Particulate Technology for Delivery of Therapeutics

Discussions of the basic structural, nanotechnology, and system engineering principles, as well as an introductory overview of essential concepts and methods in biotechnology, will be included. Text is presented side-by-side with extensive use of high-quality illustrations prepared using cutting edge computer graphics techniques. Includes numerous examples, such as applications in genetic engineering. Represents the only available introduction and overview of this interdisciplinary field, merging the physical and biological sciences. Concludes with the authors' expert assessment of the future promise of nanotechnology, from molecular "tinkertoys" to nanomedicine. David Goodsell is author of two trade books, Machinery of Life and Our Molecular Nature, and Arthur Olson is the world's leader in molecular graphics and nano-scale representation.

Green Synthesis of Nanoparticles: Applications and Prospects

This book contains 10 Chapters divided into three Sections. Section A covers synthesis of biopolymers. Lignocellulosic feedstock contains cellulose, hemicellulose, and lignin, which are used for synthesis of biopolymers. Polymer-coated noble metal nanoparticles are used in nanobiomedicine and fundamental biomaterials. Section B describes applications of biopolymers in biomedical, antimicrobial, industrial, nanotechnology, laser-based thin films, and regenerative medicines. Section C is dedicated for advancement and engineering in biopolymers for personal protective garments, equipments, membrane separation processes, purifications, and new generation of high-performance biomaterials. A new numerical-cum-graphical method called TI2BioP (Topological Indices to BioPolymers) has been developed to estimate topological indices (TIs) from two-dimensional (2D) graphical approaches for the natural biopolymers DNA, RNA, and proteins.

Green Synthesis, Characterization and Applications of Nanoparticles

This first systematic overview for more than a decade is tailor-made for the medicinal chemist. All the chapters are written by experienced drug developers and include practical examples from real drug candidates. Following an introduction to global drug properties and their impact on drug research, screening and combinatorial chemistry libraries, this handbook demonstrates the best and fastest way to estimate those properties most relevant for the efficiency and pharmacokinetic performance of a drug molecule: lipophilicity, solubility, electronic properties and conformation.

Nanoparticles

This book discusses the fundamental concepts of the green synthesis of nanoparticles and presents the latest advances in this emerging field. Providing a comprehensive overview of developments related to nanoparticle synthesis using fungi, algae, bryophytes, pteridophytes, gymnosperms, monocotyledons, dicotyledonous (angiosperms) and animal systems, it also explores techniques for the characterization of these nanoparticles. Lastly, it reviews the applications and toxicity of biologically synthesized green nanoparticles. Given its scope, it is a valuable resource for students, researchers and policymakers working in the field of nanobiotechnology and nanoscience.
Green Synthesis and Characterizations of Silver and Gold Nanoparticles

Green Synthesis and Characterizations of Silver and Gold Nanoparticles.

Green Nanoparticles: The Future of Nanobiotechnology

The Biogenic Synthesis of Au, Pd and Pt Nanoparticles and Its Medicinal Applications

Master the Fundamentals of Nanotechnology to Prepare for Nano-Related Career Opportunities If you want to move into the fast-growing field of nanotechnology, you can’t afford to miss Nano--The Essentials. This career-building resource offers a rigorous, technological introduction to the fundamentals of nanotechnology, providing everything you need to enter this burgeoning discipline and prepare for nano-related jobs. Packed with over 100 detailed illustrations and lots of practical work-related advice, the book covers the experimental tools of nanotechnology, the basics of nanomaterials, and key applications in fields such as nanosensors, nanobiology, nanomedicine, and nanomachines. This on-target guide takes readers step-by-step through the manipulation of materials in the nanoscale fullerencescarbon nanotubesself-assembled nanolayers gas-phase clustersmonolayer-protected metal nanoparticlescore-shell nanoparticlesand much more. Comprehensive and easy-to-understand, Nano--The Essentials features: A solid introduction to the fundamentals of nanomaterials Full details on the experimental tools used in nanotechnology The latest advances in nanobiology and nanomedicine Breakthroughs in the development of nanosensors Cutting-edge innovations in molecular nanomachines Inside this Expert Introduction to the Basics of Nanotechnology • Introduction • Manipulating Materials in the Nanoscale • Fullerences • Carbon Nanotubes • Self-Assembled Nanolayers • Gas-Phase Clusters • Semiconductor Quantum Dots • Monolayer-Protected Metal Nanoparticles • Core-Shell Nanoparticles • Nanoshells • Nanobiology • Nanosensors • Nanomedicines • Molecular Nanomachines • Nanotribology • Societal Implications

