

Conducting Polymer Nanoparticles Decorated With Collagen

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Advances in Nanostructured Materials - Bibhu Prasad Swain 2022

This book presents recent advances in nanostructured materials. It describes the characterization of nanomaterials, their preparation methods and performance testing techniques; the design and development of nano-scale devices; and the applications of nanomaterials, with examples taken from different industries, such as energy, bioengineering and medicine. The book is broadly divided into sections such as nanostructure semiconductor materials for device applications, nanostructured ferroelectric and ferromagnetic materials.. The topics covered include experimental approaches of device fabrication, photovoltaics and supercapacitors applications, etc. Given the contents, the book will be useful for students, researchers, and professionals working in the area of nanotechnology and nanomaterials.

Materials for Biomedical Engineering: Biopolymer Fibers - Valentina Grumezescu 2019-03-20

Materials for Biomedical Engineering: Biopolymer Fibers discusses the use of biopolymer fibers in the development of biomedical applications. It provides a recent review of the main types of polymeric fibers and their impact in biomedicine and related fields. The development of different instruments, such as sensors, medical fibers, and textiles are discussed, along with how they greatly benefited by progress made in polymeric fibers. The book provides a comprehensive and updated reference on the latest research in the field of biopolymers and their composites in relation to medical applications. Provides a valuable resource of recent scientific progress, highlighting the application and use of polymeric fibers in biomedical engineering that can be used by researchers, engineers and academics Includes novel opportunities and ideas for developing or improving technologies in biopolymers by companies, biomedical industries, and other sectors Features at least 50% of references from the last 2-3 years

Regenerative Medicine and Stem Cell Therapy for the Eye - Brian G. Ballios 2019-02-18

This book provides an overview of the types, sources, and applications of stem cells in regenerating various ocular tissues, with a perspective on both potential applications of stem cells and possible challenges. The scope of the chapters include both preclinical and clinical applications, including stem cell-derived therapies based on endogenous tissue repair; stem cell transplantation and cell replacement therapy; gene therapy; and in vitro disease modelling. Additionally, the volume presents applications in both anterior and posterior ocular disease, with a particular focus on diseases of the ocular surface, cornea, limbus, and retina, including inherited retinal dystrophies as well as acquired diseases, such as age-related macular degeneration. Regenerative Medicine and Stem Cell Therapy for the Eye is an ideal book for advanced researchers in stem cell and ocular biology as well as clinical ophthalmologists, and will be of interest to readers with backgrounds in developmental biology and bioengineering. This book also Skillfully reviews cutting-edge advances in stem cell biology as applied to regenerative medicine and ocular disease Provides expert viewpoints on key hurdles and challenges to successful implementation of stem cell-derived therapies in the clinical domain Offers a multi-disciplinary, broad understanding of cell-based therapies for ocular diseases by incorporating perspectives from biomedical scientists, physicians, and engineers Examines the

connection between cell therapy and gene editing, in particular relation to ocular disease

Cellulose Nanoparticles - Vijay Kumar Thakur 2021-07-09

Cellulose nanoparticles (CNP) are a class of bio-based nanoscale materials, which are of interest due to their unique structural features and properties such as biocompatibility, biodegradability, and renewability. They are promising candidates for applications including in biomedicine, pharmaceuticals, electronics, barrier films, nanocomposites, membranes, and supercapacitors. New resources, extraction procedures and treatments are currently under development to satisfy increasing demands for cost-effective and sustainable methods of manufacturing new types of cellulose nanoparticle-based materials on an industrial scale. Cellulose Nanoparticles: Chemistry and Fundamentals covers the synthesis, characterization and processing of cellulose nanomaterials. It aims to address the recent progress in the production methodologies for cellulose nanoparticles, covering principal cellulose resources and the main processes used for isolation. Chapters cover the preparation and characterisation of cellulose nanocrystals and nanofibrils. Together with Volume 2, these books form a useful reference work for graduate students and researchers in chemistry, materials science, nanoscience and green nanotechnology.

Smart Drug Delivery System - Ali Demir Sezer 2016-02-10

This contribution book collects reviews and original articles from eminent experts working in the interdisciplinary arena of novel drug delivery systems and their uses. From their direct and recent experience, the readers can achieve a wide vision on the new and ongoing potentialities of different smart drug delivery systems. Since the advent of analytical techniques and capabilities to measure particle sizes in nanometer ranges, there has been tremendous interest in the use of nanoparticles for more efficient methods of drug delivery. On the other hand, this reference discusses advances in the design, optimization, and adaptation of gene delivery systems for the treatment of cancer, cardiovascular, diabetic, genetic, and infectious diseases, and considers assessment and review procedures involved in the development of gene-based pharmaceuticals.

