

Nano And Micro Engineered Membrane Technology Volume 10 Membrane Science And Technology V 10

Nano and Micro Engineered Membrane Technology Micro Process Engineering, 3 Volume Set Comprehensive Membrane Science and Engineering Membrane and Membrane Reactors Operations in Chemical Engineering The 15th International Conference on Biomedical Engineering Integrated Membrane Systems and Processes Engineering Aspects of Food Emulsification and Homogenization Nanotechnology in the Food, Beverage and Nutraceutical Industries Advanced Membrane Science and Technology for Sustainable Energy and Environmental Applications Membrane Processes in Biotechnology and Pharmaceuticals Micro Electronic and Mechanical Systems Membrane Technologies and Applications Hollow Fiber Membrane Contactors Microfluidics-Enabled Soft Manufacture Membrane Contactors: Fundamentals, Applications and Potentialities Membranes for Food Applications Nanoemulsions Membrane Engineering in the Circular Economy Inorganic Membranes: Synthesis, Characterization and Applications Polymer Membranes In Biotechnology: Preparation, Functionalization And Application Food Materials Science Membrane Distillation Innovation in agri-food systems Electrospun and Nanofibrous Membranes Chemical Micro Process Engineering Membrane Characterization Membrane Technology and Applications Computational Finite Element Methods in Nanotechnology Nanofabrication Membrane Systems Emulsions Advanced Membrane Technology and Applications Sustainable Industrial Chemistry Emerging Technologies for Nanoparticle Manufacturing Membrane Fabrication Materials, Transportation and Environmental Engineering II Microscale Technologies for Cell Engineering Advances in Bionic Engineering Advances in Chemical, Material and Metallurgical Engineering World Congress of Medical Physics and Biomedical Engineering 2006

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Micro Electronic and Mechanical Systems Feb 17 2022 This book discusses key aspects of MEMS technology areas, organized in twenty-seven chapters that present the latest research developments in micro electronic and mechanical systems. The book addresses a wide range of fundamental and practical issues related to MEMS, advanced metal-oxide-semiconductor (MOS) and complementary MOS (CMOS) devices, SoC technology, integrated circuit testing and verification, and other important topics in the field. Several chapters cover state-of-the-art microfabrication techniques and materials as enabling technologies for the microsystems. Reliability issues concerning both electronic and mechanical aspects of these devices and systems are also addressed in various chapters.

Nanotechnology in the Food, Beverage and Nutraceutical Industries May 20 2022 Nanotechnology has the potential to impact on food processing significantly. This important book summarises current research in this area and provides an overview of both current and possible future applications of nanotechnologies in the food industry. Issues such as safety and regulation are also addressed. After an introductory overview, the first part discusses general issues such as risk assessment, the regulatory framework, detection and characterisation of nanoparticles in food. Part two summarises the wide range of applications of nanotechnology in food processing, including nanoscale nutraceutical delivery systems, nanoemulsions and colloids, nanoscale rapid detection devices for contaminants, nanofiltration and nanocomposite packaging materials. With its distinguished editor and international team of contributors, Nanotechnology in the food, beverage and nutraceutical industries is a valuable reference work for both food processors and those researching this expanding field. Discusses issues such as risk assessment, regulatory framework, detection and characterisation of nanoparticles in food Summarises the wide range of applications of nanotechnology in food processing, including nutraceutical delivery and packaging materials Written by a distinguished team of international contributors, this book is an invaluable reference for industry professionals and academics alike

Advances in Chemical, Material and Metallurgical Engineering Sep 19 2019 Volume is indexed by Thomson Reuters CPCI-S (WoS). The 5 volumes set contains selected, peer reviewed papers from the 2012 2nd International Conference on Chemical, Material and Metallurgical Engineering (ICCMME 2012), December 15-16, 2012, Kunming, P.R. of China. The ICCMME series provide the most up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of Chemical Engineering, Chemistry, Materials and Materials Processing and Metallurgical Engineering. The meeting provided an opportunity to highlight recent developments and to identify emerging and future areas of growth in these exciting fields.

Nanoemulsions Aug 11 2021 Nanoemulsions: Formulation, Applications, and

Characterization provides detailed information on the production, application and characterization of food nanoemulsion as presented by experts who share a wealth of experience. Those involved in the nutraceutical, pharmaceutical and cosmetic industries will find this a useful reference as it addresses findings related to different preparation and formulation methods of nanoemulsions and their application in different fields and products. As the last decade has seen a major shift from conventional emulsification processes towards nanoemulsions that both increase the efficiency and stability of emulsions and improve targeted drug and nutraceutical delivery, this book is a timely resource. Summarizes general aspects of food nanoemulsions and their formulation Provides detailed information on the production, application, and characterization of food nanoemulsion Reveals the potential of nanoemulsions, as well as their novel applications in functional foods, nutraceutical products, delivery systems, and cosmetic formulations Explains preparation of nanoemulsions by both low- and high-energy methods *Food Materials Science* Apr 07 2021 Foods are ingested and become part of our body. This book describes the science and procedure behind the materials in foods that impart their desirable properties. The book can serve as a text in a course in food materials science at the senior or graduate level or as a supplemental text in an advanced food technology course. It can also serve as a reference book for professionals in the food industry.

