour Deposition**

- Anthony C. Jones 2009

"The book is one of the most comprehensive overviews ever written on the key aspects of chemical vapour deposition processes and it is more comprehensive, technically detailed and up-to-date than other books on CVD. The contributing authors are all practising CVD technologists and are leading international experts in the field of CVD. It presents a logical and progressive overview of the various aspects of CVD processes. Basic concepts, such as the various types of CVD processes, the design of CVD reactors, reaction modelling and CVD precursor

chemistry are covered in the first few"--BOOK JACKET.

**Superconductors** - Inamuddin 2022-11-05

The book presents the current status of superconductor science and technology. It focuses on the design, properties and applications of superconductor materials. The superconductor categories covered include type-I, type-II, bulk, hard, soft, oxide, fermions, organic, iron, Lanthanide-based superconductors, high temperature superconductors and superconducting metamaterials. Keywords: Superconductors, Large-Scale Applications, Bulk Superconductors, Soft Superconductors, Oxide Superconductors, Lanthanide-based Superconductors, High Temperature Superconductors, Superconducting Metamaterials, Medical Applications, Magnetic Imaging Resonance Applications.

**Handbook of Advanced Ceramics** - 2013-04-11

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 Ceramics, Functional Ceramics (electro-ceramics and optoelectro-ceramics) and engineering ceramics. Contributions from more than 50 leading researchers from around the world Covers basic science of advanced ceramics, functional ceramics (electro-ceramics and optoelectro-ceramics), and engineering ceramics Approximately 750 illustrations  
*MAX Phases and Ultra-High Temperature Ceramics for Extreme Environments*- Low, I. M. 2013-05-31

Ceramics are a versatile material, more so than is widely known. They are thermal resistant, poor electrical conductors, insulators against nuclear radiation, and not easily damaged, making ceramics a key component in many industrial processes. *MAX Phases and Ultra-High Temperature Ceramics for*

*Extreme Environments* investigates a new class of ultra-durable ceramic materials, which exhibit characteristics of both ceramics and metals. Readers will explore recent advances in the manufacturing of ceramic materials that improve their durability and other physical properties, enhancing their overall usability and cost-effectiveness. This book will be of primary use to researchers, academics, and practitioners in chemical, mechanical, and electrical engineering. This book is part of the Research Essentials collection.  
*Comprehensive Nuclear Materials* 2020-07-22  
Materials in a nuclear environment are exposed to extreme conditions of radiation, temperature and/or corrosion, and in many cases the combination of these makes the material behavior very different from conventional materials. This is evident for the four major technological challenges the nuclear technology domain is facing currently: (i) long-term

operation of existing Generation II nuclear power plants, (ii) the design of the next generation reactors (Generation IV), (iii) the construction of the ITER fusion reactor in Cadarache (France), (iv) and the intermediate and final disposal of nuclear waste. In order to address these challenges, engineers and designers need to know the properties of a wide variety of materials under these conditions and to understand the underlying processes affecting changes in their behavior, in order to assess their performance and to determine the limits of operation. Comprehensive Nuclear Materials 2e provides broad ranging, validated summaries of all the major topics in the field of nuclear material research for fission as well as fusion reactor systems. Attention is given to the fundamental scientific aspects of nuclear materials: fuel and structural materials for fission reactors, waste materials, and materials for fusion reactors. The articles are written at a

level that allows undergraduate students to understand the material, while providing active researchers with a ready reference resource of information. Most of the chapters from the first Edition have been revised and updated and a significant number of new topics are covered in completely new material. During the ten years between the two editions, the challenge for applications of nuclear materials has been significantly impacted by world events, public awareness, and technological innovation. Materials play a key role as enablers of new technologies, and we trust that this new edition of Comprehensive Nuclear Materials has captured the key recent developments. Critically reviews the major classes and functions of materials, supporting the selection, assessment, validation and engineering of materials in extreme nuclear environments Comprehensive resource for up-to-date and authoritative information which is not always available

elsewhere, even in journals Provides an in-depth treatment of materials modeling and simulation, with a specific focus on nuclear issues Serves as an excellent entry point for students and researchers new to the field

