Pharmaceutical And Biomedical Applications Of Capillary Electropsis Progress In Pharmaceutical And Biomedical

A comprehensive discussion of various types of nanoengineered biomaterials and their applications In Nanoengineering of Biomaterials: Drug Delivery & Biomedical Applications, an expert team of chemists delivers a succinct exploration of the synthesis, characterization, in-vitro and in-vivo drug molecule release, pharmacokinetic activity, pharmacodynamic activity, and the biomedical applications of several types of nanoengineered biomaterials. The editors have also included resources to highlight the most current developments in the field. The book is a collection of valuable and accessible reference sources for researchers in materials chemistry and related disciplines. It uses a functions-directed approach to using organic and inorganic source compounds that translate into biological systems as scaffolds, micelles, dendrimers, and other delivery systems. Nanoengineering of Biomaterials offers readers up-to-date chemistry and material science insights that are readily transferrable to biomedical systems. The book also includes: Thorough introductions to alginate nanoparticle delivery of therapeutics and chitosan-based nanomaterials in biological applications Comprehensive explorations of nanostructured carrageenan as a drug carrier, gellan gum nanoparticles in drug delivery, and guar-gum nanoparticles in the delivery of bioactive molecules Practical discussions of protein-based nanoparticles for drug delivery, solid lipid nanoparticles as drug carriers, and pH-responsive nanoparticles in therapy In-depth examinations of stimuli-responsive nano carriers in drug targeting Perfect for pharmaceutical chemists, materials scientists, polymer chemists, life scientists, and medicinal chemists, Nanoengineering of Biomaterials: Drug Delivery and Biomedical Applications is also an indispensable resource for biologists and bioengineers seeking a one-stop reference on the transferability of materials chemistry and nanotechnology to biomedicine.

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

Hydrogels, as three-dimensional polymer networks, are able to retain a large amount of water in their swollen state. The biomedical application of hydrogels was initially hampered by the toxicity of cross-linking agents and the limitations of hydrogel formation under physiological conditions. However, emerging knowledge in polymer chemistry and an increased understanding of biological processes have resulted in the design of versatile materials and minimally invasive therapies.The novel but challenging properties of hydrogels are attracting the attention of researchers in the biological, medical, and pharmaceutical fields. In the last few years, new methods have been developed for the preparation of hydrophilic polymers and hydrogels, which may be used in future biomedical and drug delivery applications. Such efforts include the synthesis of self-organized nanostructures based on triblock copolymers with applications in controlled drug delivery. These hydrogels could be used as carriers for drug delivery when combined with the techniques of drug imprinting and subsequent release. Engineered protein hydrogels have many potential advantages. They are excellent biomaterials and biodegradables. Furthermore, they could encapsulate drugs and be used in injectable forms to replace surgery, to repair damaged cartilage, in regenerative medicine, or in tissue engineering. Also, they have potential applications in gene therapy, although this field is relatively new.

Biomedical Applications of Functionalized Nanomaterials: Concepts, Development and Clinical Translation presents a concise overview of the most promising nanomaterials functionalized with ligands for biomedical applications. The first section focuses on current strategies for identifying biological targets and screening of ligand to optimize anchoring to nanomaterials, providing the foundation for the remaining parts. Section Two covers specific applications of functionalized nanomaterials in therapy and diagnostics, highlighting current practice and addressing major challenges, in particular, case studies of successfully developed and marketed functionalized nanomaterials. The final section focuses on regulatory issues and clinical translation, providing a legal framework for their use in biomedicine. This book is an important reference source for worldwide drug and medical devices policymakers, biomaterials scientists and regulatory bodies. Provides an overview of the methodologies for biological target identification and ligand screening Includes case studies showing the development of functionalized nanomaterials and their biomedical applications Highlights the importance of functionalized nanomaterials for drug delivery, diagnostics and regenerative medicine applications

Smart Nanomaterials in Biomedical Applications

Tailor-Made Polysaccharides in Biomedical Applications

Biomedical and Pharmaceutical Applications

Functional Chitosan

Pharmaceutical and Biomedical Applications of Liquid Chromatography

Characterization and Biomedical Applications

Alginate is a hydrophilic, biocompatible, biodegradable, and relatively economical polymer generally found in marine brown algae. The modification in the alginate molecule after polymerization has shown strong potential in biomedical, pharmaceutical and biotechnology applications such as wound dressing, drug delivery, dental treatment, in cell culture and tissue engineering. Besides this, alginates have industrial applications too in the paper and food industries as plasticizers and additives. The few books that have been published on alginates focus more on their biology. This current book focuses on the exploration of alginates and their modification, characterization, derivatives, composites, hydrogels as well as the new and emerging applications.

