

Nonlinear Magnetization Dynamics In Nanosystems Elsevier Series In Electromagnetism

Nonlinear Magnetization Dynamics in Nanosystems **Advanced 3D-Printed Systems and Nanosystems for Drug Delivery and Tissue Engineering** **Drug Delivery Nanosystems for Biomedical Applications** *Polymeric Nanosystems* **Electrospinning: Nanofabrication and Applications** *Nanomaterials for Theranostics and Tissue Engineering* **Nano-sized Multifunctional Materials** *Applied Nanotechnology* *Inorganic Nanosystems* *Nanotechnology* *Photoactive Inorganic Nanoparticles* *Nanostructures for Drug Delivery* **Advanced Nanomaterials for Catalysis and Energy** *Micro and Nano Systems for Biophysical Studies of Cells and Small Organisms* **Nano- and Microscale Drug Delivery Systems** **Advanced Nanoformulations** **Handbook of Nanotechnology Applications** *Nanotechnology Safety* *Polymeric Nanomaterials in Nanotherapeutics* *Emerging Nanotechnologies for Manufacturing* *Colloidal Foundations of Nanoscience* *Nanochemistry* **Nanotechnologies in Preventive and Regenerative Medicine** *Nano-Pharmacokinetics and Theranostics* **Nano Tools and Devices for Enhanced Renewable Energy** *Advances in Nanosensors for Biological and Environmental Analysis* **Composite Nanoadsorbents** **Micro- and Nanoengineering of the Cell Surface** **Nanocarriers for Drug Delivery** *Design and Development of New Nanocarriers* **Quantum Aspects of Life** **Nanotechnology in Cancer** *Nanomaterials for Clinical Applications* **Drug Delivery Nanosystems** **Multifunctional Theranostic Nanomedicines in Cancer** **Impact of Nanoscience in the Food Industry** **Handbook of Nanomaterials for Cancer Theranostics** **Quantitative Data Processing in Scanning Probe Microscopy** **Nano Optoelectronic Sensors and Devices** Self-standing Substrates

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Inorganic Nanosystems Apr 21 2022 *Inorganic Nanosystems: Theranostic Nanosystems, Volume Two* examines the applications of nanotherapeutic systems and nanodiagnosics in relation to polymeric nanosystems. In the last decade, numerous biopolymers have been utilized to prepare polymeric nanosystems for therapeutic applications. These biopolymers include polylactic acid, polylactide-co-glycolide, polycaprolactone, acrylic polymers, cellulose and cellulose derivatives, alginates, chitosan, gellan gum, gelatin, albumin, chondroitin sulfate, hyaluronic acid, guar gum, gum Arabic, gum tragacanth, xanthan gum, and starches. Besides these biopolymers, grafted polymers are also being used as advanced polymeric materials to prepare many theranostic nanocarriers and nanoformulations. This book explores the array of polymeric nanosystems to understand therapeutic potentials. It will be useful to pharmaceutical scientists, including industrial pharmacists and analytical scientists, health care professionals, and regulatory scientists actively involved in the pharmaceutical product and process development of tailor-made polysaccharides in drug delivery applications. Contains in-depth discussions of polymeric nanosystems, including high-quality graphics, flow charts and graphs for enhanced understanding Reviews literature on polymeric nanosystems while also suggesting new avenues Includes contributions in all areas of polymeric nanosystems, providing a thorough and interdisciplinary work

Applied Nanotechnology May 22 2022 *Applied Nanotechnology* takes an integrated approach to the scientific, commercial and social aspects of nanotechnology, exploring: The relationship between nanotechnology and innovation The changing economics and business models required to commercialize innovations in nanotechnology Product design case studies Applications in various sectors, including information technology, composite materials, energy, and agriculture The role of government in promoting nanotechnology The potential future of molecular self-assembly in industrial production In this 2e, new chapters have been added on energy applications and the role of nanotechnology in sustainability. The section on the safety of nanoproducts has also been updated, and material on funding and commercialization has been updated and expanded, with new case studies illustrating the experience of new startups in a challenging economic environment. A route map for the commercialization of nanotechnology research Discusses product design challenges, regulatory issues, and ethical and social implications of nanotechnology Features new case studies on nanotechnology startups in challenging economic times

Impact of Nanoscience in the Food Industry Dec 25 2019 *The Impact of Nanoscience in the Food Industry, Volume 12 in The Handbook of Food Bioengineering series*, explores how nanoscience applications in food engineering offer an alternative to satisfying current food needs that cannot be fulfilled by natural products. Nanotechnology enables the development of tailored food ingredients and structures to replace products that are difficult to obtain. The book discusses how specialized nano-preservatives, sensors and food degradation and contamination detectors were developed and how they can be introduced in food products without degrading quality or properties of the final product. A valuable resource for food engineering researchers and students alike. Identifies common nanomaterials used in food preservation and food packaging Provides industrial applications to increase food production Describes analytical methods for assessing food safety Identifies how nanoscience advances allow for new developments in functional foods and nutraceuticals Discusses safety concerns, regulations and restricted use of nanomaterials in food bioengineering

Micro and Nano Systems for Biophysical Studies of Cells and Small Organisms Nov 16 2021 *Micro and Nano Systems for Biophysical Studies of Cells and Small Organisms* provides a comprehensive introduction to the state-of-the-art micro and nano systems that have recently been developed and applied to biophysical studies of cells and small organisms. These micro and nano systems span from microelectromechanical systems (MEMS) and microfluidic devices to robotic micro-nanomanipulation systems. These biophysical studies range from cell mechanics to the neural science of worms and *Drosophila*. This book will help readers understand the fundamentals surrounding the development of these tools and teach them the most recent advances in cellular and organismal biophysics enabled by these technologies. Comprehensive coverage of micro and nano-system technology and application to biophysical studies of cells and small organisms. Highlights the most recent advances in cellular and organismal biophysics enabled by micro and nano systems. Insightful outlook on future directions and trends in each chapter covering a sub-area of the book topic.