The Delivery of Nanoparticles - Abbass A. Hashim 2012-05-16

Nanoparticle is a general challenge for today's technology and the near future observations of science. Nanoparticles cover mostly all types of sciences and manufacturing technologies. The properties of this particle are flying over today scientific barriers and have passed the limitations of conventional sciences. This is the reason why nanoparticles have been evaluated for the use in many fields. InTech publisher and the contributing authors of this book in nanoparticles are all overconfident to invite all scientists to read this new book. The book's potential was held until it was approached by the art of exploring the most advanced research in the field of nano-scale particles, preparation techniques and the way of reaching their destination. 25 reputable chapters were framed in this book and there were alienated into four altered sections; Toxic Nanoparticles, Drug Nanoparticles, Biological Activities and Nano-Technology.

Application of Nanoparticles in Tissue Engineering - Sarah Afaq 2022-10-16

This book discusses advancements in the applications of nanoparticles in tissue engineering. It

examines the applications of nanobiomaterials in hard tissue regeneration, fabrication, and characterization. The book also analyzes the implication of three-dimensional and four-dimensional fabrication techniques for the production of the scaffold in tissue engineering and their advantages over conventional scaffold production techniques. Further, it presents smart materials used in making 4-D scaffolds that imitate the dynamic response of tissue against natural stimuli and adapt to the microenvironment by changing their conformation or other properties. It also summarizes the growing field of biomolecular detection and biosensors in tissue engineering and the increasing prominence of nanoparticles in the biosensors. Further, it provides the future outlook and associated challenges of the application of nanomaterials in tissue engineering.

2D Nanoarchitectures for Sensing/Biosensing Applications - Muhammad Asif 2022-10-17

Synthetic and Natural Nanofillers in Polymer Composites - N. M. Nurazzi 2023-03-10

Synthetic and Natural Nanofillers in Polymer Composites: Properties and Applications provides a detailed review of nanofiller-based composite materials and structures and discusses their current and potential applications in industrial sectors. The book covers the mechanisms of using nanofillers as reinforcement, materials selection, properties and performance, structures, design solutions, and manufacturing techniques. A broad range of different material classes are also discussed, with an emphasis on advanced materials. Other topics covered include the development and performance analysis of hybrid composites, their lifecycle analysis, the effects of different fiber loadings, and mechanical, thermal and electrical performance. This book will be a valuable reference resource for materials scientists, engineers and academic and industrial researchers working in the field of polymer composites, specifically nanocomposites and applications based on synthetic and nanofiller-reinforced composites. Covers both natural and synthetic filler-based composites and nanocomposites Provides the latest on materials selection, design solutions, manufacturing techniques, structural analysis and performance Includes case studies from leading industrial and academic experts who present cutting-edge research Presents various applications, including chemical sensors, aerospace, automotive, batteries and green packaging

3D and 4D Printing of Polymer Nanocomposite Materials - Kishor Kumar Sadasivuni 2019-10-11

3D and 4D Printing of Polymer Nanocomposite Materials: Processing, Applications, and Challenges covers advanced 3D and 4D printing processes and the latest developments in novel polymer-based printing materials, thus enabling the reader to understand and benefit from the advantages of this groundbreaking technology. The book presents processes, materials selection, and printability issues, along with sections on the preparation of polymer composite materials for 3D and 4D printing. Across the book, advanced printing techniques are covered and discussed thoroughly, including fused deposition modeling (FDM), selective laser sintering (SLS), selective laser melting (SLM), electron beam melting (EBM), inkjet 3D printing (3DP), stereolithography (SLA), and 3D plotting. Finally, major applications areas are discussed, including electronic, aerospace, construction and biomedical applications, with detailed information on the design, fabrication and processing methods required in each case. Provides a thorough, clear understanding of polymer preparation techniques and 3D and 4D printing processes, with a view to specific applications Examines synthesis, formation methodology, the dispersion of fillers, characterization, properties, and performance of polymer nanocomposites Explores the possibilities of 4D printing, covering the usage of stimuli responsive hydrogels and shape memory polymers

Polymer Functionalized Graphene - Arun Kumar Nandi 2021-06-28

This book will shed light on the synthesis, properties and applications of polymer functionalized graphene.