Ein professioneller Leitfaden zu 3D- und 4D-Drucktechniken in der Biomedizin und Pharmazie. 3D and 4D Printing in Biomedical Applications f ü hrt fundiert in 3D- und 4D-Drucktechniken in der Biomedizin und Pharmazie ein. Dieses Fachbuch enth ä lt Beitr ä ge von internationalen Wissenschaftlern und Industrieexperten und bietet einen Ü berblick ü ber das Thema, aktuelle Forschungsergebnisse und Innovationen zu Anwendungen in der Pharmazie und Biomedizin. Untersucht werden Prozessoptimierung, Innovationsprozesse, Engineering- und Plattformtechnologien. Dar ü ber hinaus informiert das Werk ü ber Entwicklungen in der Biomedizin, u. a. ü ber Formged ä chtnispolymere, Biofabrikation in 4D und Knochen aus dem Drucker. Eine F ü lle von Themen werden behandelt und n ä her beleuchtet: Potenzial des 3D-Drucks f ü r die Wirkstoffverabreichung, neue Fertigungsprozess, Bio-Scaffolding, neueste Trends und Herausforderungen f ü r 3D- und 4D-Bioprinting in der Biofabrikation. Dieses wertvolle Referenzwerk - ist ein umfassender Leitfaden zu 3D- und 4D-Drucktechniken in der Biomedizin und Pharmazie. - informiert u. a. ü ber die erste 3D-Druckplattform mit FDA-Zulassung f ü r ein pharmazeutisches Erzeugnis. - enth ä lt Reviews der derzeit verf ü gbaren pharmazeutischen Erzeugnisse, die per 3D-Druck hergestellt wurden. - pr ä sentiert die j ü ngsten Fortschritte bei neuartigen Materialien f ü r den 3D- und 4D-Druck und biomedizinische Anwendungen.

The book focuses on novel interpenetrating polymer network (IPN)/semi-IPN technologies for drug delivery and biomedical applications. The dynamism of the design and development of interpenetrating network polymers is based on their ability to provide free volume for the easy encapsulation of drugs in the three-dimensional network structure obtained by cross-linking two or more polymer networks. Natural polymer-based IPNs can deliver drugs at a controlled rate over an extended period of time, while novel IPNs ensure better mechanical strength and sustained/ controlled drug-delivery properties. This book presents an overview of the use of this technology to fabricate nanomedicine, hydrogels, nanoparticles, and microparticles, thereby unlocking IPN ' s potential in the area of drug delivery and biomedical engineering. It also discusses applications of IPN systems in cancer therapy and tissue engineering, and describes the various IPN systems and their wide usage and applications in drug delivery.

The utilization of polymers in medicine has become a reality in the last decade. This book is a concise presentation of the fundamentals, applications, and methods of optimization of polymeric drugs and polymeric drug delivery systems for medicinal purposes. The basic rationale for the use of polymeric drugs and polymer delivery systems is the possibility to alter the pharmacokinetics and pharmacodynamics of therapeutic agents so as to maintain an adequate therapeutic environment at the site of disfunction for an extended period of time. The primary objectives for using polymeric drugs and polymeric drug delivery systems are to introduce new and efficient methods of drug administration, to improve efficacy and patient compliance, to decrease toxicity, and to ensure safety. The following factors influence the design and performance of polymers for medicinal applications: disease, drug properties, type of therapy (acute or chronic), physiology of the patient, administration route, and the site requiring therapy.

Drug Delivery & Biomedical Applications

Polysaccharide Hydrogels

Concepts, Development and Clinical Translation

Protein-Based Biopolymers

Porous Silicon for Biomedical Applications

Biopolymer-Based Composites

This book explores in depth a wide range of functional biomaterials-based systems for drug, gene delivery, and biomedical aspects. The chapters cover newer technologies such as polymeric micelle, pH-responsive biomaterials, stimuli-responsive hydrogels, silk fibroin, inorganic biomaterials, synthetic biomaterials, 3D printed biomaterials, metallic biomaterials, ceramic and hybrid biomaterials. It also describes the theranostic approaches for cancer therapy, the biomaterials-based nanofibers scaffolds in tissue engineering, as well as the strategies applications of metallic biomaterials for the medical and dental prosthetic field. This newer and updated approach will be attractive for biomedical engineering students working on materials science in the development of novel drug delivery strategies. The book will be an important reference for researchers and professionals working on biomaterial research in the pharmaceutical and medical fields.

