

# Read Book Plant Derived Nanostructures Types And Applications Pdf For Free

Nanostructured Materials for Energy Related Applications Nanostructured Materials Fabrication of Metal–Organic Framework Derived Nanomaterials and Their Electrochemical Applications Bioactivity of Engineered Nanoparticles Nano-biotechnology for Waste Water Treatment Biogenic Nanoparticles for Cancer Theranostics Advances in Polymer Derived Ceramics and Composites Nanoscience Volume 8 An Introduction to Green Nanotechnology 1D Oxide Nanostructures Obtained by Sol-Gel and Hydrothermal Methods Metal Oxide Nanostructures Multifunctional Hybrid Nanomaterials for Sustainable Agri-food and Ecosystems Nanotechnology Phytonanotechnology 21st Century Nanoscience – A Handbook Nanotechnology in Agriculture and Food Science Reducing Agents in Colloidal Nanoparticle Synthesis Sustainable Nanotechnology for Environmental Remediation Nanoparticle Drug Delivery Systems for Cancer Treatment Metal Oxide-Based Heterostructures Nano-Biopesticides Today and Future Perspectives Nanomaterials and Plant Potential Insights into the World of Diatoms: From Essentials to Applications Nanoscience and Plant–Soil Systems Tailor-Made Polysaccharides in Biomedical Applications Advances in Green and Sustainable

Nanomaterials Food Applications of Nanotechnology Light Trapping with Plasmonic Back Contacts in Thin-Film Silicon Solar Cells Industrial Applications of Nanomaterials Smart Nanostructure Materials and Sensor Technology Solid Catalysts for the Upgrading of Renewable Sources Sugarcane Biorefinery, Technology and Perspectives Nanostructured Thin Films and Coatings Biomass-Based Functional Carbon Nanostructures for Supercapacitors Nanostructured Materials for Environmental Applications Nanocellulose and Nanohydrogel Matrices Handbook of Nanocelluloses Advances in Green Synthesis Biodegradable Polymers Nanotechnology for the Preparation of Cosmetics using Plant-Based Extracts

Nanoparticle Drug Delivery Systems for Cancer Treatment Oct 19 2021 In recent years, nanoparticles—bionanomaterials with specific physicochemical properties—have gained a great deal of scientific interest owing to their unique structure. Nanoparticle-based drugs are now widely regarded as a safer, more precise, and more effective mode of cancer therapy, considering their ability to enhance drug bioavailability, improve site-specific drug delivery, and protect nontarget tissues from toxic therapeutic drugs. This book compiles and details cutting-edge research in nanomedicine from an interdisciplinary team of international cancer researchers who are currently revolutionizing drug delivery techniques through the development of nanomedicines and nanotheranostics. Edited by Hala Gali-Muhtasib and Racha Chouaib, two prominent cancer researchers, this book will appeal to anyone involved in nanotechnology, cancer therapy, or drug delivery research.

**Fabrication of Metal–Organic Framework Derived Nanomaterials and Their Electrochemical Applications** Mar 04 2023 This thesis systematically introduces readers to a new metal-organic framework approach to fabricating nanostructured materials for electrochemical applications. Based on

the metal-organic framework (MOF) approach, it also demonstrates the latest ideas on how to create optimal MOF and MOF-derived nanomaterials for electrochemical reactions under controlled conditions. The thesis offers a valuable resource for researchers who want to understand electrochemical reactions at nanoscale and optimize materials from rational design to achieve enhanced electrochemical performance. It also serves as a useful reference guide to fundamental research on advanced electrochemical energy storage materials and the synthesis of nanostructured materials.

**Tailor-Made Polysaccharides in Biomedical Applications** Apr 12 2021 Tailor-Made Polysaccharides in Biomedical Applications provides extensive details on all the vital precepts, basics, and fundamental aspects of tailored polysaccharides in the pharmaceutical and biotechnological industries. This information provides readers with the foundation for understanding and developing high-quality products. The utilization of natural polymeric excipients in numerous healthcare applications demands the replacement of the synthetic polymers with natural polymers. Natural polymers are superior in terms of biocompatibility, biodegradability, economic extraction, and ready availability. Natural polymers are especially useful in that they are a renewable source of raw materials, as long as they are grown sustainably. Among these natural polymers, polysaccharides are considered as excellent excipients because they are nontoxic, stable, and biodegradable. Several research innovations have been carried out using polysaccharides in drug delivery applications. This book offers a comprehensive resource to understand the potential of these materials in forming new drug delivery methods. It will be useful to biomedical researchers, chemical engineers, regulatory scientists, and students who are actively involved in developing pharmaceutical products for biomedical applications by using tailor-made polysaccharides. Provides methodology for the design,

development, and selection of tailor-made polysaccharides in biomedical applications, including for particular therapeutic applications Includes illustrations demonstrating the mechanism of biological interaction of tailor-made polysaccharides Discusses the regulatory aspects and demonstrates the clinical efficacy of tailor-made polysaccharides