Metallic Nanoparticles

This book describes various strategies for the synthesis of green nanoparticles using plant extracts and microbes, including the advantages and disadvantages of different methods and their applications. After discussing strategies for and the potential of green synthesis of noble metal nanoparticles, it highlights the role of the solvent system. The book then explores the stability/toxicity of nanoparticles and the associated-surface engineering techniques for achieving biocompatibility, and examines the antimicrobial efficacy of green nanoparticles with regard to various bacterial pathogens, as well as the underlying cytotoxicity mechanisms. Lastly, the book addresses the potential applications of various green nanoparticles in cancer theranostics, and reviews a number of plant-mediated nanoparticles as potential pharmaceutical agents. Given its scope, the book will be of interest to all scientists and students wanting to learn more about the synthesis and applications of green nanoparticles.

Nanoscience and Plant–Soil Systems

The use of biological sources such as microbes and plants can help in synthesizing nanoparticles in a reliable and eco-friendly way. The synthesis of nanoparticles by these natural sources is characterized by processes that take place near to ambient temperature and pressures and also near neutral pH. This edited volume authored by subject specialists, provides all the latest research and builds a database of bioreduction agents to various metal nanoparticles using different precursor systems. The book also highlights the different strategies such as simplicity, cost-effectiveness, environment-friendly and easily scalable, and includes parameters for controlling the size and shape of the materials developed from the various greener methods. In order to exploit the utmost potential metal nanoparticles synthesis from the different sources such as agricultural waste, flora and fauna, food waste, microbes and biopolymer systems, it is also crucial to recognize the biochemical and molecular mechanisms of production of nanoparticles and their characterization.

Model Organisms to Study Biological Activities and Toxicity of Nanoparticles

Nano

Nanotechnology is the application of science to control matter at the molecular level. It has become one of the most promising applied technologies in all areas of science. Nanoparticles have multi-functional properties and have created very interesting applications in various fields such as medicine, nutrition, bioenergy, agriculture and the environment. But the biogenic syntheses of monodispersed nanoparticles with specific sizes and shapes have been a challenge in biomaterial science. Nanoparticles are of great interest due to their
extremely small size and large surface-to-volume ratio, which lead to both chemical and physical differences in their properties (e.g., mechanical properties, biological and sterical properties, catalytic activity, thermal and electrical conductivity, optical absorption and melting point) compared to bulk of the same chemical composition. Recently, however, synthesizing metal nanoparticles using green technology via microorganisms, plants, viruses, and so on, has been extensively studied and has become recognized as a green and efficient way for further exploiting biological systems as convenient nanofactories. Thus the biological synthesis of nanoparticles is increasingly regarded as a rapid, ecofriendly, and easily scaled-up technology. Today researchers are developing new techniques and materials using nanotechnology that may be suitable for plants to boost their native functions. Recently, biological nanoparticles were found to be more pharmacologically active than physico-chemically synthesized nanoparticles. Various applications of biosynthesized nanoparticles have been discovered, especially in the field of biomedical research, such as applications to specific delivery of drugs, use for tumor detection, angiogenesis, genetic disease and genetic disorder diagnosis, photomaging, and photothermal therapy. Further, iron oxide nanoparticles have been applied to cancer therapy, hyperthermia, drug delivery, tissue repair, cell labeling, targeting and immunoassays, detoxification of biological fluids, magnetic resonance imaging, and magnetically responsive drug delivery therapy. Nanoparticle synthesis for plant byproducts for biomedical applications has vast potential. This book offers researchers in plant science and biomedicine the latest research and opportunity to develop new tools for the synthesis of environmentally friendly and cost-effective nanoparticles for applications in biomedicine as well as other various fields.

