

The Effect Of Zinc Oxide Nano And Microparticles And Zinc

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Nanoscience and Plant-Soil Systems - Mansour Ghorbanpour 2017-02-14
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.

ZnO and TiO₂ Based Nanostructures - Andrea Lamberti 2018-10-15
This book is a printed edition of the Special Issue "ZnO and TiO₂ Based Nanostructures" that was published in *Nanomaterials*

Introduction to Cancer Biology - Momna Hejmadi 2014*

"Introduction to Cancer Biology is a short primer on how cancers develop and grow. The aim of this book is to provide a gentle exploration of the fundamental concepts in a easy-to-understand format, using examples and key figures for illustration. It is written in a style to help the reader

understand the six basic principles that inform our current understanding of cancer, at the molecular, cellular and physiological level. The text can be used either as a first step towards a deeper understanding of the mechanisms of cancer progression or it can be used as a quick revision guide. It would be suitable for anyone, with or without a background in biology."--Website.

Biochemical Toxicology - Muharrem Ince 2020-07-29

Biochemical Toxicology - Heavy Metals and Nanomaterials provides an overview of biochemical contamination, nanomaterials and toxic metals, and measurement techniques. It explains and clarifies important studies and compares and develops new and groundbreaking measurement techniques in the fields of organic and inorganic pollution and nanoscience. It is highly recommended for professionals and readers interested in the environment and human health.

Nanomaterial Biointeractions at the Cellular, Organismal and System Levels - Nilesh Sharma 2021-03-26

The range of nanomaterial applications has expanded recently from catalysis, electronics, and filtration to therapeutics, diagnostics, agriculture, and food because of unique properties and potentials of different nanoparticles and nanomaterials. Research shows that these exquisite particles can interact with an organism at the cellular, physiological, biochemical, and molecular levels. However, our

knowledge of how they affect these changes, selectively or generally, in diverse organism or ecosystems is very limited and far from satisfactory. Data indicate that the biological function largely depends on the shape, size, and surface characteristics of the nanoparticles used besides life cycle stages of an organism. Therefore, this compilation will focus on the body of work carried out by distinguished investigators using diverse nanomaterials and plant and animal species. This book includes specific case studies as well as general review articles highlighting aspects of multilayered interactions, and targets not only research and academic scholars but also the concerned industry and policy makers as well.

Leukemias - Margarita Guenova 2015-11-11

Hematology has constantly been advancing in parallel with technological developments that have expanded our understanding of the phenotypic, genetic, and molecular complexity and extreme clinical and biological heterogeneity of leukemias. This in turn allowed for developing more effective and less toxic alternative therapeutic approaches directed against critical molecular pathways in leukemic cells. The continuous and rather extensive influx of new information regarding the key features and underlying mechanisms as well as treatment options of leukemias requires frequent updating of this topic. The primary objective of this book is to provide the specialists involved in the clinical management and experimental research of acute and chronic leukemias with comprehensive and concise information on some important theoretical and practical developments in the biology, clinical assessment, and treatment of patients with leukemias; on specific clinical scenarios such as pregnancy or age; as well as on some molecular and pathogenetic mechanisms and their respective translation into novel therapies.

Nanotechnology and Plant Sciences - Manzer H. Siddiqui 2015-01-27

This book presents a holistic view of the complex and dynamic responses of plants to nanoparticles, the signal transduction mechanisms involved, and the regulation of gene expression. Further, it addresses the phytosynthesis of nanoparticles, the role of nanoparticles in the antioxidant systems of plants and agriculture, the beneficial and harmful effects of nanoparticles on plants, and the application of nanoparticles

and nanotubes to mass spectrometry, aiming ultimately at an analysis of the metabolomics of plants. The growing numbers of inventions in the field of nanotechnology are producing novel applications in the fields of biotechnology and agriculture. Nanoparticles have received much attention because of the unique physico-chemical properties of these compounds. In the life sciences, nanoparticles are used as “smart” delivery systems, prompting the Nobel Prize winner P. Ehrlich to refer to these compounds as “magic bullets.” Nanoparticles also play an important role in agriculture as compound fertilizers and nano-pesticides, acting as chemical delivery agents that target molecules to specific cellular organelles in plants. The influence of nanoparticles on plant growth and development, however, remains to be investigated. Lastly, this book reveals the research gaps that must be bridged in the years to come in order to achieve larger goals concerning the applications of nanotechnology in the plants sciences. In the 21st century, nanotechnology has become a rapidly emerging branch of science. In the world of physical sciences, nanotechnological tools have been exploited for a broad range of applications. In recent years, nanoparticles have also proven useful in several branches of the life sciences. In particular, nanotechnology has been employed in drug delivery and related applications in medicine.