### **Nanotechnology for the Preparation of Cosmetics using Plant-Based Extracts** Dec 29 2019

Cosmetic manufacturers use nanoscale size ingredients to provide better UV protection, deeper skin penetration, long-lasting effects, increased color and finish quality. This approach enables the forming of nanoscale cosmetic ingredients, which can possess active components readily absorbed into the skin, repair damage easily, and promote improved product outcomes. Nanotechnology for the Preparation of Cosmetics using Plant-Based Extracts explores the various applications of nanotechnology in the cosmetic industry. Techniques for the development of cosmetic are a topic of increasing interest with widespread opportunities for potential applications in a broad range of industrial applications. The book covers a variety of techniques and processes, focusing on its potential applications in the field of skincare and makeup cosmetics. The book will cover not only conventional processes but also innovative and efficient techniques for the preparation of cosmetics exhibiting unique applications in the field. Nanotechnology for the Preparation of Cosmetics using Plant-Based Extracts is an important reference source for materials scientists, engineers and pharmaceutical scientists who want to learn more about the use of cosmetics prepared through nanotechnology to achieve the materials characteristics and enhancements in the mechanism and properties of makeup and skincare. Presents techniques for the design and manufacture of high-performance skincare products using nanotechnology Demonstrates systematic approaches and investigations for the design, synthesis, characterization and applications of various plant-based extracts in order to make them

effective ingredients for cosmetics creation Assesses the major challenges of using plant-based materials in the manufacture of cosmetic products

Food Applications of Nanotechnology Feb 08 2021 Food Applications of Nanotechnology, Volume 88, consolidates the literature on recent developments in nanotechnology, addressing production, safety and nutritional aspects pertaining to foods and nutraceuticals. Chapters in this new release include Assembled protein nanoparticles in food and nutrition applications, Nano-scale carbohydrate Materials in food/nutrition/agricultural applications, Nanotechnology-based colloidal delivery systems in foods, Electrospinning and Electrospaying in food, Bioavailability of nanotechnology-based bioactives and nutraceuticals, and more. Contains contributions from experts in the areas of food nano-science and technology Provides extensive citation of references to cover up-to-date and background literature Covers past, present and future aspects of food nano science and technology

**Metal Oxide-Based Heterostructures** Sep 17 2021 **Metal Oxide–Based Heterostructures: Fabrication and Applications** provides information on synthesis strategies, structural and hierarchical features, morphological characteristics of metal oxide–based heterostructures, and their diverse applications. This book begins with an introduction to the various multidimensional heterostructures, synthesis aspects, and techniques used to control the formation of heterostructures. Then, the impact of synthesis routes on the formation of mixed metal oxide heterostructures and their properties are analyzed. The effect of nonmetal doping, metal doping, and composites of metal oxide heterostructures on the properties of heterostructures is also addressed and that also includes opportunities for optimization of the material’s performance for specific applications. Special attention is given to the surface characteristics of the metal oxide heterostructures and their impact on the material’s performance, and the applications of metal oxide heterostructures in various fields such as environmental remediation,

sensing, organic catalysis, photovoltaics, light emitting materials, and hydrogen production. Introduces key principles for metal oxide heterostructures, their properties, key characteristics, and synthesis routes Emphasizes the relationship between synthesis strategies and material performance, including optimization strategies such as tailoring the material's surface characteristics or structure Discusses metal oxide heterostructures and their application in lighting and displays, energy, environment, and sensing

Reducing Agents in Colloidal Nanoparticle Synthesis Dec 21 2021 Nanoparticles can be synthesised via a number of methods, including chemical vapor deposition, ball milling, laser ablation, thermal decomposition and chemical reduction. Chemical reduction is usually preferred, due to its ease and cost-effectiveness. There are several types of compound used as reducing agents in nanoparticle synthesis, and one recent development is the use of biological entities as environmentally friendly reductants. This book will highlight the role of reducing agents in the chemical synthesis of nanoparticle systems, presenting the main categories of reducing agents, which vary on reactivity, selectivity, availability and toxicity. It will provide a comprehensive presentation of both modern and more conventional types of reagents. Emphasis will be given on the presentation not only of the functionality, but also of all the different advantages and limitations of each kind of reducing agent. With contributions from global experts, this title will be appropriate for graduate students and researchers in nanochemistry, colloidal synthesis, inorganic chemistry, organometallic chemistry, chemical engineering, physical chemistry, materials science, biology and physics.

**Advances in Polymer Derived Ceramics and Composites** Oct 31 2022 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.

