

Nanobiotechnology Of Biomimetic Membranes Fundamental Biomedical Technologies 2006 12 07

Biomimetic Lipid Membranes: Fundamentals, Applications, and Commercialization Nanobiotechnology of Biomimetic Membranes [Bioelectrochemistry of Biomembranes and Biomimetic Membranes](#) Membranes Electrochemical Membrane Technology for Water and Wastewater Treatment Stimuli Responsive Polymeric Membranes Bioelectrochemistry of Biomembranes and Biomimetic Membranes Nanofiltration, 2 Volume Set [Biomimetic Membranes for Sensor and Separation Applications](#) Nanobiotechnology of Biomimetic Membranes Artificial Water Channels Molecular Assembly of Biomimetic Systems [Liposomes, Lipid Bilayers and Model Membranes](#) [Comprehensive Membrane Science and Engineering](#) Advancement in Polymer-Based Membranes for Water Remediation Biomimetic and Bioinspired Membranes for New Frontiers in Sustainable Water Treatment Technology Characterization of Biological Membranes Fundamentals of Nanotechnology [Advanced Membrane Science and Technology for Sustainable Energy and Environmental Applications](#) Bioelectrochemistry Fundamentals of Nanoparticles Nanocomposite Membrane Technology [Biomimetic Membranes for Sensor and Separation Applications](#) Biomimetic Sensor Technology Biological Soft Matter Advances in Functional Separation Membranes [Functional Heterogeneities in Biomembranes](#) Neutron Scattering Applications of Electrochemistry and Nanotechnology in Biology and Medicine II Bioinspiration and Biomimicry in Chemistry Electrospinning Dielectric Elastomers as Electromechanical Transducers Synthetic Polymeric Membranes Biosensors: Essentials [MIPs and Their Roles in the Exchange of Metalloids](#) [Fundamentals and Application of Atomic Force Microscopy for Food Research](#) Biological, Physical and Technical Basics of Cell Engineering [Advances In Water Desalination Technologies](#) [Comprehensive Membrane Science and Engineering](#) Membranes For Gas Separations

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Fundamentals of Nanotechnology May 16 2021 WINNER 2009 CHOICE AWARD OUTSTANDING ACADEMIC TITLE! Nanotechnology is no longer a subdiscipline of chemistry, engineering, or any other field. It represents the convergence of many fields, and therefore demands a new paradigm for teaching. This textbook is for the next generation of nanotechnologists. It surveys the field's broad landscape, exploring the physical basics such as nanorheology, nanofluidics, and nanomechanics as well as industrial concerns such as manufacturing, reliability, and safety. The authors then explore the vast range of nanomaterials and systematically outline devices and applications in various industrial sectors. This color text is an ideal companion to Introduction to Nanoscience by the same group of esteemed authors. Both titles are also available as the single volume Introduction to Nanoscience and Nanotechnology Qualifying instructors who purchase either of these volumes (or the combined set) are given online access to a wealth of instructional materials. These include detailed lecture notes, review summaries, slides, exercises, and more. The authors provide enough material for both one- and two-semester courses.

[Bioelectrochemistry of Biomembranes and Biomimetic Membranes](#) Aug 31 2022 Invaluable to biochemists, biophysicists, and pharmacological scientists; this book provides insights into the essential principles required to understand why and how electrochemical and electrophysiological tools are fundamental in elucidating the mode of ion transport across biomembranes. • Describes the essential electrochemical basics required to understand why and how electrochemical and electrophysiological tools are fundamental in elucidating the mode of ion transport across biomembranes • Requires only basic physical chemistry and mathematics to be understood, without intermediate stumbling blocks that would discourage the reader from proceeding further • Develops contents in a step-by-step approach that encourages students and researchers to read from beginning to end

Biological, Physical and Technical Basics of Cell Engineering Sep 27 2019 This book presents and discusses recent scientific progress on Cell and Stem Cell Engineering. It predominantly focuses on Biological, Physical and Technical Basics, and features new trends of research reaching far into the 21st century. [Bioelectrochemistry of Biomembranes and Biomimetic Membranes](#) Apr 26 2022 Invaluable to biochemists, biophysicists, and pharmacological scientists; this book provides insights into the essential principles required to understand why and how electrochemical and electrophysiological tools are fundamental in elucidating the mode of ion transport across biomembranes. • Describes the essential electrochemical basics required to understand why and how electrochemical and electrophysiological tools are fundamental in elucidating the mode of ion transport across biomembranes • Requires only basic physical chemistry and mathematics to be understood, without intermediate stumbling blocks that would discourage the reader from proceeding further • Develops contents in a step-by-step approach that encourages students and researchers to read from beginning to end