### Particulate Composites -

Randall M. German 2016-06-14

This book is focused on composites involving powders as the starting materials. It provides relevant information for questions related to the selection of constituent phases, most economic fabrication routes, proper testing procedures, and product optimization. The field is sufficiently advanced that predictive models guide many decisions. Applications are illustrated over a broad range of material and property combinations. This title includes:

- Selection of phases with consideration of intersolubility & interface
- Microstructure, especially the role of phase connectivity
- Fabrication approaches, especially net-shape consolidation
- Assessment of

typical properties, testing techniques & industry standards • Design & trade-off decisions involved in optimization, including cost

- Applications, both those that have matured and some emerging prospects. The reader may have little appreciation for how particulate composites are literally everywhere. Examples include new wear resistant consumer products (Apple watch), longer lasting automotive tires with reduced rolling resistance (Yokohama tires), and new diamond heat sinks for computers (Element Six substrates). Particulate composites also form critical components in applications such as magnets, dental fillings, brakes, darts, bio-implants, & cutting tools. Particulate composites are a multi-billion dollar industry, and can be a cost-effective solution ripe for innovation and continued rapid growth. For the engineer, the wide range of particulate composite formulation and property combinations offers the ability

to design for a variety of application and provides ample opportunity for innovation.

Particulate Composites: Fundamentals & Applications is ideal for use in a one-semester eng. course at the senior UG/graduate level, and is also suitable as a practical reference for materials scientists in academia and industry.

Materials Handbook - François Cardarelli 2008-03-19

This unique and practical book provides quick and easy access to data on the physical and chemical properties of all classes of materials. The second edition has been much expanded to include whole new families of materials while many of the existing families are broadened and refined with new material and up-to-date information. Particular emphasis is placed on the properties of common industrial materials in each class. Detailed appendices provide additional information, and careful indexing and a tabular format make the data quickly accessible. This book is

an essential tool for any practitioner or academic working in materials or in engineering.

**Ductile Mode Cutting of Brittle Materials** - Kui Liu  
2019-10-12

This book provides a systematic and comprehensive interdisciplinary overview of ductile mode cutting of brittle materials, covering a range of topics from the fundamental physics to engineering practices. Discussing the machining mechanics and material properties, it explains the fundamental mechanism of ductile-to-brittle transition in the cutting of brittle materials. It also presents theoretical modeling and molecular dynamic simulation to demonstrate that ductile mode cutting can be achieved under certain conditions, as well as extensive experimental studies that produced smooth and damage-free surfaces on different materials, such as silicon, glass, tungsten carbide and calcium fluoride. Lastly, it explores how the ductile mode cutting performance and

machinability of brittle materials can be further improved by hybrid machining processes like ultrasonic vibration and thermal-assisted cutting technologies in order to meet industry demands.

Materials Science of Carbides, Nitrides and Borides - Yury G. Gogotsi 2012-12-06

A survey of current research on a wide range of carbide, nitride and boride materials, covering the general issues relevant to the development and characterisation of a variety of advanced materials. Topics include structure and electronic properties, modeling, processing, high-temperature chemistry, oxidation and corrosion, mechanical behaviour, manufacturing and applications. The volume complements more specialised books on specific materials as well as more general texts on ceramics or hard materials, presenting a survey of materials research as a key to technological development. After decades of research, the materials are being used in

electronics, wear resistant, refractory and other applications, but numerous new applications are possible.

Roughly equal numbers of papers cover theoretical and experimental research in the general field of materials science of refractory materials.

Audience: Researchers and graduate students in materials science and engineering.

