

The Effect Of Zinc Oxide Nano And Microparticles And Zinc

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.

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

Highlights Mast cell degranulation can be inhibited by ZnO nanoparticles. This inhibition was nanoparticle size and dispersion dependent. ZnO nanoparticles had higher cytotoxicity to cancerous cells (RBL-2H3) compared to primary mast cells (BMMCs). TiO₂ nanoparticles slightly increased mast cell degranulation. These nanoscale enhancements in ZnO bioactivity of may lead to the development of novel anti-allergic therapeutics.

Optoelectronics - Advanced Device Structures (Book IV) is following the Optoelectronics (Books I, II, and III) published in 2011, 2013, and 2015, as part of the InTech collection of international works on optoelectronics. Accordingly, as with the first three books of the collection, this book covers recent achievements by specialists around the world. The growing number of countries participating in this endeavor as well as joint participation of the US and Moldova scientists in edition of this book testifies to the unifying effect of science. An interested reader will find in the book the description of properties and applications employing organic and inorganic materials, as well as the methods of fabrication and analysis of operation and regions of application of modern optoelectronic devices.

Nanostructures for Drug Delivery extensively covers the various nanostructured products that have been tested as carriers in target drug delivery systems. In addition, the book analyses the advantages of, and issues related to, using nanostructured materials in drug delivery

systems, also detailing various nanocarrier preparation techniques. As delivering the drug to the target site is a major problem in providing effective treatment for many diseases, this book covers the latest advancements in numerous nanotechnological products that are being used in disease detection, controlled drug delivery, as biosensors, and in tissue engineering that have been developed for more efficient patient healthcare. Due to the versatility of nanostructured materials, it is now possible to deliver a drug at its target site in a more accurate and efficient way. This volume is an up-to-date, state-of-the-art work that highlights the principal mechanistic aspects related to the delivery of active nanoscale therapeutic agents (natural or synthetic) and their release profile in different environmental media. It highlights nanoscale encapsulation strategies and discusses both organic and inorganic nanomaterials as carriers and delivery platforms. Demonstrates how nanostructures are successfully employed in drug delivery stems and as drug delivery agents, allowing biomaterials scientists and biochemists to create more effective drug delivery systems Offers an overview of recent research into the use of nanostructures in drug delivery techniques in a cogent, synthesized way, allowing readers to quickly familiarize themselves with this area Includes examples of how the application of nanostructures have improved the efficiency of drug delivery systems, showing medical scientists how they are beneficial Zinc oxide nanoparticles (ZnO NPs) have demonstrated the ability to improve lubrication and thermal conductivity, and stand as promising metalworking lubricant and coolant additives due to their low cost compared to other NPs. While nanomaterials are a focus of research due to their potential to enable advanced technologies, little is known about their effects on the environment and human health. This research investigates two main characteristics of ZnO metalworking nanofluids (MWnF). First, the stability of ZnO NPs (20nm) is investigated in mixtures of a microemulsion (TRIM® MicroSol® 585XT) and dispersants, all of which are commercially available. Second, toxicological assessments are conducted to survey the effect of ZnO NPs on MWnF safety. The results revealed that none of the dispersants enhanced the stability of ZnO NPs more than the prepared microemulsion alone. Research also revealed that ZnO MWnF had a significantly higher toxicity than the prepared microemulsion. This demonstrates the need for precautionary development of metalworking nanofluids.

Nanotechnology Applications in Food: Flavor, Stability, Nutrition, and Safety is an up-to-date, practical, applications-based reference that discusses the advantages and disadvantages of each application to help researchers, scientists, and bioengineers know what and what not to do to improve and facilitate the production of food ingredients and monitor food safety. The book offers a broad spectrum of topics trending in the food industry, such as pharmaceutical, biomedical, and antimicrobial approaches in food, highlighting current concerns regarding safety, regulations, and the restricted use of nanomaterials. Includes how nanobiosensors are useful for the detection of foodborne pathogens Discusses applications of nanotechnology from flavor and nutrition, to stability and safety in packaging Includes nano and microencapsulation, nanoemulsions, nanosensors, and nano delivery systems Identifies practical applications of nanoscience for use in industry today