Thanks to their unique properties, chitosan and chitosan-based materials have numerous applications in the field of biomedicine, especially in drug delivery. This book examines biomedical applications of functional chitosan, exploring the various functions and applications in the development of chitosan-based biomaterials. It also describes the chemical structure of chitosan and discusses the relationship between their structure and functions, providing a theoretical basis for the design of biomaterials. Lastly, it reviews chemically modified and composite materials of chitin and chitosan derivatives for biomedical applications, such as tissue engineering, nanomedicine, drug delivery, and gene delivery.

Hardbound. This volume reflects the changes that have taken place in the pharmaceutical industry over the last ten years, most notably the increased importance attached to the question of chirality, the growing influence of biotechnology and the need for more rigorous documentation and validation of analytical methods and procedures.The first part of this book deals with the application of new technology to pharmaceutical and biomedical analysis, reflecting the present needs for increased speed, sensitivity and selectivity in the analysis of drugs. The second chapter provides an overview of capillary electophoresis, which represents one of the most inportant analytical developments to impact directly on pharmaceutical development in recent years. Although not a chromatographic technique, capillary electrophoresis was considered too important to be ignored.Over the last 25 years, liquid chromatography has grown into a mature analytical technique an

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Nanoengineering of Biomaterials

Polymers in Medicine II

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

Chitosan in Biomedical Applications

Emerging Raman Applications and Techniques in Biomedical and Pharmaceutical Fields

Alginates

Micro- and Nanoengineered Gum-Based Biomaterials for Drug Delivery and Biomedical Applications focuses on micro- and nanotechnology in gums and biopolymers as drug and biomolecule carriers and their applications in biomedicine. Currently, natural gums and polymers are widely utilized as biocarrier systems, to deliver drugs and biomolecules to the target site, for prolonged release and the desired therapeutic effect. Natural gums and polymers are important because they are easily available from natural sources and are characteristically biodegradable, biocompatible, and nontoxic. Natural gums and polymers are also chemically modified with other polymers, in the presence of cross-linking agents, to develop scaffolds, matrices, composites, and interpenetrating polymer networks using micro- and nanotechnology. The book also discusses biological applications, such as gene delivery, cancer therapy, tissue engineering, bioimaging, and theranostics. This book is an important reference source for biomaterials scientists, biomedical engineers, and pharmaceutical scientists, who are looking to increase their understanding of how micro- and nanoengineered biomaterials are being used to create more efficient gum-based drug delivery systems. Explains how micro- and nanoengineering is being used to make a variety of gum types more effective as nanocarriers. Explores the major biomedical applications of various gum classes. Assesses the major challenges of using micro- and nanotechnologies in gum-based biomedical systems.

This book is an Up-to-date and authoritative account on physicochemical principles, pharmaceutical and biomedical applications of hydrogels. It consists of eight contributions from different authors highlighting properties and synthesis of hydrogels, their characterization by various instrumental methods of analysis, comprehensive review on stimuli-responsive hydrogels and their diverse applications, and a special section on self-healing hydrogels. Thus, this book will equip academia and industry with adequate basic and applied principles related to hydrogels.

An overview of nanomedicine and its potential The field of nanotechnology is undergoing rapid developments on many fronts. This reference provides a comprehensive review of various nanotechnologies with a view to their biomedical applications. With chapters contributed by distinguished scientists from diverse disciplines, Biomedical Applications of Nanotechnology : Reviews recent advances in the designing of various nanotechnologies based on nucleic acids, polymers, biomaterials, and metals Discusses biomedical nanotechnology in areas such as drug and gene delivery Covers advanced aspects of imaging and diagnostics Includes a chapter on the issue of nanotoxicology Complete with figures and tables, this is a practical, hands-on reference book for researchers in pharmaceutical and biotech industries, biomedical engineers, pharmaceutical scientists, pharmacologists, and materials scientists as well as for the policymakers who need to understand the potential of nanotechnology. It is also an excellent resource book for graduate-level students in pharmaceutical sciences, biomedical engineering, and other fields in which nanotechnology is playing an increasingly important role.

