



**Mechanical Engineering
New Titles**

Advances in
Materials Science
Research

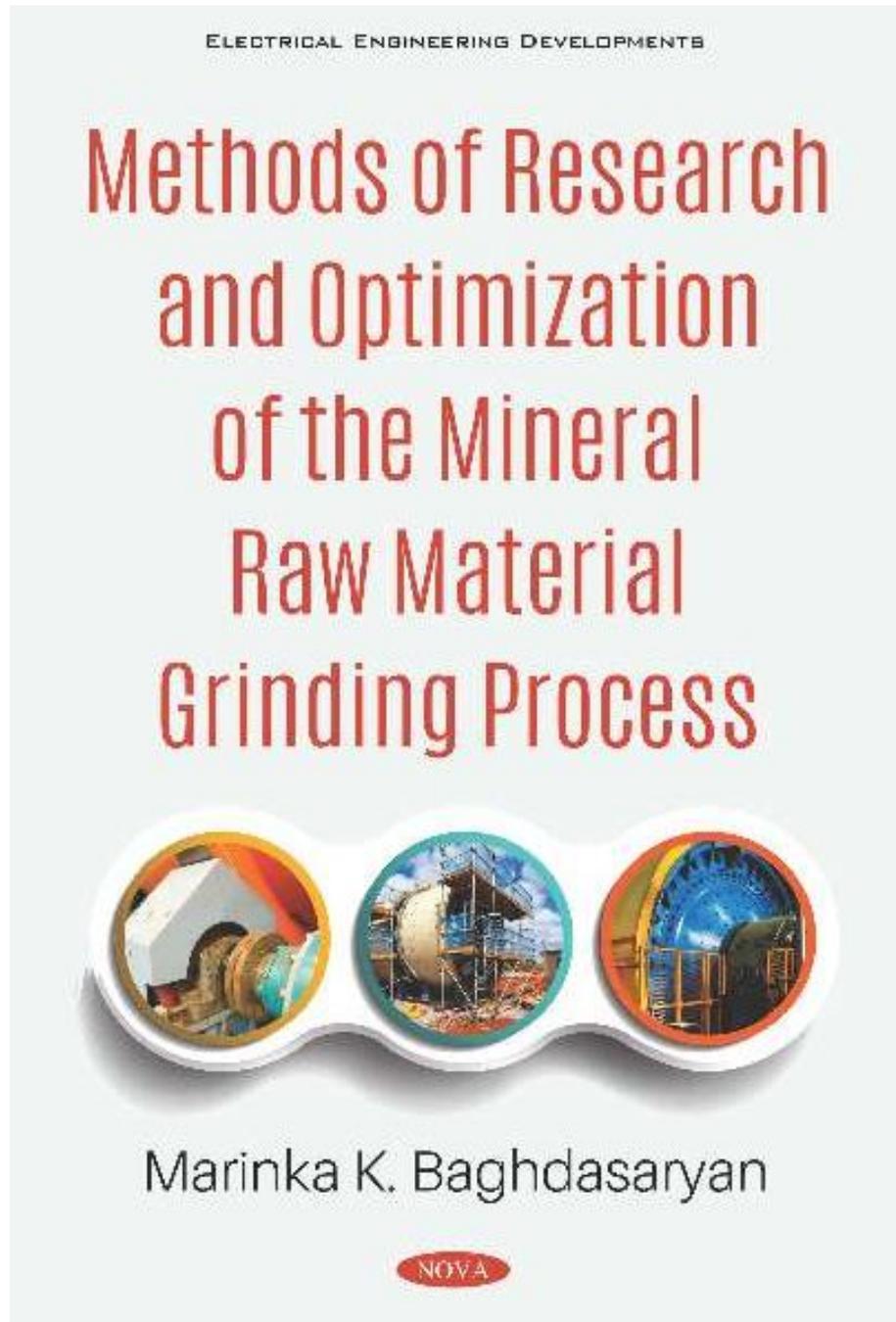
Electrical
Engineering
Developments

Materials Science
& Technologies

Mechanical
Engineering Theory
& Applications

Polymer Science &
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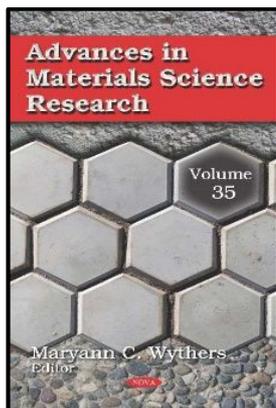
Systems
Engineering
Methods,
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Titles published by Nova Science

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Advances in Materials Science Research

Edited by Maryann C. Wythers

Advances in Materials Science Research. Volume 35 opens with an examination of the effect of bismaleimides based on the Diels-Alder reaction mechanism on high performance aerospace carbon fibre reinforced plastics. More precisely, the interlaminar fracture toughness of unidirectional bismaleimide modified composites and their healing capabilities were measured under mode I and mode II fracture loading conditions.

Following this, polyacrylonitrile nanofibers are first obtained from polyacrylonitrile in dimethylformamide by electrospinning. Then, the carbon nanofibers are obtained by calcination of polyacrylonitrile nanofibers. Additionally, the capacity of these materials to promote oxygen reduction reaction is evaluated.