Advanced Healthcare Materials - Ashutosh Tiwari 2014-05-09

Advanced materials are attracting strong interest in the fundamental as well as applied sciences and are being extensively explored for their potential usage in a range of healthcare technological and biological applications. Advanced Healthcare Nanomaterials summarises the current status of knowledge in the fields of advanced materials for functional therapeutics, point-of-care diagnostics, translational materials, up and coming bio-engineering devices. The book highlights the key features which enable engineers to design stimuli-responsive smart nanoparticles, novel biomaterials, nano/micro-devices for diagnosis, therapy (theranostics). The leading contributor researchers cover the following topics: State-of-the-art of biomaterials for human health Micro- and nanoparticles and their application in biosensors The role of

immunoassays Stimuli-responsive smart nanoparticles Diagnosis and treatment of cancer Advanced materials for biomedical application and drug delivery Nanoparticles for diagnosis and/or treatment of Alzheimers disease Hierarchical modelling of elastic behavior of human dentaltissue Biodegradable porous hydrogels Hydrogels in tissue engineering, drug delivery and woundcare Modified natural zeolites Supramolecular hydrogels based on cyclodextrinpoly(pseudo)rotaxane Polyhydroxyalkanoate-based biomaterials Biomimetic molecularly imprinted polymers The book is written for readers from diverse backgrounds across chemistry, physics, materials science and engineering, medical science, pharmacy, biotechnology, and biomedical engineering. It offers a comprehensive view of cutting-edge research on advanced materials for healthcare technology and applications.

Advances in Phytonanotechnology - Mansour Ghorbanpour

2019-05-21

Advances in Phytonanotechnology: From Synthesis to Application guides readers through various applications of nanomaterials on plants by presenting the latest research related to nanotechnology and nanomaterials on plant systems. The book focuses on the effects of these applications on plant morphology, physiology, biochemistry, ecology and genetics. Sections cover the impact on plant yield, techniques, a review of positive and negative impacts, and an overview of current policies regarding the use of nanotechnology on plants. Additionally, the book offers insights into the appropriate application of nanoscience to plants and crops for improved outcome and an exploration of their bioavailability and toxicity in the environment. Discusses the morphological, physiological and biochemical responses of plants to nanomaterials and the ability of the nanomaterials in modifying the genetic constitution of plants Emphasizes new applications of nanomaterials, including nanosensors technology and nanomaterials as nanocarriers based antimicrobial phytochemicals Presents the role of nanotechnology as a novel technique for the remediation of heavy metals by plants

Multifunctional Oxide-Based Materials: From Synthesis to Application -

Teofil Jesionowski 2019-09-03

The book deals with novel aspects and perspectives in metal oxide and hybrid material fabrication. The contributions are mainly focused on the search for a new group of advanced materials with designed physicochemical properties, especially an expanded porous structure and defined surface activity. The proposed technological procedures result in an enhanced activity of the synthesized hybrid materials, which is of great importance when considering their potential fields of application. The use of such materials in different technological disciplines, including aspects associated with environmental protection, allows for the verification of the proposed synthesis method. Thus, it can be stated that those aspects are of interdisciplinary character and may be located at the interface of three scientific disciplines—chemistry, materials science, and engineering—as well as environmental protection. Furthermore, the presented scientific scope is in some way an answer to the continuous demand for such types of materials and opens new perspectives for their practical use

Virulence Mechanisms of Bacterial Pathogens - Indira T. Kudva

2020-07-10

Ground-breaking overview of an enduring topic Despite the use of antibiotics, bacterial diseases continue to be a critical issue in public health, and bacterial pathogenesis remains a tantalizing problem for research microbiologists. This new edition of *Virulence Mechanisms of Bacterial Pathogens* broadly covers the knowledge base surrounding this topic and presents recently unraveled bacterial virulence strategies and cutting-edge therapies. A team of editors, led by USDA scientist Indira Kudva, compiled perspectives from experts to explain the wide variety of mechanisms through which bacterial pathogens cause disease: the host interface, host cell enslavement, and bacterial communication, secretion, defenses, and persistence. A collection of reviews on targeted therapies rounds out the seven sections of this unique book. The new edition provides insights into some of the most recent advances in the area of bacterial pathogenesis, including how metabolism shapes the host-pathogen interface interactions across species and genera mechanisms

of the secretion systems evasion, survival, and persistence mechanisms new therapies targeting various adaptive and virulence mechanisms of bacterial pathogens Written to promote discussion, extrapolation, exploration, and multidimensional thinking, Virulence Mechanisms of Bacterial Pathogens serves as a textbook for graduate courses on bacterial pathogenesis and a resource for specialists in bacterial pathogenicity, such as molecular biologists, physician scientists, infectious disease clinicians, dental scientists, veterinarians, molecular biologists, industry researchers, and technicians.

Nanostructured Materials - Mohindar Seehra 2017-07-12

There continues to be a worldwide interest in the size-dependent properties of nanostructured materials and their applications in many diverse fields such as catalysis, sensors, energy conversion processes, and biomedicine to name a few. The eleven chapters of this book written by different researchers include four chapters on the different methods of fabrication of specific materials followed by characterization of their properties, and the remaining seven chapters focusing on the fabrications and applications including three chapters on biomedical applications, two chapters on sensors, one chapter on solar cells, and one chapter on the use of nanoparticles in herbicides. These chapters provide up-to-date reviews useful for current and future researchers in these specific areas.