Dynamic Response of Advanced Ceramics - Ghatu Subhash 2021-06-02

Dynamic Response of Advanced Ceramics Discover fundamental concepts and recent advances in experimental, analytical, and computational research into the dynamic behavior of ceramics In Dynamic Response of Advanced Ceramics, an accomplished team of internationally renowned researchers delivers a comprehensive exploration of foundational and advanced concepts in experimental, analytical, and computational aspects of the dynamic behavior of advanced structural ceramics and



transparent materials. The book discusses new techniques used for determination of dynamic hardness and dynamic fracture toughness, as well as edge-on-impact experiments for imaging evolving damage patterns at high impact velocities. The authors also include descriptions of the dynamic deformation behavior of icosahedral ceramics and the dynamic behavior of several transparent materials, like chemically strengthened glass and glass ceramics. The developments discussed within the book have applications in everything from high-speed machining to cutting, grinding, and blast protection. Readers will also benefit from a presentation of emerging trends and directions in research on this subject as well as current challenges in experimental and computational domains, including: An introduction to the history of ceramic materials and their dynamic behavior, including examples of material response to high-strain-rate loading An

exploration of high-strain-rate experimental techniques, like 1D elastic stress-wave propagation techniques, shock waves, and impact testing Discussions of the static and dynamic responses of ceramics and the shock response of brittle solids An overview of deformation mechanisms during projectile impact on a confined ceramic, including damage evolution during the nonpenetration and penetration phases. Perfect for researchers, scientists, and engineers working on ballistic impact and shock response of brittle materials, Dynamic Response of Advanced Ceramics will also earn a place in the libraries of industry personnel studying impact-resistant solutions for a variety of applications.

**Theoretical and Experimental Studies on Early Transition Metal Nitrides for Thermoelectrics**

- Mohammad Amin Gharavi  
2019-11-18

Thermoelectricity transforms temperature gradients across thermoelectric material into an

external voltage through a phenomenon known as the Seebeck effect. This property has resulted in niche applications such as solid-state cooling for electronic and optoelectronic devices which exclude the need for a coolant or any moving parts and long-lasting, maintenance-free radioisotope thermoelectric generators used for deep-space exploration. However, the high price and low efficiency of thermoelectric generators have prompted scientists to search for new materials and/or methods to improve the efficiency of the already existing ones. Thermoelectric efficiency is governed by the dimensionless figure of merit  $ZT$ , which depends on the electrical conductivity, thermal conductivity and Seebeck coefficient value of the material and has rarely surpassed unity. In order to address these issues, research conducted on early transition metal nitrides spearheaded by cubic scandium nitride (ScN) thin films showed promising results with high power factors close

to  $3000 \text{ Wm}^{-1}\text{K}^2$  at  $500 \text{ }^\circ\text{C}$ . These results are the main motivation behind my thesis where the conducted research is separated into two different routes: • the synthesis and characterization of chromium nitride thin films and its alloys • the study of hypothetical ternary nitrides equivalent to scandium nitride Rock-salt cubic chromium nitride (CrN) deposited in the form of thin films by reactive magnetron sputtering was chosen for its large Seebeck coefficient of approximately  $-200 \text{ }^\circ\text{V/K}$  and low thermal conductivity between 2 and  $4 \text{ Wm}^{-1}\text{K}^{-1}$ . The results show that CrN in single crystal form has a low electrical resistivity below  $1 \text{ m}\Omega\text{cm}$ , a Seebeck coefficient value of  $-230 \text{ }^\circ\text{V/K}$  and a power factor close to  $5000 \text{ Wm}^{-1}\text{K}^2$  at room temperature. These promising results could lead to CrN based thermoelectric modules which are cheaper and more stable compared to traditional thermoelectric material such as bismuth telluride ( $\text{Bi}_2\text{Te}_3$ ) and lead telluride (PbTe). Although

cubic CrN has been shown to be a promising material for research with a large power factor, the electrical resistivity limits applications in pure form as the  $ZT$  is estimated to be slightly below 0.5. To overcome this issue, I enhanced the thermoelectric power-factor of CrN by alloying it with a conductor, Rock-salt cubic vanadium nitride (VN). VN is a suitable choice as both materials share the same crystal structure and have almost equal lattice constants. Through deposition at 720 °C, where a small amount of VN (less than 5%) and Cr<sub>2</sub>N is introduced into the film, a reduced electrical resistivity averaged around  $0.8 \times 10^{-3}$  Ωcm, Seebeck coefficient value of 270 μV/K and a power-factor of  $9.1 \times 10^{-3}$  W/mK<sup>2</sup> is measured at room temperature, which surpasses the thermoelectric properties of Bi<sub>2</sub>Te<sub>3</sub>. Hexagonal dichromium nitride (Cr<sub>2</sub>N) nano-inclusions increase the charge carrier concentration and act as phonon scattering sites. Single crystal Cr<sub>2</sub>N was