Nanotechnology in Cancer Apr 28 2020 *Nanotechnology in Cancer* covers current nanotechnology-based nanotherapeutics involving gold nanoparticles, colloids, gels, magnetic nanoparticles, radiofrequency, gene therapy, biological particles, and the intermolecular interactions associated with nanoparticle based cancer therapy in vivo. Different cancer types and locations are considered alongside the corresponding treatment types, and the use of imaging technologies and animal models are also explored. Both scientific and clinical aspects are considered by authors coming from both fields, with the authors using their backgrounds from different disciplines to make the connection between cancer and effective drug delivery and therapeutic strategies. Authored by leaders from the scientific research and clinical communities who use their background from different disciplines to explore the connections between cancer and effective drug delivery and therapeutic strategies Brings together tumor biology, imaging technologies, nanomaterial platforms for drug delivery, therapeutic strategies, and reconstructive surgery Explores the clinical and regulatory challenges facing nanomedicine

Advanced Nanoformulations Sep 14 2021 *Advanced Nanoformulations: Theranostic Nanosystems, Volume Three* examines the applications of nanotherapeutic systems and nanodiagnosics in relation to polymeric nanosystems. In the last decade, numerous biopolymers have been utilized to prepare polymeric nanosystems for therapeutic applications. These biopolymers include polylactic acid, polylactide-co-glycolide, polycaprolactone, acrylic polymers,

cellulose and cellulose derivatives, alginates, chitosan, gellan gum, gelatin, albumin, chondroitin sulfate, hyaluronic acid, guar gum, gum Arabic, gum tragacanth, xanthan gum, and starches. Besides these biopolymers, grafted polymers are also being used as advanced polymeric materials to prepare many theranostic nanocarriers and nanoformulations. This book explores the array of polymeric nanosystems to understand therapeutic potentials. It will be useful to pharmaceutical scientists, including industrial pharmacists and analytical scientists, health care professionals, and regulatory scientists actively involved in the pharmaceutical product and process development of tailor-made polysaccharides in drug delivery applications. Contains in-depth discussions of polymeric nanosystems, including high-quality graphics, flow charts and graphs for enhanced understanding Reviews literature on polymeric nanosystems while also suggesting new avenues Includes contributions in all areas of polymeric nanosystems, providing a thorough and interdisciplinary work

Nano-sized Multifunctional Materials Jun 23 2022 Nano-sized Multifunctional Materials: Synthesis, Properties and Applications explores how materials can be down-scaled to nanometer-size in order to tailor and control properties. These advanced, low-dimensional materials, ranging from quantum dots and nanoparticles, to ultra-thin films develop multifunctional properties. As well as demonstrating how down-scaling to nano-size can make materials multifunctional, chapters also show how this technology can be applied in electronics, medicine, energy and in the environment. This fresh approach in materials research will provide a valuable resource for materials scientists, materials engineers, chemists, physicists and bioengineers who want to learn more on the special properties of nano-sized materials. Outlines the major synthesis chemical process and problems of advanced nanomaterials Shows how multifunctional nanomaterials can be practically used in biomedical area, nanomedicine, and in the treatment of pollutants Demonstrates how the properties of a variety of materials can be engineered by downscaling them to nano size

Design and Development of New Nanocarriers Jun 30 2020 Design and Development of New Nanocarriers focuses on the design and development of new nanocarriers used in pharmaceutical applications that have emerged in recent years. In particular, the pharmaceutical uses of microfluidic techniques, supramolecular design of nanocapsules, smart hydrogels, polymeric micelles, exosomes and metal nanoparticles are discussed in detail. Written by a diverse group of international researchers, this book is a valuable reference resource for those working in both biomaterials science and the pharmaceutical industry. Shows how nanomanufacturing techniques can help to create more effective, cheaper pharmaceutical products Explores how nanofabrication techniques developed in the lab have been translated to commercial applications in recent years Explains safety and regulatory aspects of the use of nanomanufacturing processes in the pharmaceutical industry

Self-standing Substrates Aug 21 2019 This book systematically describes free-standing films and self-supporting nanoarrays growing on rigid and flexible substrates, and discusses the numerous applications in electronics, energy generation and storage in detail. The chapters present the various fabrication techniques used for growing self-supporting materials on flexible and rigid substrates, and free-standing films composed of semiconductors, inorganic, polymer and carbon hybrid materials.

Nanostructures for Drug Delivery Jan 18 2022 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

Nanomaterials for Theranostics and Tissue Engineering Jul 24 2022 Nanomaterials for Theranostics and Tissue Engineering: Techniques, Trends and Applications provides information on the major methodologies for the application of nanomaterials in the medical field. In recent years, nanotechnology for medicine, commonly known as bionanotechnology, or nanomedicine, has revolutionized various types of medical treatment. This book is intended for practicing engineers and scientists, and includes detailed, readily applicable protocols. It focuses on 4 major themes, including the synthesis of nanosystems for controlled drug delivery, nanotechnology-enhanced sensing systems, the application of nanotechnologies to the synthesis of novel biomaterials, and safety issues related to the application of medicinal nanotechnology. Provides a comprehensive overview on how nanotechnology is being used to create new tissue engineering techniques Covers, in detail, the physicochemical fundamentals of bionanotechnologies Explores major applications in the fields of theranostics and tissue engineering Assesses important challenges and safety issues related to the implementation of nanotechnology in medicine