Microfluidics-Enabled Soft Manufacture Nov 14 2021 This book covers state-of-the-art development in microfluidics-enabled soft manufacturing (MESM), ranging from fundamentals to applications. The book addresses the long-standing challenge in the manufacture of simultaneously achieving both precise control over nano-/micro-scale structures and large-scale fabrication of materials for pragmatic use, with microfluidics-enabled soft manufacture to fill the gap between the widely-varied length scales involved. It offers a comprehensive insight into the microfluidic generation of fluid systems as liquid templates, such as droplets, bubbles, jets, emulsions, and foams, which are categorized into individual templates, one-dimensional arrays, and two-/three-dimensional assemblies for the modular fabrication of microparticles, microfibers, and porous materials, respectively. MESM enriches the compositional and structural diversity of engineered materials for well-tailored properties and functionalities, markedly broadening the application horizons across interdisciplinary fields, including engineering, environment, physics, chemistry, biology, and medicine. This book aims to systematize this emerging yet versatile and powerful technology, with the hope of aiding the realization of its full potential. *Microfluidics-Enabled Soft Manufacture* will be an invaluable reference for graduate students, postgraduates, researchers, and practitioners/professionals working in micro and nanofabrication, materials science, surface science, fluid dynamics, and engineering. The first book to cover the concept of microfluidics-enabled soft manufacture as a platform for materials fabrication; Covers physical mechanisms and advanced techniques for precision generation of various microfluidics-based fluid systems; Offers cutting-edge techniques in functionalizing materials with tailored properties for interdisciplinary applications.

Nanofabrication Jul 30 2020

Nano and Micro Engineered Membrane Technology Dec 27 2022 Nano and Micro

Engineered Membrane Technology is about Nano and micro engineered membrane technology, an emerging new technological area in membrane technology. Potential applications cover a broad spectrum of science, such as micro and nano filtration, gas separation, optics and nanophotonics, catalysis, microbiology, controlled drug delivery, nanopatterning, micro contact printing, atomisation, cross flow emulsification, etc. A brief overview of filtration membranes and pore structures is presented in chapter 1 and in the subsequent chapter 2 an overview is presented of conventional micro perforation methods, like laser drilling, electroforming, precision etching etc. With micro engineering techniques (chapter 3), originating from the semiconductor industry, it is relatively easy to downscale and form submicron pores (down to 100 nm) using photolithographic methods, with e.g. contact masks and wafer steppers. In chapter 4 some elementary fluid mechanics related to fluid flow in conducts and single and multiple orifices is presented covering analytical methods as well as computational fluid dynamics. Much effort has been put in strength and maximum pressure load analysis (chapter 5) of perforated and unperforated membranes. New analytical expressions were obtained that were verified by a number of computer simulations and many experiments. A separate chapter (chapter 6) has been devoted to the pioneering work of manufacturing polymeric perforated membranes because of its potential future economical impact. Large scale microfiltration applications on e.g. skim milk and lager beer are presented in chapter 7, whereas in chapter 8 a micro scale Lab-on-a-Chip microfiltration/fractionation demonstrator is discussed. Nanotechnology and nano engineered membranes is the fascinating topic of chapter 9, with typical examples as nanopatterning, nanophotonics and nanomembrane technology. This book closes with novel pioneering applications on atomization (chapter 10) for deep pulmonary inhale and cross flow emulsification (chapter 11) for the manufacturing of e.g. functional foods and nano/micro emulsions. Overview on the implementation of nano and micro engineering techniques in membrane science; which is an upcoming new cross-road technology Demonstration of feasibility with respect to micro and nano filtration, gas separation, photonic structures, catalysis, microbiology, controlled drug delivery, nanopatterning, micro contact printing, atomisation and emulsification techniques Informative introductions with rules of thumb for fluid flow in micro channels, pressure strength of thin supported perforated and unperforated membranes, silicon micro machining techniques, membrane filtration technology, Rayleigh breakup and cross-flow emulsification

Membrane Fabrication Jan 24 2020 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

Sustainable Industrial Chemistry Mar 26 2020 In recent years the need for sustainable process design and alternative reaction routes to reduce industry's impact on the environment has gained vital importance. The book begins with a general overview of new trends in designing industrial chemical processes which are environmentally friendly and economically feasible. Specific examples written by experts from industry cover the possibilities of running industrial chemical processes in a sustainable manner and provide

an up-to-date insight into the main concerns, e.g., the use of renewable raw materials, the use of alternative energy sources in chemical processes, the design of intrinsically safe processes, microreactor and integrated reaction/ separation technologies, process intensification, waste reduction, new catalytic routes and/or solvent and process optimization.