Analysis, Fate, and Toxicity of Engineered Nanomaterials in Plants - 2019-05-30

Analysis, Fate, and Toxicity of Engineered Nanomaterials in Plants, Volume 84 in the Comprehensive Analytical Chemistry series, highlights new advances in the field, with this new volume presenting interesting chapters on the Current status of environmental monitoring, Physical principles of infrared, Chemical principles of infrared, Instrumentation and hardware, Data analysis, Sampling, Applications in water, Application in soil and sediments, Applications in ecology of animals and plants, Applications in air monitoring, Applications in contamination, Applications in marine environments, Advantages and pitfalls, and more. Provides the authority and expertise of leading contributors from an

international board of authors Presents the latest release in the Comprehensive Analytical Chemistry series Updated release includes the latest information on the field of engineered nanomaterials in plants **Nanotechnology for Agriculture** - Deepak G Panpatte 2019-11-16 The emergence of nanotechnology and the development of new nano-devices and nanomaterials open up opportunities for novel applications in agriculture and biotechnology. Nanotechnology has the potential to modernize the agricultural research and practice. Nanotechnology has gained momentum in agriculture sector during last decade, but still there are knowledge gap between scientific communities. This book comprise of holistic coverage about current developments in nanotechnology based sustainable agriculture. It contains sections focusing on each aspect of the implications of nanotechnology in different sectors of agriculture from crop production, soil fertility management, crop improvement etc. It also provides insight into the current trends and future prospects of nanotechnology along with the benefits and risks and their impact on agricultural ecosystems. This book emphasize on use of nanotechnology to reduce agrochemical usage via smart delivery system, increase nutrient use efficiency, improved water and nutrient management, nano-biosensors for management of plant diseases etc. The book provides thorough knowledge for dealing with current challenges of agricultural sector using nanotechnology based agricultural interventions. It will serve as reference literature for scientists, policymakers, students and researchers who are engaged in development of strategies to cope up with challenges of current agricultural systems and society.

Synthesis & Characterization of Nano Zinc Oxide by Solution Combustion - Sumair Ahmed 2013

This Book provides in depth details of synthesis Nano Crystalline Zinc Oxide (ZnO) by Solution Combustion Process. Starting from the chemicals required, chemical solution balancing, how to take particular amount of compound in grams, how to change oxidizer to fuel ratio, how it effects the result by changing oxidizer to fuel ratio. Characterization of different products through X-Ray Diffractometer (XRD), Raman

Spectroscopy, FTIR Spectroscopy, TG/DT Analysis and Scanning Electron Microscopy. Through XRD we find crystal structure, crystallite size. FTIR provides characteristic frequency of Zn-O bond. TG/DT Analysis gives information about stability of ZnO up to a temperature of 1000 degree Celsius. Scanning Electron Microscopy reveals the presence of ZnO nanoparticles and also it indicate the spherical morphology of the particles.

Nanoparticles in Analytical and Medical Devices - Fang Gang
2020-09-01

Nanoparticles in Analytical and Medical Devices presents the latest information on the use of nanoparticles for a diverse range of analytical and medical applications. Covers basic principles, proper use of nanoparticles in analytical and medical applications, and recent progress in the field. This comprehensive reference helps readers grasp the full potential of nanoparticles in their analytical research or medical practice. Chapters on cutting-edge topics bring readers up to date on the latest research and usage of nanoparticles, and a chapter on commercially available devices that utilize nanoparticles guides readers in overcoming issues with marketing biodevices. Synthesizes nanoparticle conjugation and other critical methods Covers nanoparticles in analytical methods and real analytical devices currently used in the medical field Provides useful new information not covered in the current literature in chapters on surface chemical functionalization for bio-immobilization and nanoparticle production from natural sources

Hall Effect Measurements & Electrical Study of CdS & ZnO Nano Material - Mujtaba Ikram 2013

"Thin film and nano technology" has convincing impact on standard of life now. No one can deny the effect of "Thin film & Nano technology" upon the modernization of industry. This book reveals advance level nano research in electrical characterization, variable range hopping modeling and hall effect measurements of cadmium sulfide and zinc oxide nano materials. Their importance as Photovoltaic and Energy Materials is also discussed. I-V characterizations for these films under light and dark conditions showed features which is responsible for its applications as

photovoltaic materials. The resistivity of ZnO and CdS thin films have followed the hopping model which also confirmed the semiconductor like nature of these materials. As for ZnO and CdS films, hopping distance decreased while hopping energy increased linearly with rising temperature. Both these materials have followed necessary conditions for Mott's VRH mechanism. The said model is applied to dc electrical resistivity data.