*1D Oxide Nanostructures Obtained by Sol-Gel and Hydrothermal Methods* Jul 28 2022 This book presents wet chemical sol-gel and hydrothermal methods for 1D oxide nanostructure preparation. These methods represent an attractive route to multifunctional nanomaterials synthesis, as they are versatile, inexpensive and, thus, appropriate for obtaining a wide range of oxide materials with tailored morphology and properties. Three specific oxides ( $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{ZnO}$ ) are discussed in detail in order to illustrate the principle of the sol-gel and hydrothermal preparation of 1D oxide nanostructures. Other oxides synthesized via this method are also briefly presented. Throughout the book, the correlation between the tubular structure and the physico-chemical properties of these materials is highlighted. 1D oxide nanostructures exhibit interesting optical and electrical properties, due to their confined morphology. In addition, a well-defined geometry can be associated with chemically active species. For example, the pure  $\text{SiO}_2$  nanotubes presented a slight photocatalytic activity, while the Pt-doped  $\text{SiO}_2$  tubular materials act as microreactors in catalytic reactions. In the case of titania and titanate nanotubes, large specific surface area and pore volume, ion-exchange ability, enhanced light absorption, and fast electron-transport capability have attracted significant research interest. The chemical and physical modifications (microwave assisted hydrothermal methods) discussed here improve the formation kinetics of the nanotubes. The  $\text{ZnO}$  nanorods/tubes were prepared as random particles or as large areas of small, oriented 1D  $\text{ZnO}$  nanostructures on a variety of substrates. In the

latter case a sol-gel layer is deposited on the substrate prior to the hydrothermal preparation. Using appropriate dopants, coatings of ZnO nanorods with controlled electrical behavior can be obtained.

**Nanoscience and Plant–Soil Systems** May 14 2021 This book provides in-depth reviews of the effects of nanoparticles on the soil environment, their interactions with plants and also their potential applications as nanofertilizers and pesticides. It offers insights into the current trends and future prospects of nanotechnology, including the benefits and risks and the impact on agriculture and soil ecosystems. Individual chapters explore topics such as nanoparticle biosynthesis, engineered nanomaterials, the use of nanoclays for remediation of polluted sites, nanomaterials in water desalination, their effect on seed germination, plant growth, and nutrient transformations in soil, as well as the use of earthworms as bioremediating agents for nanoparticles. It is a valuable resource for researchers in academia and industry working in the field of agriculture, crop protection, plant sciences, applied microbiology, soil biology and environmental sciences.

Metal Oxide Nanostructures Jun 26 2022 **Metal Oxide Nanostructures: Synthesis, Properties and Applications** covers the theoretical and experimental aspects related to design, synthesis, fabrication, processing, structural, morphological, optical and electronic properties on the topic. In addition, it reviews surface functionalization and hybrid materials, focusing on the advantages of these oxide nanostructures. The book concludes with the current and future prospective applications of these materials. Users will find a complete overview of all the important topics related to oxide nanostructures, from the physics of the materials, to its application. Delves into hybrid structured metal oxides and their promising use in the next generation of electronic devices Includes fundamental chapters on synthesis design and the properties of metal oxide nanostructures Provides an in-depth overview of novel applications, including chromogenics, electronics and energy

*Biomass-Based Functional Carbon Nanostructures for Supercapacitors* Jul 04 2020 This book presents a widespread description of the synthesis and characterization of biomass-based carbon nanostructures. It also covers the vital applications of these materials in supercapacitors and for next-generation energy storage devices. It describes the common design procedures, advantages and disadvantages of biomass-based carbon nanostructures and offers novel visions into the forthcoming directions. In addition, this book will provide new updates about the effect of doping and structural twist on the electrochemical performance of electrode materials derived from biomass sources. The book will be useful for beginners, researchers, and professionals working in the area of carbon nanomaterials and their applications in energy storage devices.

*Nanostructured Thin Films and Coatings* Aug 05 2020 Authored by leading experts from around the world, the three-volume Handbook of Nanostructured Thin Films and Coatings gives scientific researchers and product engineers a resource as dynamic and flexible as the field itself. The first two volumes cover the latest research and application of the mechanical and functional properties of thin films and coatings, while the third volume explores the cutting-edge organic nanostructured devices used to produce clean energy. This second volume, *Nanostructured Thin Films and Coatings: Functional Properties*, focuses on functional properties (i.e., optical, electronic, and electrical) and related devices and applications. It also addresses topics such as: Large-scale fabrication of functional thin films using nanoarchitecture via chemical routes Fabrication and characterization of SiC nanostructured/nanocomposite films Low-dimensional nanocomposite fabrication and its applications Optical and optoelectronic properties of silicon nanocrystals embedded in SiO<sub>2</sub> matrix Electrical properties of silicon nanocrystals embedded in amorphous SiO<sub>2</sub> matrix Optical aspects of properties and applications of sol-gel-derived nanostructured thin films Controllably micro/nanostructured films

and devices Thin-film shape memory alloy for microsystem applications A complete resource, this handbook provides the detailed explanations that newcomers need, as well as the latest cutting-edge research and data for experts. Covering a wide range of mechanical and functional technologies, including those used in clean energy, these books also feature figures, tables, and images that will aid research and help professionals acquire and maintain a solid grasp of this burgeoning field. The Handbook of Nanostructured Thin Films and Coatings is composed of this volume and two others: Nanostructured Thin Films and Coatings: Mechanical Properties Organic Nanostructured Thin Film Devices and Coatings for Clean Energy

Nanoscience Volume 8 Sep 29 2022 This volume provides a critical and comprehensive assessment of the most recent research and opinion from across the globe for anyone practising in nano-allied fields or wishing to enter the nano-world.