Integrated Membrane Systems and Processes Jul 22 2022 The book examines the possibility of integrating different membrane unit operations (microfiltration, ultrafiltration, nanofiltration, reverse osmosis, electro dialysis and gas separation) in the same industrial cycle or in combination with conventional separation systems. It gives careful analysis of the technical aspects, and the possible fields of industrial development. The book reviews many original solutions in water desalination, agro-food productions and wastewater treatments, highlighting the advantages achievable in terms of product quality, compactness, rationalization and optimization of productive cycles, reduction of environmental impact and energy saving. Also included are examples of membrane reactors and their integration with a fuel cell; polymeric membranes in the integrated gasification combined cycle power plants; integrating a membrane reformer into a solar system; and potential application of membrane integrated systems in the fusion reactor fuel cycle. With detailed analysis and broad coverage, the book is divided into two sections: Bio-applications and Inorganic Applications.

Innovation in agri-food systems Feb 05 2021 This is a fully rewritten and extended version of the successful first edition of a textbook which focuses on consumer-driven food product innovation using a systems-oriented approach. It integrates marketing and consumer sciences with technological aspects such as processing, logistics and information technology, and presents an integrated view of how new food product development is to be situated in a chain-oriented approach. Attention is also paid to the impact of changes in the environment of the agri-food system on food innovation, such as the changing consumer, the growing concern about food safety and new insights in human nutrition. Topics covered include changing markets, consumer perception of product quality, quality function deployment, the use of new and improved technology in food production, logistics and information technology, the role of regulation and legislation, quality management and control systems such as HACCP and TQM. The chapters of the first edition have been updated and extended. New chapters have been added, on consumer behaviour, corporate strategy, food safety and nutritional aspects of food innovation. Researchers and professionals in the food industry as well as students of food science, food technology and management will find this publication provides valuable information on the latest developments in the product innovation by agri-food systems.

Chemical Micro Process Engineering Dec 03 2020 A MULTI-FACETED, HIERARCHIC ANALYSIS OF CHEMICAL MICRO PROCESS TECHNOLOGY
Micro Reactor Differentiation and Process Intensification Consequences of Chemical Micro Processing Physical and Chemical Implications Impact on Chemical Engineering Impact on Process Engineering Impact on Process Results Impact on Society and Ecology Impact on Economy Application Fields and Markets of Micro Reactors MODELLING AND SIMULATION OF MICRO REACTORS Flow Phenomena on the Microscale

Methods of Computational Fluid Dynamics Flow Distributions Heat Transfer Mass Transfer and Mixing Reaction Kinetics and Modelling Free Surface Flow Flow in Porous Media GAS-PHASE REACTIONS Catalyst Coatings in Micro Channels Micro Reactors for Gas-Phase Reactions Oxidations Hydrogenations Dehydrogenations Substitutions Eliminations Additions and Coupling Reactions LIQUID- AND LIQUID/LIQUID-PHASE REACTIONS Micro Reactors for Liquid-Phase and Liquid/Liquid-Phase Reactions Aliphatic Nucleophilic and Electrophilic Substitution such as Esterification, Acylation of Amines, Thiocyanation, and much more Aromatic Electrophilic and Nucleophilic Substitution such as Nitrations, Amino-de-halogenations, Diazo Chemistry, and much more Metal-catalysed Aromatic Substitution such as Suzuki and Sonogashira Couplings, and more Free Radical Substitution such as Alkane Nitration Addition to Carbon-Carbon and Carbon-hetero Multiple Bonds such as the Michael Addition, the Diels-Alder-Reaction, the Aldol Reaction, and much more Oxidations and Reductions Eliminations and Rearrangements Inorganic Reactions such as the Belousov-Zhabotinskii-Reaction, Complex Formations, and much more GAS/LIQUID CONTACTING Micro Reactors for Gas/Liquid Contacting Aromatic Electrophilic Substitution such as Direct Fluorinations Free Radical Substitution such as Alkane Fluorinations and Chlorinations Addition to Carbon-Carbon and Carbon-hetero Multiple Bonds such as Nitro-group Hydrogenation, Cycloalkane Hydrogenation, and more Oxidations and Reductions such as Alcohol Oxidation, Photo Diels-Alder Reactions, and more Inorganic Reactions such as Sulfite Oxidation.