Nanobiotechnology Applications in Plant Protection - Kamel A. Abd-Elsalam 2019-10-04

Nanobiotechnology Applications in Plant Protection: Volume 2 continues the important and timely discussion of nanotechnology applications in plant protection and pathology, filling a gap in the literature for nano applications in crop protection. Nanobiopesticides and nanobioformulations are examined in detail and presented as powerful alternatives for eco-friendly management of plant pathogens and nematodes. Leading scholars discuss the applications of nanobiomaterials as antimicrobials, plant growth enhancers and plant nutrition management, as well as nanodiagnostic tools in phytopathology and magnetic and supramagnetic nanostructure applications for plant protection. This second volume includes exciting new content on the roles of biologically synthesized nanoparticles in seed germination and zinc-based nanostructures in protecting against toxigenic fungi. Also included is new research in phytotoxicity, nano-scale fertilizers and nanomaterial applications in nematology and discussions on Botrytis grey mold and nanobiocontrol. This book also explores the potential effects on the environment, ecosystems and consumers and addresses the implications of intellectual property for nanobiopesticides. Further discussed are nanotoxicity effects on the plant ecosystem and nano-applications for the detection, degradation and removal of pesticides.

Zinc-Based Nanostructures for Environmental and Agricultural Applications - Kamel A. Abd-Elsalam 2021-05-22

Zinc-Based Nanostructures for Environmental and Agricultural Applications shows how zinc nanostructures are being used in agriculture, food and the environment. The book has been divided into

two parts: Part I deals with the synthesis and characterization of zinc-based nanostructures such as biogenic, plant, microbial, and actinobacteria mediated synthesis of zinc nanoparticles, Part II is focused on agri-food applications such as antibacterial, antifungal, antimicrobial, plant disease management, controlling post-harvest diseases, pesticide sensing and degradations, plant promotions, ZnO nanostructure for food packaging application, safe animal food and feed supplement, elimination of mycotoxins, and veterinary applications. Part III reviews technological developments in environmental applications such as risks and benefits for aquatic organisms and the marine environment, antiseptic activity and toxicity mechanisms, wastewater treatment, and zinc oxide-based nanomaterials for photocatalytic degradation of environmental and agricultural pollutants. The book discusses various aspects, including the application of zinc-based nanostructures to enhance plant health and growth, the effect on soil microbial activity, antimicrobial mechanism, phytotoxicity and accumulation in plants, the possible impact of zinc-based nanostructures in the agricultural sector as nanofertilizer, enhancing crop productivity, and other possible antimicrobial mechanisms of ZnO nanomaterials. Explores the impact of a large variety of zinc-based nanostructures on agri-food and environment sectors Outlines how the properties of zinc-based nanostructures mean they are particularly efficient in environmental and agricultural application areas Assesses the major challenges of synthesizing and processing zinc-based nanostructured materials

Handbook of Zinc Oxide and Related Materials - Zhe Chuan Feng
2012-09-26

Through their application in energy-efficient and environmentally friendly devices, zinc oxide (ZnO) and related classes of wide gap semiconductors, including GaN and SiC, are revolutionizing numerous areas, from lighting, energy conversion, photovoltaics, and communications to biotechnology, imaging, and medicine. With an emphasis on engineering a

Zinc Oxide Based Nano Materials and Devices - , Prof. Dr. Ahmed

Nahhas 2019-10-09

This book presents a review of recent advances in ZnO-based nanomaterials and devices. ZnO as a nanomaterial has gained substantial interest in the research area of wide bandgap semiconductors and is considered to be one of the major candidates for electronic and photonic applications. ZnO has distinguished and interesting electrical and optical properties and is considered to be a potential material in optoelectronic applications such as solar cells, surface acoustic wave devices, and UV emitters. ZnO's unique properties have attracted several researchers to study its electrical and optical properties. As a nanostructured material, ZnO exhibits many advantages for nanodevices. Moreover, it has the ability to absorb the UV radiation.

Toxicology of Nanoparticles and Nanomaterials in Human, Terrestrial and Aquatic Systems - Marc A. Williams 2022-06-27

Toxicology of Nanoparticles and Nanomaterials in Human, Terrestrial and Aquatic Systems An indispensable compendium detailing the toxicology of nanoparticles with a focus on mechanisms, emerging issues, and new approaches Toxicology of Nanoparticles and Nanomaterials in Human, Terrestrial and Aquatic Systems provides authoritative information on the toxicology of ultrafine and nanoparticulate matter that contaminate terrestrial or aquatic environments and present unique challenges in applied public health and toxicological research. Detailed chapters by a panel of world-renowned experts examine the complementary and dynamic interdependence of aquatic, terrestrial, and human systems and the toxicological impacts on exposure to engineered and manufactured nanoparticles and nanomaterials. Organized into four sections, the book opens with a thorough overview of the field, including known challenges and the necessity for current research activity. The second section describes terrestrial and aquatic systems and the ecotoxicological impact of nanomaterials, followed by critical analysis of the many human health effects of nanomaterials. The book concludes with an in-depth discussion of current gaps in knowledge, future directions, new approach methodologies, alternatives to animal models, and the emerging