Nanofiltration, 2 Volume Set Mar 26 2022 An updated guide to the growing field of nanofiltration including fundamental principles, important industrial applications as well as novel materials With contributions from an international panel of experts, the revised second edition of Nanofiltration contains a comprehensive overview of this growing field. The book covers the basic principles of nanofiltration including the design and characterizations of nanofiltration membranes. The expert contributors highlight the broad ranges of industrial applications including water treatment, food, pulp and paper, and textiles. The book explores photocatalytic nanofiltration reactors, organic solvent nanofiltration, as well as nanofiltration in metal and acid recovery. In addition, information on the most recent developments in the field are examined including nanofiltration retentate treatment and renewable energy-powered nanofiltration. The authors also consider the future of nanofiltration materials such as carbon- as well as polymer-based materials. This important book: Explores the fast growing field of the membrane process of nanofiltration Examines the rapidly expanding industrial sector's use of membranes for water purification Covers the most important industrial applications with a strong focus on water treatment Contains a section on new membrane materials, including carbon-based and polymer-based materials, as well as information on artificial ion and water channels as biomimetic membranes Written for scientists and engineers in the fields of chemistry, environment, food and materials, the second edition of Nanofiltration provides a comprehensive overview of the field, outlines the principles of the technology, explores the industrial applications, and discusses new materials.

[MIPs and Their Roles in the Exchange of Metalloids](#) Nov 29 2019 Sixteen years have passed since human aquaporin-1 (AQP1) was discovered as the first water channel, facilitating trans-membrane water fluxes. Subsequent years of research showed that the water channel AQP1 was only the tip of an iceberg; the iceberg itself being the ubiquitous super family of membrane intrinsic proteins (MIPs) that facilitate trans-membrane transport of water and an increasing number of small, water-soluble and uncharged compounds. Here we introduce you to the superfamily of MIPs and provide a summary about our gradually refined understanding of the phylogenetic relationship of its members. This volume is dedicated to the metalloids, a recently discovered group of substrates for a number of specific MIPs in a diverse spectrum of organisms. Particular focus is given to the essential boron, the beneficial silicon and the highly toxic arsenic. The respective MIP isoforms that facilitate the transport of these metalloids include members from several clades of the phylogenetic tree, suggesting that metalloid transport is an ancient function within this family of channel proteins. Among all the various substrates that have been shown to be transported by MIPs, metalloids take an outstanding position. While water transport seems to be a common function of many MIPs, single isoforms in plants have been identified as being crucially important for the uptake of boric acid as well as silicic acid. Here, the function seems not to be redundant, as mutations in those genes render plants deficient in boron and silicon, respectively.

Applications of Electrochemistry and Nanotechnology in Biology and Medicine Jun 04 2020 The study of electrochemical nanotechnology has emerged as researchers apply electrochemistry to nanoscience and nanotechnology. These two related volumes in the Modern Aspects of Electrochemistry Series review recent developments and breakthroughs in the specific application of electrochemistry and nanotechnology to biology and medicine. Internationally renowned experts contribute chapters that address both fundamental and practical aspects of several key emerging technologies in biomedicine, such as the processing of new biomaterials, biofunctionalization of surfaces, characterization of biomaterials, discovery of novel phenomena and biological processes occurring at the molecular level.

Synthetic Polymeric Membranes Jan 30 2020 Researchers in polymeric membranes as well as R&D professionals will find this work an essential addition to the literature. It concentrates on the method recently developed to study the surfaces of synthetic polymeric membranes using an Atomic Force Microscope (AFM), which is fast becoming a very important tool. Each chapter includes information on basic principles, commercial applications, an overview of current research and guidelines for future research.

Biosensors: Essentials Dec 31 2019 Today, biosensors are broadly applied in research, clinical diagnosis and monitoring, as well as in pharmaceutical, environmental or food analysis. In this work, the author presents the essentials that advanced students and researchers need to know in order to make full use of this technology. This includes a description of biochemical recognition elements, such as enzymes, antibodies, aptamers or even whole cells. Various signal transducers such as electrochemical and optical transducers, luminescence devices and advanced techniques such as quartz crystal microbalances and MEMS systems are covered as well. Current applications are introduced through various case studies, rounded out by a forward-looking chapter on the prospects for biosensor development offered by nanotechnology, lab-on-a-chip, and biomimetic systems.

Bioelectrochemistry Mar 14 2021 Bioelectrochemistry is a fast growing field at the interface between electrochemistry and other sciences such as biochemistry, analytical chemistry and medicinal chemistry. In the recent years, the methods and the understanding of the fundamentals have seen significant progress, which has led to rapid development in the field. Here, the expert editors have carefully selected contributions to best reflect the latest developments in this hot and rapidly growing interdisciplinary topic. The resulting excellent and timely overview of this multifaceted field covers recent methodological advances, as well as a range of new applications for analytical detection, drug screening, tumor therapy, and for energy conversion in biofuel cells. This book is a must-have for all Electrochemists, Biochemists, Analytical Chemists, and Medicinal Chemists.

