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Reverse Osmosis Elsevier

Electrospun and Nanofibrous Membranes: Principles and Applications covers the fundamental basic science and many engineering aspects of electrospun membrane technology and nanofibers, membrane design and membrane processes. The book comprehensively reviews a wide range of applications including pressure-driven processes, MD process, batteries, oil-water separation, air filtration, drug delivery, fuel-cells, and ion-exchange membranes, as well as antimicrobial membranes. Electrospun and Nanofibrous Membranes will be useful for a range of audiences: chemical, polymer, and materials engineers; professors and graduate students working on membrane-based separation technology and electrospun nanofibers; as well as R&D engineers in industry working with applications including water and wastewater treatment, desalination, drug delivery and tissue engineering, new generation of batteries, fuel cells, and air filtration. Introduces the principles of electrospinning and electrospun membranes Reviews and evaluates the different configurations of electrospinning Discusses scale-up strategies for nanofiber production

Nanofiltration Membranes Elsevier

Separation of Functional Molecules in Food by Membrane Technology deals with an issue that is becoming a new research trend in the field of food and bioproducts processing. The book fills in the gap of transfer knowledge between academia and industry by highlighting membrane techniques and applications for the separation of food components in bioresources, discussing separation mechanisms, balancing advantages and disadvantages, and providing relevant applications. Edited by Charis Galanakis, the book is divided in 13 chapters written by experts from the meat science, food technology and engineering industries. Covers the 13 most relevant topics of functional macro and micro molecules separation using membrane technology in the food industry Brings the most recent advances in the field of membrane processing Presents the sustainability principles of the food industry and the modern bioeconomy frame of our times

Forward Osmosis Elsevier Offers a comprehensive overview of membrane science and technology from a single source Written by a renowned author with more than 40 years' experience in membrane science and technology, and polymer science Covers all major current applications of membrane technology in two definitive volumes Includes academic analyses, applications and practical problems for each existing membrane technology Includes novel applications such as membrane reactors, hybrid systems and optical resolution as well as membrane fuel cells

Handbook of Membrane Separations John Wiley & Sons

Membranes processing techniques are used to help separate chemical components based on molecular size under specific pressure. A great advantage of membrane processing techniques is that it is a non-thermal processing technique, which can retain enormous bioactive constituents to a greater extent. Being a less energy intensive process, this technique is widely used in several food processing industries such as in the clarification of fruit juices and wine; the concentration of milk; the preparation of whey protein concentrate; and water and waste treatment, among others. Applications of Membrane Technology for Food Processing Industries introduces membrane processing techniques, presenting principles, theory and operational conditions for achieving efficient quality product. It discusses different types of membrane processing techniques viz. reverse osmosis, nanofiltration, ultrafiltration, electro dialysis, microfiltration, pervaporation, including its applications, advantages and disadvantages. Key Features: Deals with the retention of antioxidants by using novel membrane processing techniques Includes the application of membrane processing techniques in whey processing Explains the method for degumming, dewaxing and decolorization of edible crude oils Narrates application of membrane processing techniques in waste water treatment for efficient use Readers, such as professors, scientist, research scholars, students and industrial personnel, will come to know about the current trends in use of membrane processing techniques for its application in several food processing industries. This book can be a ready reference for the food industrial industry for manufacturing of deacidified clarified fruit juices and wine by using integrated membrane technique approach. In a nutshell, this book will benefit food scientist,

academicians, students and food industrial persons by providing in-depth knowledge about membrane processing of foods for quality retention and also for efficient consumer acceptability.

Molecular Dynamics Simulation American Water Works Association

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.

Advancement in Polymer-Based Membranes for Water Remediation John Wiley & Sons

This book explains the processes of membrane technologies applications, used in the treatment of water sources and by medical professionals for kidney dialysis, and is a helpful research tool for engineers, scientists, administrators, and educators seeking an introduction to these processes. Covers history and theory, design and equipment, regulations, and more.