environmental threat from nanoplastics. Presenting case exemplars of the ecotoxicological impact of nanoparticles in aquatic and terrestrial systems, this important resource: Presents in-depth coverage of ecosafety, environmental behavior, fate and transport, interactive effects with other contaminants, and current challenges in soil nano-ecotoxicology Addresses rising concerns regarding air pollution and neurological disorders, and the roles played by the gastrointestinal system, the mucosal microbiome, and the immunotoxicology and vasculotoxicity of metal-based nanoparticles Provides detailed coverage of nanomaterial health effects from both animal and in vitro models, including the gut microbiome, innate immunity, neurological and cardiovascular impacts, mechanisms of action, and hazard characterization Analyzes key topics in ecological nanotoxicology such as environmental micro- and nano-plastic pollution and applied risk assessment Toxicology of Nanoparticles and Nanomaterials in Human, Terrestrial and Aquatic Systems is essential reading for toxicologists, applied biologists, ecotoxicologists, research scientists, medical professionals, regulators, and advanced students in fields such as public health, environmental ecotoxicology and medicine, immunotoxicology, neurotoxicology, cardiovascular and systems biology, hazard identification, and risk assessment.

Nanostructures for Novel Therapy - Denisa Ficai 2017-02-25

Nanostructures for Novel Therapy: Synthesis, Characterization and Applications focuses on the fabrication and characterization of therapeutic nanostructures, in particular, synthesis, design, and in vitro and in vivo therapeutic evaluation. The chapters provide a cogent overview of recent therapeutic applications of nanostructured materials that includes applications of nanostructured materials for wound healing in plastic surgery and stem cell therapy. The book explores the promise for more effective therapy through the use of nanostructured materials, while also assessing the challenges their use might pose from both an economic and medicinal point of view. This innovative look at how nanostructured materials are used in therapeutics will be of great benefit to researchers, providing a greater understanding of the different ways

nanomaterials could improve medical treatment, along with a discussion of the obstacles that need to be overcome in order to guarantee widespread availability. Outlines how the characteristics of nanostructures made from different materials gives particular properties that can be successfully used in therapeutics Compares the properties of different nanostructures, allowing medicinal chemists and engineers to select which are most appropriate for their needs Highlights new uses of nanostructures within the therapeutic field, enabling the discovery of new, more effective drugs

Toxicology - Marcelo Larramendy 2016-10-26

This edited book, *Toxicology - New Aspects to This Scientific Conundrum*, is intended to provide an overview on the different xenobiotics employed every day in our anthropogenic activities. We hope that this book will continue to meet the expectations and needs of all interested in the implications for the living species of known and new toxicants and to guide them in the future investigations.

Zinc Oxide Nanostructures - Magnus Willander 2014-07-22

Zinc oxide (ZnO) in its nanostructured form is emerging as a promising material with great potential for the development of many smart electronic devices. This book presents up-to-date information about various synthesis methods to obtain device-quality ZnO nanostructures. It describes both high-temperature (over 100° C) and low-temperature (under 100° C) approaches to synthesizing ZnO nanostructures; device applications for technical and medical devices, light-emitting diodes, electrochemical sensors, nanogenerators, and photodynamic therapy; and the concept of self-powered devices and systems using ZnO nanostructures. The book emphasizes the utilization of non-conventional substrates such as plastic, paper, and textile as new platforms for developing electronics.

Nanomaterials in the Wet Processing of Textiles - Shahid Ul-Islam 2018-02-26

Nanotechnology has attracted attention of textile and polymer scientists and has been playing extraordinary role over the past few decades in the functional finishing of different textile materials. Nanoparticles due to

their diverse functions have not only imparted flame retardant, UV-blocking, water repellent, self-cleaning, and antimicrobial properties to the textiles, but also have greater affinity for fabrics leading to an increase in durability of the functions. This book emphasizes recent approaches and strategies that are currently at operation to functionalize both natural and synthetic textile materials using diverse nanoparticles and their composites with polymers. The book concludes by paying attention towards removal of toxic chemicals using state-of-the-art nano-adsorbents. Main Topics 1. Textile dyeing using metallic nanoparticles 2. Metal oxide nanoparticles for multifunctional finishing 3. New approaches to produce UV protective textiles 4. Polymeric nanocomposites for antimicrobial finishing 5. Self-cleaning of textiles using advanced nanoparticles 6. Silver nanoparticles in dyeing and finishing applications 7. Zinc Oxide - prospects in textile industry 8. Titanium dioxide: Next generation photo-catalysts 9. Textile effluent using chitosan nanocomposites 10. Recent advances in remediation of textile effluents using nano-catalysts