Drug Delivery Nanosystems for Biomedical Applications Oct 27 2022 Drug Delivery Nanosystems for Biomedical Application reviews some of the most challenging nanosystems with different routes of delivery that are useful for specific drugs, from both efficacy and bioavailability points-of-view. The chapters explore how this area is developing, the present state of the field, and future developments, in particular, inorganic, metallic, polymeric, composite and lipid nanosystems and their possible evolution to clinical applications. The book is a valuable research reference for both researchers and industrial partners who are not only interested in learning about this area, but also want to gain insights on how to move towards translational research. Focuses on applications, including tissue engineering and regenerative technologies, showing how nanosystems are used in practice Explores how nanosystems are used to deliver a variety of drugs, including peptides, hormone growth factors and genes Assesses the safety and nanotoxicity aspects of drug delivery nanosystems

Nonlinear Magnetization Dynamics in Nanosystems Dec 29 2022 As data transfer rates increase within the magnetic recording industry, improvements in device performance and reliability crucially depend on the thorough understanding of nonlinear magnetization dynamics at a sub-nanoscale level. This book offers a modern, stimulating approach to the subject of nonlinear magnetization dynamics by discussing important aspects such as the Landau-Lifshitz-Gilbert (LLG) equation, analytical solutions, and the connection between the general topological and structural aspects of dynamics. An advanced reference for the study and understanding of nonlinear magnetization dynamics, it addresses situations such as the understanding of spin dynamics in short time scales and device performance and reliability in magnetic recording. Topics covered include nonlinear magnetization dynamics and the Landau-Lifshitz-Gilbert equation, nonlinear dynamical systems, spin waves, ferromagnetic resonance and pulsed magnetization switching. The book explains how to derive exact analytical solutions for the complete nonlinear problem and emphasises the connection between the general topological and structural aspects of nonlinear magnetization dynamics and the discretization schemes better suited to its numerical study. It is an exceptional research tool providing an advanced understanding of the study of magnetization dynamics in situations of fundamental and technological interest.

Advanced Nanomaterials for Catalysis and Energy Dec 17 2021 Advanced Nanomaterials for Catalysis and Energy: Synthesis, Characterization and Applications outlines new approaches to the synthesis of nanomaterials (synthesis in flow conditions, laser electrodispersion of single metals or alloys on carbon or oxide supports, mechanochemistry, sol-gel routes, etc.) to provide systems with a narrow particle size distribution, controlled metal-support interaction and nanocomposites with uniform spatial distribution of domains of different phases, even in dense sintered materials. Methods for characterization of real structure and surface properties of nanomaterials are discussed, including synchrotron radiation diffraction and X-ray photoelectron spectroscopy studies, neutronography, transmission/scanning electron microscopy with elemental analysis, and more. The book covers the effect of nanosystems' composition, bulk and surface properties, metal-support interaction, particle size and morphology, deposition density, etc. on their functional properties (transport features, catalytic activity and reaction mechanism). Finally, it includes examples of various developed nanostructured solid electrolytes and mixed ionic-electronic conductors as materials in solid oxide fuel cells and asymmetric supported membranes for oxygen and hydrogen separation. Outlines synthetic and characterization methods for nanocatalysts Relates nanocatalysts' properties to their specific applications Proposes optimization methods aiming at specific applications

Emerging Nanotechnologies for Manufacturing May 10 2021 In the second edition of Emerging Nanotechnologies for Manufacturing, an unrivalled team of international experts explores existing and emerging nanotechnologies as they transform large-scale manufacturing contexts in key sectors such as medicine, advanced materials, energy, and electronics. From their different perspectives, the contributors explore technologies and techniques as well as applications and

how they transform those sectors. With updated chapters and expanded coverage, the new edition of *Emerging Nanotechnologies for Manufacturing* reflects the latest developments in nanotechnologies for manufacturing and covers additional nanotechnologies applied in the medical fields, such as drug delivery systems. New chapters on graphene and smart precursors for novel nanomaterials are also added. This important and in-depth guide will benefit a broad readership, from R&D scientists and engineers to venture capitalists. Covers nanotechnology for manufacturing techniques and applications across a variety of industries. Explores the latest developments such as nanosuspensions and nanocarriers in drug delivery systems, graphene applications, and usage of smart precursors to develop nanomaterials. Proven reference guide written by leading experts in the field.

Micro- and Nanoengineering of the Cell Surface Sep 02 2020 *Micro- and Nanoengineering of the Cell Surface* explores the direct engineering of cell surfaces, enabling materials scientists and chemists to manipulate or augment cell functions and phenotypes. The book is accessible for readers across industry, academia, and in clinical settings in multiple disciplines, including materials science, engineering, chemistry, biology, and medicine. Written by leaders in the field, it covers numerous cell surface engineering methods along with their current and potential applications in cell therapy, tissue engineering, biosensing, and diagnosis. The interface of chemistry, materials science, and biology presents many opportunities for developing innovative tools to diagnose and treat various diseases. However, cell surface engineering using chemistry and materials science approaches is a new and diverse field. This book provides a full coverage of the subject, introducing the fundamentals of cell membrane biology before exploring the key application areas. Demystifies the direct engineering of cell surfaces, enabling materials scientists and chemists to manipulate or augment cell functions and phenotypes. Provides a toolkit of micro- and nanoengineering approaches to the manipulation of the cell surface. Unlocks the potential of cell surface manipulation for a range of new applications in the fields of in vitro research, cell therapy, tissue engineering, biosensing, and diagnostics.