Chitosan in Biomedical Applications provides a thorough insight into the complete chitosan chemistry, collection, chemical modifications, characterization and applications of chitosan in biomedical applications and healthcare fields. Chitosan, a biopolymer of natural origin, has been explored for its variety of applications in biomedical research, medical diagnostic aids and material science. It is the second most abundant natural biopolymer after cellulose, and considered as an excellent excipient because of its non-toxic, stable, biodegradable properties. Several research innovations have been made on applications of chitosan in biomedical applications. The book explores key topics, such as molecular weight, degree of deacetylation, and molecular geometry, along with an emphasis on recent advances in the field written by academic, industry, and clinical researchers. Chitosan in Biomedical Applications will be of interest to those in biomedical fields including the biomaterials and tissue engineering community investigating and developing biomaterials for biomedical applications, particularly graduate students, young faculty and others exploring chitosan-based materials. Provides methodology for the design, development and selection of chitosan in biomedical applications for particular therapeutic applications Includes illustrations demonstrating the mechanism of biological interaction of chitosan Discusses the regulatory aspects and demonstrates the clinical efficacy of chitosan

Functional Biomaterials

Silicones for Pharmaceutical and Biomedical Applications

Tailored Polymer Architectures for Pharmaceutical and Biomedical Applications

For Drug Delivery and Biomedical Applications

3D and 4D Printing in Biomedical Applications

Bioactivity and Biomedical Applications

Polymers for Pharmaceutical and Biomedical Applications: Fundamentals, Selection, and Preparation supports the successful selection, design, and development of polymers with the required properties and performance for a range of advanced pharmaceutical and biomedical applications. The book begins by introducing polymers for pharmaceutical and biomedical applications, examining classification, basic properties, structures, and grades. This is followed by in-depth chapters focusing on synthesis and modification, characterization techniques, and dissolution and solubility of polymers for pharmaceutical applications. Key applications are then highlighted, with chapters explaining in detail the preparation of polymers for conventional dosage, modified drug delivery, conjugates, advanced drug and gene delivery, medical devices, pharmaceutical packaging, tissue engineering, artificial organs, and dentistry. Throughout the book, the aim is to provide accessible, step-by-step coverage, supported by diagrams and case studies. Finally, safety and regulatory aspects are discussed. This is a valuable resource for all those who are newly approaching the field of polymers and product development for pharmaceutical and biomedical applications. This includes researchers and advanced students across polymer science, pharmaceutical science, biomaterials, biomedicine, healthcare, and chemistry, and scientists and R&D professionals in an industrial setting.

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

Direct Nose-to-Brain Drug Delivery provides the reader with precise knowledge about the strategies and approaches for enhanced nose-to-brain drug delivery. It highlights the development of novel nanocarrier-based drug delivery systems for targeted drug delivery to the brain microenvironments with a focus on the technological advances in the development of the novel drug delivery devices for intranasal administration, including special emphasis on brain targeting through nose. This book explores the various quantification parameters to assess the brain targeting efficiency following intranasal administration and includes an overview on the toxicity aspects of the various materials used to develop the direct nose-to-brain drug delivery vehicles and of the regulatory aspects including patents and current clinical status of the potential neurotherapeutics for the effective management of neuro-ailments. Technological advances in new drug delivery systems with diverse applications in pharmaceutical, biomedical, biomaterials, and biotechnological fields are also explained. This book is a crucial source that will assist the veteran scientists, industrial technologists, and clinical research professionals to develop new drug delivery systems and novel drug administration devices for the treatment of neuro-ailments. Explains the targeting approaches for enhanced brain targeting following intranasal drug administration Explores the various nanocarriers developed to date for neurotherapeutic delivery via nose-to-brain Discusses pharmaceutical and biomedical applications after nose-to-brain delivery of therapeutic pharmaceuticals and biologicals

Tailor-Made and Functionalized Biopolymer Systems: For Drug Delivery and Biomedical Applications covers the design and application of these functionalized and tailor-made biopolymers and biopolymer systems intended for drug delivery and biomedical applications. Various concepts, design protocols and biomedical applications of tailor-made biopolymer systems are covered, guiding the reader from theoretical knowledge to practical application. Authored by an array of experts from global institutions, this book offers an interdisciplinary approach to how tailor-made biopolymers lead to novel drug delivery and treatment solutions. This will be a useful reference to a broad audience, including biomedical engineers, materials scientists, pharmacologists and chemists. Provides a concise overview of tailor-made and functionalized biopolymer systems for biomedical applications Covers a range of modified biopolymers, biopolymeric composites and biopolymer-based systems in drug delivery, development of artificial organs, diagnostic applications, and more Describes characterization, synthesis and functionalization of biopolymers and biopolymers systems

Biomedical Applications of Nanoparticles

From Source to Biomedical Applications

Interpenetrating Polymer Network: Biomedical Applications

Micro- and Nanoengineered Gum-Based Biomaterials for Drug Delivery and Biomedical Applications