also studied separately, as it shows interesting elastic-plastic mechanical properties and high resistance to oxidation at high temperatures for long periods of time. In the second part of this thesis, hypothetical ternary nitrides equivalent to ScN are investigated for their prospective thermoelectric properties. Scandium nitride has a relatively high thermal conductivity value (close to 10 Wm<sup>-1</sup>K<sup>-1</sup>), resulting in a low  $ZT$ . A hypothetical ternary equivalent to ScN may have a similar electronic band structure and large power factor, but with a lower thermal conductivity value leading to better thermoelectric properties. Thus, the elements magnesium, titanium, zirconium, and hafnium were chosen for this purpose. DFT calculations were used to simulate TiMgN<sub>2</sub>, ZrMgN<sub>2</sub> and HfMgN<sub>2</sub>. The results show the MeMgN<sub>2</sub> stoichiometry to be stable, with two rivaling crystal structures: trigonal NaCrS<sub>2</sub> and monoclinic LiUN<sub>2</sub>. The

calculated electronic band structure of these compounds shows a direct band-gap for the monoclinic and an indirect band-gap for the trigonal crystal structures. These findings, coupled with predicted Seebeck coefficient values, encourages actual synthesis of such materials. DFT calculations were also used to study (Zr, Mg)N and (Hf, Mg)N alloys based on the SQS model. The transition temperature between the ordered monoclinic structure of ZrMgN<sub>2</sub> and HfMgN<sub>2</sub> and the disordered (Zr, Mg)N and (Hf, Mg)N alloys is calculated to be approximately 800 K and 1050 K respectively. Density of State (DoS) calculations show that similar to (Ti, Mg)N, (Zr, Mg)N and (Hf, Mg)N are also semiconducting. The thermoelectric properties of both compounds are also predicted, and that in the range of a moderate change in the Fermi level, high Seebeck coefficient values at room temperature can be achieved. Finally, in order to complete the mentioned study on

hypothetical ternaries, I deposited (Ti, Mg)N thin film alloys by reactive magnetron sputtering. These films, which were deposited at 400 °C, are porous and are crystallized in the rocksalt cubic structure. As-deposited films show an electrical resistivity of 150 m<sup>2</sup>/cm and a Seebeck coefficient of -25  $\mu$ V/K, which shows semiconducting properties. In order to initiate a phase transformation, these films when annealed at approximately 800 °C, where nano-inclusions of a titanium/magnesium oxynitride are formed in a LiTiO<sub>2</sub>-type superstructure are identified by XRD and TEM analysis.

### **Methodologies and Applications for Chemoinformatics and Chemical Engineering -**

Haghi, A. K. 2013-05-31  
In recent years, significant advances have been made in the development of chemistry and computer science integration into the fields of biomedical and chemical engineering, applying quantum principles to practical, macro-

world science. Methodologies and Applications for Chemoinformatics and Chemical Engineering brings together innovative research, new concepts, and novel developments in the application of informatics tools for applied chemistry and computer science. This book is essential amongst chemists, engineers, and researchers in providing mutual communication between academics and industry professionals around the world.

Blackbody Radiometry - Victor Sapritsky 2020-10-19

This book, the first of a two-volume set, focuses on the basic physical principles of blackbody radiometry and describes artificial sources of blackbody radiation, widely used as sources of optical radiation, whose energy characteristics can be calculated on the base of fundamental physical laws. Following a review of radiometric quantities, radiation laws, and radiative heat transfer, it introduces the basic principles of blackbody

radiators design, details of their practical implementation, and methods of measuring their defining characteristics, as well as metrological aspects of blackbody-based measurements. Chapters are dedicated to the effective emissivity concept, methods of increasing effective emissivities, their measurement and modeling using the Monte Carlo method, techniques of blackbody radiators heating, cooling, isothermalization, and measuring their temperature.