**Handbook of Nanocelluloses** Mar 31 2020 This Handbook covers the fundamental aspects, experimental setup, synthesis, properties, and characterization of different nanocelluloses. It also explores the technology challenges of nanocelluloses and the emerging applications and the global markets of nanocelluloses-based systems. In particular, this book: · Covers the history of nanocelluloses, types and classifications, fabrication techniques, critical processing parameters, physical and chemical properties, surface functionalization, and other treatments to allow practical applications. · Covers all recent aspects of nanocelluloses technologies, from experimental set-up to industrial applications. · Includes new physical, chemical and biological techniques for nanocelluloses fabrication, in-depth treatment of their surface functionalization, and characterization. · Discusses the unique properties of nanocelluloses that can be obtained by modifying their diameter, morphology, composition and dispersion in other materials. · Discusses the properties and morphology of several

kinds of dispersion in polymeric materials, such as micro/nanofiberlated cellulose, cellulose nanofibers, cellulose nanocrystals, amorphous cellulose nanoparticles, and hybrid cellulose nanomaterials. · Presents the different techniques for dispersion, and self-assembly of polymeric materials, critical parameters of synthesis, modelling and simulation, and characterization methods. · Highlights a wide range of emerging applications of nanocelluloses, e.g. drug delivery, tissue engineering, medical implants, medical diagnostics and therapy, biosensors, catalysis, energy harvesting, energy storage, water/waste treatment, papermaking, textiles, construction industry, automotive, aerospace and many more. · Provides an outlook on the opportunities and challenges for the fabrication and manufacturing of nanocelluloses in industry. · Provides an in-depth look at the nature of nanocelluloses in terms of their applicability for industrial uses. · Provides in-depth insight and review on most recent types of nanocelluloses-based systems of unique structures and compositions. · Highlights the challenges and interdisciplinary perspective of nanocelluloses-based systems in science, biology, engineering, medicine, and technology, incorporating both fundamentals and applications. - Demonstrates how cutting-edge developments in nanofibers translate into real-world innovations in a range of industry sectors. This Handbook is a valuable reference for materials scientists, biologists, physicians, chemical, biomedical, manufacturing and mechanical engineers working in R&D industry and academia, who want to learn more about how nanocelluloses-based systems are commercially applied.

**An Introduction to Green Nanotechnology** Aug 29 2022 An Introduction to Green Nanotechnology, Volume 28, provides students, scientists and chemical engineers with an overview of several types of nanostructures, discusses the synthesis and characterization of nanostructures, and provides applications of nanotechnology in daily life. The book offers a foundation to green nanotechnology by

explaining why green nanotechnology is important. Covers biological sources in green nanotechnology, antioxidants, green nanostructures, mechanism, synthesis and characterization. The book ends with an evaluation of the risks of nanotechnology in human life and future perspectives. Introduces novel sources of plants having a high potential to be used as bio media to synthesize nanostructures Provides phytochemical properties and antioxidant potential, and their effects on stability, morphology and size of green nanostructures Includes a medicinal and technological comparison of green synthesized nanostructures to nano-products from non-green methods Uses accessible language, avoiding complex concepts of mathematics, biology and chemistry

**Light Trapping with Plasmonic Back Contacts in Thin-Film Silicon Solar Cells** Jan 10 2021

*Multifunctional Hybrid Nanomaterials for Sustainable Agri-food and Ecosystems* May 26 2022

Multifunctional Hybrid Nanomaterials for Sustainable Agrifood and Ecosystems shows how hybrid nanomaterials (HNMs) are being used to enhance agriculture, food and environmental science. The book discusses the synthesis and characterization of HNMs before exploring agrifoods and environmental functions. It shows how novel HNMs are being used for the detection and separation of heavy metal ions, for destroying and sensing of insecticides, in managed release fertilizer and pesticide formulations, plant protection, plant promotions, purification, detection, and to control mycotoxins. Further, the book describes the use of silica-based total nanosystems, carbon nanotubes, nanocellulose-based, and polymer nanohybrids for agricultural and biological applications. This book is an important reference source for materials scientists, engineers and food scientists who want to gain a greater understanding on how multifunctional nanomaterials are being used for a range of agricultural and environmental applications. Outlines the major nanomaterial types that are being used in agriculture Explains why the properties of multifunctional nanomaterials are particularly efficient for use in

agriculture Assesses the major challenges of using multifunctional nanomaterials on an industrial scale  
Biodegradable Polymers Jan 28 2020 Basic concepts on biodegradable biopolymer science are presented in this book, as well as techniques, analyses, standards, and essential criteria for the characterization of biodegradable materials obtained from biopolymers. The development and innovation of products and processes considering the environment are highlighted in this book. All of the applications described have been discussed from the point of view of sustainability. Additionally, this book highlights that biodegradability is a great burden when trying to replace, modify, and/or design existing products, and processes that are highly polluting. Finally, the present book concludes with reflections on the development of biopolymers in different areas, and some of their consequences depending on their biodegradability.