Nanostructured Zinc Oxide - Kamlendra Awasthi 2021-08-10

Nanostructured Zinc Oxide covers the various routes for the synthesis of different types of nanostructured zinc oxide including; 1D (nanorods, nanowires etc.), 2D and 3D (nanosheets, nanoparticles, nanospheres etc.). This comprehensive overview provides readers with a clear understanding of the various parameters controlling morphologies. The book also reviews key properties of ZnO including optical, electronic, thermal, piezoelectric and surface properties and techniques in order to tailor key properties. There is a large emphasis in the book on ZnO nanostructures and their role in optoelectronics. ZnO is very interesting and widely investigated material for a number of applications. This book presents up-to-date information about the ZnO nanostructures-based applications such as gas sensing, pH sensing, photocatalysis, antibacterial activity, drug delivery, and electrodes for optoelectronics. Reviews methods to synthesize, tailor, and characterize 1D, 2D, and 3D zinc oxide nanostructured materials Discusses key properties of zinc oxide nanostructured materials including optical, electronic, thermal,

piezoelectric, and surface properties Addresses most relevant zinc oxide applications in optoelectronics such as light-emitting diodes, solar cells, and sensors

Nanotoxicology and Nanosafety 2.0 - Ying-Jan Wang 2020-12-29

With the rapid development of nanotechnology, nanomaterials have been widely applied in many industrial sectors, including medicine, consumer products, and electronics. While such technology has brought benefits and convenience to our daily lives, it may also potentially threaten human health. In some cases, nanomaterials present unexpected risks to both humans and the environment. Assessments of the potential hazards associated with nanotechnology have been emerging, but substantial challenges remain, because the large number of different nanomaterials cannot be effectively evaluated in a timely manner. The development of a good strategy for a nanomaterials hazard assessment not only promotes the more widespread adoption of non-rodent or 3Rs principles, but also makes nanotoxicology testing more ethical, relevant, and cost- and time-efficient. A thorough understanding of the mechanisms by which nanomaterials perturb biological systems is critical for a more comprehensive elucidation of their nanotoxicity, and this will also facilitate the development of prevention and intervention policies against adverse outcomes induced by them. We hope that the articles included in this eBook can provide updated knowledge on nanotoxicology and nanosafety, from the point of view of both toxicology and ecotoxicology.

Nanostructures for Antimicrobial Therapy - Anton Ficai 2017-05-29

Nanostructures for Antimicrobial Therapy discusses the pros and cons of the use of nanostructured materials in the prevention and eradication of infections, highlighting the efficient microbicidal effect of nanoparticles against antibiotic-resistant pathogens and biofilms. Conventional antibiotics are becoming ineffective towards microorganisms due to their widespread and often inappropriate use. As a result, the development of antibiotic resistance in microorganisms is increasingly being reported. New approaches are needed to confront the rising issues related to infectious diseases. The merging of biomaterials, such as chitosan, carrageenan, gelatin, poly (lactic-co-glycolic acid) with nanotechnology

provides a promising platform for antimicrobial therapy as it provides a controlled way to target cells and induce the desired response without the adverse effects common to many traditional treatments.

Nanoparticles represent one of the most promising therapeutic treatments to the problem caused by infectious micro-organisms resistant to traditional therapies. This volume discusses this promise in detail, and also discusses what challenges the greater use of nanoparticles might pose to medical professionals. The unique physicochemical properties of nanoparticles, combined with their growth inhibitory capacity against microbes has led to the upsurge in the research on nanoparticles as antimicrobials. The importance of bactericidal nanobiomaterials study will likely increase as development of resistant strains of bacteria against most potent antibiotics continues. Shows how nanoantibiotics can be used to more effectively treat disease. Discusses the advantages and issues of a variety of different nanoantibiotics, enabling medics to select which best meets their needs. Provides a cogent summary of recent developments in this field, allowing readers to quickly familiarize themselves with this topic area

Characterization of Pharmaceutical Nano- and Microsystems -

Leena Peltonen 2020-10-27

Learn about the analytical tools used to characterize particulate drug delivery systems with this comprehensive overview Edited by a leading expert in the field, *Characterization of Pharmaceutical Nano- and Microsystems* provides a complete description of the analytical techniques used to characterize particulate drug systems on the micro- and nanoscale. The book offers readers a full understanding of the basic physicochemical characteristics, material properties and differences between micro- and nanosystems. It explains how and why greater experience and more reliable measurement techniques are required as particle size shrinks, and the measured phenomena grow weaker. *Characterization of Pharmaceutical Nano- and Microsystems* deals with a wide variety of topics relevant to chemical and solid-state analysis of drug delivery systems, including drug release, permeation, cell interaction, and safety. It is a complete resource for those interested in

the development and manufacture of new medicines, the drug development process, and the translation of those drugs into life-enriching and lifesaving medicines. *Characterization of Pharmaceutical Nano- and Microsystems* covers all of the following topics: An introduction to the analytical tools applied to determine particle size, morphology, and shape Common chemical approaches to drug system characterization A description of solid-state characterization of drug systems Drug release and permeation studies Toxicity and safety issues The interaction of drug particles with cells Perfect for pharmaceutical chemists and engineers, as well as all other industry professionals and researchers who deal with drug delivery systems on a regular basis, *Characterization of Pharmaceutical Nano- and Microsystems* also belongs on bookshelves of interested students and faculty who interact with this topic.