One Step Green Synthesis of Gold Nanoparticles by Filamentous Thermophilic Fungi

Nanoparticles are considered to be the building blocks for nanotechnology and are referred to as the particles having more than one dimension of the order of 100 nm or less. The nanostructured materials are being offered as better built, long lasting, cleaner, safer, and smarter products for use in communications, medicine, transportation, agriculture and other industries. Topics in molecular recognition, biomolecule-nanocrystal conjugates as fluorescence label for biological cells, and DNA-mediated groupings of nanocrystals are widespread, intriguing researchers from both biological and engineering fields. The diversity of nanotechnology covers fields from biology to material science, physics to chemistry, and other fields with variety of specialties. Controlled size, shape, composition, crystallinity, and structure-dependent properties of nanoparticles govern the unique properties of nanotechnology. The controlled biosynthesis of nanoparticles is of high scientific and technological interest as the microorganisms grab target ions from their environment and then turn the metal ions into the element metal through enzymatic mechanism generated through their cellular (Intra/Extra) activities. The project aims to introduce the basics and advancements made so far in the field of biosynthesis of nanoparticles for graduate students and researchers around the world. The main aims are to (a) introduce the reader to the variety of microorganisms and their ability to synthesize the nanoparticles, (b) provide an overview of the methodologies applied to biosynthesize the variety of nanoparticles of medical and commercial uses, (c) provide a literature review on diversity of microorganisms able to synthesize nanoparticles of different types, (d) to discuss the regulatory mechanisms in microorganism able to synthesize variety of nanoparticles, (e) discuss experimental design problems associated with the controlled biosynthesis of nanoparticles, (f) discuss the stability and toxicity of nanoparticles in varying environment towards their therapeutic implications. The regulations, challenges and implications of biosynthesized nanoparticles for commercial significance will also represent among the main sections of the book. These aims will be organized by invited research/review articles from renowned researchers exploring biosynthesis of variety of nanoparticles, and differ in length and number of chapters, with the literature review section containing the bulk of the text.

Microbial Nanotechnology

This book reports on multidisciplinary research focusing on the analysis, synthesis and design of bionanomaterials. It merges the biophysicists’, the biochemists’ and bioengineers’ perspectives, covering the study of the basic properties of materials and their interaction with biological systems, the development of new devices for medical purposes such as implantable systems, and new algorithms and methods for modeling the mechanical, physical or biological properties of biomaterials. The different chapters, which are based on selected contributions presented at the second edition of BIONAM, held on October 4-7, 2016, in Salerno, Italy, cover both basic and applied research. This includes novel synthetic strategies for nanomaterials, as well as the implementation of bio- and smart materials for pharmacological and medical purposes (e.g. drug delivery, implantable systems), environmental applications, and many others. The book provides a broad audience of academic and professionals with a comprehensive, timely snapshot of the field of biomaterials. Besides offering a set of innovative theories together with the necessary practical tools for their implementation, it also highlights current challenges in the field, thus fostering new discussions and possible future collaborations between groups with different backgrounds.

Nanomaterials and Plant Potential
This book provides a comprehensive overview of state-of-the-art applications of nanotechnology in biology and medicine, as well as model organisms that can help us understand the biological activity and associated toxicity of nanoparticles, and devise strategies to minimize toxicity and enhance therapies. Thanks to their high surface-to-volume ratio, nanoparticles are characterized by excellent biocompatibility and bioavailability, a high therapeutic index, and relatively low toxicity, which has led to their widespread application in the early diagnosis of diseases, comprehensive monitoring of disease progression, and improved therapeutics. The book also explores nanoparticle-based insecticides and their mechanisms of action, and provides a comparative analysis of the various model organisms that are used to understand the biological properties of nanoparticles. Further, it describes various in-vivo models that yield important insights into nanomaterial-mediated toxicity, promoting the optimal utilization of nanoparticles. In closing, the book discusses future perspectives and regulatory issues concerning the use of nanomaterials in translational research.