As new sorbents are developed for purifying gases or liquids via physisorption and/or chemisorption processes, the objective is typically to increase the specific surface area to maximize the available binding sites for capturing various species of interest. One drawback to making a sorbent more porous is that it often leads to a product that is fragile or friable and can be damaged, thus imposing process limitations. Thus, the authors propose an alternative approach for improving the mechanical integrity of the sorbent by binding it within a porous matrix that passively holds the sorbent in place.

Next, evidence that the nanopillared graphene surface can induce strong dewettability is been reported by molecular dynamics simulations. The retracting and detaching behaviors of the liquid film can be effectively controlled by tuning the geometric parameters of the liquid film or nanopillar as well as the temperature.

This compilation also includes a study which aims to present the advantages of using a thermodynamic analysis for the production of high purity hydrogen by the ethanol steam reforming combined with CO₂ absorption (ESR-CO₂-ABS). For this purpose, a thermodynamic analysis is used to find optimal reaction conditions for the ESR-CO₂-ABS system. Thermodynamic analysis of the ESR-CO₂-ABS system was performed using CaO, CaO•MgO, Na₂ZrO₃, Li₂ZrO₃ and Li₄SiO₄ as CO₂ absorbents to determine optimal operating conditions to generate high production and concentration of hydrogen in the product gas.

In conclusion, the authors discuss how recently, research emphasis has been directed towards integrating multiple functions into polymer materials. Among these new advancements in materials science are functional polymers with structural designs for versatile applications. Piperazine is an interesting heterocyclic diamine which possess excellent medicinal and chelating property. Polymers and surfactants based on piperazine and surfactants have shown good hydrophilic, chelating anti-bacterial and anti-helminthic properties.

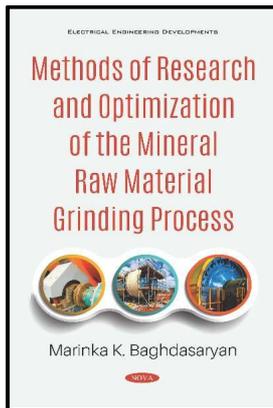
Volume 35 - HB 9781536147209 £210.99 January 2019 Nova Science Publishers 225 pages

Volume 36 - HB 9781536148480 £210.99 January 2019 Nova Science Publishers 218 pages

Volume 37 - HB 9781536150384 £210.99 February 2019 Nova Science Publishers 209 pages

Volume 38 - HB 9781536155976 £210.99 May 2019 Nova Science Publishers 216 pages

Volume 39 - HB 9781536161762 £210.99 September 2019 Nova Science Publishers 228 pages



Methods of Research and Optimization of the Mineral Raw Material Grinding Process

Marinka K. Baghdasaryan

In the monograph, a number of problems of scientific and technical importance are introduced and discussed, which are of great interest, and can find widespread application in the circles of engineers and researchers, as well as graduate and post-graduate students engaged in investigation, optimization and management of electromechanical systems.

The theoretical and practical results presented in the work have applied significance for investigating, optimizing, revealing the regularities of changing the operation modes, establishing the technological factors and power dependencies, controlling the operating state of the elastic transmission links of the electromechanical system, and, based on them, developing a control system for the diagnosis tool of the system's operating state and increasing the power consumption efficiency.

The methods introduced in the monograph differ from those developed by other well-known authors in that the author has succeeded in revealing the relationship of technological and energetic parameters. Taking into consideration the variety of the technological load, mechanisms and schemes, the author has proposed and implemented new complex approaches to making optimal decisions on the problem, considering them in the solution of diverse problems aimed at increasing the efficiency of the ore-grinding technological process. In Chapter 1 of the monograph, the principles of increasing the control efficiency of the ore-grinding technological process by assessing the power-saving possibilities for the consumed energy have been considered.

In Chapter 2, the operation modes of the ore mill have been investigated, for which models for investigating the change in the moment of the active load and the mill–motor electromechanical system have been developed. A system of criteria for studying the changes in the grinding degree, time, and the number of mills used has been obtained, and the condition for the stability of the gravity center of the mill active load, as well as the frequency areas of interest for assessing the state of the system have been revealed.

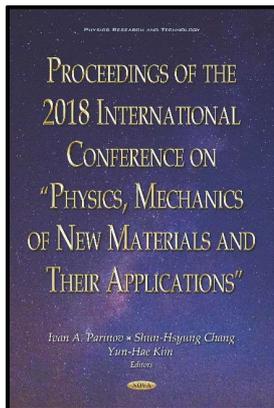
Chapter 3 is devoted to the development of the imitation model for investigating the dynamic processes of the electrical drive systems ensuring the ore mill operation, which reveals the regularities of changes in the electromagnetic torque and dynamic load at different characteristics of changes in the resistive torque created by the mill, and at different values of hardness of the drive unit.

In Chapter 4, the possibilities of identifying and preventing abnormal operating modes of synchronous electrical drive of the ore-grinding mill are considered.

In Chapter 5, the optimization problem is formulated through the analysis of the grinding control strategy and energy-saving requirements. The necessity of forming a loss matrix to determine the optimization criteria and controlled parameters is substantiated.