Sustainable Agriculture Reviews 41 - Shamsul Hayat 2020-02-06

This book presents recent developments involving the role of nanoparticles on plant physiology and growth. Nanotechnology applications include improvement of agricultural production using bio-conjugated NPs (encapsulation), transfer of DNA in plants for development of insect pest-resistant varieties, nanoformulations of agrochemicals such as pesticides and fertilizers for crop improvement, and nanosensors/nanobiosensors in crop protection for identification of diseases and residues of agrochemicals. Recent findings on the increased use of nanotechnology in agriculture by densely populated countries such as China and India indicate that this technology may impart a substantial impact on reducing hunger, malnutrition, and child mortality.

Nanoscience in Dermatology - Michael R. Hamblin 2016-08-13

Nanoscience in Dermatology covers one of the two fastest growing areas within dermatological science, nanoscience and nanotechnology in dermatology. Recently, great progress has been made in the research and development of nanotechnologies and nanomaterials related to various applications in medicine and, in general, the life sciences. There is increasing enthusiasm for nanotechnology applications in dermatology (drug delivery, diagnostics, therapeutics, imaging, sensors, etc.) for

understanding skin biology, improving early detection and treatment of skin diseases, and in the design and optimization of cosmetics. Light sensitive nanoparticles have recently been explored, opening a new era for the combined applications of light with nanotechnology, also called photonanodermatology. However, concerns have been raised regarding the adverse effects of intentional and unintentional nanoparticle exposure and their toxicity. Written by experts working in these exciting fields, this book extensively covers nanotechnology applications, together with the fundamentals and toxicity aspects. It not only addresses current applications of nanotechnology, but also discusses future trends of these ever-growing and rapidly changing fields, providing scientists and dermatologists with a clear understanding of the advantages and challenges of nanotechnology in skin medicine. Provides knowledge of current and future applications of nanoscience and nanotechnology in dermatology Outlines the fundamentals, methods, toxicity aspects, and other relevant aspects for nanotechnology based applications in dermatology Coherently structured book written by experts working in the fields covered

Nanostructures for Cancer Therapy - Alexandru Mihai Grumezescu
2017-04-11

Nanostructures for Cancer Therapy discusses the available preclinical and clinical nanoparticle technology platforms and their impact on cancer therapy, including current trends and developments in the use of nanostructured materials in chemotherapy and chemotherapeutics. In particular, coverage is given to the applications of gold nanoparticles and quantum dots in cancer therapies. In addition to the multifunctional nanomaterials involved in the treatment of cancer, other topics covered include nanocomposites that can target tumoral cells and the release of antitumoral therapeutic agents. The book is an up-to-date overview that covers the inorganic and organic nanostructures involved in the diagnostics and treatment of cancer. Provides an examination of nanoparticle delivery systems for cancer treatment, illustrating how the use of nanotechnology can help provide more effective chemotherapeutic treatments Examines, in detail, the different types of nanomaterials used

in cancer therapy, also explaining the effect of each Provides a cogent overview of recent developments in the use of nanostructured materials in chemotherapeutics, allowing readers to quickly familiarize themselves with this area

Plant Responses to Nanomaterials - Vijay Pratap Singh 2021-05-03

The population of the world continues to increase at an alarming rate. The trouble linked with overpopulation ranges from food and water scarcity to inadequacy of space for organisms. Overpopulation is also linked with several other demographic hazards, for instance, population blooming will not only result in exhaustion of natural repositories, but it will also induce intense pressure on the world economy. Today nanotechnology is often discussed as a key discipline of research but it has positive and negative aspects. Also, due to industrialization and ever-increasing population, nano-pollution has been an emerging topic among scientists for investigation and debate. Nanotechnology measures any substance on a macromolecular scale, molecular scale, and even atomic scale. More importantly, nanotechnology deals with the manipulation and control of any matter at the dimension of a single nanometer. Nanotechnology and nanoparticles (NPs) play important roles in sustainable development and environmental challenges as well. NPs possess both harmful and beneficial effects on the environment and its harboring components, such as microbes, plants, and humans. There are many beneficial impacts exerted by nanoparticles, however, including their role in the management of waste water and soil treatment, cosmetics, food packaging, agriculture, biomedicines, pharmaceuticals, renewable energies, and environmental remedies. Conversely, NPs also show some toxic effects on microbes, plants, as well as human beings. It has been reported that use of nanotechnological products leads to the more accumulation of NPs in soil and aquatic ecosystems, which may be detrimental for living organisms. Further, toxic effects of NPs on microbes, invertebrates, and aquatic organisms including algae, has been measured. Scientists have also reported on the negative impact of NPs on plants by discussing the delivery of NPs in plants. Additionally, scientists have also showed that NPs interact with plant cells, which

results in alterations in growth, biological function, gene expression, and development. Thus, there has been much investigated and reported on NPs and plant interactions in the last decade. This book discusses the most recent work on NPs and plant interaction, which should be useful for scientists working in nanotechnology across a wide variety of disciplines.

