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Porous Silicon for Biomedical Applications Table of Contents. Porous silicon has a range of properties, making it ideal for drug delivery, cancer therapy, and... Key Features. Readership. Details. Hélder A. Santos is a Professor in Pharmaceutical Nanotechnology, Principal Investigator/Group ...

Porous Silicon for Biomedical Applications - 1st Edition

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Porous Silicon for Biomedical Applications (Woodhead ...

Abstract. In the past two decades, porous silicon (PSi) has attracted increasing attention for its potential biomedical applications. With its controllable geometry, tunable nanoporous structure, large pore volume/high specific surface area, and versatile surface chemistry, PSi shows significant advantages over conventional drug carriers.

Tailoring Porous Silicon for Biomedical Applications: From ...

Chapters in part one focus on the fundamentals and properties of porous silicon for biomedical applications, including thermal properties and stabilization, photochemical and nonthermal chemical modification, protein-modified porous silicon films, and biocompatibility of porous silicon. Part two discusses applications in bioimaging and sensing, and explores the optical properties of porous silicon materials; in vivo imaging assessment and radiolabelling of porous silicon; and nanoporous ...

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Porous silicon has a range of properties, making it ideal for drug delivery, cancer therapy, and tissue engineering. Porous Silicon for Biomedical Applications provides a comprehensive review of this emerging nanostructured and biodegradable biomaterial.. Chapters in part one focus on the fundamentals and properties of porous silicon for biomedical applications, including thermal properties ...

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Medical Applications. The exciting world of nanotherapuetics is amoung us. Due to the biocompatibility and biodegradability of porous Silicon, new applications on and within the human body are now possible. Silicon is one of the many minerials that a body needs to stay healthy. Using this Advantage, porous Silicon can be used for medicine vessels carrying therapuetics to targeted areas of the body. pSi, once oxidized, is very compatible with a variety of liquid substances.

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The research on porous silicon (PSi) materials for biomedical applications has expanded greatly since the early studies of Leigh Canham more than 25 years ago. Currently, PSi nanoparticles are receiving growing attention from the scientific biomedical community.

~~Porous silicon nanoparticles for nanomedicine: preparation ...~~

This work describes the formation of porous composite materials based on a combination of bioactive mesoporous silicon and

bioerodible polymers such as poly - caprolactone (PCL). The fabrication of a range of composites prepared by both salt leaching and microemulsion techniques are discussed.

Porous silicon - based scaffolds for tissue engineering and ...

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Porous Silicon: From Formation to Application: Biomedical and Sensor Applications, Volume Two: Korotcenkov, Ghenadii: Amazon.sg: Books

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The GREMAN laboratory is affiliated to the University of Tours, the INSA-CVL and the CNRS. One of the teams in the GREMAN works on porous silicon synthesis and characterization since 2004 [Canham_2014]. This material can be utilized as magnetic therapeutic vector [Prestidge_2007]. Reduced in micro- or nanoparticles, porous silicon has been demonstrated to be a biocompatible

Porous silicon has a range of properties, making it ideal for drug delivery, cancer therapy, and tissue engineering. Porous Silicon for Biomedical Applications provides a comprehensive review of this emerging nanostructured and biodegradable biomaterial. Chapters in part one focus on the fundamentals and properties of porous silicon for biomedical applications, including thermal properties and stabilization, photochemical and nonthermal chemical modification, protein-modified porous silicon films, and biocompatibility of porous silicon. Part two discusses applications in bioimaging and sensing, and explores the optical properties of porous silicon materials; in vivo imaging assessment and radiolabelling of porous silicon; and nanoporous silicon biosensors for DNA sensing and for bacteria detection. Finally, part three highlights drug loading and characterization of porous silicon materials, tumor targeting and imaging, and porous silicon scaffolds for functional tissue engineering, stem cell growth, and osteodifferentiation. With its acclaimed editor and international team of expert contributors, Porous Silicon for Biomedical Applications 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 the field. Comprehensive review of porous silicon focusing on the fabrication and properties of this emerging material Specifically discusses drug delivery and orthopedic applications of porous silicon Aimed at materials researchers and scientists in the biomaterials industry – particularly those concerned with drug delivery and orthopedics

Porous silicon is rapidly attracting increasing interest from various fields, including optoelectronics, microelectronics, photonics, medicine, chemistry, and biosensing. This nanostructured and biodegradable material has a range of unique properties that make it ideal for many applications. For example, the pores and surface chemistry of the material can be manipulated to change the rate of drug release from hours to months. Porous Silicon: Biomedical and Sensor Applications, Volume Two is part of the three-book series Porous Silicon: From Formation to Application. It discusses applications of porous silicon in bioengineering and in various sensors, including gas sensors, biosensors, pressure sensors, mechanical sensors, optical sensors, and many other types. It also thoroughly reviews the fabrication, parameters, and applications of devices that use porous silicon. Drawing upon a vast amount of recently published literature, the book guides readers through practical implementations that span environmental control, chemistry, spectroscopy, gas chromatography, microelectronics, micromachining, microfluidics, medicine, biotechnology, and the car industry. It is divided into three sections that focus on: Types of sensors that use porous silicon Auxiliary devices that use porous silicon Biomedical applications such as drug delivery, tissue engineering, and in vivo imaging Representing the most recent progress in applications of porous silicon to biomedical and sensory technology, this reference is indispensable for those involved in the research, development, and application of porous silicon in several scientific disciplines. It also serves as a starting point for the interested but unfamiliar reader to gain a thorough understanding of the unusual properties of porous silicon, other porous materials, and possible areas for current and future applications.