In Chapter 6, the automated diagnosis and control systems are proposed that provide wide control possibilities, and, in the last chapter, method of rationing the specific consumption of electricity by the technological process of grinding is presented.

HB 9781536159486 £193.99 November 2019 Nova Science Publishers 338 pages



Proceedings of the 2018 International Conference on "Physics, Mechanics of New Materials and Their Applications"

Edited by Ivan A. Parinov

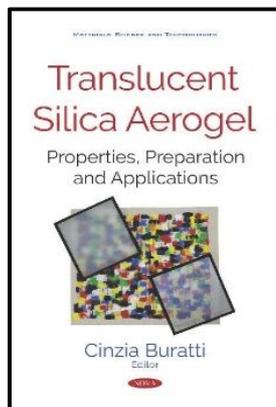
The developed original principles and approaches for advanced materials and composites (ferro-piezoelectrics, nanostructures, functional materials and polymeric structures etc.) defines the main achievements and directions of modern natural and technical sciences, technologies, techniques and industry. Direct improvement of the materials and devices characteristics are based on numerous chemical, physical and mechanical studies, modern numerical approaches and methods of mathematical modeling and physical experiment.

These PHENMA 2018 proceedings are devoted to development and solution of different actual problems into framework of the above-mentioned scientific directions. The proposed book presents interesting original results in theoretical, computational and experimental methods, which allow manufacturing nano-materials and composites (for example, ferro-piezoelectrical and environmentally-friendly), and other materials in different scale levels with before given and improved properties. The materials could be obtained due to reprocessing natural materials, wasters, fruits and plants.

These proceedings also discuss results of mathematical modeling and experimental studies of advanced devices (piezoelectric transducers, energy-harvesters, different sensors, medical devices etc.). The presented studies are based on the new generation nano-materials, ferro-piezoelectrics and other structure-sensitive materials with special properties. The book treats promising modern nano- and microstructure techniques for manufacture of different novel materials (for example, nanostructures) and devices, which are very important for educational purposes and industry, unification and development of various expertises, designs and analyzes. The book presents new results of internationally recognized scientific teams in different areas of materials science, condensed matter physics, physical and mechanical theory and experiment, processing techniques and engineering of advanced materials and composites, numerical methods and numerous applications. These results are devoted to R&D of advanced piezo-ferroelectrics, nanostructures, other promising materials and composites with specific properties, based on the developed processing techniques and modern approaches of chemistry, physics, mechanics and materials science, and also wide spectrum of applications including industry and marketing. The book presents a wide spectrum of results, obtained on the base of original mathematical models, physical experiments, computer modeling, and nano- and piezoelectric applications. This collection presents 50 selected reports of the 2018 International Conference on "Physics, Mechanics of New Materials and Their Applications" (PHENMA 2018, August 9-11, 2018, Busan, South Korea).

The book is addressed to students, post-graduate students, scientists and engineers, investigating and developing a new generation of nano-materials and nano-composites, piezo-ferroelectrics, other advanced materials with structure-sensitive properties, and also different devices, manufactured on their base and used in numerous applications in various areas of science, technique and technology. The book presents new research methods and scientific results in the condensed matter physics, materials science, physical and mechanical experiment, processing techniques and engineering of nanomaterials, piezoelectrics and other advanced materials and composites, numerical methods, and also different applications and developed devices.

HB 9781536158625 £193.99 October 2019 Nova Science Publishers 480 pages



Translucent Silica Aerogel Properties, Preparation and Applications

Edited by Cinzia Buratti

Silica translucent aerogels are unique materials able to improve the thermal insulation performance of buildings without compromising daylight transmission.

The aim of the book is to give a general overview on state of the art research on translucent aerogels and their applications in buildings and to provide a data set about thermal and physical properties, useful in buildings' energy performance simulation and design.

Silica aerogels are nanostructured solid materials made of approximately 96% air and 4% silica. They show a thermal conductivity in the 0.012–0.020 W/mK range and excellent optical properties, especially visible transmission. They come in granular and monolithic form. Granular aerogels are relatively easy to produce and less expensive than monolithic panes, but show worse optical and thermal performance. Monolithic aerogels enable vision through the material, but their fabrication process is not developed at an industrial scale.

The book collects the contributions of experts in the field of translucent aerogels from all over the world. The contents of the eight chapters are detailed as follows:

Chapter 1 is the contribution from Union College, Schenectady (USA). The chapter reviews the chemical approaches to silica wet gels preparation, the drying methods used to yield monoliths, and the challenges and limitations associated with its production.

Chapter 2 is a contribution from EMPA, Dübendorf (Switzerland). It is a review of current state of the art research on silica aerogel granulate production, including raw materials selection, hydrophobization strategies, and drying methodologies.

Chapter 3 is a contribution from Takenaka Corporation, Tokyo (Japan). The main techniques for the optical properties evaluation are described and data are provided. An original application of translucent aerogels in buildings and future research topics are also proposed.

Chapter 4 is a contribution from Recep Tayyip Erdogan University, Rize and Ataturk University, Erzurum (Turkey). A review of the thermal properties of aerogels is provided, highlighting their better performance when compared to conventional and superinsulation materials.