An extensive and comprehensive reference source, this book is of considerable value to students, researchers, and engineers involved in any aspect of blackbody radiometry.

**Oxide Free Nanomaterials for Energy Storage and Conversion Applications** - Prabhakarn Arunachalam 2021-12-10

Oxide Free Nanomaterials for Energy Storage and Conversion Applications covers in depth topics on non-oxide nanomaterials involving

transition metal nitrides, carbides, selenides, phosphides, oxynitrides based electrodes, & other non-oxide groups. The current application of nanostructured nonoxides involves their major usage in energy storage and conversion devices variety of applications such as supercapacitor, batteries, dye-sensitized solar cells and hydrogen production applications. The current application of energy storage devices involves their usage of nanostructured non-oxide materials with improved energy and power densities. In this book readers will discover the major advancements in this field during the past decades. The various techniques used to prepare environmentally friendly nanostructured non-oxide materials, their structural and morphological characterization, their improved mechanical and material properties, and finally, current applications and future impacts of these materials are discussed. While planning and fabricating non-oxide materials, the readers must be

concern over that they ought to be abundant, cost-efficient and environment-friendly for clean innovation and conceivably be of use in an expansive choice of utilization. The book gives detailed literature on the development of nanostructured non-oxides, their use as energy related devices and their present trend in the industry and market. This book also emphasis on the latest advancement about application of these noble non-oxide based materials for photocatalytic water-splitting. Recent progress on various kinds of both photocatalytic and electrocatalytic nanomaterials is reviewed, and essential aspects which govern catalytic behaviours and the corresponding stability are discussed. The book will give an updated literature on the synthesis, potential applications and future of nanostructured non-oxides in energy related applications. This book is highly useful to researchers working in the field with diversified backgrounds are expected to

making the chapter truly interdisciplinary in nature. The contents in the book will emphasize the recent advances in interdisciplinary research on processing, morphology, structure and properties of nanostructured non-materials and their applications in energy applications such as supercapacitors, batteries, solar cells, electrochemical water splitting and other energy applications. Thus, nanotechnology researchers, scientists and experts need to have update of the growing trends and applications in the field of science and technology. Further, the postgraduate students, scientists, researchers and technologists are need to buy this book. Offers a comprehensive coverage of the nanostructured non-oxide materials and their potential energy applications Examines the properties of nanostructured non-oxide materials that make them so adaptable Explores the mechanisms by which nanoparticles interact with each other, showing how these

can be used for industrial applications Shows the how nanostructured non-oxide materials are used in a wide range of industry sectors, containing energy production and storage

**Nanotechnology: Concepts, Methodologies, Tools, and Applications** - Management Association, Information Resources 2014-02-28

Over the past few decades, devices and technologies have been significantly miniaturized from one generation to the next, providing far more potential in a much smaller package. The smallest of these recently developed tools are miniscule enough to be invisible to the naked eye. Nanotechnology: Concepts, Methodologies, Tools, and Applications describes some of the latest advances in microscopic technologies in fields as diverse as biochemistry, materials science, medicine, and electronics. Through its investigation of theories, applications, and new developments in the

nanotechnology field, this impressive reference source will serve as a valuable tool for researchers, engineers, academics, and students alike. Proceedings of the Scientific-Practical Conference "Research and Development - 2016" - K. V. Anisimov 2017-12-04

This book is open access under a CC BY 4.0 license. It relates to the III Annual Conference hosted by The Ministry of Education and Science of the Russian Federation in December 2016. This event has summarized, analyzed and discussed the interim results, academic outputs and scientific achievements of the Russian Federal Targeted Programme "Research and Development in Priority Areas of Development of the Russian Scientific and Technological Complex for 2014-2020." It contains 75 selected papers from 6 areas considered priority by the Federal Targeted Programme: computer science, ecology & environment sciences; energy and energy efficiency; lifesciences; nanoscience & nanotechnology and transport