Neutron Scattering Jul 06 2020 This book brings suitable data concerning theory and experiments of neutron interactions with different materials. Since the neutron discovery by Chadwick in 1932, researchers of the entire world begin to make studies about it. It is well known that neutrons have no charge, and their electric dipole moment is either zero or too small to measure, but theories and experiments show that neutrons have spin (presence of magnetic moment), and polarization neutron scattering is plausible. The reader can obtain remarks about inelastic scattering cross sections for neutrons; polarized neutron reflectivity; scattering methods; neutron reflectometry tool to probe the chemical structures; neutron scattering for amino acid crystals; and small-angle neutron scattering nanoemulsion heat transfer fluids in this book.

Nanobiotechnology of Biomimetic Membranes Jan 24 2022 This book describes the current state of research and development in biomimetic membranes for nanobiotechnology applications. It takes an international perspective on the issue of developing biotechnology applications from an understanding of the biomimetic membrane at the nanoscale. The success of these applications relies on a good understanding of the interaction and incorporation of macromolecules in membranes and the fundamental properties of the membrane itself.

Dielectric Elastomers as Electromechanical Transducers Mar 02 2020 Dielectric Elastomers as Electromechanical Transducers provides a comprehensive and updated insight into dielectric elastomers; one of the most promising classes of polymer-based smart materials and technologies. This technology can be used in a very broad range of applications, from robotics and automation to the biomedical field. The need for improved transducer performance has resulted in considerable efforts towards the development of devices relying on materials with intrinsic transduction properties. These materials, often termed as "smart" or "intelligent", include improved piezoelectrics and magnetostrictive or shape-memory materials. Emerging electromechanical transduction technologies, based on so-called ElectroActive Polymers (EAP), have gained considerable attention. EAP offer the potential for performance exceeding other smart materials, while retaining the cost and versatility inherent to polymer materials. Within the EAP family, "dielectric elastomers", are of particular interest as they show good overall performance, simplicity of structure and robustness. Dielectric elastomer transducers are rapidly emerging as high-performance "pseudo-muscular actuators, useful for different kinds of tasks. Further, in addition to actuation, dielectric elastomers have also been shown to offer unique possibilities for improved generator and sensing devices. Dielectric elastomer transduction is enabling an enormous range of new applications that were precluded to any other EAP or smart-material technology until recently. This book provides a comprehensive and updated insight into dielectric elastomer transduction, covering all its fundamental aspects. The book deals with transduction principles, basic materials properties, design of efficient device architectures, material and device modelling, along with applications. Concise and comprehensive treatment for practitioners and academics Guides the reader through the latest developments in electroactive-polymer-based technology Designed for ease of use with sections on fundamentals, materials, devices, models and applications

Nanocomposite Membrane Technology Jan 12 2021 Nanocomposite Membrane Technology: Fundamentals and Applications is the first book to deliver an extensive exploration of nanocomposite membrane technology. This groundbreaking text offers an eloquent introduction to the field as well as a comprehensive overview of fundamental aspects and application areas. Approaching the subject from the material

Biomimetic Lipid Membranes: Fundamentals, Applications, and Commercialization Nov 02 2022 This book compiles the fundamentals, applications and viable product strategies of biomimetic lipid membranes into a single, comprehensive source. It broadens its perspective to interdisciplinary realms incorporating medicine, biology, physics, chemistry, materials science, as well as engineering and pharmacy at large. The book guides readers from membrane structure and models to biophysical chemistry and functionalization of membrane surfaces. It then takes the reader through a myriad of surface-sensitive techniques before delving into cutting-edge applications that could help inspire new research directions. With more than half the world's drugs and various toxins targeting these crucial structures, the book addresses a topic of major importance in the field of medicine, particularly biosensor design, diagnostic tool development, vaccine formulation, micro/nano-array systems, and drug screening/development. Provides fundamental knowledge on biomimetic lipid membranes; Addresses some of biomimetic membrane types, preparation methods, properties and characterization techniques; Explains state-of-art technological developments that incorporate microfluidic systems, array technologies, lab-on-a-chip-tools, biosensing, and bioprinting techniques; Describes the integration of biomimetic membranes with current top-notch tools and platforms; Examines applications in medicine, pharmaceutical industry, and environmental monitoring.

Advances in Functional Separation Membranes Sep 07 2020 Membrane technology has received great popularity in many industrial sectors and significantly enhanced our abilities to restructure production processes, protect the environment and public health, and provide competitive strategies for separation and purification. However, the need for sustainable development has imposed new targets for this technology, such as more effective/precise separation and stricter admissible limits for the discharge of contaminants into the environment. Focusing on hot topic environment-related applications, Advances in Functional Separation Membranes introduces emerging membranes nanoengineered with attractive functions and discusses their key features. It also provides a comprehensive guide to various design strategies for such functional membranes, making it useful reference for environmental chemists and membrane engineers alike.