**Springer Handbook of Nanomaterials**

Gold Nanoparticles for Physics, Chemistry and Biology offers an overview of recent research into gold nanoparticles, covering their discovery, usage and contemporary practical applications. This Second Edition begins with a history of over 2000 years of the use of gold nanoparticles, with a review of the specific properties which make gold unique. Updated chapters include gold nanoparticle preparation methods, their plasmon resonance and thermo-optical properties, their catalytic properties and their future technological applications. New chapters have been included, and reveal the growing impact of plasmonics in research, with an introduction to quantum plasmonics, plasmon assisted catalysis and electro-photon conversion. The growing field of nanoparticles for health is also addressed with a study of gold nanoparticles as radiosensibiliser for radiotherapy, and of gold nanoparticle functionalisation. This new edition also considers the relevance of bimetallic nanoparticles for specific applications. World-class scientists provide the most up-to-date findings for an introduction to gold nanoparticles within the related areas of chemistry, biology, material science, optics and physics. It is perfectly suited to advanced level students and researchers looking to enhance their knowledge in the study of gold nanoparticles.

**Plant Secondary Metabolites**

Green Biosynthesis of Nanoparticles

This book discusses fabrication of functionalized gold nanoparticles (GNPs) and multifunctional nanocomposites, their optical properties, and applications in biological studies. This is the very first book of its kind to comprehensively discuss published data on in vitro and in vivo biodistribution, toxicity, and uptake of GNP by mammalian cells providing a systematization of data over the GNP types and parameters, their surface functionalization, animal and cell models. As distinct from other related books, Gold Nanoparticles in Biomedical Applications discusses the immunological properties of GNPs and summarizes their applications as an antigen carrier and adjuvant in immunization for the preparation of antibodies in vivo. Although the potential of GNPs in nanobiotechnology has been recognized for the past decade, new insights into the unique properties of multifunctional nanostructures have recently emerged. With these developments in mind, this book unites ground breaking experimental data with a discussion of hybrid nanoparticle systems that combine different nanomaterials to create multifunctional structures. These novel hybrids constitute the material basis of theraonotics, bringing together the advanced properties of functionalized GNPs and composites into a single multifunctional nanostructure with simultaneous diagnostic and therapeutic functions. Such nanohybrids can be physically and chemically tailored for a particular organ, disease, and patient thus making personalized medicine available.

**Chemistry of Natural Products**

This is the first book dedicated to the interactions of non-mycorrhizal microbial endophytes with plant roots. The phenotypes of these interactions can be extremely plastic, depending on environmental factors, nutritional status, genetic disposition and developmental stages of the two partners. This book explores diversity, life history strategies, interactions, applications in agriculture and forestry, methods for isolation, cultivation, and both conventional and molecular methods for identification and detection of these endophytes.

**Silver Nanoparticle Applications**

This book describes the biogenic and green synthesis of gold, palladium and platinum nanoparticles through a variety of methods. 80% of the world’s population use traditional medicinal plants as the primary form of healthcare. Biogenic nanoparticles are those particles which are synthesized by biogenic systems like plants, microbes, and fishes. Different plants possess different properties according to their use in fighting against disease. The biological synthesis of metal nanoparticles is mainly a strategy which is employed to protect against toxic and harsh effects that can often arise in the normal synthesis of such particles. The book explains the properties of gold, palladium and platinum metal nanoparticles and discusses the mechanisms behind
biological synthesis. It emphasises the basic idea of various syntheses and will, therefore, be of particular support to potential researchers interested in plant synthesis.

**Catalytic Application of Nano-Gold Catalysts**

A state-of-the-art reference, Metal Nanoparticles offers the latest research on the synthesis, characterization, and applications of nanoparticles. Following an introduction of structural, optical, electronic, and electrochemical properties of nanoparticles, the book elaborates on nanoclusters, hyper-Raleigh scattering, nanoarrays, and several applications including single electron devices, chemical sensors, biomolecule sensors, and DNA detection. The text emphasizes how size, shape, and surface chemistry affect particle performance throughout. Topics include synthesis and formation of nanoclusters, nanosphere lithography, modeling of nanoparticle optical properties, and biomolecule sensors.