& communications. The chapters report the results of the 3-years research projects supported by the Programme and finalized in 2016. Proceedings of the Estonian Academy of Sciences, Engineering - 2006-12

Advances in Materials Science for Environmental and Energy Technologies V - Tatsuki Ohji 2016-09-06

This proceedings volume contains a collection of 20 papers from the following symposia held during the 2015 Materials Science and Technology (MS&T '15) meeting: 7th International Symposium on Green and Sustainable Technologies for Materials Manufacturing Processing Materials for Nuclear Applications and Extreme Environments Materials Issues in Nuclear Waste Management in the 21st Century Nanotechnology for Energy, Healthcare and Industry Materials for Processes for CO<sub>2</sub> Capture, Conversion and Sequestration Hybrid Organic - Inorganic



Materials for Alternative Energy

## **Ultra-High Temperature**

**Ceramics** - William G.

Fahrenholtz 2014-10-10

The 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 ( $>3000^{\circ}\text{C}$ ), 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 critically combines the historical aspects and the state-of-the-art on the processing, densification, properties, and performance of boride 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, 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 the 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.

Wear of Materials - P Blau  
2003-10

The 14th International  
Conference on Wear of

Materials took place in Washington, DC, USA, 30 March - 3 April 2003. These proceedings contain over two-hundred peer reviewed papers containing the best research, technical developments and engineering case studies from around the world. Biomaterials and nano-tribology receive special attention in this collection reflecting the general trends in the field. Further highlights include a focus on the new generation of instrumentation to probe wear at increasingly small scales. Approximately ninety communications and case studies, a popular format for the academic community have also been included, enabling the inclusion of the most up-to-date research. Over 200 peer-reviewed papers including hot topics such as biomaterials and nano-tribology Keeping you up-to-date with the latest research from leading experts Includes communications and case studies

**Advances in Engineering  
Materials and Applied  
Mechanics** - Guangde Zhang

2015-10-22

With the rapid development of Machinery, Materials Science and Engineering Application, discussion on new ideas related mechanical engineering and materials science arise. In this proceedings volume the author(s) are focussed on Machinery, Materials Science and Engineering Applications and other related topics. The Conference has produced a Handbook of Refractory Carbides & Nitrides - Hugh O. Pierson 1996-12-31

Refractory carbides and nitrides are useful materials with numerous industrial applications and a promising future, in addition to being materials of great interest to the scientific community. Although most of their applications are recent, the refractory carbides and nitrides have been known for over one hundred years. The industrial importance of the refractory carbides and nitrides is growing rapidly, not only in the traditional and well-established applications based on the strength and refractory

nature of these materials such as cutting tools and abrasives, but also in new and promising fields such as electronics and optoelectronics.

Cathodic Arcs - André Anders 2009-07-30

Cathodic arcs are among the longest studied yet least understood objects in science. Plasma-generating, tiny spots appear on the cathode; they are highly dynamic and hard to control. With an approach emphasizing the fractal character of cathode spots, strongly fluctuating plasma properties are described such as the presence of multiply charged ions that move with supersonic velocity. Richly illustrated, the book also deals with practical issues, such as arc source construction, macroparticle removal, and the synthesis of dense, well adherent coatings. The book spans a bridge from plasma physics to coatings technology based on energetic condensation, appealing to scientists, practitioners and graduate students alike.

Advances in Manufacturing

Engineering - Seyed Sattar  
Emamian 2020-08-31

This book presents selected papers from the 5th International Conference on Mechanical, Manufacturing and Plant Engineering (ICMMPPE 2019), held in Kuala Lumpur, Malaysia. It highlights the latest advances in the area, brings together researchers and professionals in the field and provides a valuable platform for exchanging ideas and fostering collaboration. Joining technologies could be change to manufacturing technologies. Addressing real-world problems concerning joining technologies that are at the heart of various manufacturing sectors, the respective papers present the outcomes of the latest experimental and numerical work on problems in soldering, arc welding and solid-state joining technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies. technologies.