Membrane Technologies and Applications Jan 16 2022 Membrane technologies play an increasingly important role in unit operations for resource recovery, pollution prevention, and energy production, as well as environmental monitoring and quality control. They are also key component technologies of fuel cells and bioseparation applications. Membrane Technologies and Applications provides essential data and background information on various dimensions of membrane technologies, with a major focus on their practical application. Membranes of inorganic materials offer cost-effective solutions for simple to complex separation problems. This book is designed for anyone interested in water and wastewater treatment, membrane suppliers, as well as students and academics studying the field.

Computational Finite Element Methods in Nanotechnology Aug 31 2020 Computational Finite Element Methods in Nanotechnology demonstrates the capabilities of finite element methods in nanotechnology for a range of fields. Bringing together contributions from researchers around the world, it covers key concepts as well as cutting-edge research and applications to inspire new developments and future interdisciplinary research. In particular, it emphasizes the importance of finite element methods (FEMs) for computational tools in the development of efficient nanoscale systems. The book explores a variety of topics, including: A novel FE-based thermo-electrical-mechanical-coupled model to study mechanical stress, temperature, and electric fields in nano- and microelectronics The integration of distributed element, lumped element, and system-level methods for the design, modeling, and simulation of nano- and micro-electromechanical systems (N/MEMS) Challenges in the simulation of nanorobotic systems and macro-dimensions The simulation of structures and processes such as

dislocations, growth of epitaxial films, and precipitation Modeling of self-positioning nanostructures, nanocomposites, and carbon nanotubes and their composites Progress in using FEM to analyze the electric field formed in needleless electrospinning How molecular dynamic (MD) simulations can be integrated into the FEM Applications of finite element analysis in nanomaterials and systems used in medicine, dentistry, biotechnology, and other areas The book includes numerous examples and case studies, as well as recent applications of microscale and nanoscale modeling systems with FEMs using COMSOL Multiphysics® and MATLAB®. A one-stop reference for professionals, researchers, and students, this is also an accessible introduction to computational FEMs in nanotechnology for those new to the field.

Membranes for Food Applications Sep 12 2021 Edited by an internationally recognized leader in the field, this third volume in the series represents the complete reference to membrane processes in the food industry. The handbook adopts a highly practical approach to this hot topic, combining the hands-on experience of the expert authors involved. They provide chapters devoted to such varied applications as dairy fractionation, electrodialysis, pressure-driven membrane processes in alcoholic beverages, membrane emulsification, contactors and bioreactors, as well as membranes for food packaging.

Membrane Systems Jun 28 2020 Membrane processes today play a significant role in the replacement therapy for acute and chronic organ failure diseases. Current extracorporeal blood purification and oxygenation devices employ membranes acting as selective barriers for the removal of endogenous and exogenous toxins and for gas exchange, respectively. Additionally, membrane technology offers new interesting opportunities for the design of bioartificial livers, pancreas, kidneys, lungs etc. This book reviews the latest developments in membrane systems for bioartificial organs and regenerative medicine, investigates how membrane technology can improve the quality and efficiency of biomedical devices, and highlights the design procedures for membrane materials covering the preparation, characterization, and sterilization steps as well as transport phenomena. The different strategies pursued for the development of membrane bioartificial organs, including crucial issues related to blood/cell-membrane interactions are described with the aim of opening new and exciting frontiers in the coming decades. The book is a valuable tool for tissue engineers, clinicians, biomaterials scientists, membranologists as well as biologists and biotechnologists. It is also a source of reference for students, academic and industrial researchers in the topic of biotechnology, biomedical engineering, materials science and medicine.

The 15th International Conference on Biomedical Engineering Aug 23 2022 This volume presents the processing of the 15th ICMBE held from 4th to 7th December 2013, Singapore. Biomedical engineering is applied in most aspects of our healthcare ecosystem. From electronic health records to diagnostic tools to therapeutic, rehabilitative and regenerative treatments, the work of biomedical engineers is evident. Biomedical engineers work at the intersection of engineering, life sciences and healthcare. The engineers would use principles from applied science including mechanical, electrical, chemical and computer engineering together with physical sciences including physics, chemistry and mathematics to apply them to biology and medicine. Applying such

concepts to the human body is very much the same concepts that go into building and programming a machine. The goal is to better understand, replace or fix a target system to ultimately improve the quality of healthcare. With this understanding, the conference proceedings offer a single platform for individuals and organizations working in the biomedical engineering related field to gather and network with each other in so doing create the catalyst for future development of biomedical engineering in Asia.