Quantum Aspects of Life May 30 2020 This book presents the hotly debated question of whether quantum mechanics plays a non-trivial role in biology. In a timely way, it sets out a distinct quantum biology agenda. The burgeoning fields of nanotechnology, biotechnology, quantum technology, and quantum information processing are now strongly converging. The acronym BINS, for Bio-Info-Nano-Systems, has been coined to describe the synergetic interface of these several disciplines. The living cell is an information replicating and processing system that is replete with naturally-evolved nanomachines, which at some level require a quantum mechanical description. As quantum engineering and nanotechnology meet, increasing use will be made of biological structures, or hybrids of biological and fabricated systems, for producing novel devices for information storage and processing and other tasks. An understanding of these systems at a quantum mechanical level will be indispensable. Contents: Foreword (Sir R Penrose) Emergence and Complexity: A Quantum Origin of Life? (P C W Davies) Quantum Mechanics and Emergence (S Lloyd) Quantum Mechanisms in Biology: Quantum Coherence and the Search for the First Replicator (J Al-Khalili & J McFadden) Ultrafast Quantum Dynamics in Photosynthesis (A O Castro, F F Olsen, C F Lee & N F Johnson) Modelling Quantum Decoherence in Biomolecules (J Bothma, J Gilmore & R H McKenzie) The Biological Evidence: Molecular Evolution: A Role for Quantum Mechanics in the Dynamics of Molecular Machines that Read and Write DNA (A Goel) Memory Depends on the Cytoskeleton, but is it Quantum? (A Mershin & D V Nanopoulos) Quantum Metabolism and Allometric Scaling Relations in Biology (L Demetrius) Spectroscopy of the Genetic Code (J D Bashford & P D Jarvis) Towards Understanding the Origin of Genetic Languages (A D Patel) Artificial Quantum Life: Can Arbitrary Quantum Systems Undergo Self-Replication? (A K Pati & S L Braunstein) A Semi-Quantum Version of the Game of Life (A P Flitney & D Abbott) Evolutionary Stability in Quantum Games (A Iqbal & T Cheon) Quantum Transmemetic Intelligence (E W Piotrowski & J S?adkowski) The Debate: Dreams versus Reality: Plenary Debate Session on Quantum Computing (For Panel: C M Caves, D Lidar, H Brandt, A R Hamilton, Against Panel: D K Ferry, J Gea-Banacloche, S M Bezrukov, L B Kish, Debate Chair: C R Doering, Transcript Editor: D Abbott) Plenary Debate: Quantum Effects in Biology: Trivial or Not? (For Panel: P C W Davies, S Hameroff, A Zeilinger, D Abbott, Against Panel: J Eisert, H M Wiseman, S M Bezrukov, H Frauenfelder, Debate Chair: J Gea-Banacloche, Transcript Editor: D Abbott) Nontrivial Quantum Effects in Biology: A Skeptical Physicist's View (H Wiseman & J Eisert) That's Life! — The Geometry of ? Electron Clouds (S Hameroff) Readership: Graduate students and researchers in quantum physics, biophysics, nanosciences, quantum chemistry, mathematical biology and complexity theory, as well as philosophers of science.

Keywords: Quantum Biology; Quantum Computation; Quantum Mechanics; Biophysics; Nanotechnology; Quantum Technology; Quantum Information Processing; Bio-Info-Nano-Systems (BINS); Emergence; Complexity; Complex Systems; Cellular Automata; Game

Theory; Biomolecules; Photosynthesis; DNA; Genetic Code; Decoherence Key Features: Is structured in a debate style, where contributors argue opposing positions. Brings together some of the finest minds and latest developments in the field. Is entirely unique and there are no competing titles.

Polymeric Nanomaterials in Nanotherapeutics Jun 11 2021 *Polymeric Nanomaterials in Nanotherapeutics* describes how polymeric nanosensors and nanorobotics are used for biomedical instrumentation, surgery, diagnosis and targeted drug delivery for cancer, pharmacokinetics, monitoring of diabetes and healthcare. Key areas of coverage include drug administration and formulations for targeted delivery and release of active agents (drug molecules) to non-healthy tissues and cells. The book demonstrates how these are applied to dental work, wound healing, cancer, cardiovascular diseases, neurodegenerative disorders, infectious diseases, chronic inflammatory diseases, metabolic diseases, and more. Methods of administration discussed include oral, dental, topical and transdermal, pulmonary and nasal, ocular, vaginal, and brain drug delivery and targeting. Drug delivery topics treated in several subchapters includes materials for active targeting and cases study of polymeric nanomaterials in clinical trials. The toxicity and regulatory status of therapeutic polymeric nanomaterials are also examined. The book gives a broad perspective on the topic for researchers, postgraduate students and professionals in the biomaterials, biotechnology, and biomedical fields. Shows how the properties of polymeric nanomaterials can be used to create more efficient medical treatments/therapies. Demonstrates the potential and range of applications of polymeric nanomaterials in disease prevention, diagnosis, drug development, and for improving treatment outcomes. Accurately explains how nanotherapeutics can help in solving problems in the field through the latest technologies and formulations.

Polymeric Nanosystems Sep 26 2022 *Polymeric Nanosystems: Theranostic Nanosystems, Volume 1* is an interdisciplinary work examining the applications of nanotherapeutic systems as well as nanodiagnostics in relation to polymeric nanosystems. In the last decade, numerous biopolymers have been utilized to prepare polymeric nanosystems for therapeutic applications. These biopolymers include polylactic acid, polylactide-co-glycolide, polycaprolactone, acrylic polymers, cellulose and cellulose derivatives, alginates, chitosan, gellan gum, gelatin, albumin, chondroitin sulfate, hyaluronic acid, guar gum, gum Arabic, gum tragacanth, xanthan gum, and starches. Besides these biopolymers, grafted polymers are also being used as advanced polymeric materials to prepare many theranostic nanocarriers, and nanoformulations. This book explores the array of polymeric nanosystems to understand therapeutic potentials. *Polymeric Nanosystems: Theranostic Nanosystems, Volume 1* will be useful to pharmaceutical scientists including industrial pharmacists & analytical scientists, health care professionals and regulatory scientists actively involved in pharmaceutical product and process development of tailored-made polysaccharides in drug delivery applications. Contains in-depth discussions of the polymeric nanosystems including high-quality graphics, flow charts, and graphs for enhanced understanding. Reviews the literature on polymeric nanosystems while also suggesting new avenues. Includes contributions in all areas of polymeric nanosystems, providing a thorough and interdisciplinary work.