**Advances in Medical and**

**Surgical Engineering** -  
Waqar Ahmed 2020-03-21

Advances in Medical and Surgical Engineering integrates the knowledge and experience of experts from academia and practicing surgeons working with patients. The cutting-edge progress in medical technology applications is making the traditional line between engineering and medical science ever thinner. This is an excellent resource for biomedical engineers working in industry and academia on developing medical technologies. It covers challenges in the application of technology in the clinic with views from an editorial team that is highly experienced in engineering, biomaterials, surgical practice, biomedical science and technology, and that has a proven track record of publishing applied biomedical science and technology. For medical practitioners, this book covers advances in technology in their domain. For students, this book identifies the opportunities of

research based on the reviews of utilization of current technologies. The content in this book can also be of interest to policymakers, research funding agencies, and libraries, that are contributing to development of medical technologies. Covers circulatory support, aortic valve implantation and microvascular anastomosis. Explores arthroplasty of both the knee and the shoulder. Includes tribology of materials, laser treatment and machining of biomaterial.

*The Cold Spray Materials Deposition Process*

2007-09-21

The cold spray process produces dense, low oxide coatings which can be used in such diverse applications as corrosion control and metals repair. It has emerged as an important alternative to thermal spray coating techniques in certain areas. This pioneering book reviews both the fundamentals of the process and how it can best be applied in practice. The first part of the book discusses the

development of the process together with its advantages and disadvantages in comparison with thermal spray coating techniques. Part two reviews key process parameters such as powders, nozzle design, particle temperature and velocity, and particle/substrate interaction. It also describes portable and stationary cold spray systems. The final part of the book discusses how the cold spray process can be applied in such areas as improved wear, corrosion protection, electromagnetic interference shielding and repair of damaged components. The cold spray materials deposition process is a standard reference on this important process and its industrial applications. Examines the fundamentals of the cold spraying process. Assesses how the technique can best be applied in practice. Describes portable and stationary cold spray systems.

*Non-traditional*

*Micro-machining Processes*

Golam Kibria 2017-03-07

This book presents a complete

coverage of micromachining processes from their basic material removal phenomena to past and recent research carried by a number of researchers worldwide. Chapters on effective utilization of material resources, improved efficiency, reliability, durability, and cost effectiveness of the products are presented. This book provides the reader with new and recent developments in the field of micromachining and microfabrication of engineering materials.

**Advances in Polymer Derived Ceramics and Composites** - Paolo Colombo  
2010-07-20

This book collects some of papers presented at the very successful Symposium "Polymer Derived Ceramics and Composites" in the framework of the 8th Pacific Rim Conference on Ceramic and Glass Technology. There, over 70 researchers from around the world discussed their latest innovations over four full days. It covers all the main aspects of

interdisciplinary research and development in the field of Polymer-Derived-Ceramics, from the precursor synthesis and characteristics to the polymer-to-ceramic conversion, from processing and shaping of preceramic polymers into ceramic components to their microstructure at the nano- and micro-scale, from their properties to their most relevant applications in different fields.

*Handbook of Advanced Ceramics* - Branko Matović  
2013-04-11

**11th International Symposium on High-Temperature Metallurgical Processing** - Zhiwei Peng  
2020-01-23

In recent years, global metallurgical industries have experienced fast and prosperous growth. High-temperature metallurgical technology is the backbone to support the technical, environmental, and economical needs for this growth. This collection features contributions covering the

advancements and developments of new high-temperature metallurgical technologies and their applications to the areas of processing of minerals; extraction of metals; preparation of refractory and ceramic materials; sintering and synthesis of fine particles; treatment and recycling of slag and wastes; and saving of energy and protection of environment. The volume will have a broad impact on the academics and professionals serving the metallurgical industries around the world. Advances in Science and Technology of Mn+1AXn Phases - I M Low 2012-10-26 Advances in Science and Technology of Mn+1AXn Phases presents a comprehensive review of synthesis, microstructures, properties, ab-initio calculations and applications of Mn+1AXn phases and targets the continuing research of advanced materials and ceramics. An overview of the current status, future directions, challenges and