World Congress of Medical Physics and Biomedical Engineering 2006 Aug 19 2019

These proceedings of the World Congress 2006, the fourteenth conference in this series, offer a strong scientific program covering a wide range of issues and challenges which are currently present in Medical physics and Biomedical Engineering. About 2,500 peer reviewed contributions are presented in a six volume book, comprising 25 tracks, joint conferences and symposia, and including invited contributions from well known researchers in this field.

Membrane Characterization Nov 02 2020 Membrane Characterization provides a valuable source of information on how membranes are characterized, an extremely limited field that is confined to only brief descriptions in various technical papers available online. For the first time, readers will be able to understand the importance of membrane characterization, the techniques required, and the fundamental theory behind them. This book focuses on characterization techniques that are normally used for membranes prepared from polymeric, ceramic, and composite materials. Features specific details on many membrane characterization techniques for various membrane materials of industrial and academic interest Contains examples of international best practice techniques for the evaluation of several membrane parameters, including pore size, charge, and fouling Discusses various membrane models more suitable to a specific application Provides examples of ab initio calculations for the design, optimization, and scale-up of processes based on characterization data

Emulsions May 28 2020 Emulsions, the third volume of the Nanotechnology in the Food Industry series, is an invaluable resource for anyone in the food industry who needs the most recent information about scientific advances in nanotechnology on this topic. This volume focuses on basic and advanced knowledge about nanoemulsion, and presents an overview of the production methods, materials (solvents, emulsifiers, and functional ingredients), and current analytical techniques that can be used for the identification and characterization of nanoemulsions. The book also discusses the applications of nanoemulsion with special emphasis on systems suitable for utilization within the food industry. This book is useful to a wide audience of food science research professionals and students who are doing research in this field, as well as others interested in recent nanotechnological progress worldwide. Presents fundamentals of nanoemulsions, methods of preparation (high-energy and low-energy techniques), and applications in the food industry Includes research studies of nanoemulsification technology to improve bioavailability of food ingredients and research analysis Offers benefits and methods of risk assessment to ensure food safety Presents cutting-edge encapsulating systems to improve the quality of functional compounds Provides a variety of methods, such as high-shear stirring, high-pressure homogenizers, self-emulsification, phase transitions and phase-inversion, to further research in this field

Membrane Distillation Mar 06 2021 Modern membrane engineering is critical to the development of process-intensification strategies and to the stimulation of industrial growth. Membrane Distillation (MD) is a broad reference that covers specific information on membranes available and methods for MD membrane preparation and characterization. The book offers an introduction to the terminology and fundamental concepts as well as a historical review of MD development. Commercial membranes used in MD as well as laboratory-made membranes, including emerging membranes, are described in detail and illustrated by a number of clear and instructive schematic drawings and images. A comprehensive review on the development of MD membranes, MD modules, MD membrane characterization, MD configurations, applications in different areas and theoretical models Introduction to the terminology and fundamental concepts associated with MD as well as an historical review of MD development Description of commercial membranes used in MD as well as laboratory-made membranes, including emerging membranes

Membrane Contactors: Fundamentals, Applications and Potentialities Oct 13 2021 Membrane Contactors: Fundamentals, Applications and Potentialities, Volume 11 covers new operations that could be efficiently used to improve the performance of a variety of industrial production cycles in applications ranging from biotechnology to agrofood. This book focuses on the basic "principles of work": required membrane materials and properties; major operating parameters; the importance of module configuration and design and; the performance of membrane contactors in specific processes. The authors' dynamic approach to this subject makes Membrane Contactors: Fundamentals, Applications and Potentialities, Volume 11 the most comprehensive book currently available on all aspects related to the 'membrane contactor world. * Describes new unit operations in process engineering * Covers a wide variety of industrial applications, from biotechnology to agrofood * Applicable to process intensification and sustainable growth strategies

Advanced Membrane Science and Technology for Sustainable Energy and Environmental Applications Apr 19 2022 Membrane materials allow for the selective separation of gas and vapour and for ion transport. Materials research and development continues to drive improvements in the design, manufacture and integration of membrane technologies as critical components in both sustainable energy and clean industry applications. Membrane utilisation offers process simplification and intensification in industry, providing low-cost, and efficient and reliable operation, and contributing towards emissions reductions and energy security. Advanced membrane science and technology for sustainable energy and environmental applications presents a comprehensive review of membrane utilisation and integration within energy and environmental industries. Part one introduces the topic of membrane science and engineering, from the fundamentals of membrane processes and separation to membrane characterization and economic analysis. Part two focuses on membrane utilisation for carbon dioxide (CO₂) capture in coal and gas power plants, including pre- and post-combustion and oxygen transport technologies. Part three reviews membranes for the petrochemical industry, with chapters covering hydrocarbon fuel, natural gas and synthesis gas processing, as well as advanced biofuels production. Part four covers membranes for alternative energy applications and energy