Drug Delivery and Biomedical Applications

Emerging Concepts in Analysis and Applications of Hydrogels

Natural Polysaccharides in Drug Delivery and Biomedical Applications provides a fundamental overview of natural polysaccharides, their sources, extraction methodologies, and characterizations. It covers specific natural polysaccharides and their effective application in drug delivery and biomedical use. Additionally, chapters in the book discuss key topics including the sources and extraction methodologies of natural polysaccharides, their role in tissue engineering applications, polysaccharide-based nanoparticles in biomedical applications, and their role in the delivery of anticancer drugs. Written by industry leaders and edited by experts, this book emphasizes recent advances made in the field. Natural Polysaccharides in Drug Delivery and Biomedical Applications provides academics, researchers, and pharmaceutical health care professionals with a comprehensive book on polysaccharides in pharmaceutical delivery process. Provides fundamental concepts of natural polysaccharides as it applies to the pharmaceutical, biomedical, and biotechnology industries Includes contributions from global leaders and experts from academia, industry, and regulatory agencies in the application of natural polysaccharides in pharmaceutical products and biomedical utilization Offers practical examples, illustrations, chemical structures, and research case studies to help explain natural polysaccharides concepts in drug delivery and biomedical applications

With the start of 2020, the wrath of pandemic challenged the scientific community to develop more advanced drug delivery approaches for biomedical applications, endowing conventional drugs with additional therapeutic benefits and minimum side effects. Although significant advancements have been done in the field of drug delivery, there is a need to focus towards strategizing novel and improved drug delivery systems that should be convenient and cost-effective to the patients, and simultaneously they should also provide financial benefits to pharmaceutical companies. Controlled drug delivery technology offers ample opportunities and scope for improvising the therapeutic efficacy of drugs via optimizing the drug release rate and time. For this endeavour, smart nanomaterials have served as remarkable candidates for biomedical applications, owing to their ground-breaking properties and design. The development of such nanomaterials requires a broad knowledge related to their physio-chemical properties, molecular structure, mechanisms by which the nanomaterials interact with the cells, and methods by which drugs are released at the site of action. This knowledge must also be allied with the knowledge of signaling crosstalk mechanisms that are modulated by the nanomaterial-drugs composite. It can be anticipated that these emerging drug delivery technologies can facilitate the world to successfully encounter such pandemic outbursts in the future in a cost-effective and time-effective manner. The chapters in this book deal with the advanced technologies and approaches that can benefit advanced students, researchers, and industry experts in developing smart and intelligent nanomaterials for future biomedical applications, and development, manufacturing, and commercialization for controlled and targeted drug delivery.

Biopolymers are endowed with excellent attributes such as biodegradability, biocompatibility and functional versatility, which render them an edge over other polymers. Today, they find broad applications in the biomedical field and pharmaceutical world. Nanotechnology has offered tremendous opportunities to design and tailor-make biopolymers augmenting their applications further. This book presents topical articles on the synthesis and applications of biopolymers, biopolymer nanoparticles and nanocomposites. The book includes chapters on conducting polymers, vegetable oils, chitosan and cellulose based polyurethanes, polymeric hydrogels, biopolymeric nanoparticles and nanocomposites, and their applications as drug carriers and sensors in cancer therapy and others. This book would be useful for students, scholars, and scientists interested in the synthesis, biomedical and pharmaceutical applications of biopolymers and their nanocomposites.

Biopolymer-Based Composites: Drug Delivery and Biomedical Applications presents a comprehensive review on recent developments in biopolymer-based composites and their use in drug delivery and biomedical applications. The information contained in this book is critical for the more efficient use of composites, as detailed up-to-date information is a pre-requirement. The information provided brings cutting-edge developments to the attention of young investigators to encourage further advances in the field of bio-composite research. Currently, biopolymers are being investigated for the design of various drug delivery and biomedical devices due to their non-toxic, biodegradable and biocompatible nature. Mostly, biopolymer-based solid orals, gels, hydrogel beads, and transdermal matrices have been designed in order to control drug/protein release in simulated bio-fluids. Presents the most updated information in the field of pharmaceutical and biological sciences Contains color figures and illustrations to help users understand key topics Useful guide for young researchers working towards new innovations Includes chapters covered by eminent scientists in the field