Innovation in Nano-polysaccharides for Eco-sustainability - Preeti Singh 2021-10-15

Innovation in Nano-polysaccharides for Eco-sustainability: From Science to Industrial Applications presents fundamentals, advanced preparation methods, and novel applications for polysaccharide-based nanomaterials. Sections cover the fundamental aspects of polysaccharides and nano-polysaccharides, including their structure and properties, surface modification, processing and characterization. Key considerations are explained in detail, including the connection between the substituents of polysaccharides and their resulting physical properties, renewable resources, their sustainable utilization, and specific high value applications, such as pharmaceuticals, photocatalysts, energy, and wastewater treatment, and more. This is a valuable resource for researchers, scientists, and advanced students across bio-based polymers, nanomaterials, polymer chemistry, sustainable materials, biology, materials science and engineering, and chemical engineering. In industry, this book will support scientists, R&D, and engineers looking to utilize bio-based materials in advanced industrial applications. Covers the fundamentals, mechanisms, preparation methods, unique properties and performance of nano-polysaccharide materials Explores sustainable applications of nano-polysaccharides in areas such as pharmaceuticals, energy and wastewater treatment Addresses key challenges, including the implementation of sustainable concepts in chemical design and paths to scalability and commercialization

Nanocellulose: A Multipurpose Advanced Functional Material - Guang Yang 2021-11-18

Drs. Ullah and Yang hold patents related to cellulose material. All other Topic Editors declare no competing interests with regard to the Research Topic subject. This Research Topic is dedicated to Prof. Lina Zhang on the occasion of her 80th Birthday, in gratitude, esteem, and affection.

Green Synthesis of Nanomaterials - Giovanni Benelli 2019-11-18

Nanomaterials possess astonishing physical and chemical properties. They play a key role in the development of novel and effective drugs, catalysts, sensors, and pesticides, to cite just a few examples. Notably, the synthesis of nanomaterials is usually achieved with chemical and physical methods needing the use of extremely toxic chemicals or high-energy inputs. To move towards more eco-friendly processes, researchers have recently focused on so-called “green synthesis”, where microbial, animal-, and plant-borne compounds can be used as cheap reducing and stabilizing agents to fabricate nanomaterials. Green synthesis routes are cheap, environmentally sustainable, and can lead to the fabrication of nano-objects with controlled sizes and shapes—two key features determining their bioactivity. However, real-world applications of green-fabricated nanomaterials are largely unexplored. Besides, what do we really know about their non-target toxicity? Which are their main modes of action? What is their possible fate in the environment? In this framework, the present Special Issue will include articles by expert authorities on nanomaterials synthesis and applications. Special emphasis will be placed on their impact on the environment and long-term toxicity.

[Cell Mechanoresponse at Cell-Material Interface](#) - Qiang Wei 2022-02-01

Environmental Nanotechnology - Nandita Dasgupta 2018-05-15

This book presents the environmental benefits of nanomaterials in agriculture, water purification and nanomedicine. Nanotechnology will modify the environment both in a positive and negative way. On the one hand, new nanomaterials are promising for reducing greenhouse gases, cleaning toxic wastes and building alternative energy sources. On the other hand, some toxic nanoparticles enter and disrupt ecosystems. Therefore, research should focus on the sustainable use of nanomaterials to avoid environmental contamination. This volume is the first of several volumes on Environmental Nanotechnology, which will be published in the series Environmental Chemistry for a Sustainable World.

Nanobiomaterials Science, Development and Evaluation - Mehdi Razavi 2017-05-22

Nanobiomaterials Science, Development and Evaluation examines the practical aspects of producing nanostructured biomaterials for a range of applications. With a strong focus on materials, such as metals, ceramics, polymers, and composites, the book also examines

nanostructured coatings and toxicology aspects. Chapters in Part One look at materials classes and their synthesis with information on all major material groups. Part Two focuses on nanostructured coatings and practical aspects associated with the use of nanobiomaterials in vivo. This book brings together the work of international contributors who are actively engaged on the forefront of research in their respective disciplines, and is a valuable resource for materials scientists in academia, industry, and all those who wish to broaden their knowledge in the allied field. Focuses on the synthesis and evaluation techniques for a range of nanobiomaterials Examines nanostructured inorganic coatings for biomaterials Discusses issues related to the toxicology of nanobiomaterials Presents the practical aspects of nanobiomaterials *Electrochemistry Volume 16* - Craig Banks 2021-12-10