**Gold Nanoparticles in Biomedical Applications**

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.

**Green Metal Nanoparticles**

Green Synthesis, Characterization and Applications of Nanoparticles shows how eco-friendly nanoparticles are engineered and used. In particular, metal nanoparticles, metal oxide nanoparticles and other categories of nanoparticles are discussed. The book outlines a range of methodologies and explores the appropriate use of each. Characterization methods include spectroscopic, microscopic and diffraction methods, but magnetic resonance methods are also included as they can be used to understand the mechanism of nanoparticle synthesis using organisms. Applications covered include targeted drug delivery, water purification and hydrogen generation. This is an important research resource for those wishing to learn more about how eco-efficient nanoparticles can best be used. Theoretical details and mathematical derivations are kept to a necessary minimum to suit the need of interdisciplinary audiences and those who may be relatively new to the field. Explores recent trends in growth, characterization, properties and applications of nanoparticles Gives readers an understanding on how they are applied through the use of case studies and examples Assesses the advantages and disadvantages of a variety of synthesis and characterization techniques for green nanoparticles in different situations

**Bionanotechnology**

New analytical strategies and techniques are necessary to meet requirements of modern technologies and new materials. In this sense, this book provides a thorough review of current analytical approaches, industrial practices, and strategies in Fourier transform application.

**Green Nanotechnology Approach for Synthesis and Encapsulation of Gold Nanoparticles from Agricultural Waste**

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.

Molecular Drug Properties

This book provides an account of the biogenic synthesis of nanomaterials by using different microorganisms. The chapters are focused on the biosynthesis of various metal and metal oxide nanosized materials by using bacteria, actinomycetes, fungi, and algae, including mechanisms of microbial synthesis. Other chapters summarize recent developments of microbial-based nanostructures for the management of food-borne pathogens, plant pathogenic fungi, as nutrients, and biomedical applications. Microorganisms are discussed not only as biofactories for the synthesis of nanomaterials but also as removal agents of toxic metals from the environment. Exposure sources and ecotoxicity of microbially synthesized nanoparticles are also discussed.

Organic Pollutants Ten Years After the Stockholm Convention

The Springer Handbook of Nanomaterials covers the description of materials which have dimension on the "nanoscale". The description of the nanomaterials in this Handbook follows the thorough but concise explanation of the synergy of structure, properties, processing and applications of the given material. The Handbook mainly describes materials in their solid phase; exceptions might be e.g. small sized liquid aerosols or gas bubbles in liquids. The materials are organized by their dimensionality. Zero dimensional structures collect clusters, nanoparticles and quantum dots, one dimensional are nanowires and nanotubes, while two dimensional are represented by thin films and surfaces. The chapters in these larger topics are written on a specific materials and dimensionality combination, e.g. ceramic nanowires. Chapters are authored by well-established and well-known scientists of the particular field. They have measurable part of publications and an important role in establishing new knowledge of the particular field.

Green Nanoparticles

Plant secondary metabolites have been a fertile area of chemical investigation for many years, driving the development of both analytical chemistry and of new synthetic reactions and methodologies. The subject is multi-disciplinary with chemists, biochemists and plant scientists all contributing to our current understanding. In recent years there has been an upsurge in interest from other disciplines, related to the realisation that secondary metabolites are dietary components that may have a considerable impact on human health, and to the development of gene technology that permits modulation of the contents of desirable and undesirable components. Plant Secondary Metabolites: Occurrence, Structure and Role in the Human Diet addresses this wider interest by covering the main groups of natural products from a chemical and biosynthetic perspective with illustrations of how genetic engineering can be applied to manipulate levels of secondary metabolites of economic value as well as those of potential importance in diet and health. These descriptive chapters are augmented by chapters showing where these products are found in the diet, how they are metabolised and reviewing the evidence for their beneficial bioactivity.