opportunities of Mn+1AXn phases that exhibit some of the best attributes of metals and ceramics is included. Students of materials science and engineering at postgraduate level will value this book as a reference source at an international level for both teaching and research in materials science and engineering. In addition to students the principal audiences of this book are ceramic researchers, materials scientists and engineers, materials physicists and chemists. The book is also an invaluable reference for the professional materials and ceramics societies. The most up-to-date and comprehensive research data on MAX phases is presented. Written by highly knowledgeable and well-respected researchers in the field. Discusses new and unusual properties **Design, Development, and Applications of Engineering Ceramics and Composites** - Dileep Singh 2010-07-23 This compilation of proceedings covering the latest

scientific and technological developments in design, development, and applications of engineering ceramics and composites provides a useful one-stop resource for understanding the most important issues in design, development, and applications of engineering ceramics and composites. Logically organized and carefully selected articles give insight into design, development, and applications of engineering ceramics and composites and incorporates the latest developments related to design, development, and applications of engineering ceramics and composites including developments in engineering ceramics, advanced ceramic coatings, and geopolymers.

### **Technological Applications of Nanomaterials**

- Annelise Kopp Alves 2021-10-21

This book contains an overview of novel synthesis, characterization, and applications of nanomaterials. Based on an extensive state-of-the-art literature survey and

results obtained from researches during the past years, this book presents techniques and special applications of classical and modern nanomaterials. This book reviews different nanomaterials, from the synthesis and characterization of diverse materials to modern applications such as viral detection, hyperthermia, thermoelectric, nano-coatings, electrochromic, pigments, among others. This book is aimed at students, researchers, and engineers who seek general scientific knowledge about nanomaterials with an application-oriented approach. High Temperature Materials and Mechanisms - Yoseph Bar-Cohen 2014-03-03

The use of high-temperature materials in current and future applications, including silicone materials for handling hot foods and metal alloys for developing high-speed aircraft and spacecraft systems, has generated a growing interest in high-temperature technologies. High Temperature Materials and Mechanisms explores a



broad range of issues relate  
**Polymers - Opportunities  
and Risks I** - Peter Eyerer  
2010-07-31

Since their first industrial use polymers have gained a tremendous success. The two volumes of "Polymers - Opportunities and Risks" elaborate on both their potentials and on the impact on the environment arising from their production and applications. Volume 11 "Polymers - Opportunities and Risks I: General and Environmental Aspects" is dedicated to the basics of the engineering of polymers - always with a view to possible environmental implications. Topics include: materials, processing, designing, surfaces, the utilization phase, recycling, and depositing. Volume 12 "Polymers - Opportunities and Risks II: Sustainability, Product Design and Processing" highlights raw materials and renewable polymers, sustainability, additives for manufacture and processing, melt modification, biodegradation, adhesive

technologies, and solar applications. All contributions were written by leading experts with substantial practical experience in their fields. They are an invaluable source of information not only for scientists, but also for environmental managers and decision makers.

Disorder and Order in Strongly Nonstoichiometric Compounds - A.I. Gusev 2013-03-09

Deals with the influence of stoichiometry and order/disorder on materials properties. It summarizes the knowledge available in a comprehensive way.

Metal-Matrix Composites - T. S. Srivatsan 2021-02-16

This collection brings together engineers, scientists, scholars, and entrepreneurs to present their novel and innovative contributions in the domain specific to metal-matrix composites and on aspects specific to modeling, analysis, measurements, and observations specific to microstructural advances. Topics include but are not limited to: · Metals and metal-

matrix composites · Nano-metal based composites · Intermetallic-based composites  
Contributions in the above topics connect to applications in industry-relevant areas:

automotive, energy applications, aerospace, failure analysis, biomedical and healthcare, and heavy equipment and machinery.