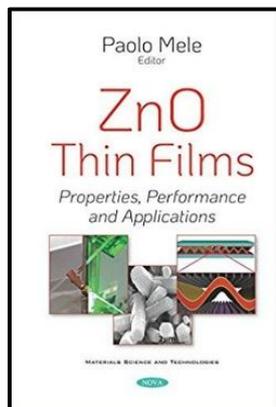
Chapter 5 is a contribution from the University of Perugia, Perugia (Italy). The acoustic properties of both granular and monolithic systems are investigated. For example, the influence of granule size and layer thickness that is deepened for granular aerogels is discussed, while for the monolithic form, the little data that is currently available is reported on.

Chapter 6 is a contribution from the University of Tuscia, Viterbo (Italy) and Buro Happold Ltd, London (UK). It is focused on Life Cycle Assessment of silica aerogel, showing the research challenges in understanding its environmental impact, lower than the one of conventional thermal insulating glazing systems.

Chapter 7 is a contribution from the University of Lyon and INSA-Lyon, Lyon (France). An overview of measurement methods and modeling tools available in literature is provided and a summary of the main mechanical properties of both monolithic and granular aerogels is reported on.

Chapter 8 is a contribution from the Norwegian University of Science and Technology, Trondheim and SINTEF, Trondheim (Norway). Authors present their experimental investigations on various aerogel systems in different building envelopes (new aerogel glass material, aerogel-incorporated concrete, and so forth).

HB 9781536153293 £134.99 April 2019 Nova Science Publishers 306 pages



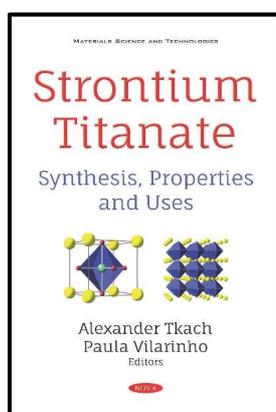
ZnO Thin Films Properties, Performance and Applications

Edited by Paolo Mele

Zinc oxide (ZnO) is an n-type semiconductor with versatile applications such as optical devices in ultraviolet region, piezoelectric transducers, transparent electrode for solar cells and gas sensors. This book “ZnO Thin Films: Properties, Performance and Applications” gives a deep insight in the intriguing science of zinc oxide thin films. It is devoted to cover the most recent advances and reviews the state of the art of ZnO thin films applications involving energy harvesting, microelectronics, magnetic devices, photocatalysis, photovoltaics, optics, thermoelectricity, piezoelectricity, electrochemistry, temperature sensing.

It serves as a fundamental information source on the techniques and methodologies involved in zinc oxide thin films growth, characterization, post-deposition plasma treatments and device processing. This book will be invaluable to the experts to consolidate their knowledge and provide insight and inspiration to beginners wishing to learn about zinc oxide thin films.

HB 9781536160864 £193.99 September 2019 Nova Science Publishers 301 pages



Strontium Titanate Synthesis, Properties and Uses

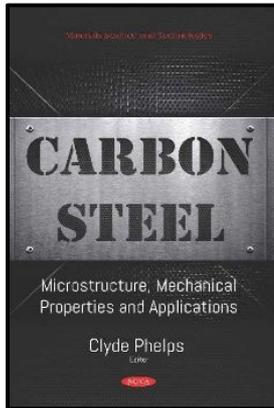
Edited by Oleksandr Tkach, Paula Vilarinho

Strontium titanate (STO) is a classical high-permittivity perovskite material known since the 1940s. Although incipient ferroelectric behaviour of SrTiO₃ was thoroughly studied during several decades, many new physical phenomena in STO and its solid solutions have been predicted theoretically and observed experimentally in past few years. The obtained results were successfully applied for the development of modern electronic devices on the basis of macroscopic and nanostructured samples. Besides the incipient ferroelectricity, properties of STO include a structural phase transition, semiconductivity, superconductivity, and thermoelectricity, among others.

This book provides the latest information on the developments of preparation, characterization, and application of STO and the materials based on it, with perspectives on future research. It collects the contributions of several established researchers from around the world on the fundamental mechanisms, processing, and possible uses for STO-based materials in the form of single crystals, thin films, and ceramics.

This book covers a broad range of topics related to STO and materials based on it, including an overview of lattice dynamics and magnetic resonance characterization, Sr/Ti ratio, and stress induced modification of the properties, modelling, and simulation of improper ferroelectricity and multiferroic phases, dielectric responses and thermoelectric performance for tunable devices, and energy harvesting applications, respectively.

HB 9781536154375 £193.99 July 2019 Nova Science Publishers 346 pages



Carbon Steel Microstructure, Mechanical Properties and Applications

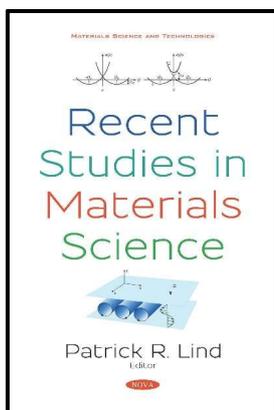
Edited by Clyde Phelps

This compilation opens with a section discussing the key interactions required to successfully friction stir weld carbon steels. Friction stir welding is a relatively recent development, predominantly technologically established using aluminum, where the lower melting point of the material greatly aided the process.