Fourier Transforms

"Researchers in nanotechnology are turning towards "Nature" to provide inspiration to develop novel innovative methods for nanoparticle synthesis. Currently used chemical and physical methods of nanoparticles synthesis use toxic chemicals in their synthesis protocols. The toxic residues from these nanoparticles make them unsafe for food related applications. There is a need to develop nanoparticles using greener alternatives. Another challenging question that needs to be addressed is agricultural waste management. Merging these two problems led to the concept of creating wealth out of waste. Agricultural waste materials such as grape seeds, skin, stalk and organic waste generated during the Canadian fall season due to the fall of maple leaves and pine needles were used in this study to synthesize gold nanoparticles (AuNP). The main goal of this study is to synthesize gold nanoparticles without using toxic chemicals in the synthesis protocol making them suitable for drug/functional food delivery systems. A green nanotechnology approach was followed by using water as the solvent throughout the study. This value addition to agricultural waste has led to the yield of high value and ecofriendly gold nanoparticles. From the transmission electron microscopy (TEM) micrographs of gold nanoparticles produced using grape seeds (GSE), skin (GSK), stalk (GST) and pine needle extract, nearly spherically-shaped AuNP about 20 - 25 nm in diameter were observed. Whereas the gold nanoparticles produced using maple leaf extract produced triangular prisms. This is the first study stating the use of maple..."
leaf extracts to potentially synthesize gold nanoparticles. As the plant matrix is a highly complex system, catechin, a polyphenolic compound present in grape seed, skin, and stalk, and in pine needles, was selected for further investigation. Gold nanoparticles were synthesized using different combinations of catechin (CAT), tannic acid (TAE), 1:1 CAT: TAE, 1:4 CAT: TAE. TEM images showed that gold nanoparticles synthesized using catechin were quasi-spherical in shape with 40 - 50 nm in size. All the gold nanoparticles produced by green synthesis method in this study were hydrophilic in nature. In order to make hybrid organic-inorganic carriers for drug delivery systems, AuNP synthesized using catechin was encapsulated in maltodextrin and beta-cyclodextrin complexes. The method adopted for encapsulation of AuNP into maltodextrin followed a top-down approach. The complex formation of AuNP into beta-cyclodextrin followed a bottom-up approach. Three different encapsulation methods such as microwave assisted encapsulation, freeze drying encapsulation and simple inclusion encapsulation for maltodextrin and molecular inclusion encapsulation for beta-cyclodextrin were studied for encapsulation of AuNP. The scanning electron microscopy (SEM) images of the AuNP encapsulated powder showed interesting morphology when comparing microwave assisted encapsulation to freeze drying encapsulation in both maltodextrin and beta-cyclodextrin. It was found from this study that organic-inorganic hybrid carriers can be developed using water following a green nanotechnology approach.

**Green Metal Nanoparticles**

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.

**Recent Advances in Biopolymers**

Ten years after coming into force of the Stockholm Convention on Persistent Organic Pollutants (POPs), a wide range of organic chemicals (industrial formulations, plant protection products, pharmaceuticals and personal care products, etc.) still poses the highest priority environmental hazard. The broadening of knowledge of organic pollutants (OPs) environmental fate and effects, as well as the decontamination techniques, is accompanied by an increase in significance of certain pollution sources (e.g. sewage sludge and dredged sediments application, textile industry), associated with a potential generation of new dangers for humans and natural ecosystems. The present book addresses these aspects, especially in the light of Organic Pollutants risk assessment as well as the practical application of novel analytical methods and techniques for removing OPs from the environment. Providing analytical and environmental update, this contribution can be particularly valuable for engineers and environmental scientists.

**Algae**

Gold, considered catalytically inactive for a long time, is now a fascinating partner of modern chemistry, as scientists such as Bond, Teles, Haruta, Hutchings, Ito and Hayashi opened new perspectives for the whole synthetic chemist community. Recently gold has attracted significant attention due to its advantageous characteristics as a catalytic material and since it allows easy functionalization with biologically active molecules. In this context, when gold is prepared as very small particles, it turns out to be a highly active catalyst. However, such a phenomenon completely disappears when the gold particle size grows into the micrometer range. Therefore, the preparation for obtaining an active gold catalyst is so important. The primary objective of this book is to provide a comprehensive overview of gold metal nanoparticles and their application as promising catalysts.