Polymers for Pharmaceutical and Biomedical Applications

Tailor-Made and Functionalized Biopolymer Systems

Process Engineering and Additive Manufacturing

Natural Polysaccharides in Drug Delivery and Biomedical Applications

Lignin-based Materials for Biomedical Applications

Direct Nose-to-Brain Drug Delivery

Biopolymer-Based Nanomaterials in Drug Delivery and Biomedical Applications presents a clear and detailed body of information on biopolymer chemistry and polymer sciences in drug delivery. The book covers the recently reported nanomaterials consisting of biopolymers such as polysaccharides (i.e., plant, animal, bacteria, algae and fungi-derived) and proteins in terms of their structures, synthetic protocols and characterizations. In addition, their applications as therapeutic drug and gene delivery carriers and in other biomedical fields are reviewed. This book compiles chapters contributed by internationally renowned scholars working in biopolymer-based nanomaterials, offering a wide vision on the new and ongoing potential of different biopolymeric nanomaterials. The information related to concepts, design protocols and applications of biopolymer-based nanoplatforms is presented here, with detailed chapters on Pectin based nanomaterials, Konjac glucomannan based nanomaterials, Guar gum-based nanomaterials, tailor-made gum Arabic based nanomaterials, among others. Such systems are widely being used as functional materials for drug delivery and other therapeutic applications. Provides a critical and detailed examination in the recent development of biopolymer-based nanomaterials Focuses on modified biopolymer-based, diverse cutting-edge techniques in drug delivery and biomedical applications Assesses the opportunities and challenges of biopolymer-based nano-carriers in pharmaceutical and biomedical fields

Polymers and polymer based composites have gained increasingly larger applications in medicine and surgery. Presently, most biomaterials applications rely on industrial substances that were initially developed by industry for non-medical purposes. Moreover, polymers have been often used regardless of their peculiar characteristics which can be viceversa and very attractive for some specific applications. In the past years we have assisted to a significative and faster development of polymer science as well as of medicine and surgery. The assistance of computer aided apparatus, the use of always more advanced instruments, the larger interest of the academic and industrial world, bring continuously new contributions to the research on biomedical and parmaceutical use of polymers. The need of a forum where these specific researchs can be presented and discussed, and the success of the 1st Conference on Polymers in Medicine, held in Porto Cervo in 1982, have encouraged the Editors to plana periodical meeting, focused on polymers and composites, to be held every odd year. This book contains papers selected by an International Scientific Committee among those presented at the 2nd International Conference on Polymers in Medicine, Biomedical and Pharmaceutical Applications, held in Capri, Italy, 3-7 June, 1985. In addition to contributed papers, several Authors were invited to present the "state of the art" as well as their personal contibution on specific key arguments. The level of all contributions was high, the participation well qualified, and the meeting interesting and hopefully pleasant.

The book describes the theory and applications of Capillary Electrophoresis (CE) in the field of pharmaceutical and biomedical analysis. It is targeted towards users who are intimately involved in analytical problems, especially those which involve small samples. This book presents the technique of capillary electrophoresis from the point of view of the serious hands-on use in the field of pharmaceutical and biomedical analysis. An overview of general theory is presented to acquaint the novice with the fundamental principles. A more theoretical approach is taken in the presentation of electrokinetic chromatography. The next chapter discusses advances in column technologies, the preceding chapters having provided a foundation as to how separations occur. In the next three chapters, recognized experts in their fields present fundamentals and state-of-the-art techniques in the areas of optical, electrochemical and mass spectrometric detection. The major focus of the remaining chapters is on applications. This includes the analysis of pharmaceuticals, amino acids and peptides, macromolecules, nucleosides, nucleotides and oligonucleotides. The use of CE for analysis of small ions and separation of biological particles is also discussed. The issue of sample preparation for analysis by CE is addressed, especially as it relates to clinical analysis.

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

Drug Delivery Nanosystems for Biomedical Applications

Smart Materials for Biomedical Applications

Polymers in Medicine

Pharmaceutical and Medical Applications of Near-Infrared Spectroscopy

Fundamentals, Selection, and Preparation

Biomedical Applications of Functionalized Nanomaterials

Porous Silicon for Biomedical Applications, Second Edition, provides an updated guide to the diverse range of biomedical applications of porous silicon, from biosensing and imaging to tissue engineering and cancer therapy. Across biomedical disciplines, there is an ongoing search for biomaterials that are biocompatible, modifiable, structurally sound, and versatile. Porous silicon possesses a range of properties that make it ideal for a variety of biomedical applications, such as controllable geometry, tunable nanoporous structure, large pore volume/high specific surface area, and versatile surface chemistry. This book provides a fully updated and detailed overview of the range of biomedical applications for porous silicon. Part One offers the reader a helpful insight into the fundamentals and beneficial properties of porous silicon, including thermal properties and stabilization, photochemical and nonthermal chemical modification, protein modification, and biocompatibility. The book then builds on the systematic detailing of each biomedical application using porous silicon, from bioimaging and sensing to drug delivery and tissue engineering. This new edition also includes new chapters on in-vivo assessment of porous silicon, photodynamic and photothermal therapy, micro- and nanoneedles, Raman imaging, cancer immunotherapy, and more. With its acclaimed editor and international team of expert contributors, Porous Silicon for Biomedical Applications, Second Edition, is a technical resource and indispensable guide for all those involved in the research, development, and application of porous silicon and other biomaterials, while providing a comprehensive introduction for students and academics interested in this field. Reviews the fundamental aspects of porous silicon, including the fabrication and unique properties of this useful material. Discusses a broad selection of biomedical applications, offering a detailed insight into the benefits of porous silicon in both research and clinical settings. Includes fully updated content from the previous edition, as well as brand new chapters, covering topics such as porous silicon micro- and nanoneedles, and cancer immunotherapy.