Providing the reader with an up to date digest of the most important current research carried out in the field, this volume is compiled and written by leading experts from across the globe. It reviews the trends in electrochemical sensing and its applications and touches on research areas from a diverse range including microbial electrosynthesis for bio-based production using renewable electricity and recent advances in inorganic nanostructured materials for electrochemical water splitting. The reviews of established and current interest in the field make this book a key reference for researchers in this exciting and developing area.

Nanobiomaterials in Hard Tissue Engineering - Alexandru Grumezescu 2016-02-10

Nanobiomaterials in Hard Tissue Engineering covers the latest developments in the field of hard tissue engineering at the nanoscale. Leading researchers from around the world discuss the latest research and offer new insights. This book presents data about the fabrication and characterization of nanobiomaterials involved in hard tissue reconstruction, describing recent progress and the advantages of both conventional and computer-aided methods. Recent applications of different classes of nanobiomaterials are discussed, with in vitro and in vivo applications also explained in detail. Special attention is paid to the applications of nanobiomaterials in bone regeneration and in the development of functional coatings for tailored implants to improve osseointegration. Finally, the book considers future challenges and perspectives. This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians. An up-to-date and highly structured guide for researchers, practitioners and students working in biomedical, biotechnological and engineering fields A detailed and invaluable overview of hard tissue engineering, an increasingly important field Proposes novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology

Nanomaterials for Drug Delivery and Therapy - Alexandru Mihai Grumezescu 2019-03-14

Nanomaterials for Drug Delivery and Therapy presents recent advances in the field of nanobiomaterials and their important applications in drug delivery, therapy and engineering. The book offers pharmaceutical perspectives, exploring the development of nanobiomaterials and their interaction with the human body. Chapters show how nanomaterials are used in treatments, including neurology, dentistry and cancer therapy. Authored by a range of contributors from global institutions, this book offers a broad, international perspective on how nanotechnology-based advances are leading to novel drug delivery and treatment solutions. It is a valuable research resource that will help both practicing medics and researchers in pharmaceutical science and nanomedicine learn more on how nanotechnology is improving treatments. Assesses the opportunities and challenges of nanotechnology-based drug delivery systems Explores how nanotechnology is being used to create more efficient drug delivery systems Discusses which nanomaterials make the best drug carriers

Single-Chain Polymer Nanoparticles - José A. Pomposo 2017-08-18

This first book on this important and emerging topic presents an overview of the very latest results obtained in single-chain polymer nanoparticles obtained by folding synthetic single

polymer chains, painting a complete picture from synthesis via characterization to everyday applications. The initial chapters describe the synthetic methods as well as the molecular simulation of these nanoparticles, while subsequent chapters discuss the analytical techniques that are applied to characterize them, including size and structural characterization as well as scattering techniques. The final chapters are then devoted to the practical applications in nanomedicine, sensing, catalysis and several other uses, concluding with a look at the future for such nanoparticles. Essential reading for polymer and materials scientists, materials engineers, biochemists as well as environmental chemists.

Biomaterials and Regenerative Medicine in Ophthalmology - Traian Chirila 2009-12-18

With an increasingly aged population, eye diseases are becoming more widespread. Biomaterials have contributed in recent years to numerous medical devices for the restoration of eyesight, improving many patients' quality of life. Consequently, biomaterials and regenerative medicine are becoming increasingly important to the advances of ophthalmology and optometry.

Biomaterials and regenerative medicine in ophthalmology reviews the present status and future direction of biomaterials and regenerative medicine in this important field. Part one discusses applications in the anterior segment of the eye with chapters on such topics as advances in intraocular lenses (IOLs), synthetic corneal implants, contact lenses, and tissue engineering of the lens. Part two then reviews applications in the posterior segment of the eye with such chapters on designing hydrogels as vitreous substitutes, retinal repair and regeneration and the development of tissue engineered membranes. Chapters in Part three discuss other pertinent topics such as hydrogel sealants for wound repair in ophthalmic surgery, orbital enucleation implants and polymeric materials for orbital reconstruction. With its distinguished editor and international team of contributors, Biomaterials and regenerative medicine in ophthalmology is a standard reference for scientists and clinicians, as well as all those concerned with this ophthalmology. Reviews the increasingly important role of biomaterials and regenerative medicine in the advancement of ophthalmology and optometry Provides an overview of the present status and future direction of biomaterials and regenerative medicine in this important field Discusses applications in both the anterior and posterior segments of the eye with chapters on such topics as synthetic corneal implants and retinal repair and regeneration