storage, such as membrane technology for redox and lithium batteries, fuel cells and hydrogen production. Finally, part five discusses membranes utilisation in industrial and environmental applications, including microfiltration, ultrafiltration, and forward osmosis, as well as water, wastewater and nuclear power applications. With its distinguished editors and team of expert contributors, *Advanced membrane science and technology for sustainable energy and environmental applications* is an essential reference for membrane and materials engineers and manufacturers, as well as researchers and academics interested in this field. Presents a comprehensive review of membrane science and technology, focusing on developments and applications in sustainable energy and clean-industry Discusses the fundamentals of membrane processes and separation and membrane characterization and economic analysis Addresses the key issues of membrane utilisation in coal and gas power plants and the petrochemical industry, the use of membranes for alternative energy applications and membrane utilisation in industrial and environmental applications

Membrane Processes in Biotechnology and Pharmaceuticals Mar 18 2022 Chapter 1: Principles on membrane and membrane processes -- Chapter 2: Ultrafiltration -- Chapter 3: Microfiltration -- Chapter 4: Virus Filtration -- Chapter 5: Membrane chromatography -- Chapter 6: Membranes for the Preparation of Emulsions and Particles -- Chapter 7: Other Membrane Processes -- Chapter 8: Some Perspectives.

Membrane and Membrane Reactors Operations in Chemical Engineering Sep 24 2022 This Special Issue is aimed at highlighting the potentialities of membrane and membrane reactor operations in various sectors of chemical engineering, based on application of the process intensification strategy. In all of the contributions, the principles of process intensification were pursued during the adoption of membrane technology, demonstrating how it may lead to the development of redesigned processes that are more compact and efficient while also being more environmental friendly, energy saving, and amenable to integration with other green processes. This Special Issue comprises a number of experimental and theoretical studies dealing with the application of membrane and membrane reactor technology in various scientific fields of chemical engineering, such as membrane distillation for wastewater treatment, hydrogen production from reforming reactions via inorganic membrane and membrane photoassisted reactors, membrane desalination, gas/liquid phase membrane separation of CO₂, and membrane filtration for the recovery of antioxidants from agricultural byproducts, contributing to valorization of the potentialities of membrane operations.

Inorganic Membranes: Synthesis, Characterization and Applications Jun 09 2021 The withstanding properties of inorganic membranes provide a set of tools for solving many of the problems that the society is facing, from environmental to energy problems and from water quality to more competitive industries. Such a wide variety of issues requires a fundamental approach, together with the precise description of applications provided by those researchers that have been close to the industrial applications. The contents of this book expand the lectures given in a Summer School of the European Membrane Society. They combine an easily accessible description of the technology, suitable for the graduate level, with the most advanced developments and the prospective of future applications. The large variety of membrane types makes almost compulsory to select a specialist for

each of them, and this has been the approach selected in this book. In the case of porous membranes, the advances are related to the synthesis of microporous materials such as silica, carbon and zeolite membranes and hollow fibre membranes. A chapter covers the increasingly relevant hybrid membranes. Attention is also devoted to dense inorganic membranes, experiencing constantly improved properties. The applications of all these membranes are considered throughout the book. Covers all the inorganic membranes field, by different experts It comes from a European Summer School It includes future directions in the field

Membrane Technology and Applications Oct 01 2020 Table of Contents Preface Acknowledgments for the first edition Acknowledgments for the second edition 1 Overview of Membrane Science and Technology 1 2 Membrane Transport Theory 15 3 Membranes and Modules 89 4 Concentration Polarization 161 5 Reverse Osmosis 191 6 Ultrafiltration 237 7 Microfiltration 275 8 Gas Separation 301 9 Pervaporation 355 10 Ion Exchange Membrane Processes - Electrodialysis 393 11 Carrier Facilitated Transport 425 12 Medical Applications of Membranes 465 13 Other Membrane Processes 491 Appendix 523 Index 535.

Electrospun and Nanofibrous Membranes Jan 04 2021 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 comprehensively the principles of electrospinning and electrospun membranes Reviews and evaluates the different configurations of electrospinning Discusses scale-up strategies for nanofiber production

Advanced Membrane Technology and Applications Apr 26 2020 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.