Drug Delivery Nanosystems Feb 25 2020 Nanotechnology seeks to exploit distinct technological advances controlling the structure of nanoscale biomaterials at a nanodimensional scale approaching individual molecules and their aggregates or supramolecular structures. The term "nanomedicine" is used to describe those technologies under the umbrella of nanotechnology that have therapeutic applications in human health. This book presents recent trends and research achievements in the field of pharmaceutical nanotechnology and advanced drug delivery nanosystems, especially for theranostic purposes. The applications of drug delivery nanosystems considered carriers of active pharmaceutical ingredients (APIs) (e.g., proteins, peptides, and nucleic acids) are analyzed on the basis of technology, preparation protocols, and biomedical applications. The book also extensively reports on the principles, design protocols, and applications of nanosystems in drug delivery, imaging, and targeting of active molecules of pharmaceutical interest.

Nanomaterials for Clinical Applications Mar 28 2020 *Nanomaterials in Clinical Medicine: Case Studies in Nanomedicines* focuses on the nanomaterials that can be formulated as drug delivery vehicles, such as liposomes, micelles, nanoemulsions and nanogels. Their physicochemical, morphological, thermodynamical and nanotoxicological properties are analyzed with respect to the design and development of drug delivery nanosystems for the encapsulation of an active pharmaceutical ingredient and its controlled release. Each chapter covers basic properties, the nanosystem (e.g., liposomes), the added value in drug delivery and targeting, and future perspectives. Case studies and examples of how nanomaterials are being used in clinical medicine, including marketed liposomal medicines and medical utility and regimens are also included. Particular attention is given to new nanocarriers, such as elastic liposomes, lipid polymeric hybrid nanoparticles, organogel, nanofibers carbon nanomaterials, quantum dots and inorganic nanoparticles. This book is an important information source for those wanting to increase their understanding of what major nanomaterials are being used to create more effective drug delivery systems. Summarizes

the major nanomaterials used in clinical medicine, explaining how their properties make them suitable for this purpose Explains how nanomaterials are used to create increasingly efficient drug delivery vehicles Includes real-life examples, demonstrating how nanomaterials are being used in medical practice

Nanocarriers for Drug Delivery Aug 01 2020 Nano-carriers for Drug Delivery: Nanoscience and Nanotechnology in Drug Delivery presents recent discoveries in research on the pharmaceutical applications of the various types of nanosystem-based drug delivery systems. As many nanosystems have reached the market over the past decade, this book proves their benefits to patients. It explores these new carriers and the advances in drug delivery they have facilitated. Reflecting the interdisciplinary nature of the subject matter, the book includes experts from different fields, and with various backgrounds and expertise. It will appeal to researchers and students from different disciplines, such as materials science, technology and various biomedical fields. Coverage includes industrial applications that bridge the gap between lab-based research and practical industrial use. The resulting work is a reference and practical source of guidance for researchers, students and scientists working in the fields of nanotechnology, materials science and technology and biomedical science. Enables readers from different fields to access recent research and protocols across traditional boundaries Focuses on protocols and techniques, as well as the knowledge base of the field, thus enabling those in R&D to learn about, and successfully deploy, cutting-edge techniques Includes sections on nanocarrier systems

Colloidal Foundations of Nanoscience Apr 09 2021 Colloidal Foundations of Nanoscience explores the theory and concepts of colloid chemistry and its applications to nanoscience and nanotechnology. It provides the essential conceptual and methodological tools to approach nano-research issues. The authors' expertise in colloid science will contribute to the understanding of basic issues involved in research. Each chapter covers a classical subject of colloid science, in simple and straightforward terms, and addresses its relevance to nanoscience before introducing case studies. Gathers in a single volume the information currently scattered across various sources Straightforward introduction of theoretical concepts and in-depth case studies help you understand molecular mechanisms and master advanced techniques Includes chapter on self-assembly as an alternative to nanostructured phases Includes examples showing applications of classical concepts to real-world cutting-edge research

Composite Nanoadsorbents Oct 03 2020 Composite Nanoadsorbents discusses the most recent advances in the field, including promising techniques for waste water decontamination and the advantages and drawbacks of nanoadsorbents in these applications. The implications of nanoadsorbents to public health and future developments for facilitating environmental sustainability are also discussed. New approaches for nanomaterials are analyzed, focusing on the effect of nanotechnology in adsorption applications. The effectiveness of nanosized materials is evaluated, along with cost factors and new synthesis routes of composite nanomaterials. Combining the areas of nanotechnology, adsorption, and composite surface chemistry, the synthesis, modifications and applications of nanotechnology in the adsorption process are demonstrated. Edited by a prolific expert in the field, this book will be a valuable resource for researchers, postgraduate students and professionals in the fields of nanotechnology, adsorption and materials synthesis. Bridges the gap between theory and application of composite nanoadsorbents Provides an understanding of the benefits of nanoadsorbents and their cost, efficiency and novelty Includes material on inorganic nanoadsorbents and carbon nanotubes