Cardiovascular Regenerative Medicine - Vahid Serpooshan 2019-06-29

This book is a comprehensive and up-to-date resource on the use of regenerative medicine for the treatment of cardiovascular disease. It provides a much-needed review of the rapid development and evolution of bio-fabrication techniques to engineer cardiovascular tissues as well as their use in clinical settings. The book incorporates recent advances in the biology, biomaterial design, and manufacturing of bioengineered cardiovascular tissue with their clinical applications to bridge the basic sciences to current and future cardiovascular treatment. The book begins with an examination of state-of-the-art cellular, biomaterial, and macromolecular technologies for the repair and regeneration of diseased heart tissue. It discusses advances in nanotechnology and bioengineering of cardiac microtissues using acoustic assembly. Subsequent chapters explore the clinical applications and translational potential of current technologies such as cardiac patch-based treatments, cell-based regenerative therapies, and injectable hydrogels. The book examines how these methodologies are used to treat a variety of cardiovascular diseases including myocardial infarction, congenital heart disease, and ischemic heart injuries. Finally, the volume concludes with a summary of the most prominent challenges and perspectives on the field of cardiovascular tissue engineering and clinical cardiovascular regenerative medicine. Cardiovascular Regenerative Medicine is an essential resource for physicians, residents, fellows, and medical students in cardiology and cardiovascular regeneration as well as clinical and basic researchers in bioengineering, nanomaterial and technology, and cardiovascular biology.

2D Functional Nanomaterials - Ganesh S. Kamble 2022-03-14

2D Functional Nanomaterials Outlines the latest developments in 2D heterojunction

nanomaterials with energy conversion applications In *2D Functional Nanomaterials: Synthesis, Characterization, and Applications*, Dr. Ganesh S. Kamble presents an authoritative overview of the most recent progress in the rational design and synthesis of 2D nanomaterials and their applications in semiconducting catalysts, biosensors, electrolysis, batteries, and solar cells. This interdisciplinary volume is a valuable resource for materials scientists, electrical engineers, nanoscientists, and solid-state physicists looking for up-to-date information on 2D heterojunction nanomaterials. The text summarizes the scientific contributions of international experts in the fabrication and application of 2D nanomaterials while discussing the importance and impact of 2D nanomaterials on future economic growth, novel manufacturing processes, and innovative products. Provides thorough coverage of graphene chemical derivatives synthesis and applications, including state-of-the-art developments and perspectives Describes 2D/2D graphene oxide-layered double hydroxide nanocomposites for immobilization of different radionuclides Covers 2D nanomaterials for biomedical applications and novel 2D nanomaterials for next-generation photodetectors Discusses applications of 2D nanomaterials for cancer therapy and recent trends in graphene-latex nanocomposites Perfect for materials scientists, inorganic chemists, and electronics engineers, *2D Functional Nanomaterials: Synthesis, Characterization, and Applications* is also an essential resource for solid-state physicists seeking accurate information on recent progress in two-dimensional heterojunction materials with energy conversion applications.

Polymer Nanocomposites in Biomedical Engineering - Kishor Kumar Sadasivuni 2019-01-29

This book presents a thorough discussion of the physics, biology, chemistry and medicinal science behind a new and important area of materials science and engineering: polymer nanocomposites. The tremendous opportunities of polymer nanocomposites in the biomedical field arise from their multitude of applications and their ability to satisfy the vastly different functional requirements for each of these applications. In the biomedical field, a polymer nanocomposite system must meet certain design and functional criteria, including biocompatibility, biodegradability, mechanical properties, and, in some cases, aesthetic demands. The content of this book builds on what has been learnt in elementary courses about synthesising polymers, different nanoparticles, polymer composites, biomedical requirements, uses of polymer nanocomposites in medicine as well as medical devices and the major mechanisms involved during each application. The impact of hybrid nanofillers and synergistic composite mixtures which are used extensively or show promising outcomes in the biomedical field are also discussed. These novel materials vary from inorganic/ceramic-reinforced nanocomposites for mechanical property improvement to peptide-based nanomaterials, with the chemistry designed to render the entire material biocompatible.