Next, corrosion models of carbon steel in aqueous solution are reviewed under atmospheric and oxygen depleted environments by focusing on the cathodic reaction and the corrosion film formed on carbon steel as a function of pH and anions.

In conclusion, the temperature relation of interlamellar spacing of pearlite with supercooling in carbon steels, based on a previously theoretically foundation, has been determined by the pearlite and bainite phase volumes in alloy steels from the degree of supercooling.

HB 9781536154351 £134.99 May 2019 Nova Science Publishers 196 pages



Recent Studies in Materials Science

Edited by Patrick R. Lind

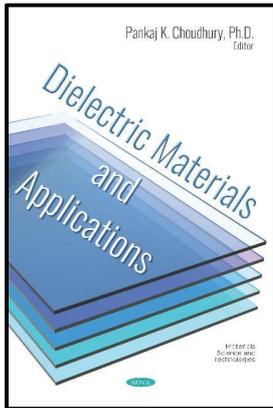
The goal of the first chapter is to express the main achievements in use of the Jahn-Teller effect (JTE) and pseudo JTE (PJTE) in search of materials with enhanced or novel properties, are presented as a part of what is known as materials science.

The hallmark of this entire chapter is the commitment to identify situations in which “waves” are produced and provide a systematic classification of such convective instabilities together with a description of related features based on advanced numerical simulations.

The quality and mechanical or electrical properties of the resulting solids and crystals are adversely affected by thermogravitational convection as it can induce defects in their atomic or molecular structure (this is the case, e.g., of typical crystal-growth techniques such as the horizontal Bridgman (HB), the Floating zone (FZ) or the Czochralski (CZ) methods). This present chapter aims to present a focused review of landmark (past) and very recent contributions on the nature, structure and hierarchy of instabilities of this type of convection.

This chapter is devoted to the investigation of the thermo-kinetics features of overcooled austenite transformation in three grades of 0.75-0.77 wt.% C complex-alloyed (Mn-Si, Mn-Si-Cr-Mo) steel intended for rail applications. Magnetometric and thermal analyses were used to build Time-Temperature-Transformation and Continuous-Cooling-Transformation diagrams presenting the kinetics of austenite transformation in studied steels.

HB 9781536152708 £163.99 March 2019 Nova Science Publishers 229 pages



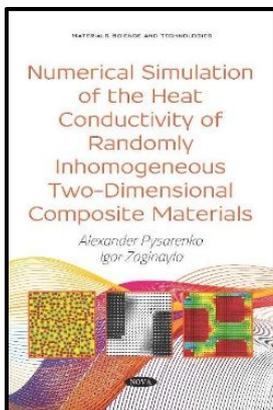
Dielectric Materials and Applications

Edited by Pankaj Kr. Choudhury

The book *Dielectric Materials and Applications* focuses on the recent research advancements in the area of dielectrics that can be utilized in a variety of technology-oriented applications. The topics covered in this book include the investigations of materials having low dielectric constants for Cu interconnects, a two-layer metallic waveguide as a tool to determine the complex permittivity of liquids and/or clinical diagnostics, microwave dielectric materials for the miniaturization of portable electronic devices, microwave assisted heating of dielectric and composite materials, and the dielectric properties of certain 3D nanocomposites.

The other areas of discussion encapsulate the modeling of supershaped dielectric lens antennas, the roles of dielectric mediums in metamaterials to realize photonic devices ranging from absorbers, sensors and communication systems. Some of the chapters are purely experimental, whereas some others are based on modeling and simulation. Reading this volume truly remains key to understanding novel applications of dielectric materials in different areas of technological interest.

HB 9781536153163 £193.99 July 2019 Nova Science Publishers 416 pages



Numerical Simulation of the Heat Conductivity of Randomly Inhomogeneous Two-Dimensional Composite Materials

Alexander Pysarenko, Igor Zaginaylo

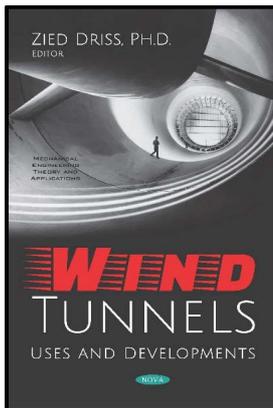
Numerical Simulation of the Heat Conductivity of Randomly Inhomogeneous Two-Dimensional Composite Materials consists of six sections. The introduction and second section present a wide variety of theoretical and empirical models for heat transport in two-component composites and their governing scientific principles. In particular, the methods of homogenization and the representative volume element are examined. The third section is devoted to the numerical methods in heat conduction processes in composites. In this section, the choice of the finite difference method and the Monte Carlo method for numerical experiments on the study of heat transfer in two-component composites was confirmed.

The fourth section describes the computational model for two-component composite material with different values of the matrix and filler thermal conductivity. The study assumes a random placement of inclusions in the composite matrix with the following parameters: The concentration and size of inclusions, and the minimum distance between the inclusions.

The fifth section deals with the distribution statistics of the effective heat conductivity. General forms of the effective thermal conductivity distributions and their transformation have been obtained when the parameters of the inclusions placement have been changed. Moreover, the influence of the placement heat-insulating inclusions on the parameters of the effective thermal conductivity distributions has also been discussed. The Monte Carlo simulation has been used to obtain the statistics of the effective anisotropy of the thermal conductivity distributions and its relationship to the effective thermal conductivity distributions statistics.