Advanced Membrane Technology and Applications BoD - Books on Demand

Nanotechnology in Water and Waste Water Treatment: Theory and Applications explores the unique physicochemical and surface properties of nanoparticles and highlights the advantages they provide for engineering applications. Applications covered include the generation of fresh water from surface water and seawater, the prevention of the contamination of the environment, and the creation of effective and efficient methods for remediation of polluted waters. Each chapter covers a different nanotechnology-based approach and examines the basic principles, practical applications, recent breakthroughs and associated limitations. This book is ideal for researchers and professionals in the fields of nanotechnology, water treatment and desalination. In addition, it is also ideal for postgraduate students, industry and government professionals, managers and policymakers. Gathers together the latest research and developments in the field from journal articles and conference proceedings Discusses and evaluates the most economical and low cost treatment technologies Presents information from related fields on the applicability, strengths and weaknesses of particular nanomaterials in key applications, thus allowing for the continuation and expansion of research in a range of fields

Water Treatment Membrane Processes Amer Water Works Assn

Handbook of Nanomaterials for Wastewater Treatment: Fundamentals and Scale up Issues provides coverage of the nanomaterials used for wastewater treatment, covering photocatalytic nanocomposite materials, nanomaterials used as adsorbents, water remediation processes, and their current status and challenges. The book explores the major applications of nanomaterials for effective catalysis and adsorption, also providing in-depth information on the properties and application of new advanced nanomaterials for wastewater treatment processes. This is an important reference source for researchers who need to solve basic and advanced problems relating to the use of nanomaterials for the development of wastewater treatment processes and technologies. As nanotechnology has the potential to substantially improve current water and wastewater treatment processes, the synthesis methods and physicochemical properties of nanomaterials and noble metal nanoparticles make their performance and mechanisms efficient for the treatment of various pollutants. Explains the properties of the most commonly used nanomaterials used for wastewater treatment Describes the major nanoscale synthesis and processing techniques for wastewater treatment Assesses the major challenges for using nanomaterials on a mass scale for wastewater treatment

Theory and Practice of Water and Wastewater Treatment Elsevier

Membranes play a crucial role in ensuring the optimum use and recovery of materials in manufacturing. In the process industries, they are required for efficient production and minimization of environmental impact. They are also essential for the efficient production of clean water, a significant global issue. Membrane

Fabrication brings together ex

Advances In Water Desalination Technologies John Wiley & Sons

Molecular Dynamic Simulation: Fundamentals and Applications

explains the basic principles of MD simulation and explores its recent developments and roles in advanced modeling approaches. The implementation of MD simulation and its application to various aspects of materials science and engineering including mechanical, thermal, mass transportation, and physical/chemical reaction problems are illustrated.

Innovative modeling techniques that apply MD to explore the mechanics of typical nanomaterials and nanostructures and to characterize crystalline, amorphous, and liquid systems are also presented. The rich research experience of the authors in MD simulation will ensure that the readers are provided with both an in-depth understanding of MD simulation and clear technical guidance. Provides a comprehensive overview of the underlying theories of molecular dynamics (MD) simulation Presents application-based examples pertaining to a broad range of mechanical, thermal, and mass transport problems Explores innovative modeling techniques for simulating typical nanomaterials and nanostructures and for characterizing crystalline, amorphous, and liquid systems

Separation and Purification Technologies in Biorefineries John Wiley & Sons

Covering fabrication, characterization, and applications nanofiltration (NF) membranes, this book provides a comprehensive overview of the development of NF membrane technology over the past decade. It uniquely covers a variety of fabrication techniques, comparing the procedures of each technique to produce polymeric membranes of different morphologies. The book also discusses advances in the materials used in thin film composite (TFC) polyamide membrane fabrication and their influences on properties with respect to structural and separation characteristics. A comprehensive review on NF characterization methods and techniques is provided, assessing physical and chemical properties and separation characteristics and stability. Technical challenges in fabricating a new generation of NF membranes are also reviewed and the possible approaches to overcome the challenges are provided. The book concludes with relevant case studies on the use of NF membranes in industrial implementation of both aqueous and nonaqueous media. Details the latest progress on the fabrication techniques of asymmetric and composite NF membranes. Discusses characterization methods used in assessing membrane physical/chemical properties, separation characteristics, and performance stability. Describes the potential of advanced materials in improving properties of polyamide selective layer as well as microporous substrate. Reviews the technical challenges in fabricating a new generation of composite membrane—thin film nanocomposite (TFN) membrane—possible approaches to overcome challenges. Offers case studies on the applications of NF membranes for both aqueous and nonaqueous media.