Reactive Polymers: Fundamentals and Applications - Johannes Karl Fink 2017-10-31

Reactive Polymers: Fundamentals and Applications: A Concise Guide to Industrial Polymers, Third Edition introduces engineers and scientists to a range of reactive polymers and then details their applications and performance benefits. Basic principles and industrial processes are described for each class of reactive resin (thermoset), as well as additives, the curing process, applications and uses. The initial chapters are devoted to individual resin types (e.g., epoxides, cyanacrylates), followed by more general chapters on topics such as reactive extrusion and dental applications. Injection molding of reactive polymers, radiation curing, thermosetting elastomers, and reactive extrusion equipment are covered as well. The use of reactive polymers enables manufacturers to make chemical changes at a late stage in the production process, which, in turn, cause changes in performance and properties. Material selection and control of the reaction are essential to achieve optimal performance. Material new to this edition includes the most recent developments, applications and commercial products for each chemical class of thermosets, as well as sections on fabrication methods, reactive biopolymers, recycling of reactive polymers and case studies. Covers the basics and most recent developments, including reactive biopolymers, recycling of reactive polymers, nanocomposites and fluorosilicones Offers

an indispensable guide for engineers and advanced students alike Provides extensive literature and patent review Reflects a thorough review of all literature published in this area since 2014 Features revised and updated chapters to reflect the latest research in reactive polymers [Biomaterial Fabrication Techniques](#) - Adnan Haider 2022-11-22

This reference is a guide to biomaterial fabrication techniques. The book comprises ten chapters introducing the reader to a range of biomaterial synthesis while highlighting biomedical applications. Each chapter presents a review of the topic followed by updated information about relevant core and applied concepts in an easy to understand format. The first two chapters present vital information about biomaterial components, such as polymer nanocomposites and scaffolds, and the strategies used for their fabrication. The proceeding chapters explain the principles of the most widely used fabrication techniques, and their application in detail. These include freeze drying, electrospinning, 3D printing, multiphoton lithography, particulate leaching, supramolecular self assembly, solvent casting and melt molding. The book is an essential primer on biomaterial synthesis for students and early career researchers in the field of biomedical engineering, applied chemistry and tissue engineering.

Microbial Fuel Cells - Inamuddin 2019-03-15

Microbial fuel cells are very promising as renewable energy sources. They are based on the direct conversion of organic or inorganic materials to electricity by utilizing microorganisms as catalysts. These cells are well suited for applications that require only low power, e.g. ultracapacitors, toys, electronic gadgets, meteorological buoys, remote sensors, digital wristwatches, smartphones and hardware in space and robots. In addition to electricity generation, microbial fuel cells can be used for wastewater treatment, desalination and biofuel production. The book addresses characterization techniques and operating conditions of microbial fuel cells, as well as the usefulness of various types of anode and cathode materials.

Dissertation Abstracts International - 2002

Carbon Nanostructures for Biomedical Applications - Tatiana Da Ros 2021-02-15

Carbon nanostructures, namely fullerenes, single and multiwall carbon nanotubes, graphene as well as the most recent graphene quantum dots and carbon nanodots, have experienced a tremendous progress along the last two decades in terms of the knowledge acquired on their chemical and physical properties. These insights have enabled their increasing use in biomedical applications, from scaffolds to devices. Edited by renowned experts in the subject, this book collects and delineates the most notable advances within the growing field surrounding carbon nanostructures for biomedical purposes. Exploration ranges from fundamentals around classifications to toxicity, biocompatibility and the immune response. Modified nanocarbon-based materials and emergent classes, such as carbon dots and nanohorns are discussed, with chapters devoted from carriers for drug delivery and inhibitors of emergent viruses infection, to applications across imaging, biosensors, tissue scaffolding and biotechnology. The book will provide a valuable reference resource and will extensively benefit researchers and professionals working across the fields of chemistry, materials science, and biomedical and chemical engineering.