The local heat fluxes statistics and pattern maps of local heat fluxes through a randomly inhomogeneous material with a heat-conducting matrix and heat-insulating inclusions have been analyzed in the sixth section. Numerical experiments reveal the influence of the number and extent of induced heat-conducting channels on the effective thermal conductivity of the material. Special attention has been paid to an area with a shortage of induced heat-conducting channels, or the so-called dark matrix. Multimodal distributions of the local heat flux density, as well as the binding of two distribution modes to heat-insulating inclusions and induced thermal conductive channels have been described. The third mode of distribution was tied to a dark matrix on the heat-insulating inclusions map. This section also presents the statistical distributions of angles between the direction of local heat fluxes and the temperature macro gradient as well as the transformation of the character of distribution when changing the parameters of placement for inclusions.

PB 9781536146875 £79.99 February 2019 Nova Science Publishers 142 pages



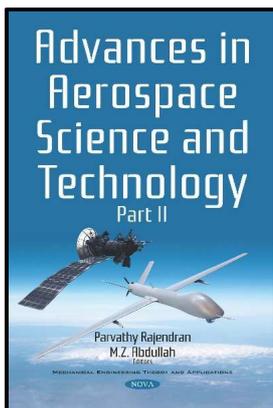
Wind Tunnels Uses and Developments

Zied Driss

Wind tunnels are facilities in which the wind is produced by fans or by compressed air to study and measure the action of the air flow around a solid. There are two basic types of wind tunnels: the closed-circuit and the open-circuit. Open-circuits draw air from the ambient environment and exhaust it back to the ambient after exiting the fan, while in closed-circuit, the air repeatedly circulates through the tunnel. The closed-circuit design delivers improved efficiency and generates less noise, but it is more expensive and more difficult to manufacture.

Wind tunnels are typically used in aerodynamic research to analyze the behavior of flows under varying conditions, both within channels and over solid surfaces. The present book focus on uses and developments of wind tunnels. It consists on nine chapters presenting different studies on the design, uses and developments of the wind tunnel in different applications like wind turbines, building and aircraft models. The presented case studies and development approaches aim to provide the readers, such as engineers and PhD students, with basic and applied studies broadly related to the wind tunnels and its applications.

HB 9781536158984 £134.99 September 2019 Nova Science Publishers 252 pages



Advances in Aerospace Science and Technology Part II

Edited by Parvathy Rajendran

Aerospace science and technology have made remarkable progress in the last century. Although a few publications have written on this topic, most are inadequate in elucidating the various advanced technologies developed in recent years. For this reason, publishing a book in which prominent researchers elaborate and discuss their research efforts in conjunction with other efforts appears sensible. In this book, the most accurate and current materials were gathered, reviewed, and presented by an exceptional group of experts. This book presents state-of-the-art and current developments and applications in aerospace.

This is a Part II continuation book of previously published edited book composed of the following:

Chapter 1: Application of High-Performance Interconnection in Aerospace Technology

Chapter 2: Knitted Structures in Aerospace Applications

Chapter 3: Carbon Nanotube-Reinforced Hierarchical Carbon Fibre Composites

Chapter 4: Influence of Aviation Fuel on Composite Materials

Chapter 5: Deterioration in Aero-Engines

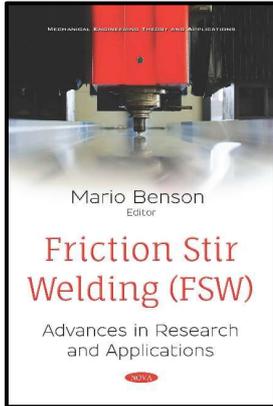
Chapter 6: Important Aerodynamic Parameters in Flapping-Wing Unmanned Aerial Vehicles

Chapter 7: Visual Localisation and Mapping using Unmanned Aerial Vehicles

Chapter 8: Geospatial Mapping Using Satellites

This book is intended for undergraduate and graduate students as well as professionals in the field of aeronautical/aerospace engineering. The book could also serve as a guide for engineers and practitioners, academicians, government agencies, and industries.

HB 9781536156898 £134.99 June 2019 Nova Science Publishers 234 pages



Friction Stir Welding (FSW) **Advances in Research and Applications**

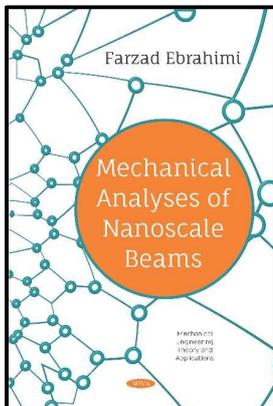
Edited by Mario Benson

The opening chapter provides a comprehensive insight into dissimilar materials joined by FSW technology. FSW parameters such as tool design, tool pin offset, rotational speed, welding speed, tool tilt angle and position of workpiece material in the fixture for dissimilar materials are summarized.

In the next chapter the author confirms the emission of particles in the nanorange during FSW of the most commonly used aluminium alloys, AA 5083 and AA 6082, which are originated from the aluminium alloy itself, due to friction of the welding tool against the workpiece.