Advances in Poultry Nutrition Research - Amlan Kumar Patra 2021-07-07

Due to the wide acceptance of poultry meat and eggs, poultry farming is the fastest growing global livestock industry. Nutrition plays a vital role in economic production and the maintenance of proper poultry health. Therefore, there is a great need to update balanced nutrient requirements for new breeds, utilize alternative feed resources, evaluate newer feed additives to optimize production while excluding antimicrobial feed additives and maintain overall health. The first section of this book contains six chapters that discuss the utilization of unconventional feeds, nanominerals to reduce mineral proportions in diets, and water intake affected by environmental temperature. The second section contains six chapters that describe proper nutritional management to improve gut health and immunity, the prevention of common diseases, and the amelioration of heat stress in poultry.

Mixture Toxicity - Cornelis A. M. van Gestel 2016-04-19

In the last decade and a half, great progress has been made in the development of concepts and models for mixture toxicity, both in human and environmental toxicology. However, due to their different protection goals, developments have often progressed in parallel but with little integration. Arguably the first book to clearly link ecotoxicology and classic human toxicology, *Mixture Toxicity: Linking Approaches from Ecological and Human Toxicology* incorporates extensive reviews of exposure to toxicants, toxicokinetics and toxicodynamics, toxicity of mixtures, and risk assessment. The book examines developments in both fields, compares and contrasts their current state of the art, and identifies where one field can learn from the other. Each chapter provides an essential overview of the state of the art in both human and ecotoxicological mixture risk assessment, focusing on the work published

in the last fifteen years. The coverage progresses from exposure to risk assessment, at each step identifying the special complications typically raised by mixtures. Based on in-depth discussions among specialists representing different disciplines and approaches, the chapters each address: Exposure — how to quantify the amounts of chemicals that may enter the living organism Kinetics, dynamics, and metabolism — how the chemicals enter an organism, travel within the organism, how they are metabolized and reach the target site, and explain development of toxicity with time Toxicity — what are the chemicals' detrimental effects on the organism Test design and complex mixture characterization — how chemicals interact, how to measure effects of mixtures, and how to identify responsible chemicals Risk assessment — how to assess for risks in humans and the environment An unusual combination of different points of view on exposure to and risk assessment of chemical mixtures, this book summarizes current knowledge on combined effects of toxicant mixtures, information that is generally only available in a very fragmented form as individual journal papers. It identifies possible crosslinks and includes recommendations for mutual developments that can improve the state of knowledge on mixture toxicity and ultimately lead to better and more integrated risk assessment.

Nanomaterials and Plant Potential - Azamal Husen 2019-03-01

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.

Zinc Oxide Nanostructures: Synthesis and Characterization - Sotirios Baskoutas 2018-12-04

This book is a printed edition of the Special Issue "Zinc Oxide Nanostructures: Synthesis and Characterization" that was published in *Materials*

Nanoparticles for Biomedical Applications - Eun Ji Chung
2019-11-19

Nanoparticles for Biomedical Applications: Fundamental Concepts,

Biological Interactions and Clinical Applications brings into one place information on the design and biomedical applications of different classes of nanoparticles. While aspects are dealt with in individual journal articles, there is not one source that covers this area comprehensively. This book fills this gap in the literature. Outlines an in-depth review of biomedical applications of a variety of nanoparticle classes Discusses the major techniques for designing nanoparticles for use in biomedicine Explores safety and regulatory aspects for the use of nanoparticles in biomedicine

Symmetry-Adapted Machine Learning for Information Security - James (Jong Hyuk) Park 2020-12-15

Symmetry-adapted machine learning has shown encouraging ability to mitigate the security risks in information and communication technology (ICT) systems. It is a subset of artificial intelligence (AI) that relies on the principles of processing future events by learning past events or historical data. The autonomous nature of symmetry-adapted machine learning supports effective data processing and analysis for security detection in ICT systems without the interference of human authorities. Many industries are developing machine-learning-adapted solutions to support security for smart hardware, distributed computing, and the cloud. In our Special Issue book, we focus on the deployment of symmetry-adapted machine learning for information security in various application areas. This security approach can support effective methods to handle the dynamic nature of security attacks by extraction and analysis of data to identify hidden patterns of data. The main topics of this Issue include malware classification, an intrusion detection system, image watermarking, color image watermarking, battlefield target aggregation behavior recognition model, IP camera, Internet of Things (IoT) security, service function chain, indoor positioning system, and crypto-analysis.