Smart Materials for Tissue Engineering - Qun Wang 2017-05-03

In the last couple of decades, research in the area of tissue engineering has witnessed tremendous progress. The focus has been on replacing or facilitating the regeneration of damaged or diseased cell, tissue or organs by applying a biomaterial support system, and a combination of cells and bioactive molecules. In addition new smart materials have been developed which provide opportunities to fabricate, characterize and utilize materials systematically to control cell behaviours and tissue formation by biomimetic topography that closely replicate the natural extracellular matrix. Following on from *Smart Materials for Tissue Engineering: Fundamental Principles*, this book comprehensively covers the different uses of smart materials in tissues engineering, providing a valuable resource for biochemists, materials

scientists and biomedical engineers working in industry and academia.

Soft Matter And Biomaterials On The Nanoscale: The Wspc Reference On Functional Nanomaterials - Part I (In 4 Volumes) - 2020-06-24

This book is indexed in Chemical Abstracts ServiceSoft and bio-nanomaterials offer a tremendously rich behavior due to the diversity and tailorability of their structures. Built from polymers, nanoparticles, small and large molecules, peptoids and other nanoscale building blocks, such materials exhibit exciting functions, either intrinsically or through the engineering of their organization and combination of blocks. Thus, it is not surprising that a variety of challenges, for example, in energy storage, environment protection, advanced manufacturing, purification and healthcare, can be addressed using these materials. The recent advances in understanding the behavior of soft matter and biomaterials are being actively translated into functional materials systems and devices, which take advantages of newly discovered and specifically created morphologies with desired properties. This major reference work presents a detailed overview of recent research developments on fundamental and application-inspired aspects of soft and bio-nanomaterials and their emerging functions, and will be divided into four volumes: Vol 1: Soft Matter under Geometrical Confinement: From Fundamentals at Planar Surfaces and Interfaces to Functionalities of Nanoporous Materials; Vol 2: Polymers on the Nanoscale: Nano-structured Polymers and Their Applications; Vol 3: Bio-Inspired Nanomaterials: Nanomaterials Built from Biomolecules and Using Bio-derived Principles; Vol 4: Nanomedicine: Nanoscale Materials in Nano/Bio Medicine.

Design and Investment of High Voltage NanoDielectrics - Mohamed, Ahmed Thabet 2020-08-21
Nanotechnology has emerged as a trending research area as its industrial uses continue to multiply. Some specific areas that have benefited from the dynamic properties of nanomaterials are high voltage electronics and electrical engineering. Nanoparticles have created new avenues for engineers to explore within these fields; however, significant research on this subject is lacking. *Design and Investment of High Voltage NanoDielectrics* is a collection of innovative research on the methods and application of nanoparticles in high voltage insulations and dielectric properties. This book discusses the wide array of uses nanoparticles have within high voltage electrics engineering and the diverse polymeric properties that nanomaterials help make prevalent. While highlighting topics including electrical degradation, magnetic materials, and fundamental polymers, this book is ideally designed for researchers, engineers, industry professionals, practitioners, scientists, managers, manufacturers, analysts, students, and educators seeking current research on the dielectric properties of modern nanocomposite materials.

Novel Biocomposite Engineering and Bio-Applications - Gary Chinga Carrasco 2019-01-17

This book is a printed edition of the Special Issue "Novel Biocomposite Engineering and Bio-Applications" that was published in *Bioengineering*

Hybrids Part A: Hybrids for Tissue Regeneration - Kai Zheng 2021-10-01

Antimicrobial Resistance in Developing Countries - Aníbal de J. Sosa 2009-10-08

Avoiding infection has always been expensive. Some human populations escaped tropical infections by migrating into cold climates but then had to procure fuel, warm clothing, durable housing, and crops from a short growing season. Waterborne infections were averted by owning your own well or supporting a community reservoir. Everyone got vaccines in rich countries, while people in others got them later if at all. Antimicrobial agents seemed at first to be an exception. They did not need to be delivered through a cold chain and to everyone, as vaccines did. They had to be given only to infected patients and often then as relatively cheap injectables or pills off a shelf for only a few days to get astonishing cures. Antimicrobials not only were better than most other innovations but also reached more of the world's people sooner. The problem appeared later. After each new antimicrobial became widely used, genes expressing resistance to it began to emerge and spread through bacterial populations. Patients infected

with bacteria expressing such resistance genes then failed treatment and remained infected or died. Growing resistance to antimicrobial agents began to take away more and more of the cures that the agents had brought.