Artificial Water Channels Dec 23 2021 This volume will focus on the chemistry, physics and material sciences contributions toward the rapidly evolving field of artificial water channels. The development of synthetic biomimetic artificial water-channels and pores is key for a better understanding of the natural function of protein channels. It is hoped to offer new strategies to generate highly selective, advanced materials for water purification systems. While synthetic chemists have produced sophisticated architectures able to confine water clusters, most water channel based work is being conducted with natural protein channels as selectivity components, embedded in the diverse arrays of bio-assisted artificial systems. Experimental results have demonstrated that natural biomolecules can be used as bio-assisted building blocks for the construction of highly selective water transport through artificial channels. Moving to simpler water-channel systems offers a chance to better understand mechanistic and structural behaviours and to uncover novel interactive water channels that might parallel those in biomolecular systems. In this volume the topics covered include: Structure and function of natural proteins for water transport Biomimetic water channels The modelling and enhancement of water hydrodynamics Applications to water transport systems tic and structural behaviours and to uncover novel interactive water channels that might parallel those in biomolecular systems. In this volume the topics covered include: Structure and function of natural proteins for water transport Biomimetic water channels The modelling and enhancement of water hydrodynamics Applications to water transport systems

Biomimetic Membranes for Sensor and Separation Applications Dec 11 2020 This book addresses the possibilities and challenges in mimicking biological membranes and creating membrane-based sensor and separation devices. Recent advances in developing biomimetic membranes for technological applications

will be presented with focus on the use of integral membrane protein mediated transport for sensing and separation. It describes the fundamentals of biosensing as well as separation and shows how the two processes are working in a cooperative manner in biological systems. Biomimetics is a truly cross-disciplinary approach and this is exemplified using the process of forward osmosis will be presented as an illustration of how advances in membrane technology may be directly stimulated by an increased understanding of biological membrane transport. In the development of a biomimetic sensor/separation technology, both channels (ion and water channels) and carriers (transporters) are important. An ideal sensor/separation device requires the supporting biomimetic matrix to be virtually impermeable to anything but the solute in question. In practice, however, a biomimetic support matrix will generally have finite permeabilities to water, electrolytes, and non-electrolytes. These non-protein mediated membrane transport contributions will be presented and the implications for biomimetic device construction will be discussed. New developments in our understanding of the reciprocal coupling between the material properties of the biomimetic matrix and the embedded proteins will be presented and strategies for inducing biomimetic matrix stability will be discussed. Once reconstituted in its final host biomimetic matrix the protein stability also needs to be maintained and controlled. Beta-barrel proteins exemplified by the E. Coli outer membrane channels or small peptides are inherently more stable than alpha-helical bundle proteins which may require additional stabilizing modifications. The challenges associated with insertion and stabilization of alpha-helical bundle proteins including many carriers and ligand and voltage gated ion (and water) channels will be discussed and exemplified using the aquaporin protein. Many biomimetic membrane applications require that the final device can be used in the macroscopic realm. Thus a biomimetic separation device must have the ability to process hundred of liters of permeate in hours – effectively demanding square-meter size membranes. Scalability is a general issue for all nano-inspired technology developments and will be addressed here in the context biomimetic membrane array fabrication. Finally a robust working biomimetic device based on membrane transport must be encapsulated and protected yet allowing massive transport through the encapsulation material. This challenge will be discussed using microfluidic design strategies as examples of how to use microfluidic systems to create and encapsulate biomimetic membranes. The book provides an overview of what is known in the field, where additional research is needed, and where the field is heading.

Biological Soft Matter Oct 09 2020 Explore a comprehensive, one-stop reference on biological soft matter written and edited by leading voices in the field **Biological Soft Matter: Fundamentals, Properties and Applications** delivers a unique and indispensable compilation of up-to-date knowledge and material on biological soft matter. The book presents a thorough overview about biological soft matter, beginning with different substance classes, including proteins, nucleic acids, lipids, and polysaccharides. It goes on to describe a variety of superstructures and aggregated and how they are formed by self-assembly processes like protein folding or crystallization. The distinguished editors have included materials with a special emphasis on macromolecular assembly, including how it applies to lipid membranes, DNA condensation, and DNA fibrillization. **Biological Soft Matter** is a crucial resource for anyone working in the field, compiling information about all important substance classes and their respective roles in forming superstructures. The book is ideal for beginners and experts alike and makes the perfect guide for chemists, physicists, and life scientists with an interest in the area. Readers will also benefit from the inclusion of: An introduction to DNA nano-engineering and DNA-driven nanoparticle assembly Explorations of polysaccharides and glycoproteins, engineered biopolymers, and engineered hydrogels Discussions of macromolecular assemblies, including liquid membranes and small molecule inhibitors for amyloid aggregation A treatment of inorganic nanomaterials as promoters and inhibitors of amyloid fibril formation An examination of a wide variety of natural and artificial polymers Perfect for materials scientists, biochemists, polymer chemists, and protein chemists, **Biological Soft Matter: Fundamentals, Properties and Applications** will also earn a place in the libraries of biophysicists and physical chemists seeking a one-stop reference summarizing the rapidly evolving topic of biological soft matter.