In the closing chapter, feasibility to join 2.5 mm thick AA5052 aluminium alloy and 1.4 mm thick high strength steel, DP590, by conventional FSW process (FSW) and TIG-assisted HFSW process (HFSW) is studied through couple experimental and numerical analysis. A comparative study in joining of dissimilar materials by conventional FSW and HFSW processes is performed to realize the effect of different welding parameters on the growth of IMC layer thickness.

PB 9781536153842 £68.99 May 2019 Nova Science Publishers 90 pages



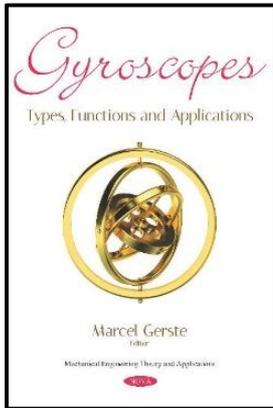
Mechanical Analyses of Nanoscale Beams

Farzad Ebrahimi

A material structure assembled from a layer or cluster of atoms with the size of the order of nanometers is called a nanostructure. There are many events such as the discovery of scanning electron microscopy that gave fillip to nanotechnology research. However, with the discovery of a new allotrope of carbon in the late 1980s and early 1990s, namely the fullerene, carbon nanotubes, and graphene, a new chapter in nanotechnology research has emerged. These have become the basic building blocks for many nanodevices such as nano sensors, nano actuators, nano gyroscopes, etc. All of these devices are packaged under Nano Electro Mechanical Systems (NEMS) or Nano Opto Mechanical Systems (NOMS) devices. The key elements in these devices are the nanobeams, nanorods, nanoplates and nanoshells, respectively.

This book is a comprehensive text to cover the mechanical analyses of nanobeams. The book introduces the reader to the fundamentals, as well as more in-depth aspects, of vibration and buckling analyses of nanoscale beams faced with different environments and the associated latest research applications. Most of the solutions presented in these chapters are the results of investigations conducted by the author and his collaborators since 2015. The results presented herein may be treated as a benchmark for checking the validity and accuracy of other numerical solutions. Despite a number of existing texts on the theory and analysis of nanoscale beams, there is not a single book that is devoted entirely to the mechanical investigation of nanobeams. It is hoped that this book willfill the gap to some extent and be used as a valuable reference source for postgraduate students, engineers, scientists, and applied mathematicians in thisfield.

HB 9781536150896 £260.99 August 2019 Nova Science Publishers 570 pages



Gyroscopes Types, Functions and Applications

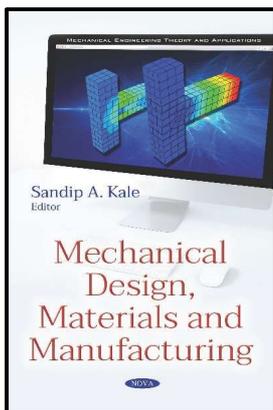
Edited by Marcel Gerste

In the first chapter of *Gyroscopes: Types, Functions and Applications*, the operating principle, types and applications of fiber-optic gyroscopes are summarized, and a novel slow light gyroscope based on coupled resonators is introduced.

Following this, two signal processing techniques are discussed, each for a different type of gyroscope noise. These two techniques are then combined to produce a general technique for improving the accuracy of a gyroscope.

The main methods of creating compact passive optical gyroscopes and their development trends are examined in the closing chapter.

PB 9781536158564 £68.99 July 2019 Nova Science Publishers 128 pages

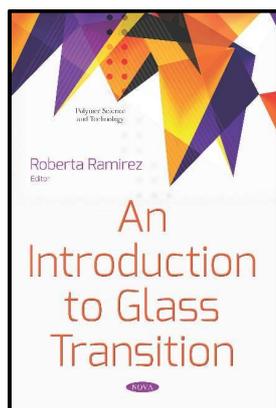


Mechanical Design, Materials and Manufacturing

Edited by Sandip A. Kale

Though the developments in the field of electronics and digital industries are significant, the importance of the basic mechanical industry remains always on the top side. The purpose of this book is to present some advanced research studies on mechanical design, materials and manufacturing. The first chapter presents an analysis of a novel force transducer which has a special shape that allows strategic placement of the strain gauges and senses axial forces by ignoring the moments. The second chapter explains the basic principle of calculation and analysis of the defective structure of solids. The third most interesting chapter presents advanced methods used in molecular dynamics simulation of macromolecules. Chapter Four explores an extended method of mathematical modelling of Freudenstein-Chebyshev approximation theory for sigmoidal function applied to four and five precision points. Chapter Five presents an algorithm to find the transfer vertex of a given epicyclic gear train. In the sixth chapter, an analytical study (using ABAQUS/CAE) on the strengthening of the beam-column joint under seismic conditions using carbon fiber reinforced polymer (CFRP) sheets has been carried out. Chapter Seven discusses preparation, properties and applications of nanomaterials, ceramics and bioceramics. Chapter Eight discusses the fluorescence of atomic hydrogen in aqueous media. Chapter Nine presents a methodology to design, develop and simulate a twin spindle turning special purpose machine based on the data collected from hydraulic, pneumatic, and electro pneumatic data which will serve as low cost automation. The last chapter is about the estimation of axial force in incremental sheet metal forming.