Biochemistry of Collagens, Laminins and Elastin - Morten Karsdal 2019-05-28

There are 28 different collagens, with 46 unique chains, which allows for a collagen for each time and place. Some collagens are specialized for basement membrane, whereas others are the central structural component of the interstitial matrix. There are eight collagens among the 20 most abundant proteins in the body, which makes these molecules essential building blocks of tissues. In addition, lessons learned from monogenomic mutations in these proteins result in grave pathologies, exemplifying their importance in development. These molecules, and their post-translationally modified products serve as biomarkers of diseases in a range of pathologies associated with the extracellular matrix. *Biochemistry of Collagens, Laminins, and Elastin: Structure, Function, and Biomarkers, Second Edition* provides researchers and students current data on key structural proteins (collagens, laminins, and elastin), reviews on how these molecules affect pathologies, and information on how selected modifications of proteins can result in altered signaling properties of the original extracellular matrix component. Further, it discusses the novel concept that an increasing number of components of the extracellular matrix harbor cryptic signaling functions that may be viewed as endocrine function, and it highlights how this knowledge can be exploited to modulate fibrotic disease. Provides an updated comprehensive introduction to collagen and structural proteins Gives insight into emerging analytical technologies that can detect biomarkers of extracellular matrix degradation Includes seven new chapters, including one on how collagen biomarkers are used in clinical research to support drug development and in precision medicine Contains insights into the biochemical interactions and changes to structural composition of proteins in disease states Proves the importance of proteins for collagen assembly, function, and durability

Biomaterials Science - William R Wagner 2020-05-23

The revised edition of the renowned and bestselling title is the most comprehensive single text on all aspects of biomaterials science from principles to applications. *Biomaterials Science*, fourth edition, provides a balanced, insightful approach to both the learning of the science and technology of biomaterials and acts as the key reference for practitioners who are involved in the applications of materials in medicine. This new edition incorporates key updates to reflect the latest relevant research in the field, particularly in the applications section, which includes the latest in topics such as nanotechnology, robotic implantation, and biomaterials utilized in cancer research detection and therapy. Other additions include regenerative engineering, 3D printing, personalized medicine and organs on a chip. Translation from the lab to commercial products is emphasized with new content dedicated to medical device development, global issues related to translation, and issues of quality assurance and reimbursement. In response to customer feedback, the new edition also features consolidation of redundant material to ensure clarity and focus. *Biomaterials Science*, 4th edition is an important update to the best-selling text, vital to the biomaterials' community. The most comprehensive coverage of principles and applications of all classes of biomaterials Edited and contributed by the best-known figures in the biomaterials field today; fully endorsed and supported by the Society for Biomaterials Fully revised and updated to address issues of translation, nanotechnology, additive manufacturing, organs on chip, precision medicine and much more. Online chapter exercises available for most chapters

Encyclopedia of Renewable and Sustainable Materials - 2020-01-09

Encyclopedia of Renewable and Sustainable Materials provides a comprehensive overview, covering research and development on all aspects of renewable, recyclable and sustainable materials. The use of renewable and sustainable materials in building construction, the automotive sector, energy, textiles and others can create markets for agricultural products and additional revenue streams for farmers, as well as significantly reduce carbon dioxide (CO₂)

emissions, manufacturing energy requirements, manufacturing costs and waste. This book provides researchers, students and professionals in materials science and engineering with tactics and information as they face increasingly complex challenges around the development, selection and use of construction and manufacturing materials. Covers a broad range of topics not available elsewhere in one resource Arranged thematically for ease of navigation Discusses key features on processing, use, application and the environmental benefits of renewable and sustainable materials Contains a special focus on sustainability that will lead to the reduction of carbon emissions and enhance protection of the natural environment with regard to sustainable materials

Orthopedic Biomaterials - Bingyun Li 2018-03-22

This book covers the latest advances, applications, and challenges in orthopedic biomaterials. Topics covered include materials for orthopedic applications, including nanomaterials, biomimetic materials, calcium phosphates, polymers, biodegradable metals, bone grafts/implants, and biomaterial-mediated drug delivery. Absorbable orthopedic biomaterials and challenges related to orthopedic biomaterials are covered in detail. This is an ideal book for graduate and undergraduate students, researchers, and professionals working with orthopedic biomaterials and tissue engineering. This book also: Describes biodegradable metals for orthopedic applications, such as Zn-based medical implants Thoroughly covers various materials for orthopedic applications, including absorbable orthopedic biomaterials with a focus on polymers Details the state-of-the-art research on orthopedic nanomaterials and nanotechnology