Biomimetic Membranes for Sensor and Separation Applications Feb 22 2022 This book addresses the possibilities and challenges in mimicking biological membranes and creating membrane-based sensor and separation devices. Recent advances in developing biomimetic membranes for technological applications will be presented with focus on the use of integral membrane protein mediated transport for sensing and separation. It describes the fundamentals of biosensing as well as separation and shows how the two processes are working in a cooperative manner in biological systems. Biomimetics is a truly cross-disciplinary approach and this is exemplified using the process of forward osmosis will be presented as an illustration of how advances in membrane technology may be directly stimulated by an increased understanding of biological membrane transport. In the development of a biomimetic sensor/separation technology, both channels (ion and water channels) and carriers (transporters) are important. An ideal sensor/separation device requires the supporting biomimetic matrix to be virtually impermeable to anything but the solute in question. In practice, however, a biomimetic support matrix will generally have finite permeabilities to water, electrolytes, and non-electrolytes. These non-protein mediated membrane transport contributions will be presented and the implications for biomimetic device construction will be discussed. New developments in our understanding of the reciprocal coupling between the material properties of the biomimetic matrix and the embedded proteins will be presented and strategies for inducing biomimetic matrix stability will be discussed. Once reconstituted in its final host biomimetic matrix the protein stability also needs to be maintained and controlled. Beta-barrel proteins exemplified by the E. Coli outer membrane channels or small peptides are inherently more stable than alpha-helical bundle proteins which may require additional stabilizing modifications. The challenges associated with insertion and stabilization of alpha-helical bundle proteins including many carriers and ligand and voltage gated ion (and water) channels will be discussed and exemplified using the aquaporin protein. Many biomimetic membrane applications require that the final device can be used in the macroscopic realm. Thus a biomimetic separation device must have the ability to process hundred of liters of permeate in hours – effectively demanding square-meter size membranes. Scalability is a general issue for all nano-inspired technology developments and will be addressed here in the context biomimetic membrane array fabrication. Finally a robust working biomimetic device based on membrane transport must be encapsulated and protected yet allowing massive transport through the encapsulation material. This challenge will be discussed using microfluidic design strategies as examples of how to use microfluidic systems to create and encapsulate biomimetic membranes. The book provides an overview of what is known in the field, where additional research is needed, and where the field is heading.

Liposomes, Lipid Bilayers and Model Membranes Oct 21 2021 As a result of their unique physical properties, biological membrane mimetics, such as liposomes, are used in a broad range of scientific and technological applications. **Liposomes, Lipid Bilayers and Model Membranes: From Basic Research to Application** describes state-of-the-art research and future directions in the field of membranes, which has evolved from basic studies of the physicochemical properties of amphiphiles to their application in industry and medicine. Written by leading researchers in their fields, this book describes basic and applied research, and serves as a useful reference for both the novice and the expert. Part one covers a range of basic research topics, from theory and computational simulations to some of the most up-to-date experimental research. Topics discussed include soft matter physics of membranes, nonlamellar phases, extraction of molecules by amphiphiles, lipid models for membrane rafts, membrane dynamics, nanodiscs, microemulsions, active membranes, as well as interactions of bilayers with drugs or DNA to treat disease or for gene transfer, respectively. Part two of the book focuses on technological applications of amphiphiles, such as liposome-based nanoparticles for drug delivery, formulation of liposomes for prolonged in vivo circulation and functionalization for medical purposes, novel drug delivery systems for increased drug loading, and the use of tethered membranes for bio-sensing applications. Chapters also describe the use of liposomes in textile dyeing and how lipidic nanoparticles are used by the food industry.

Advances In Water Desalination Technologies Aug 26 2019 The book presents chapters from world leaders on water desalination advances with respect to processes, separations materials, and energy and environmental considerations. It provides a balanced discussion of the mature and newer desalination technologies and provides a fundamental assessment of the potential of emerging approaches. Realistic assessments for the feasibility of energy extraction from salinity gradients, desalting high salinity source water, membrane distillation, capacitive deionization, are among the topics discussed. Also, among the topics discussed in the book are recent advances in the desalination application of nanomaterials, carbon nanotubes, and surface structuring of membranes.