Nanotechnologies in Preventive and Regenerative Medicine Feb 07 2021 Nanotechnologies in Preventive and Regenerative Medicine demonstrates how control at the nanoscale can help achieve earlier diagnoses and create more effective treatments. Chapters take a logical approach, arranging materials by their area of application. Biomaterials are, by convention, divided according to the area of their application, with each chapter outlining current challenges before discussing how nanotechnology and nanomaterials can help solve these challenges This applications-orientated book is a valuable resource for researchers in biomedical science who want to gain a greater understanding on how nanotechnology can help create more effective vaccines and treatments, and to nanomaterials researchers seeking to gain a greater understanding of how these materials are applied in medicine. Demonstrates how nanotechnology can help achieve more successful diagnoses at an earlier stage Explains how nanomaterials can be manipulated to create more effective drug treatments Offers suggestions on how the use of nanotechnology might have future applications to create even more effective treatments

Nano Tools and Devices for Enhanced Renewable Energy Dec 05 2020 Nano Tools and Devices for Enhanced Renewable Energy addresses key challenges faced in major energy sectors as the world strives for more affordable and renewable energy sources. The book collates and discusses the latest innovations in nanotechnology for energy applications, providing a comprehensive single resource for those interested in renewable energy. Chapters cover a range of nano tools and devices, as well as renewable energy types and sources, from energy storage to geothermal energy. Materials scientists, engineers and environmental scientists interested in the application and evaluation of innovative nano tools and devices in renewable energy technologies will find this book very valuable. Nanotechnology can help to reduce energy consumption and lessen toxicity burdens on the environment. Despite the rapid growth of development and use of nanotechnology in the modern world, there are still challenges faced by researchers and development groups in industry and academia. This book helps solve the problems of reduced accessibility of relevant research, presenting important information on adverse impacts on the environment, human health, safety and sustainability. Covers a range of nano tools and devices, as well as renewable energy types and sources, from energy storage to geothermal energy Offers an insight into the commercialization and regulatory aspects of nanotechnology for renewable energy Helps solve the problems of reduced accessibility of relevant information, presenting important research on adverse impacts on the environment, human health, safety and sustainability

Nano-Pharmacokinetics and Theranostics Jan 06 2021 Nano-Pharmacokinetics and Theranostics: Advancing Cancer Therapy addresses from a comprehensive and multidisciplinary approach the translational aspects and clinical perspectives of nano-pharmacokinetics using cancer as a model disease. Nano-pharmacokinetics is emerging as an important sub discipline of nanoscience and medical sciences because of the increasing safety issues of nanosystems on living organisms. This book reports the dynamics of nanosystems in living organisms for better understanding of nanotoxicity, pharmacology, biochemistry, physiology and medicine perspectives. It further examines current progress of state-of-the art pharmacokinetics mechanisms, which will be of great help to develop more clinical-oriented nanosystems with a wide safety margin. The book is divided into three sections: the first section focuses on the concept of pharmacokinetics with state-of-the-art Nano-Pharmacokinetics (NPK). The second section looks at the engineering of nanoparticles and pharmacokinetics clinical development. The final section focuses on Nano-Pharmacokinetics and Theranostics, elaborating the basic question of how pharmacokinetics of nanomaterials relate to their end applications such as cancer therapy. Nano-Pharmacokinetics and Theranostics: Advancing Cancer Therapy will be useful to researchers in the field of nanoparticle based targeted drug delivery including pharmaceutical scientists, material scientists, chemists, nanotechnologists, biomedical scientists, and clinicians. Includes contributions from highly qualified scientists, regulatory entities, enterprises and medical practitioners to explain the long and inherently multidisciplinary pathway of nano-pharmacokinetics Describes assessment methods of nano-pharmacokinetics Examines the interface between nanomedicine and pharmacokinetics to diagnose and treat cancer

Electrospinning: Nanofabrication and Applications Aug 25 2022 Electrospinning: Nanofabrication and Applications presents an overview of the electrospinning technique, nanofabrication strategies and potential applications. The book begins with an introduction to the fundamentals of electrospinning, discussing fundamental principles of the electrospinning process, controlling parameters, materials and structures. Nanofabrication strategies, including coaxial electrospinning, multi-needle electrospinning, needleless electrospinning, electro-netting, near-field electrospinning, and three-dimensional macrostructure assembling are also covered. Final sections explore the applications of electrospun nanofibers in different fields and future prospects. This is a valuable reference for engineers and materials scientist working with fibrous materials and textiles, as well as researchers in the areas of nanotechnology, electrospinning, nanofibers and textiles. Explores controllable fabrication of electrospun nanomaterials and their multifunctional applications Explains the electrospinning technique as used in nanofabrication and nanofibers Outlines the applications of electrospun nanofibrous materials in tissue engineering, filtration, oil-water separation, water treatment, food technology, supercapacitors, sensors and so on

Multifunctional Theranostic Nanomedicines in Cancer Jan 26 2020 Multifunctional Theranostic Nanomedicines in Cancer focuses on new trends, applications, and the significance of novel multifunctional nanotheranostics in cancer imaging for diagnosis and treatment. Cancer nanotechnology offers new opportunities for cancer diagnosis and treatment. Multifunctional nanoparticles harboring various functions—including targeting, imaging, and therapy—have been intensively studied with the goal of overcoming the limitations of conventional cancer diagnosis and therapy. Thus theranostic nanomedicines have emerged in recent years to provide an efficient and safer alternative in cancer management. This book covers polymer-based therapies, lipid-based therapies, inorganic particle-based therapies, photo-related therapies, radiotherapies, chemotherapies, and surgeries. Multifunctional Theranostic Nanomedicines in Cancer offers an indispensable guide for researchers in academia, industry, and clinical settings; it is also ideal for postgraduate students; and formulation scientists working on cancer. Provides a comprehensive resource of recent scientific progress and novel applications of theranostic nanomedicines Discusses treatment options from a pharmaceutical sciences perspective Includes translational science and targeted CNS cancer treatment