This book focuses on the study of synthesized ZnO powder using $Zn(CH_3COO)_2 \cdot 2H_2O$ precursor, methanol (as solvent), and sodium hydroxide (NaOH) to vary the pH. The successfully synthesized ZnO powder from the sol-gel centrifugation and sol-gel storage methods were characterized and investigated by X-ray diffraction, field emission scanning electron microscopy, transmission electron microscopy, Fourier-transform infrared spectroscopy, UV-visible spectroscopy, and photoluminescence test to compare the properties of the nanoparticles. The best characteristic of the ZnO powder from both methods was observed when the powders were coated on an ITO glass to fabricate a PEC. The current density-voltage performances of both PECs were investigated under luminescent and dark conditions.

The book gives a comprehensive review of the present state-of-the-art in ZnO R+D, including growth, doping, lattice dynamics, electric magnetic and optical properties. The emphasis is on the electric and optical properties, because this is the area where novel applications may be expected with highest promise. The book highlights not only the most recent results but gives both an overview of past research and of the present status -- not avoiding critical and controversial discussions of various aspects such as band symmetries and laser processes. Intended to have long-lasting impact on ZnO R+D, this monograph addresses (post-)graduate students but also advanced scientists, who want to embark on ZnO research or are already involved, the present state of the art and assists them in avoiding duplication of old results (or mistakes).

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BoD – Books on Demand

Advances in Phytotechnology: 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

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.

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

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.

"The effect of zinc vapor on the dc resistance of polycrystalline zinc oxide was investigated at temperatures of 700 and 800 °C. The partial pressures of zinc vapor used to investigate this behavior ranged from 1E-04 to 1E-02 atmospheres. The results show that the resistance of polycrystalline zinc oxide is significantly decreased in the presence of zinc vapor at these temperatures. The decrease in resistance is attributed to donor electrons associated with adsorbed zinc on the surface of zinc oxide, and not to bulk diffusion of zinc into the oxide. The decrease in resistance is also found to be dependent on the zinc partial pressure, with higher zinc pressures producing a larger decrease in resistance. The relationship between zinc partial pressure and resistance is not observed to depend strongly on temperature"--Abstract, leaf iv.

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.

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

Scientific Study from the year 2015 in the subject Nutritional Science, course: Meat Hygiene, language: English, abstract: The purpose of this study was investigation of the effect of zinc oxide nanoparticles (Zn O NPs) on *Listeria monocytogenes* in Ready-to-eat meat products, to introduce a new, cheap, safe and fast way of food preservation. This work was performed on 240 Random Samples of RTE meat products (Frankfurter, Salami, Basterma & Luncheon) (60 sample of each product). There was a significant increase in *Listeria monocytogenes* CFU/g in the 1st control group of each product which was not treated by any concentration of Zn O NPs, while in the 2nd group of each product which was treated with 60 ppm of Zn O NPs, there was some inhibition of CFU/g, and in the 3rd group of each product which was treated with 90 ppm of Zn O NPs, there was a significant inhibition which is matching with the highest concentration of Zn O NPs used in this study .

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.

Encyclopedia of Food Chemistry is the ideal primer for food scientists, researchers, students and young professionals who want to acquaint themselves with food chemistry. Well-organized, clearly written, and abundantly referenced, the book provides a foundation for readers to understand the principles, concepts, and techniques used in food chemistry applications. Articles are written by international experts and cover a wide range of topics, including food chemistry, food components and their interactions, properties (flavor, aroma, texture) the structure of food, functional foods, processing, storage, nanoparticles for food use, antioxidants, the Maillard and Strecker reactions, process derived contaminants, and the detection of economically-motivated food adulteration. The encyclopedia will provide readers with an introduction to specific topics within the wider context of food chemistry, as well as helping them identify the links between the various sub-topics. Offers readers a comprehensive understanding of food chemistry and the various connections between the sub-topics Provides an authoritative introduction for non-specialists and readers from undergraduate levels and upwards Meticulously organized, with articles structured logically based on the various elements of food chemistry

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