Emerging Technologies for Nanoparticle Manufacturing Feb 23 2020 This book provides an overview of nanoparticle production methods, scale-up issues drawing attention to industrial applicability, and addresses their successful applications for commercial use. There is a need for a reference book which will address various aspects of recent progress in the methods of development of nanoparticles with a focus on polymeric and lipid nanoparticles, their scale-up techniques, and challenges in their commercialization. There is no consolidated reference book that discusses the emerging technologies for nanoparticle manufacturing. This book focuses on the following major aspects of emerging technologies for nano particle manufacturing. I. Introduction and Biomedical Applications of Nanoparticles II. Polymeric Nanoparticles III. Lipid Nanoparticles IV. Metallic Nanoparticles V. Quality Control for Nanoparticles VI. Challenges in Scale-Up Production of Nanoparticles VII. Injectable Nanosystems VIII. Future Directions and Challenges Leading scientists are selected as chapter authors who have contributed significantly in this field and they focus more on emerging technologies for nanoparticle manufacturing, future directions, and challenges.

Materials, Transportation and Environmental Engineering II Dec 23 2019 Collection of selected, peer reviewed papers from the 2014 the 2nd International Conference on Materials, Transportation and Environmental Engineering (CMTEE 2014), July 30-31, 2014, Kunming, China. The 587 papers are grouped as follows: Chapter 1: Materials and Chemical Engineering and Technologies, Chapter 2: Environmental Materials, Biomaterials and Technologies, Chapter 3: Energy and Thermal Engineering, Environmental Engineering, Chapter 4: Civil and Building Engineering, Structural and Geotechnical Engineering, Applied Mechanics, Chapter 5: Research and Design of Industrial Facilities and Technologies, Chapter 6: Recent Technologies in Mechatronics, Control and Automation, Chapter 7: Communication and Information Technologies, Algorithms and Numerical Methods of Data Processing, Chapter 8: Traffic, Road and Transportation Engineering, Chapter 9: Biomedical Engineering, Chapter 10: Urban Planning, Sustainable City and Green Building Applications, Chapter 11: Management Engineering, Business and Economics Engineering, Chapter 12: New Technologies in Education and Sports

Membrane Engineering in the Circular Economy Jul 10 2021 Membrane Engineering in the Circular Economy: Renewable Sources Valorization in Energy and Downstream Processing in Agro-food Industry describes the modification of the general concept of "waste," including waste valorization as added-value products that are useful for energy production and biotechnology industries. Speaking to the relevance of this new vision, the book highlights the fundamentals of membrane operations in the exploitation of

renewable sources for energy production and the valorization of agro-food waste at the industrial level. This book is an excellent resource for researchers, biologists, membranologists and engineers in chemistry, biochemical engineering, food sciences and the agro-food refinery industry. Discusses membrane engineering for agro-food wastes' transformation into added-value products Presents circular and zero-waste economy principles pursued by membrane technology and applied to the agro-food industry Includes potentialities of agro-food wastes for renewable and energy production via membrane operations

Microscale Technologies for Cell Engineering Nov 21 2019 This book offers readers cutting-edge research at the interface of polymer science and engineering, biomedical engineering, materials science, and biology. State-of-the-art developments in microscale technologies for cell engineering applications are covered, including technologies relevant to both pluripotent and adult stem cells, the immune system, and somatic cells of the animal and human origin. This book bridges the gap in the understanding of engineering biology at multiple length scale, including microenvironmental control, bioprocessing, and tissue engineering in the areas of cardiac, cartilage, skeletal, and vascular tissues, among others. This book also discusses unique, emerging areas of micropatterning and three-dimensional printing models of cellular engineering, and contributes to the better understanding of the role of biophysical factors in determining the cell fate. *Microscale Technologies for Cell Engineering* is valuable for bioengineers, biomaterial scientists, tissue engineers, clinicians, immunoengineers, immunologists and stem cell biologists, as it offers a review of the current cutting-edge cell engineering research at multiple length scale and will be valuable in developing new strategies for efficient scale-up and clinical translation.

Hollow Fiber Membrane Contactors Dec 15 2021 This book on hollow fiber contractors presents an up-to-date compilation of the latest developments and milestones in this membrane technology. *Hollow Fiber Membrane Contactors: Module Fabrication, Design and Operation, and Potential Applications* provides a comprehensive discussion of hollow fiber membrane applications (including a few case studies) in biotechnology, chemical, food, and nuclear engineering. The chapters in this book have been classified using the following, based on different ways of contacting fluids with each other: Gas-liquid contacting; Liquid-liquid contacting; Supported liquid membrane; Supported gas membrane; Fluid-fluid contacting. Other features include: Discusses using non-dispersive solvent extraction, hollow fiber strip dispersion, hollow fiber supported liquid membranes and role of process intensification in integrated use of these processes Provides technical and economic perspectives with several case studies related to specific scenarios Demonstrates module fabrication, design, operation and maintenance of hollow fiber contactors for different applications and performance Presents discussion on newer concepts like membrane emulsification, membrane nanoprecipitation, membrane crystallization and membrane condenser Special focus on emerging areas such as the use of hollow fiber contactor in back end of nuclear fuel cycle, membrane distillation, dehumidification of air and gas absorption and stripping Discusses theoretical analysis including computational modeling of different hollow fiber membrane processes, and presents emphasis on newly developed area of hollow fiber membrane based analytical