**Metal Nanoparticles**

For the first time, this comprehensive handbook presents the emerging field of microwave technology for the synthesis of nanoparticles. Divided into three parts--fundamentals, methods, and applications--it covers topics including microwave theory, scale-up, microwave plasma synthesis, characterization, and more. This offers both an important volume for academic researchers, and a resource for those in industry exploring the applications of nanoparticles in semiconductors, electronics, catalysis, sensors, and more.

**Facile green synthesis of gold nanoparticles from Codium edule (Codiaceae)**

During the last few decades, research into natural products has advanced tremendously thanks to contributions from the fields of chemistry, life sciences, food science and material sciences. Comparisons of
natural products from microorganisms, lower eukaryotes, animals, higher plants and marine organisms are now well documented. This book provides an easy-to-read overview of natural products. It includes twelve chapters covering most of the aspects of natural products chemistry. Each chapter covers general introduction, nomenclature, occurrence, isolation, detection, structure elucidation both by degradation and spectroscopic techniques, biosynthesis, synthesis, biological activity and commercial applications, if any, of the compounds mentioned in each topic. Therefore it will be useful for students, other researchers and industry. The introduction to each chapter is brief and attempts only to supply general knowledge in the particular field. Furthermore, at the end of each chapter there is a list of recommended books for additional study and a list of relevant questions for practice.

Reducing Agents in Colloidal Nanoparticle Synthesis

Exploring the synthesis, characterization, surface manipulation, electron transfer and biological activity of silver nanoparticles, this book examines the fundamentals of the properties and synthesis of these particles. With a renewed interest in silver nanoparticles, this book addresses the need to understand their potential in industrial, medical and other applications. It is divided into six chapters, each written by an expert and providing a comprehensive review of the topic while detailing recent advances made in each specific area. These topics include surface plasmon band, synthesis and characterization, Surface-enhanced Raman spectroscopy (SERS) and plasmon resonance mediated processes, photocatalysis, biomedical applications and biological activity. It also presents the current state of the art, challenges and future trends of catalysis, sensing and biomedical applications. ‘Silver Nanoparticle Applications’ provides an invaluable reference work and introduction for chemists, biologists, physicists and biomedical researchers who are interested in exploring the uses and applications of silver nanoparticles. It is also intended for students, researchers and professionals interested in nanotechnology.

Advances in Bionanomaterials

There are physical and chemical methods of synthesis of nanomaterials. But due to the damage caused by these methods to the environment there is a pressing need of green nanotechnology, which is a clean and eco-friendly technology for the development of nanomaterials. The present book includes green synthesis of nanoparticles by algae, diatoms and plants. The mechanism behind the synthesis of nanoparticles will also be discussed. The book would be a valuable resource for students, researchers and teachers of biology, chemistry, chemical technology, nanotechnology, microbial technology and those who are interested in green nanotechnology.

Microbial Root Endophytes

This new volume discusses the multitude of possibilities for new development in nanotechnology that focuses on overcoming the problems and challenges faced by the biomedical and food industries. The volume hopes to facilitate the development of devices and materials that benefit patients and their healthcare. The book is broken into three parts that cover: nanotechnology techniques for biomedical applications nanoparticles and materials for food, health, and pharmaceutical application potential applications of nanotechnology in food safety

Microwaves in Nanoparticle Synthesis

The book focuses on novel particulate technologies for the purpose of drug delivery to humans. Nowadays, macro and nano-scale particles are being investigated for targeted delivery of small and large biological macromolecules. The targeting of drugs can minimize the dosage regimen and reduces dose related potential toxicity of drug molecules, which in turn lead to increased potential compliance. Various types of organic, inorganic and polymer particles are currently being investigated. These are attracting the attention of the research workers in the field of drug delivery science and technology. This book covers polymersomes, inorganic-organic composites, gold nanoparticles biopolymer and synthetic polymer particles etc. All aspects of drug delivery in relation to each technology have been described including these advances. Easy to read and understand the content of each chapter Rich in up-to-date information regarding their application.