Lignin-based Materials for Biomedical Applications: Preparation, Characterization, and Implementation explores the emerging area of lignin-based materials as a platform for advanced biomedical applications, guiding the reader from source through to implementation. The first part of the book introduces the basics of lignin, including extraction methods, chemical modifications, structure and composition, and properties that make lignin suitable for biomedical applications. In addition, structural characterization techniques are described in detail. The next chapters focus on the preparation of lignin-based materials for biomedical applications, presenting methodologies for lignin-based nanoparticles, hydrogels, aerogels, and nanofibers, and providing in-depth coverage of lignin-based materials with specific properties—including antioxidant properties, UV absorbing capability, antimicrobial properties, and colloidal particles with tailored properties—and applications, such as drug and gene delivery, and tissue engineering. Finally, future perspectives and possible new applications are considered. This is an essential reference for all those with an interest in lignin-based materials and their biomedical applications, including researchers and advanced students across bio-based polymers, polymer science, polymer chemistry, biomaterials, nanotechnology, materials science and engineering, drug delivery, and biomedical engineering, as well as industrial R&D and scientists involved with bio-based polymers, specifically for biomedical applications. Unlocks the potential of lignin-based materials with advanced properties for cutting-edge applications in areas such as drug delivery, gene delivery and tissue engineering Presents state-of-the-art methodologies used in the development of lignin-based nanoparticles, hydrogels, aerogels and nanofibers Explains the fundamentals of lignin, including structure and composition, extraction and isolation methods, types and properties, chemical modifications, and characterization techniques

This book presents the latest technological advances in Raman spectroscopy that are presently redrawing the landscape of many fields of biomedical and pharmaceutical R&D. Numerous examples are given to illustrate the application of the new methods.

Since the completion of the first edition of this book, major developments have occurred in the pharmaceutical industry that have shaped the field of near-infrared (NIR) spectroscopy. A new initiative from the U.S. Food and Drug Administration (FDA) to modernize regulations of pharmaceutical manufacturing and drug quality has helped position NIR spectroscopy as an effective tool for pharmaceutical testing. Pharmaceutical and Medical Applications of Near-Infrared Spectroscopy: Second Edition reflects these developments and brings readers an up-to-date summary of how this technique is being applied to pharmaceutical manufacturing. Topics include: The origins and principles of NIR spectroscopy, including early instrumentation, spectroscopic theory, and light-particle interaction The physics of each instrument type, the strengths and weaknesses of each, and the manufacturers that produce them The possible advantages of using NIR methods for monitoring or controlling blending, as well as practical concerns for mixing processes NIR spectroscopy as applied to traditional granulation, drug layering, and film coating of beads or granules Pharmaceutical assays, including qualitative analysis, quantitative analysis, determination of actives in tablets and capsules, and considerations for intact dosage form analysis Steps involved in the validation and acceptance of an NIR spectroscopy method, including quality assurance, qualification and verification of instruments, and the International Conference on Harmonization (ICH) guidelines Medical applications, including those related to blood glucose measurements, tissue and major organ analysis, fetal analysis, and cancer research Providing comprehensive coverage of NIR spectroscopy, from theory, mathematics, application, and mechanics of NIR analysis, the book supplies ample references to facilitate further rese

Applications in the Biomedical and Food Industries

Hydrogels

Pharmaceutical and Biomedical Applications of Capillary Electrophoresis

Pharmaceutical and Biomedical Applications of Spectroscopy in the Photon Migration Regime