techniques Presents discussion on upcoming area dealing with hollow fiber contactors-based technology in fermentation and enzymatic transformation and in chiral separations This book is equally suited for newcomers to the field, as well as for engineers and scientists that have basic knowledge in this field but are interested in obtaining more information about specific future applications.

Comprehensive Membrane Science and Engineering Oct 25 2022 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 contactors, 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

Polymer Membranes In Biotechnology: Preparation, Functionalization And Application May 08 2021 This book provides a concise and comprehensive introduction of polymer membranes' preparation, functionalization and applications in biotechniques including affinity membrane chromatography, membrane-based biosensor and membrane-based bioreactor. Following an introduction to the general concept of membrane separation in Chapter 1, preparation of polymeric membranes is discussed in Chapter 2. The book then describes in Chapter 3 membrane surface activation, which is a key step in ligand immobilizations. Chapter 4 focuses on ligand immobilization techniques and the organic chemistries behind them. Chapter 5 introduces the application of affinity membrane chromatography. Finally, in Chapter 6, membranes used in biosensors and gas sensors, enzymatic membranes used as biosensor, and membrane biosensor for waste water treatment will be discussed. A novel filter medium, i.e. nonwoven nanofiber membrane, and its preparation method, i.e. electrospinning technique, are also introduced in this book./a

Advances in Bionic Engineering Oct 21 2019 Collection of selected, peer reviewed papers from the 4th International Conference of Bionic Engineering (ICBE'13), August 13–16, 2013, Nanjing, China. Volume is indexed by Thomson Reuters CPCI-S (WoS).

The 131 papers are grouped as follows: Chapter 1: Bionic Structures; Chapter 2: Biomechanics; Chapter 3: Bionic Actuator; Chapter 4: Materials; Chapter 5: Agricultural, Industry Application & Engineering; Chapter 6: Biomedical Engineering; Chapter 7: Bio-Inspired Functional Surface; Chapter 8: Bio-Inspired Sensor; Chapter 9: Robotics and Artificial Intelligence; Chapter 10: Bio-Inspired Methods

Engineering Aspects of Food Emulsification and Homogenization Jun 21 2022

Emulsions are found in a wide variety of food products, pharmaceuticals, paints, and cosmetics, thus emulsification is a truly multidisciplinary phenomenon. Therefore understanding of the process must evolve from the combination of (at least) three different scientific specializations. *Engineering Aspects of Food Emulsification and Homogenization* describes the state-of-the-art technology and brings together aspects from physical chemistry, fluid mechanics, and chemical engineering. The book explores the unit operations used in emulsification and homogenization processes, using fundamental theory from different fields to discuss design and function of different emulsification techniques. This book summarizes the present understanding of the involved physical–chemical processes as well as specific information about the limits and possibilities for the different types of emulsifying equipment. It covers colloidal chemistry and engineering aspects of emulsification and discusses high-energy and low-energy emulsification methods. The chapters highlight low-energy emulsification processes such as membrane emulsification that are now industrially feasible. Dramatically more energy-efficient processes are being developed, and this book clarifies their present limitations, such as scale-up and achievable droplet sizes. The present literature on emulsification is, to a large degree, influenced by the division between physical chemistry, fluid dynamics, and chemical engineering. Written by experts drawn from academia and industry, this book brings those areas together to provide a comprehensive resource that gives a deeper understanding of emulsification and homogenization in food product development.

Micro Process Engineering, 3 Volume Set Nov 26 2022 This three-volume handbook provides an overview of the key aspects of micro process engineering. Volume 1 covers the fundamentals, operations and catalysts, volume 2 examines devices, reactions and applications, with volume 3 rounding off the trilogy with system, process and plant engineering. Fluid dynamics, mixing, heat/mass transfer, purification and separation microstructured devices and microstructured reactors are explained in the first volume. Volume 2 segments microreactor design, fabrication and assembly, bulk and fine chemistry, polymerisation, fuel processing and functional materials into understandable parts. The final volume of the handbook addresses microreactor systems design and scale-up, sensing, analysis and control, chemical process engineering, economic and eco-efficiency analyses as well as microreactor plant case studies in one book. Together, this 3-volume handbook explains the science behind micro process engineering to the scale-up and their real life industrial applications.