Bio-Nanoparticles

The use of biological sources such as microbes and plants can help in synthesizing nanoparticles in a reliable and eco-friendly way. The synthesis of nanoparticles by these natural sources is characterized by processes that take place near to ambient temperature and pressures and also near neutral pH. This edited volume authored by subject specialists, provides all the latest research and builds a database of bioreduction agents to various metal nanoparticles using different precursor systems. The book also highlights the different strategies such as simplicity, cost-effectiveness, environment-friendly and easily scalable, and includes parameters for controlling the size and shape of the materials developed from the various greener methods. In order to exploit the utmost potential metal nanoparticles synthesis from the different sources such as
Read Book Green Synthesis Of Gold Nanoparticles From The Leaf

agricultural waste, flora and fauna, food waste, microbes and biopolymer systems, it is also crucial to recognize the biochemical and molecular mechanisms of production of nanoparticles and their characterization.

**Nanotechnology and Nanomaterial Applications in Food, Health, and Biomedical Sciences**

Metallic nanoparticles display fascinating properties that are quite different from those of individual atoms, surfaces or bulk materials. They are a focus of interest for fundamental science and, because of their huge potential in nanotechnology, they are the subject of intense research effort in a range of disciplines. Applications, or potential applications, are diverse and interdisciplinary. They include, for example, use in biochemistry, in catalysis and as chemical and biological sensors, as systems for nanoelectronics and nanostructured magnetism (e.g. data storage devices), where the drive for further miniaturization provides tremendous technological challenges and, in medicine, there is interest in their potential as agents for drug delivery. The book describes the structure of metallic nanoparticles, the experimental and theoretical techniques by which this is determined, and the models employed to facilitate understanding. The various methods for the production of nanoparticles are outlined. It surveys the properties of clusters and the methods of characterisation, such as photoionization, optical spectroscopy, chemical reactivity and magnetic behaviour, and discusses element-specific information that can be extracted by synchrotron-based techniques such as EXAFS, XMCD and XMLD. The properties of clusters can vary depending on whether they are free, deposited on a surface or embedded in a matrix of another material; these issues are explored. Clusters on a surface can be formed by the diffusion and aggregation of atoms; ways of modelling these processes are described. Finally we look at nanotechnology and examine the science behind the potential of metallic nanoparticles in chemical synthesis, catalysis, the magnetic separation of biomolecules, the detection of DNA, the controlled release of molecules and their relevance to data storage. The book addresses a wide audience. There was a huge development of the subject beginning in the mid-1980s where researchers began to study the properties of free nanoparticle and models were developed to describe the observations. The newcomer is introduced to the established models and techniques of the field without the need to refer to other sources to make the material accessible. It then takes the reader through to the latest research and provides a comprehensive list of references for those who wish to pursue particular aspects in more detail. It will also be an invaluable handbook for the expert in a particular aspect of nanoscale research who wishes to acquire knowledge of other areas. The authors are specialists in different aspects of the subject with expertise in physics and chemistry, experimental techniques and computational modelling, and in interdisciplinary research. They have collaborated in research. They have also collaborated in writing this book, with the aim from the outset of making it a coherent whole rather than a series of independent loosely connected articles. * Appeals to a wide audience * Provides an introduction to established models and techniques in the field * Comprehensive list of references

**Gold Nanoparticles For Physics, Chemistry And Biology (Second Edition)**

Algae - Organisms for Imminent Biotechnology will be useful source of information on basic and applied aspects of algae for post graduate students, researchers, scientists, agriculturists, and decision makers. The book comprises a total of 12 chapters covering various aspects of algae particularly on microalgal biotechnology, bloom dynamics, photobioreactor design and operation of microalgal mass cultivation, algae used as indicator of water quality, microalgal biosensors for ecological monitoring in aquatic environment, carbon capture and storage by microalgae to enhancing CO2 removal, synthesis and biotechnological potentials of algal nanoparticles, biofilms, silica-based nanovectors, challenges and opportunities in marine algae, and genetic identification and mass propagation of economically important seaweeds and seaweeds as source of new bioactive prototypes.

Copyright code : 9ecb5f438d14881d239621e3f969686e