Reverse Osmosis and Nanofiltration John Wiley & Sons

Provides an excellent balance between theory and applications in the ever-evolving field of water and wastewater treatment Completely updated and expanded, this is the most current and comprehensive textbook available for the areas of water and wastewater treatment, covering the broad spectrum of technologies used in practice today—ranging from commonly used standards to the latest state of the art innovations. The book begins with the fundamentals—applied water chemistry and applied microbiology—and then goes on to cover physical, chemical, and biological unit processes. Both theory and design concepts are developed systematically, combined in a unified way, and are fully supported by comprehensive, illustrative examples. Theory and Practice of Water and Wastewater Treatment, 2nd Edition: Addresses physical/chemical treatment, as well as biological treatment, of water and wastewater Includes a discussion of new technologies, such as membrane processes for water and wastewater treatment, fixed-film biotreatment, and advanced oxidation Provides detailed coverage of the fundamentals: basic applied water chemistry and applied microbiology Fully updates chapters on analysis and constituents in water; microbiology; and disinfection Develops theory and design concepts methodically and combines them in a cohesive manner Includes a new chapter on life cycle analysis (LCA) Theory and Practice of Water and Wastewater Treatment, 2nd Edition is an important text for undergraduate and graduate level courses in water and/or wastewater treatment in Civil, Environmental, and Chemical Engineering.

60 Years of the Loeb-Sourirajan Membrane BoD - Books on Demand

Osmosis Engineering provides a comprehensive overview of the state-of-the-art surrounding osmosis-based research and

industrial applications. The book covers the underpinning theories, technology developments and commercial applications. Sections discuss innovative and advanced membranes and modules for osmosis separation processes (e.g., reverse osmosis, forward osmosis, pressure retarded osmosis, osmotic membrane distillation), different application of these osmosis separation processes for energy and water separation, such as the treatment of radioactive waste, oily wastewater and heavy metal removal, draw solutions, pretreatment technologies, fouling effects, the use of renewable energy driven osmotic processes, computational, environmental and economic studies, and more. Covers state-of-the-art osmotic engineering technologies and applications Presents multidisciplinary topics in engineered osmosis, including both fundamental and applied EO concepts Includes major challenges such as fouling mitigation, membrane development, pre-treatment and energy usage

An Introduction to Engineering of Water Supply Systems
CRC Press

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.

Nanotechnology in Water and Wastewater Treatment CRC Press
Membrane Separation Principles and Applications: From Material Selection to Mechanisms and Industrial Uses, the latest volume in the Handbooks in Separation Science series, is the first single resource to explore all aspects of this rapidly growing area of study. Membrane technology is now accepted as one of the most effective tools for separation and purification, primarily due to its simple operation. The result has been a proliferation of studies on this topic; however, the relationships between fundamental knowledge and applications are rarely discussed. This book acts as a guideline for those who are interested in exploring membranes at a more progressive level. Covering methods of

pressure driving force, partial pressure driving force, concentration driving force, electrical potential driving force, hybrid processes, and more, this volume is more complete than any other known resource on membrane separations. Covers membrane material selection, membrane fabrication, membrane characterization, separation mechanisms and applications in each chapter Authored by contributors who are internationally recognized as experts in their respective fields Organized by the driving force behind each type of membrane separation—a unique approach that more clearly links fundamental principles with their dominant applications