Biological Macromolecules

Preparation, Characterization, and Implementation

Biomedical Applications of Nanoparticles describes the most interesting and investigated biomedical applications of nanoparticles, emphasizing their therapeutic impact. Progress made in the therapy of severe diseases, such as cancer and difficult infections is strictly correlated to the scientific progress and technological development in the field of materials science. Nanoparticles have numerous therapeutic applications, starting with the design of new drugs, delivery systems, therapeutic materials, and their contribution to the development of preventive strategies. The book highlights the impact of nanoparticles on the therapy of infections, antimicrobial effect and also anti-cancer strategies. Successful examples are given throughout the book, along with analysis in order to improve future outcomes of novel therapies. Highlights the term nanotherapeutics and presents several classifications of nanotherapeutics from different points-of-view Presents the recent progress related to nanotherapeutics in the oral cavity Provides the recent progress in the field of biomedical nanoparticles

Vibrational Spectroscopy Applications in Biomedical, Pharmaceutical and Food Sciences synthesizes the latest research on the applications of vibrational spectroscopy in biomedical, pharmaceutical and food analysis. Suitable for graduate-level students as well as experienced researchers in academia and industry, this book is organized into five distinct sections. The first deals with the fundamentals of vibrational spectroscopy, with the second presenting the most important sampling methodology used for infrared and Raman spectroscopy in various fields of interest. Since spectroscopy is the study of the interaction of electromagnetic radiation with matter, this section deals with the characteristics, properties and absorption of electromagnetic radiation. Final sections describe the analytical studies performed all over the world in biomedical, pharmaceutical and in the food sciences. Presents a critical discussion of many of the applications of vibrational spectroscopy Covers details of the analytical methodologies used in pharmaceutical and biomedical applications Discusses the latest developments in pharmaceutical and biomedical analysis of both small and large molecules

Hydrogels are an emerging area of interest in medicine as well as pharmaceutics, and their physico-chemical characterization is fundamental to their practical applications. Compared with synthetic polymers, polysaccharides that are widely present in living organisms and come from renewable sources are extremely advantageous for hydrogel formation. Furthermore, polysaccharides are usually non-toxic and biocompatible and show a number of peculiar physico-chemical properties that make them suitable for a wide variety of biomedical applications. This book bridges the gap between the preparation of hydrogels and their characterization techniques. It aims to offer a valid support that can help the readers find appropriate keys to open the doors to the complex world of polysaccharide hydrogels.

Biological Macromolecules: Bioactivity and Biomedical Applications presents a comprehensive study of biomacromolecules and their potential use in various biomedical applications. Consisting of four sections, the book begins with an overview of the key sources, properties and functions of biomacromolecules, covering the foundational knowledge required for study on the topic. It then progresses to a discussion of the various bioactive components of biomacromolecules. Individual chapters explore a range of potential bioactivities, considering the use of biomacromolecules as nutraceuticals, antioxidants, antimicrobials, anticancer agents, and antidiabetics, among others. The third section of the book focuses on specific applications of biomacromolecules, ranging from drug delivery and wound management to tissue engineering and enzyme immobilization. This focus on the various practical uses of biological macromolecules provide an interdisciplinary assessment of their function in practice. The final section explores the key challenges and future perspectives on biological macromolecules in biomedicine. Covers a variety of different biomacromolecules, including carbohydrates, lipids, proteins, and nucleic acids in plants, fungi, animals, and microbiological resources Discusses a range of applicable areas where biomacromolecules play a significant role, such as drug delivery, wound management, and regenerative medicine Includes a detailed overview of biomacromolecule bioactivity and properties Features chapters on research challenges, evolving applications, and future perspectives

Biomedical Applications of Nanotechnology

Vibrational Spectroscopy Applications in Biomedical, Pharmaceutical and Food Sciences

Mechanism, Technological Advances, Applications, and Regulatory Updates

Biopolymer-Based Nanomaterials in Drug Delivery and Biomedical Applications

Biopolymers and Nanocomposites for Biomedical and Pharmaceutical Applications

Protein-Based Biopolymers: From Source to Biomedical Applications provides an overview on the development and application of protein biopolymers in biomedicine. Protein polymers have garnered increasing focus in the development of biomedical materials, devices and therapeutics due to their intrinsic bioactivity, biocompatibility and biodegradability. This book comprehensively reviews the latest advances on the synthesis, characterization, properties and applications of protein-based biopolymers. Each chapter is dedicated to a single protein class, covering a broad range of proteins including silk, collagen, keratin, fibrin, and more. In addition, the book explores the biomedical potential of these polymers, from tissue engineering, to drug delivery and wound healing. This book offers a valuable resource for academics and researchers in the fields of materials science, biomedical engineering and R&D groups working in pharmaceutical and biomedical industries. Covers a range of protein-based biopolymers, including elastin, collagen, keratin, soy and more Guides the reader through the fabrication, characterization and properties of protein biopolymers Explores the biomedical potential of protein biopolymers, covering applications such as cancer therapy, tissue engineering and drug delivery