HB 9781536147919 £193.99 February 2019 Nova Science Publishers 311 pages



An Introduction to Glass Transition

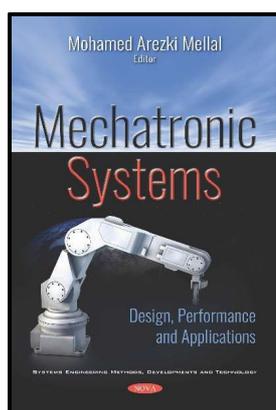
Edited by Roberta Ramirez

An Introduction to Glass Transition opens with a comparison of entropy function of temperature dependence with configurational entropy, which was published by various authors and found almost the same temperature dependence with overlap. From the dependence of the logarithm of configurational entropy vs. the logarithm of temperature, the authors suggest that it is possible to successfully predict the relations between the values of m for different glass formers. Following this, microscopic local dynamics were analyzed by way of atomistic molecular dynamics simulations through the conformational transition behavior across a wide range of temperatures. The glass transition temperature may be predicted through the intersection of separate temperature dependences. Such local dynamics were found to become gradually heterogeneous when the temperature went down close to the glassy state.

The closing chapter provides a brief summary of the studies relevant to glass transitions in well-defined lipids systems such as anhydrous and/or water mixed systems. Then, some current problems and future problems are described.

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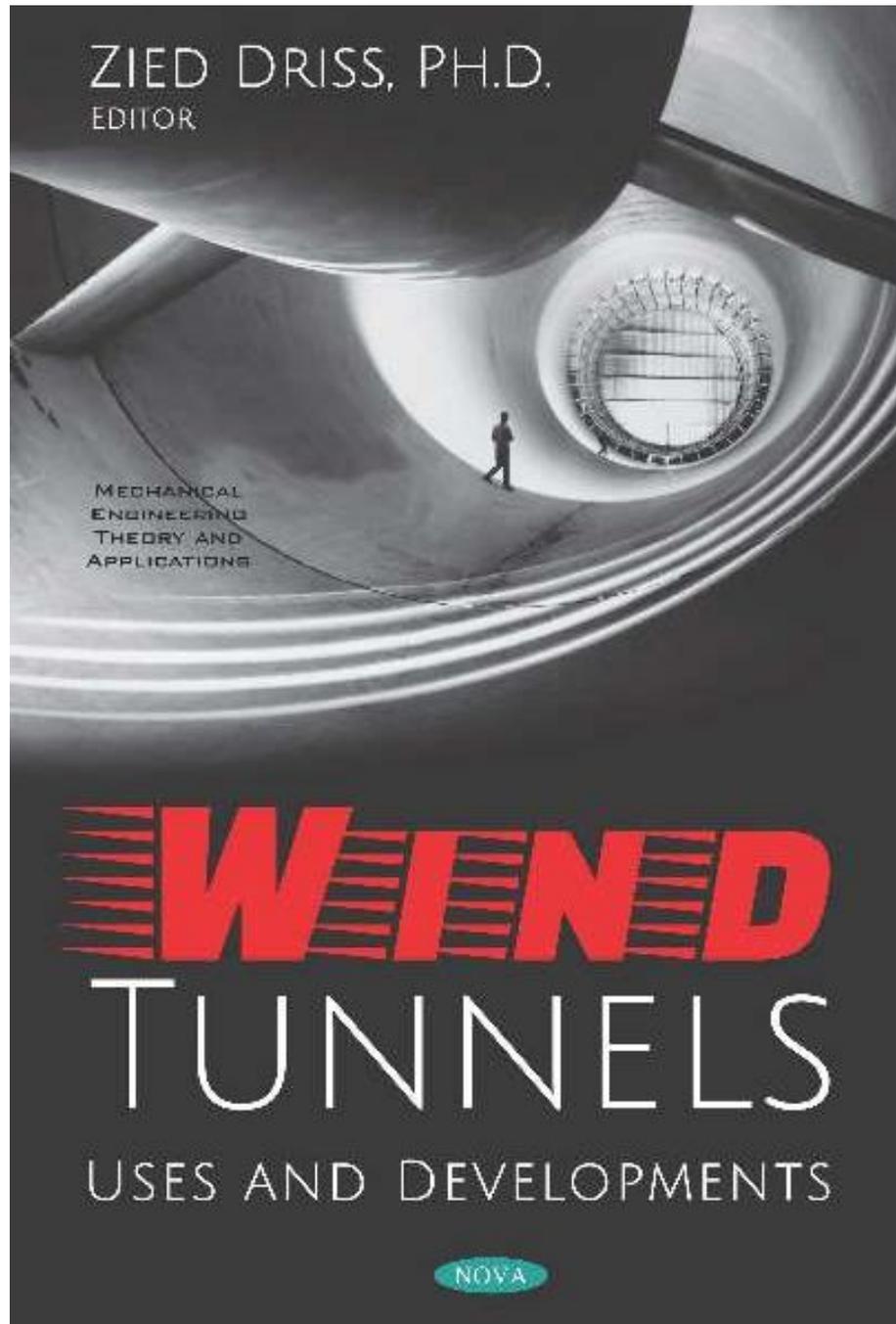
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