Biomimetic and Bioinspired Membranes for New Frontiers in Sustainable Water Treatment Technology Jul 18 2021 Biomimetic and bioinspired membranes are the most promising type of membrane for multiple usage scenarios, including commercial separation applications as well as water and wastewater treatment technologies. In recent years, aquaporin biomimetic membranes (ABMs) for water purification have raised considerable interest. These membranes display uniquely favorable properties and outstanding performances, such as diverse interactions, varied selective transport mechanisms, superior stability, high resistance to membrane fouling, and distinct adaptability. Biomimetic membranes would make a significant contribution to alleviate water stress, environmental threats, and energy consumption.

Comprehensive Membrane Science and Engineering Sep 19 2021 **Comprehensive Membrane Science and Engineering, Second Edition** is an interdisciplinary and innovative reference work on membrane science and technology. Written by leading researchers and industry professionals from a range of backgrounds, chapters elaborate on recent and future developments in the field of membrane science and explore how the field has advanced since the previous edition published in 2010. Chapters are written by academics and practitioners across a variety of fields, including chemistry, chemical engineering, material science, physics, biology and food science. Each volume covers a wide spectrum of applications and advanced technologies, such as new membrane materials (e.g. thermally rearranged polymers, polymers of intrinsic microporosity and new hydrophobic fluoropolymer) and processes (e.g. reverse electrodialysis, membrane

contractors, membrane crystallization, membrane condenser, membrane dryers and membrane emulsifiers) that have only recently proved their full potential for industrial application. This work covers the latest advances in membrane science, linking fundamental research with real-life practical applications using specially selected case studies of medium and large-scale membrane operations to demonstrate successes and failures with a look to future developments in the field. Contains comprehensive, cutting-edge coverage, helping readers understand the latest theory Offers readers a variety of perspectives on how membrane science and engineering research can be best applied in practice across a range of industries Provides the theory behind the limits, advantages, future developments and failure expectations of local membrane operations in emerging countries

Fundamentals and Application of Atomic Force Microscopy for Food Research Oct 28 2019 Fundamentals and Application of Atomic Force Microscopy for Food Research explains how to get reliable AFM data and current application progress of AFM in different food substances. Sections focus on an Introduction to AFM for food research and Applications of AFM for different types of food substances. Edited by 3 experts in the field of nanotechnology and food science, this book reduces the difficulty of AFM application and shortens the learning time for new hands. Until now, no such book has systematically described the application of Atomic Force Microscopy (AFM) for food research. Many scientists in the field of food science and engineering need to evaluate their developed foods and food contact surfaces at nanoscale. However, there is a steep learning curve for new hands, hence the need for this comprehensive resource. Describes the application of AFM for food research Covers applications of AFM for different types of food substances Addresses future uses and perspectives of AFM for the development of food nanotechnology

Characterization of Biological Membranes Jun 16 2021 The study of membranes has become of high importance in the fields of biology, pharmaceutical chemistry and medicine, since much of what happens in a cell or in a virus involves biological membranes. The current book is an excellent introduction to the area, which explains how modern analytical methods can be applied to study biological membranes and membrane proteins and the bioprocesses they are involved to.

Membranes Jul 30 2022 Describes the properties of cellular membranes and their relationship with fundamental biological processes. This book provides insight on the chemistry, structures, model systems, and techniques employed for studying membrane properties and processes. A major focus is on the prominence of membranes in diverse physiological processes and disease, as well as applications of membranes and biomimetic membrane systems in varied disciplines. The book aims to illuminate the significance and beauty of membrane science, and serve both as an entry point for scholars wishing to embark on membrane research, as well as scientists already working in the field.

Electrochemical Membrane Technology for Water and Wastewater Treatment Jun 28 2022 Electrochemical Membrane Technology for Water and Wastewater Treatment consolidates state-of-the-art research developments in electrochemical membrane technology in water reclamation and sustainability in terms of fundamental theories, membrane and electrode materials, reactor designs, and fouling control mechanisms and applications. Fundamental theories and applications of electrochemical membrane technology are detailed, with emerging applications of electrochemical membrane technology introduced. The knowledge gaps and future research perspectives in electrochemical membrane technology are also addressed. This book is an excellent resource for understanding fundamental theories, the latest developments, and future prospects in electrochemical membrane technology. The concepts presented in this book can benefit a broad audience of researchers and engineers working in water purification, membrane technology and electrochemical process. Consolidates scattered knowledge of electrochemical membrane technology into a more assessable resource Provides a comprehensive review of fundamental theories, membrane materials and module design as well as the latest developments in electrochemical membrane technology Provides a state-of-the-art review on the applications of electrochemical membrane technology Includes detailed discussions on the challenges and prospects of electrochemical membrane technology in different applications Presents an excellent reference for the education and understanding of water treatment, wastewater treatment, membrane technology, electrochemical technology, environmental science and technology, and the latest research and developments

Advanced Membrane Science and Technology for Sustainable Energy and Environmental Applications Apr 14 2021 Progress in membrane materials, selective membrane design, and computer modeling and simulation have contributed greatly to the application of advanced membranes in conventional and alternative power sectors, as well as to clean industry applications. This book presents a comprehensive review of membrane science and technology.