Porous silicon is rapidly attracting increasing interest in various fields, including optoelectronics, microelectronics, photonics, medicine, chemistry, biosensing, and energy. Porous Silicon: Formation and Properties fills a gap in the literature of the field today, providing a thorough introduction to current knowledge of the formation, processing, and properties of porous silicon. It also analyzes present and potential applications of porous silicon in technology, including various devices. With contributions from an international team of well-known experts, this book presents the most recent progress in the field of porous silicon. Focused chapters cover the fundamentals of silicon porosification, the qualities of porous silicon, including its electrical, luminescent, optical, and thermal properties, and the processing of porous silicon for use in the technology of other fields. It also gives valuable insights on what can be expected from the field in the near future. The book includes extensive references to recently published literature on the subject, allowing for deeper exploration of information on the porosification process, designing porous silicon-based technology, and improving performance of devices fabricated using porous silicon. It is an indispensable addition to the library of any scientist or technician involved or interested in the research, development, and application of porous silicon.

Porous silicon has been investigated as a novel material for biomedical applications since the early 1990s. Owing to its low toxicity profile and unique properties, it has been utilized in a variety of manners, including biomedical imaging and sustained delivery applications discussed within. In the first portion of this dissertation, quantum confined domains of silicon were used as ratiometric fluorescent probes, in which the long-lived excited states were harnessed to generate wavelength-dependent

quenching motifs. To further evaluate the performance of porous silicon as a biomedical imaging agent, it was then compared and contrasted against a series of luminescent silicon nanocrystals to probe which unique properties are intrinsic to all silicon nanocrystals and which are imbued during the fabrication process. Finally, porous silicon microparticles were used to sustain the delivery of hormonal progestins to develop injectable contraceptives with the goal of reducing maternal mortality rates in sub-Saharan Africa. Owing to the anisotropic dissolution of porous silicon, hydrophobic progestin molecules were able to be released from the porous particle host in a highly linear fashion and for longer periods of time than the unprotected controls. The progestins were incorporated into the porous particle via a technique known as melt casting, in which molten drug infiltrates and then recrystallizes within the porous structure. Strategies for melt casting thermally instable drugs were also explored. Particles containing segesterone acetate were found to be non-toxic and well tolerated in a cohort of adult female Sprague-Dawley rats over an extended period of time.

The Handbook of Porous Silicon brings together the expertise of a large, international team of almost 100 academic researchers, engineers, and product developers from industry across electronics, medicine, nutrition and consumer care to summarize the field in its entirity with 150 chapters and 5000 references. The volume presents 5 parts which cover fabrication techniques, material properties, characterization techniques, processing and applications. Much attention was given in the the past to its luminescent properties, but increasingly it is the biodegradability, mechanical, thermal and sensing capabilities that are attracting attention. The volume is divided into focussed data reviews with, wherever possible, quantitative rather than qualitative descriptions of both properties and performance. The book is targeted at undergraduates, postgraduates, and experienced researchers.

Inorganic Frameworks as Smart Nanocarriers for Drug Delivery brings together recent research in the area of inorganic frameworks for drug delivery. Different types of nanocarriers are presented and discussed in detail, providing an up-to-date overview on inorganic nanoparticles with pharmaceutical applications. Written by a diverse range of international academics, this book is a valuable reference resource for researchers in biomaterials, the pharmaceutical industry, and those who want to learn more about the current applications of inorganic smart nanocarriers. Includes assembly methods for a variety of smart nanocarrier systems, also showing how they are applied Highlights how metal-oxide nanoparticles are effectively used in drug delivery Assesses the pros and cons of different metallic nanomaterials as drug carriers

Properties of nanosilicon in the form of nanoparticles, nanowires, nanotubes, and as porous material are of great interest. They can be used in finding suitable components for future miniature devices, and for the more exciting possibilities of novel optoelectronic applications due to bright luminescence from porous silicon, nanoparticles and nanowires. New findings from research into metal encapsulated clusters, silicon fullerenes and nanotubes have opened up a new paradigm in nanosilicon research and this could lead to large scale production of nanoparticles with control on size and shape as well as novel quasi one-dimensional structures. There are possibilities of using silicon as an optical material and in the development of a silicon laser.

In Nanosilicon, leading experts cover state-of-the-art experimental and theoretical advances in the different forms of nanosilicon. Furthermore, applications of nanosilicon to single electron transistors, as photonic material, chemical and biological sensors at molecular scale, and silicon nanowire devices are also discussed. Self-assemblies of silicon nanoforms are important for applications. These developments are also related to cage structures of silicon in clathrates. With an interesting focus on the bottlenecks in the advancement of silicon based technology, this book provides a much-needed overview of the current state of understanding of nanosilicon research. Latest developments in nanoparticles, nanowires and nanotubes of silicon Focus on nanosilicon - a very timely subject attracting large interest Novel chapters on metal encapsulated silicon clusters and nanotubes

Written by an international team of editors and contributors from renowned universities and institutes, this book addresses the latest research in the field of nanobiomaterials, covering nanotechnologies for their fabrication, developments in biomedical applications, and the challenges of biosafety in clinic uses. Clearly structured, the volume defines the scope and classification of the field, resulting in a broad overview from fundamental principles to current technological advances, and from materials synthesis to biomedical applications along with future trends.

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

Hydroxyapatite in the form of hydroxycarbonate apatite is the principal mineral component of bone tissue in mammals. In Bioceramics, it is classed as a bioactive material, which means bone tissue grows directly on it when placed in apposition without intervening fibrous tissue. Hydroxyapatite is hence commonly used as bone grafts, fillers and as coatings for metal implants. This important book provides an overview of the most recent research and developments involving hydroxyapatite as a key material in medicine and its application. Reviews the important properties of hydroxyapatite as a biomaterial Considers a range of specific forms of the material and their advantages Reviews a range of specific medical applications for this important material