Nanostructured Materials for Environmental Applications Jun 02 2020 This book discusses how nanostructured materials play a key role in helping address environmental challenges. Employing nanostructured materials in catalysis can increase the efficient decomposition of toxic pollutants in air, water, and soil. This multidisciplinary book discusses the most promising nanostructured materials made-up of metals, metal oxides, metal chalcogenides, multi-metal oxides, carbon nanostructures, and hybrid materials that can address environmental remediation. It provides a well-referenced introduction to newcomers from allied disciplines and will be valuable to researchers in academia, industry, and government working on solutions to environmental problems.

**Nanotechnology in Agriculture and Food Science** Jan 22 2022 A comprehensive overview of the current state of this highly relevant topic. An interdisciplinary team of researchers reports on the opportunities and challenges of nanotechnology in the agriculture and food sector, highlighting the scientific, technical, regulatory, safety, and societal impacts. They also discuss the perspectives for the

future, and provide insights into ways of assuring safety so as to obtain confidence for the consumer, as well as an overview of the innovations and applications. Essential reading for materials and agricultural scientists, food chemists and technologists, as well as toxicologists and ecotoxicologists. *Advances in Green Synthesis* Feb 29 2020 This edited book focusses on green chemistry as the research community endeavours to create eco-friendly materials and technologies. It provides an in-depth overview of the fundamentals, key concepts and experimental techniques for eco-friendly synthesis of organic compounds and metal/metal oxide nanoparticles/nanomaterials. It also emphasizes the mechanisms, designing and industrial technologies for green synthesis and its applications. Each chapter brings the recent developments, state of the art, challenges and perspectives which cover all the aspects in one place, and which concern the green synthesis and evolution. Authored by world-renowned experts in a broad range of green chemistry sectors, this book is an archival reference guide for researchers, engineers, scientists and postgraduates working in the field of sustainable science, green chemistry, environmental science, engineering sciences and industrial technologies.

**Nanostructured Materials for Energy Related Applications** May 06 2023 This book describes the role and fundamental aspects of the diverse ranges of nanostructured materials for energy applications in a comprehensive manner. Advanced nanomaterial is an important and interdisciplinary field which includes science and technology. This work thus gives the reader an in depth analysis focussed on particular nanomaterials and systems applicable for technologies such as clean fuel, hydrogen generation, absorption and storage, supercapacitors, battery applications and more. Furthermore, it not only aims to exploit certain nanomaterials for technology transfer, but also exploits a wide knowledge on avenues such as biomass-derived nanomaterials, carbon dioxide conversions into renewable fuel chemicals using nanomaterials. These are the areas with lacunae that demand more research and

application.

**Smart Nanostructure Materials and Sensor Technology** Nov 07 2020 This book highlights the significance and usefulness of nanomaterials for the development of sensing devices and their real-life applications. The book also addresses various means of synthesizing 2D/3D nanomaterials, e.g., hydrothermal deposition process, electrospinning, Ostwald ripening, sputtering heterogeneous deposition, liquid-phase preparation, the vapor deposition approach, and aerosol flame synthesis. It presents an informative overview of the role of nanoscale materials in the development of advanced sensor devices at nanoscale and discusses the applications of nanomaterials in different forms prepared by diverse techniques in the field of optoelectronics and biomedical devices. Major features, such as type of nanomaterials, fabrication methods, applications, tasks, benefits and restrictions, and saleable features, are also covered.

Nanomaterials and Plant Potential Jul 16 2021 This book discusses the latest developments in plant-mediated fabrication of metal and metal-oxide nanoparticles, and their characterization by using a variety of modern techniques. It explores in detail the application of nanoparticles in drug delivery, cancer treatment, catalysis, and as antimicrobial agent, antioxidant and the promoter of plant production and protection. Application of these nanoparticles in plant systems has started only recently and information is still scanty about their possible effects on plant growth and development. Accumulation and translocation of nanoparticles in plants, and the consequent growth response and stress modulation are not well understood. Plants exposed to these particles exhibit both positive and negative effects, depending on the concentration, size, and shape of the nanoparticles. The impact on plant growth and yield is often positive at lower concentrations and negative at higher ones. Exposure to some nanoparticles may improve the free-radical scavenging potential and antioxidant enzymatic

activities in plants and alter the micro-RNAs expression that regulate the different morphological, physiological and metabolic processes in plant system, leading to improved plant growth and yields. The nanoparticles also carry out genetic reforms by efficient transfer of DNA or complete plastid genome into the respective plant genome due to their miniscule size and improved site-specific penetration. Moreover, controlled application of nanomaterials in the form of nanofertilizer offers a more synchronized nutrient fluidity with the uptake by the plant exposed, ensuring an increased nutrient availability. This book addresses these issues and many more. It covers fabrication of different/specific nanomaterials and their wide-range application in agriculture sector, encompassing the controlled release of nutrients, nutrient-use efficiency, genetic exchange, production of secondary metabolites, defense mechanisms, and the growth and productivity of plants exposed to different manufactured nanomaterials. The role of nanofertilizers and nano-biosensors for improving plant production and protection and the possible toxicities caused by certain nanomaterials, the aspects that are little explored by now, have also been generously elucidated.