Bioinspiration and Biomimicry in Chemistry May 04 2020 Can we emulate nature's technology in chemistry? Through billions of years of evolution, Nature has generated some remarkable systems and substances that have made life on earth what it is today. Increasingly, scientists are seeking to mimic Nature's systems and processes in the lab in order to harness the power of Nature for the benefit of society. Bioinspiration and Biomimicry in Chemistry explores the chemistry of Nature and how we can replicate what Nature does in abiological settings. Specifically, the book focuses on wholly artificial, man-made systems that employ or are inspired by principles of Nature, but which do not use materials of biological origin. Beginning with a general overview of the concept of bioinspiration and biomimicry in chemistry, the book tackles such topics as: Bioinspired molecular machines Bioinspired catalysis Biomimetic amphiphiles and vesicles Biomimetic principles in macromolecular science Biomimetic cavities and bioinspired receptors Biomimicry in organic synthesis Written by a team of leading international experts, the contributed chapters collectively lay the groundwork for a new generation of environmentally friendly and sustainable materials, pharmaceuticals, and technologies. Readers will discover the latest advances in our ability to replicate natural systems and materials as well as the many impediments that remain, proving how much we still need to learn about how Nature works. Bioinspiration and Biomimicry in Chemistry is recommended for students and researchers in all realms of chemistry. Addressing how scientists are working to reverse engineer Nature in all areas of chemical research, the book is designed to stimulate new discussion and research in this exciting and promising field.

Electrospinning Apr 02 2020 Electrospinning is a technique used to produce nanofibres from a polymer solution using an electrostatic force. The technology is now being used to create materials for a wide variety of uses from tissue engineering and 3D printing to packaging materials and electronic sensors. This new book focusses on the recent developments in their design, process parameters and polymers-selection to enable the commercial applications of electrospinning. The initial chapters introduce the technique and then specific chapters focus on the different application areas showing the various approaches for successful implementation of this fabrication process towards commercialization from basic research and development. The book will be suitable for graduate students, academics and industrial entrepreneurs in materials science, polymer science and chemical engineering as well as those interested in the energy and health applications of the materials.

Comprehensive Membrane Science and Engineering Jul 26 2019 This multivolume work covers all aspects of membrane science and technology - from basic phenomena to the most advanced applications and future perspectives. Modern membrane engineering is critical to the development of process-intensification strategies and to the stimulation of industrial growth. The work presents researchers and industrial managers with an indispensable tool toward achieving these aims. Covers membrane science theory and economics, as well as applications ranging from chemical purification and natural gas enrichment to potable water Includes contributions and case studies from internationally recognized experts and from up-and-coming researchers working in this multi-billion dollar field Takes a unique, multidisciplinary approach that stimulates research in hybrid technologies for current (and future) life-saving applications (artificial organs, drug delivery)

Advancement in Polymer-Based Membranes for Water Remediation Aug 19 2021 Advancements in Polymer-Based Membranes for Water Remediation describes the advanced membrane science and engineering behind the separation processes within the domain of polymer-based membrane systems in water remediation. Emphasis has been put on several aspects, ranging from fundamental concepts to the commercialization of pressure and potential driven membranes, updated with the latest technological progresses, and relevant polymer materials and application potential towards water treatment systems. Also included in this book are advances in polymers for membrane application in reverse osmosis, nanofiltration, ultrafiltration, microfiltration, forward osmosis, and polymeric ion-exchange membranes for electrodialysis and capacitive deionization. With its critical analyzes and opinions from experts around the world, this book will garner considerable interest among actual users, i.e., scientists, engineers, industrialists, entrepreneurs and students. Evaluates water remediation using pressure driven and potential driven membrane processes Reviews emerging polymer systems for membranes preparation Offers a comprehensive analysis in the development of polymer-based membranes and their applications in water remediation Analyzes membrane performance parameters to evaluate separation efficiency for various water pollutants Covers concept-to-commercialization aspects of polymer-based membranes in terms of water purification, pollutant removal, stability and scalability

Functional Heterogeneities in Biomembranes Aug 07 2020

Membranes For Gas Separations Jun 24 2019 This book aims at illustrating several examples of different membrane compositions ranging from inorganic, polymeric, metallic, metal organic framework, and composite which have been successfully deployed to separate industrially relevant gas mixtures including hydrogen, nitrogen, methane, carbon dioxide, olefins/paraffins among others. Each book chapter highlights some of the current and key fundamental and technological challenges for these membranes that must be overcome in order to envision its application at industrial level. Contents: Mixed Matrix Membranes for Gas Separation Applications (Maria Carreon, Ganpat Dahe, Jie Feng and Surendar R Venna)Ceramic-Supported Organic Composite Membranes for Gas Separation (Gongping Liu and Wanqin Jin)Molecular Modeling of MOF Membranes for Gas Separations (Ilknur Erucar and Seda Keskin)Membrane Processes for