Advances in Nanosensors for Biological and Environmental Analysis Nov 04 2020 *Advances in Nanosensors for Biological and Environmental Analysis* presents the current state-of-art in nanosensors for biological and environmental analysis, also covering commercial aspects. Broadly, the book provides detailed information on the emergence of different types of nanomaterials as transduction platforms used in the development of nanosensors. These include carbon nanotubes, graphene, 2-D transition metal dichalcogenides, conducting polymers and metal organic frameworks. Additional topics include sections on the way nanosensors have inspired new product development in various types of biological and environmental applications that are currently available and on the horizon. Features detailed information on various types of biological and environmental nanosensors Gives particular attention to the different categories of advanced functional interfaces, processes for their development, and application areas Includes the current state-of-the-art in terms of commercial aspects

Nano- and Microscale Drug Delivery Systems Oct 15 2021 *Nano- and Microscale Drug Delivery Systems: Design and Fabrication* presents the developments that have taken place in recent years in the field of micro- and nanoscale drug delivery systems. Particular attention is assigned to the fabrication and design of drug delivery systems in order to i) reduce the side effects of therapeutic agents, ii) increase their pharmacological effect, and iii) improve aqueous solubility and chemical stability of different therapeutic agents. This book is designed to offer a cogent, concise overview of current scholarship in this important area of research through its focus on the characterization and fabrication of a variety of nanomaterials for drug delivery applications. It is an invaluable reference source for both biomaterials scientists and biomedical engineers who want to learn more about how nanomaterials are engineered and used in the design of drug delivery nanosystems. Shows how micro- and nanomaterials can be engineered to create more effective drug delivery systems Summarizes current nanotechnology research in the field of drug delivery systems Explores the pros and cons of using particular nanomaterials as therapeutic agents Serves as a valuable reference for both biomaterials scientists and biomedical engineers who want to learn more about how nanomaterials are engineered and used in the design of drug delivery nanosystems

Nanochemistry Mar 08 2021 The second edition of *Nanochemistry* covers the main studies of nanoparticle production, reactions, and compounds, and reviews the work of leading scientists from around the world. This book is the first monograph on nanochemistry, giving perspectives on the present status and future possibilities in this rapidly advancing discipline. It provides the solid fundamentals and theory of nanoscience, and progress through topics including synthesis and stabilization of nanoparticles, cryochemistry of metal atoms and nanoparticles, chemical nanoreactors, and more. Nanoparticles are capable of transformations that have already led to revolutionary applications, including reagents for self-cleaning glass surfaces and fabrics, different antiseptic coverings, sensors for monitoring the environment and catalysts mitigating pollution. Leads the reader through the theory, research and key applications of nanochemistry, providing a thorough reference for researchers 40% more content than the first edition and an expanded author team Reviews new advances in the field, including organic nanoparticles and key methods for making nanoparticles (e.g. solvated metal atom dispersion and self-assembly techniques)

Nanotechnology Safety Jul 12 2021 *Nanotechnology* is a new and emerging discipline that is multidisciplinary and interdisciplinary. The usage of nanosystems, nanomaterials, nano-devices, etc. permeates all aspects of society. Cancer targeting and curing nanosystems are being introduced into the biomedical and pharmaceutical industries; so are lightweight energy absorbing or blast-proof nanohybrid material in the aerospace, automotive and marine industries and high-efficiency energy harvesting nanomaterials, etc. Society has a vested interest in knowing how these new materials, devices and systems are changing the economy and similar landscapes. The book outlines the regulatory and environmental issues related to nanotechnology per industry, offers guidelines in assessing the risks and discusses the legal and socioeconomic issues involved. Case studies will be utilized to provide examples of the positive and negative impacts of nanotechnology. Provides an overview and the basis for understanding the critical importance of the reactivity and efficacy of nanomaterials and the emerging role of nanotechnology in society Explains the fundamentals, ethics, regulatory and environmental issues of nanosafety and how they shape the emerging nanotechnology industry and markets and includes extensive lists of glossary terms, terminologies and concepts needed for Material Data Safety Sheets Discusses the relevance and specificity of nanosafety issues per industry and includes discussions on the "Homeland Security and Infrastructure Industries" of interest to society in general Includes nanotechnology risk assessment and delineates and quantifies the risk assessment process for nanotechnology safety of paramount importance to most industries and systems Outlines the legal and intellectual property ramifications of nanotechnology and its impact on productivity and society

Quantitative Data Processing in Scanning Probe Microscopy Oct 23 2019 *Quantitative Data Processing in Scanning Probe Microscopy: SPM Applications for Nanometrology, Second Edition* describes the recommended practices for measurements and data processing for various SPM techniques, also discussing associated numerical techniques and recommendations for further reading for particular physical quantities measurements. Each chapter has been revised and updated for this new edition to reflect the progress that has been made in SPM techniques in recent years. New features for this edition include more step-by-step examples, better sample data and more links to related documentation in open source software. Scanning Probe Microscopy (SPM) techniques have the potential to produce information on various local physical properties. Unfortunately, there is still a large gap between what is measured by commercial devices and what could be considered as a quantitative result. This book determines to educate and close that gap. Associated data sets can be downloaded from <http://gwyddion.net/qspm/> Features step-by-step guidance to aid readers in progressing from a general understanding of SPM principles to a greater mastery of complex data measurement techniques Includes a focus on metrology aspects of measurements, arming readers with a solid grasp of instrumentation and measuring methods accuracy Worked examples show quantitative data processing for different SPM analytical techniques