**Nanostructured Materials** Apr 05 2023 This book discusses the early stages of the development of nanostructures, including synthesis techniques, growth mechanisms, the physics and chemistry of nanostructured materials, various innovative characterization techniques, the need for functionalization and different functionalization methods as well as the various properties of nanostructured materials. It focuses on the applications of nanostructured materials, such as mechanical applications, nanoelectronics and microelectronic devices, nano-optics, nanophotonics and nano-optoelectronics, as well as piezoelectric, agriculture, biomedical and, environmental remediation applications, and anti-microbial and antibacterial properties. Further, it includes a chapter on nanomaterial research developments, highlighting work on the life-cycle analysis of nanostructured materials and toxicity

aspects.

**21st Century Nanoscience – A Handbook** Feb 20 2022 This 21st Century Nanoscience Handbook will be the most comprehensive, up-to-date large reference work for the field of nanoscience. Handbook of Nanophysics by the same editor published in the fall of 2010 and was embraced as the first comprehensive reference to consider both fundamental and applied aspects of nanophysics. This follow-up project has been conceived as a necessary expansion and full update that considers the significant advances made in the field since 2010. It goes well beyond the physics as warranted by recent developments in the field. This seventh volume in a ten-volume set covers bioinspired systems and methods. Key Features: Provides the most comprehensive, up-to-date large reference work for the field. Chapters written by international experts in the field. Emphasises presentation and real results and applications. This handbook distinguishes itself from other works by its breadth of coverage, readability and timely topics. The intended readership is very broad, from students and instructors to engineers, physicists, chemists, biologists, biomedical researchers, industry professionals, governmental scientists, and others whose work is impacted by nanotechnology. It will be an indispensable resource in academic, government, and industry libraries worldwide. The fields impacted by nanophysics extend from materials science and engineering to biotechnology, biomedical engineering, medicine, electrical engineering, pharmaceutical science, computer technology, aerospace engineering, mechanical engineering, food science, and beyond.

*Biogenic Nanoparticles for Cancer Theranostics* Dec 01 2022 Biogenic Nanoparticles for Cancer Theranostics outlines the synthesis of biogenic nanoparticles to become cancer theranostic agents. The book also discusses their cellular interaction and uptake, pharmacokinetics, biodistribution, drug delivery efficiency, and other biological effects. Additionally, the book explores the mechanism of

their penetration in cancerous tissue, its clearance, and its metabolism. Moreover, the in vitro and in vivo toxicological effects of biogenic nanoparticles are discussed. This book is an important reference source for materials scientists and biomedical scientists who are looking to increase their understanding of how biogenic nanoparticles are being used for a range of cancer treatment types. Metal nanoparticles have traditionally been synthesized by classical physico-chemical methods which have many drawbacks, such as high energy demand, high cost and potential ecotoxicity. As a result, the biosynthesis of metal nanoparticles is gaining increasing prominence. Biosynthesis approaches to metal nanoparticles are clean, safe, energy efficient and environment friendly. Explains the synthesis methods and applications of biogenic nanoparticles for cancer theranostics Outlines the distinctive features of biogenic nanoparticles that make them effective cancer treatment agents Assesses the major challenges of using biogenic nanoparticles on a mass scale

Solid Catalysts for the Upgrading of Renewable Sources Oct 07 2020 The use of solid catalysts for the upgrade of renewable sources gives the opportunity to combine the two main cores of green chemistry, that is, on the one hand, the set-up of sustainable processes and, on the other, the use of biomass-derived materials. Solid catalysts have taken on a leading role in traditional petrochemical processes and could represent a key tool in new biorefinery-driven technologies. This book will cover topics related to the preparation and use of heterogeneous catalytic systems for the transformation of renewable sources, as well as of materials deriving from agro-industrial wastes and by-products. At the same time, the ever-increasing importance of bioproducts, due to the acceptance and request of consumers, makes the upgrade of biomass into chemicals and materials not only an environmental issue, but also an economical advantage.