Membrane Fabrication CRC Press

A response to increasingly stringent regulation of pollution and toxicity levels in industrial waste discharge, *Micellar Enhanced Ultrafiltration: Fundamentals & Applications* offers the most complete book available on the benefits and use of micellar-enhanced ultrafiltration (MEUF) to achieve continuous removal of organic and inorganic pollutants. An Unparalleled Book That Addresses Both Academic and Industrial Points of View Several membrane-based techniques, such as microfiltration, ultrafiltration, nanofiltration, and reverse osmosis, are currently used in a wide range of applications throughout the textile, pulp and paper, sugar, chemical, pharmaceutical, biomedical, biotechnological, and food industries. However, although reverse osmosis is an effective means of removing contaminants, this book explains why MEUF is a better substitute, as it is less expensive, less energy-intensive, and more efficient and practical for a wider range of applications. Topics covered include: Effects of pollution in water and its consequences Various treatment processes and membrane technologies Fundamentals of ultrafiltration Outline of various membrane modules and modeling approaches Principles of colloid chemistry Theories of micelle formation Stability and dynamics of micelles Phenomena of counterion binding Solubilization of organic pollutants Selection criteria for surfactants Various flux enhancement techniques Recovery of precious metals This book conveys how, with proper selection of surfactant and membrane, MEUF can be used to efficiently remove almost all metal ions (heavy metals, lanthanides, radioactive materials, etc.) with reasonably high efficiency and throughput. It also details the MEUF process for removal of inorganic (cations, anions, and their mixture) and organic pollutants. The authors explain how the economy of the overall process makes recovery and reuse of surfactants essential, and they address various influencing factors on the increase in throughput and the resulting operating problems. Elaborating on technologies involving precipitation and other methods, they also illustrate additional potential applications for MEUF technology.

Applications of Membrane Technology for Food Processing Industries World Scientific

Membrane Separation Processes: Theories, Problems, and Solutions provides graduate and senior undergraduate students and membrane researchers in academia and industry with the fundamental knowledge on the topic by explaining the underlying theory that is indispensable for solving problems that occur in membrane separation processes. All major membrane processes are discussed, and an economic analysis is provided. Separation processes such as RO, UF, MF, RO, PRO and MD are thoroughly

discussed. During the last two decades, the scope of the R&D of membrane separation processes has been significantly broadened. Other sections in the book cover membrane contactor and membrane adsorption. In addition, hybrid systems in which two or more membrane systems are combined are now being investigated for large-scale applications. Written by renowned experts with extensive experience with industry, education and R&D who have complementary expertise In-depth coverage of the most important conventional and emerging membrane processes Provides fundamental membrane theories for solving problems in separation processes without using complicated software **Handbook of Nanomaterials for Wastewater Treatment** Elsevier
The Handbook of Membrane Separations: Chemical, Pharmaceutical, Food, and Biotechnological Applications, Second Edition provides detailed information on membrane separation technologies from an international team of experts. The handbook fills an important gap in the current literature by providing a comprehensive discussion of membrane application **An Introduction to Water Supply Systems** CRC Press
The 2nd volume on applications with discuss the various aspects of state-of-the-art, new challenges and opportunities for gas and vapor separation of polymer membranes, membranes for wastewater treatment, polymer electrolyte membranes and methanol fuel cells, polymer membranes for water desalination, optical, electrochemical and anion/polyanion sensors, polymeric pervaporation membranes, organic-organic separation, biopolymer electrolytes for energy devices, carbon nanoparticles for pervaporation polymeric membranes, and mixed matrix membranes for nanofiltration application. **Micellar Enhanced Ultrafiltration** Elsevier
Advanced membranes-from fundamentals and membrane chemistry to manufacturing and applications A hands-on reference for practicing professionals, **Advanced Membrane Technology and Applications** covers the fundamental principles and theories of separation and purification by membranes, the important membrane processes and systems, and major industrial applications. It goes far beyond the basics to address the formulation and industrial manufacture of membranes and applications. This practical guide: Includes coverage of all the major types of membranes: ultrafiltration; microfiltration; nanofiltration; reverse osmosis (including the recent high-flux and low-pressure membranes and anti-fouling membranes); membranes for gas separations; and membranes for fuel cell uses Addresses six major topics: membranes and applications in water and wastewater; membranes for biotechnology and chemical/biomedical applications; gas separations; membrane contractors and reactors; environmental and energy applications; and membrane materials and characterization Includes discussions of important strategic issues and the future of membrane technology With chapters contributed by leading experts in their specific areas and a practical focus, this is the definitive reference for professionals in industrial manufacturing and separations and research and development; practitioners in the manufacture and applications of membranes; scientists in water treatment, pharmaceutical, food, and fuel cell processing industries; process engineers; and others. It is also an excellent resource for researchers in industry and academia and graduate students taking courses in separations and membranes and related fields.