Photoactive Inorganic Nanoparticles Feb 19 2022 Nanoparticles are usually designed for specific applications and selection of the most convenient capping can be a complex task, but is crucial for successful design. In this volume, the authors discuss the selection of functional cappings to coat nanoparticles in a range of different applications. The opening chapter provides an understanding of basic aspects of surface chemistry at the nanoscale. Each following chapter covers a particular kind of capping, beginning with a basic introduction and describing characteristics such as structure, functionality, solubility, (photo)physics, and toxicity. Special emphasis is placed on how important these specific features are in the preparation of smart nanomaterials. In-depth explanations and examples are then presented, highlighting the latest results and cutting-edge research carried out with the selected capping according to the kind of nanoparticle employed (such as rare-earth doped, semiconducting, and metallic). An additional chapter focusses on computational techniques for modelling nanosurfaces. *Photoactive Inorganic Nanoparticles: Surface Composition and its Role in Nanosystem Functionality* will be a valuable working resource for graduate students, researchers, and industry R&D professionals working in the field of applied nanomaterials. Aids selection of the best functional cappings for particular applications Covers a broad range of application areas, including medical, biological, and materials science Provides material on computational techniques for modelling nanosurfaces

Handbook of Nanotechnology Applications Aug 13 2021 *Handbook of Nanotechnology Applications: Environment, Energy, Agriculture and Medicine* presents a comprehensive overview on recent developments and prospects surrounding nanotechnology use in water/wastewater separation and purification, energy storage and conversion, agricultural and food process, and effective diagnoses and treatments in medical fields. The book includes detailed overviews of nanotechnology, including nanofiltration membrane for water/wastewater treatment, nanomedicine and nanosensor development for medical implementation, advanced nanomaterials of different structural dimensions (0D, 1D, 2D and 3D) for energy applications, as well as food and agricultural utilization. Other sections discuss the challenges of lab-based research transitioning towards practical industrial use. Helps scientists and researchers quickly learn and understand the key role of nanotechnology in important industrial applications Takes an interdisciplinary approach, demonstrating how nanotechnology is being used in a wide range of industry sectors Outlines the role nanotechnology plays in creating safer, cheaper and more energy-efficient projects and devices

Handbook of Nanomaterials for Cancer Theranostics Nov 23 2019 *Handbook of Nanomaterials for Cancer Theranostics* focuses on recent developments in advanced theranostic nanomedicines from a chemical and biological perspective where the advantages of theranostics are achieved by combining multiple components. The authors explore the pros and cons of theranostic nanomaterials developed in cancer research in the last 15 years, with the different strategies compared and scrutinized. In addition, the book explores how nanomaterials may overcome the regulatory hurdles facing theranostic nanomedicines. This is an important research reference for postgraduates and researchers in nanomedicine and cancer research who want to learn more on how nanomaterials can help create more effective cancer treatments. Highlights the development of smart theranostic nanomaterials to tackle biomedical problems in cancer therapy and diagnostics Explores the regulatory hurdles facing theranostic nanomedicine Discusses how the use of nanomaterials can help create more effective cancer treatments

Advanced 3D-Printed Systems and Nanosystems for Drug Delivery and Tissue Engineering Nov 28 2022 *Advanced 3D-Printed Systems and Nanosystems for Drug Delivery and Tissue Engineering* explores the intricacies of nanostructures and 3D printed systems in terms of their design as drug delivery or tissue engineering devices, their further evaluations and diverse applications. The book highlights the most recent advances in both nanosystems and 3D-printed

systems for both drug delivery and tissue engineering applications. It discusses the convergence of biofabrication with nanotechnology, constructing a directional customizable biomaterial arrangement for promoting tissue regeneration, combined with the potential for controlled bioactive delivery. These discussions provide a new viewpoint for both biomaterials scientists and pharmaceutical scientists. Shows how nanotechnology and 3D printing are being used to create systems which are intelligent, biomimetic and customizable to the patient Explores the current generation of nanostructured 3D printed medical devices Assesses the major challenges of using 3D printed nanosystems for the manufacture of new pharmaceuticals

Nanotechnology Mar 20 2022 Nanotechnology: An Introduction, Second Edition, is ideal for the newcomer to nanotechnology, someone who also brings a strong background in one of the traditional disciplines, such as physics, mechanical or electrical engineering, or chemistry or biology, or someone who has experience working in microelectromechanical systems (MEMS) technology. This book brings together the principles, theory, and practice of nanotechnology, giving a broad, yet authoritative, introduction to the possibilities and limitations of this exciting and rapidly developing field. The book's author, Prof Ramsden, also discusses design, manufacture, and applications and their impact on a wide range of nanotechnology areas. Provides an overview of the rapidly growing and developing field of nanotechnology Focuses on key essentials, and structured around a robust anatomy of the subject Brings together the principles, theory, and practice of nanotechnology, giving a broad, yet authoritative, introduction to the possibilities and limitations of this exciting and rapidly developing field

Nano Optoelectronic Sensors and Devices Sep 21 2019 Nanophotonics has emerged as a major technology and applications domain, exploiting the interaction of light-emitting and light-sensing nanostructured materials. These devices are lightweight, highly efficient, low on power consumption, and are cost effective to produce. The authors of this book have been involved in pioneering work in manufacturing photonic devices from carbon nanotube (CNT) nanowires and provide a series of practical guidelines for their design and manufacture, using processes such as nano-robotic manipulation and assembly methods. They also introduce the design and operational principles of opto-electrical sensing devices at the nano scale. Thermal annealing and packaging processes are also covered, as key elements in a scalable manufacturing process. Examples of applications of different nanowire based photonic devices are presented. These include applications in the fields of electronics (e.g. FET, CNT Schottky diode) and solar energy. Discusses opto-electronic nanomaterials, characterization and properties from an engineering perspective, enabling the commercialization of key emerging technologies Provides scalable techniques for nanowire structure growth, manipulation and assembly (i.e. synthesis) Explores key application areas such as sensing, electronics and solar energy