Bioactivity of Engineered Nanoparticles Feb 03 2023 This book brings together reviews from

international experts who are exploring the biological activities of nanomaterials for medical applications or to better understand nanotoxicity. Topics include but are not limited to the following: 1) mechanistic understanding of nanostructure-bioactivity relationships; 2) the regulation of nanoparticles' bioactivity by means of chemical modification; 3) the new methodologies and standard methods used to assess nanoparticles' bioactivity; 4) the mechanisms involved in nanoparticle-biomolecule interactions and nanoparticle-cell interactions; and 5) biomedical applications of nanotechnology. The book will be a valuable resource for a broad readership in various subfields of chemical science, engineering, biology, environment, and medicine.

Sugarcane Biorefinery, Technology and Perspectives Sep 05 2020 Sugarcane Biorefinery, Technology and Perspectives provides the reader with a current view of the global scenario of sugarcane biorefinery, launching a new expectation on this important crop from a chemical, energy and sustainability point-of-view. The book explores the existing biorefinery platforms that can be used to convert sugarcane to new high value added products. It also addresses one of today's most controversial issues involving energy cane, in addition to the dilemma "sugar cane vs. food vs. the environment", adding even more value in a culture that is already a symbol of case study around the world. Focusing on the chemical composition of sugarcane, and the production and processes that optimize it for either agricultural or energy use, the book is designed to provide practical insights for current application and inspire the further exploration of options for balancing food and fuel demands. Presents the productive chain of sugarcane and its implications on food production and the environment Includes discussions on the evolution of the sustainable development of the sugar-energy sector Contextualizes and premises for the technological road mapping of energy-cane Provides information on new technologies in the sugar-energy sector

*Phytonanotechnology* Mar 24 2022 This book provides essential information on the role of phytonanotechnology in the removal of environmental pollutants and covers recent advances in experimental and theoretical studies on plant-derived nanoparticles. It also discusses their current and potential applications and challenges. The combination of nanotechnology and phytoremediation, which is called phytonanotechnology, have the potential to remove contaminants from the environment or degrade them. The efficiency of contaminant removal can be improved by combining both methods as they are complementary to each other. Phytonanotechnology offers the advantages of increased bioavailability, prolongation of heavy metal absorption time, and multiple metal removal, all contributing to improved efficacy and decreased toxicity in plants and surroundings. Therefore, there is immense scope for nature-derived molecules to be formulated into nanotechnology-based phytoremediation approaches targeting the specific heavy metal removal from effluents and surroundings. This encourages research initiatives to synthesize more phytonanotechnology based uptake plant systems with high efficiency. Efficient formulation targeting strategies and the evaluation of targeting efficiency of phytonanotechnology, conforming to international standards of their toxicology and biocompatibility, could pave the way for heavy metal uptake and removal by plant-based systems. This book serves as a valuable resource for postgraduate students, environmental scientists and materials scientists in academia and corporate research.

Nano-biotechnology for Waste Water Treatment Jan 02 2023 This book embodies the potentials of nanobiotechnology-based water treatment techniques to provide a solid understanding of the subjects. Starting with a refresher of the basic conventional technologies which are now been integrated with nanomaterials for an efficient, viable, and eco-friendly treatment of contaminated water. The book covers various physical, chemical, and hybrid methods of nanobiomaterial synthesis and their

fabrication for characterizing existing techniques. The book gives special attention to those nanotechnology-based approaches that promise easier, faster, and cheaper processes in contaminants monitoring and their treatment. Several case studies explain in an easy to understand format how employing nanobiomaterials as an indicator and analytical tool will enable students to learn about cleaning up the environment.

*Nanocellulose and Nanohydrogel Matrices* May 02 2020 This first book on nanocellulose and nanohydrogels for biomedical applications is unique in discussing recent advancements in the field, resulting in a comprehensive, well-structured overview of nanocellulose and nanohydrogel materials based nanocomposites. The book covers different types of nanocellulose materials and their recent developments in the drug delivery and nanomedicine sector, along with synthesis, characterization, as well as applications in the biotechnological and biomedical fields. The book also covers the current status and future perspectives of bacterial cellulose and polyester hydrogel matrices, their preparation, characterization, and tissue engineering applications of water soluble hydrogel matrices obtained from biodegradable sources. In addition, the chitosan-based hydrogel and nanogel matrices, their involvement in the current biofabrication technologies, and influencing factors towards the biomedical sector of biosensors, biopharmaceuticals, tissue engineering appliances, implant materials, diagnostic probes and surgical aids are very well documented. Further, the history of cellulose-based and conducting polymer-based nanohydrogels, their classification, synthesis methods and applicability to different sectors, the challenges associated with their use, recent advances on the inhibitors of apoptosis proteins are also included. The recent developments and applications in the drug delivery sector gives an overview of facts about the nanofibrillated cellulose and copoly(amino acid) hydrogel matrices in the biotechnology and biomedicine field. This book serves as an essential reference for

researchers and academics in chemistry, pharmacy, microbiology, materials science and biomedical engineering.