N2 – CH4 Separation (Shiguang Li, Zhaowang Zong, Miao Yu and Moises A Carreon) Polymer Blend Membranes for Gas Separations (Charles J Holt, Juan P Vizuet, Inga H Musselman, Kenneth J Balkus Jr and John P Ferraris) Manipulating Polyimide Nanostructures via Cross-linking for Membrane Gas Separation (Lingxiang Zhu, Maryam Omidvar and Haiqing Lin) Dense Inorganic Membranes for Hydrogen Separation (Sean-Thomas B Lundin, Neil S Patki, Thomas F Fuerst, Sandrine Ricote, Colin A Wolden and J Douglas Way) Readership: Graduate students and professionals in the field of membranes, gas separations and chemical engineering. Membranes; Gas Separations; Zeolites; Polymers; Metals Key Features: Covers diverse industrially relevant gas separations Illustrates different membrane compositions Chapters devoted to both experimental and modelling studies

Stimuli Responsive Polymeric Membranes May 28 2022 Stimuli Responsive Polymeric Membranes: Smart Polymeric Membranes explains the fundamentals and advances in topics relating to the field of membrane science. It elaborately explains concepts relating to stimuli responsive membranes, with special importance given down to minute details. Material selection, preparation, characterization and applications of various stimuli responsive membranes are extensively addressed, and their relevance (including examples) is included. The book covers history and development, merits and demerits, mechanisms of transport and fouling, applicability of membranes to various diverse areas, and preparation and characterization techniques of membranes. Next, the concept of fouling and its remedial actions is discussed. Finally, promising fields of research in the membrane science and future perspectives of membrane science field are explored. Provides basic and advanced knowledge of smart membranes, considering their morphological, physicochemical and separation characteristics Written in a clear and lucid style, keeping a diverse audience in mind Based on the state-of-art research of the authors

Molecular Assembly of Biomimetic Systems Nov 21 2021 This handy reference details state-of-the-art preparation of molecular assemblies of biotechnologically relevant biomimetic systems (artificial proteins, peptides, molecular motors, photosensitive systems) with an emphasis on biomimetic membranes, capsules, and interfaces. Medical applications such as drug release, gene therapy, and tissue engineering as well as biosensing, biocatalysis, and energy storage are highlighted.

Nanobiotechnology of Biomimetic Membranes Oct 01 2022 This book describes the current state of research and development in biomimetic membranes for nanobiotechnology applications. It takes an international perspective on the issue of developing biotechnology applications from an understanding of the biomimetic membrane at the nanoscale. The success of these applications relies on a good understanding of the interaction and incorporation of macromolecules in membranes and the fundamental properties of the membrane itself.

Biomimetic Sensor Technology Nov 09 2020 This book deals with biomimetic sensors that can quantify taste and smell - the electronic tongue and nose. Of all sensor technologies, these have been widely considered as the most difficult to realise and the development of these sensors significantly contributes to the understanding of the reception mechanisms in gustatory and olfactory systems. The author begins by dealing with the basic principles of measurement and multivariate analysis. Reception mechanisms in biological systems are briefly reviewed. Several types of biosensor, including enzyme-immobilized membranes, SPR, the quartz resonance oscillator and IC technologies are explained in detail. This book is the first to focus on artificial taste and smell sensors and also reviews conventional biosensors, such as enzyme sensors, in detail.

Fundamentals of Nanoparticles Feb 10 2021 Fundamentals of Nanoparticles: Classifications, Synthesis Methods, Properties and Characterization explores the nanoparticles and architecture of nanostructured materials being used today in a comprehensive, detailed manner. This book focuses primarily on the characterization, properties and synthesis of nanoscale materials, and is divided into three major parts. This is a valuable reference for materials scientists, and chemical and mechanical engineers working in R&D and academia, who want to learn more about how nanoparticles and nanomaterials are characterized and engineered. Part one covers nanoparticles formation, self-assembly in the architecture nanostructures, types and classifications of nanoparticles, and signature physical and chemical properties, toxicity and regulations. Part two presents different ways to form nanometer particles, including bottom-up and top-down approaches, the classical and non-classical theories of nanoparticles formation and self-assembly, surface functionalization and other surface treatments to allow practical use. Part three covers characterization of nanoparticles and nanostructured materials, including the determination of size and shape, in addition to atomic and electronic structures and other important properties. Includes new physical and chemical techniques for the synthesis of nanoparticles and architecture nanostructures Features an in-depth treatment of nanoparticles and nanostructures, including their characterization and chemical and physical properties Explores the unusual properties of materials that are developed by modifying their shape and composition and by manipulating the arrangement of atoms and molecules Explains important techniques for the synthesis, fabrication and the characterization of complex nano-architectures