Insights into the World of Diatoms: From Essentials to Applications Jun 14 2021 This edited book provides a comprehensive and a reliable source of information on all major areas of diatom research. It addresses research advances in the key areas of diatom biology, morphology, systematics, phylogeny and ecology along with their interdisciplinary applications. Diatoms are the world's most diverse group of algae populating the freshwater and marine ecosystems of the world. They are unicellular, photosynthetic, eukaryotes having ornate silicified cell walls. Diatoms contribute around 25% of annual global carbon fixation, which is more than all of the terrestrial rainforests combined. Diatoms underpin major aquatic food webs and drive global biogeochemical cycles and have several ecological and interdisciplinary applications. This book targets a wide range of audience including researchers, academicians, teachers and students of varied disciplines such as biology, environmental sciences, ecology, evolution, nanotechnology and other related disciplines. It is useful read for beginners as well as advanced researchers.

*Nano-Biopesticides Today and Future Perspectives* Aug 17 2021 *Nano-Biopesticides Today and Future Perspectives* is the first single-volume resource to examine the practical development, implementation and implications of combining the environmentally aware use of biopesticides with the potential power of nanotechnology. While biopesticides have been utilized for years, researchers have only recently begun exploring delivery methods that utilize nanotechnology to increase efficacy while limiting the negative impacts traditionally seen through the use of pest control means. Written by a panel of global experts, the book provides a foundation on nano-biopesticide development paths, plant health and nutrition, formulation and means of delivery. Researchers in academic and commercial

settings will value this foundational reference of insights within the biopesticide realm. Provides comprehensive insights, including relevant information on environmental impact and safety, technology development, implementation, and intellectual property Discusses the role of nanotechnology and its potential applications as a nanomaterial in crop protection for a cleaner and greener agriculture Presents a strategic, comprehensive and forward-looking approach

Industrial Applications of Nanomaterials Dec 09 2020 *Industrial Applications of Nanomaterials* explains the industry based applications of nanomaterials, along with their environmental impacts, lifecycle analysis, safety and sustainability. This book brings together the industrial applications of nanomaterials with the incorporation of various technologies and areas, covering new trends and challenges. Significant properties, safety and sustainability and environmental impacts of synthesis routes are also explored, as are major industrial applications, including agriculture, medicine, communication, construction, energy, and in the military. This book is an important information source for those in research and development who want to gain a greater understanding of how nanotechnology is being used to create cheaper, more efficient products. Explains how different classes of nanomaterials are being used to create cheaper, more efficient products Explores the environmental impacts of using a variety of nanomaterials Discusses the challenges faced by engineers looking to integrate nanotechnology in new product development

*Advances in Green and Sustainable Nanomaterials* Mar 12 2021 Sustainable development has been gaining momentum in the modern world, and the use of nanomaterials in various applications is expanding. This volume explores the increasing valuable use of green nanomaterials in energy production and storage, in biomedical applications, and for agricultural and environmental sustainability. Providing an overview of the synthesis, characterization, and applications of green and

sustainable nanomaterials, the volume presents a varied selection of examples in practice. Key features include: Provides valuable information on standard protocols for the synthesis of green nanomaterials Promotes advanced technologies for applications of green and sustainable nanomaterials Demonstrates numerous characterization tools for working with sustainable nanomaterials Explores application areas of the synthesized nanomaterials .

**Sustainable Nanotechnology for Environmental Remediation** Nov 19 2021 Sustainable Nanotechnology for Environmental Remediation provides a single-source solution to researchers working in environmental, wastewater management, biological and composite nanomaterials applications. It addresses the potential environmental risks and uncertainties surrounding the use of nanomaterials for environmental remediation, giving an understanding of their impact on ecological receptors in addition to their potential benefits. Users will find comprehensive information on the application of state-of-the-art processes currently available to synthesize advanced green nanocomposite materials and biogenic nanomaterials. Other sections explore a wide range of promising approaches for green nanotechnologies and nanocomposites preparations. Case study chapters connect materials engineering and technology to the social context for a sustainable environment. Applications and different case studies provide solutions to the challenges faced by industry, thus minimizing negative social impacts. Provides information on the use of biologically mediated synthetic protocols to generate nanomaterials Discusses a wide range of promising approaches for green nanotechnologies and nanocomposites preparations Presents novel fabrication techniques for bionanocomposites, paving the way for the development of a new generation of advanced materials that can cope with spatiotemporal multi-variant environments

*Nanotechnology* Apr 24 2022 This book highlights the implications of nanotechnology and the effects

of nanoparticles on agricultural systems, their interactions with plants as well as their potential applications as fertilizers and pesticides. It also discusses how innovative, eco-friendly approaches to improve food and agricultural systems lead to increased plant productivity. Further, it offers insights into the current trends and future prospects of nanotechnology along with the benefits and risks and their impact on agricultural ecosystems. Nanomaterials in agriculture reduce the amount of chemical products sprayed by means of smart delivery of active ingredients; minimize nutrient losses in fertilization; and increase yields through optimized water and nutrient management. There is also huge potential for nanotechnology in the provision of state-of-the-art solutions for various challenges faced by agriculture and society, both today and in the future.

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