
Membrane Separation Processes By Kaushik Nath

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Green Sustainable Process for Chemical and Environmental Engineering and Science Springer Science & Business Media
MEMBRANE SEPARATION PROCESSESPHI Learning Pvt. Ltd.

Modeling in Membranes and Membrane-Based Processes Elsevier

The book Modeling in Membranes and Membrane-Based Processes is based on the idea of developing a reference which will cover most relevant and "state-of-the-art" approaches

in membrane modeling. This book explores almost every major aspect of modeling and the techniques applied in membrane separation studies and applications. This includes first principle-based models, thermodynamics models, computational fluid dynamics simulations, molecular dynamics simulations, and artificial intelligence-based modeling for membrane separation processes. These models have been discussed in light of various applications ranging from desalination to gas separation. In addition, this breakthrough new volume covers the fundamentals of polymer membrane pore formation mechanisms, covering not only a wide range of modeling techniques, but also has various facets of membrane-based applications. Thus, this book can be an

excellent source for a holistic perspective on membranes in general, as well as a comprehensive and valuable reference work. Whether a veteran engineer in the field or lab or a student in chemical or process engineering, this latest volume in the "Advances in Membrane Processes" is a must-have, along with the first book in the series, Membrane Processes, also available from Wiley-Scrivener.

Gaussian Processes for Machine Learning Springer Science & Business Media

This book is based on the principles, limitations, challenges, improvements and applications of nanotechnology in medical science as described in the literature. It highlights various parameters affecting the synthesis of bio-nanomaterials and exclusive techniques utilized for characterizing the nanostructures for their potential use in biomedical and environmental applications. Moreover, biodegradable synthesis of nanomaterials is regarded as an important tool to reduce the destructive effects associated with the traditional methods of synthesis for nanostructures commonly utilized in laboratory and industry and as well as academic scale of innovative research foundation.

Advances in Nanocomposite Materials for Environmental and Energy Harvesting Applications PHI Learning Pvt. Ltd.

The book is about climate resilience and environmental sustainability approaches, discussing knowledge at global level and the local challenges,

presented by authors from various countries. Environmental sustainability is at stake and implications of climate change are clearly visible in most parts of the world. In the times of the prevailing global environmental crisis, this book discusses key issues of climate change and sustainable energy alternatives, waste management and development. It discusses climate change scenario using simulation models in various Asian countries, signatures of climate change in Antarctica, implications in the Indian Ocean and the Indian scenario of REDD+. A special focus has been given on building climate resilience in our agricultural ecosystems and sustainable agriculture. It discusses the prospects and challenges of renewable energy options including biofuels and energy from wastewaters, explores the technical aspects of eco-friendly bioremediation of pollutants, sustainable solid waste management practices and challenges, carbon footprints of industry, and emphasizes on the significance of combining traditional knowledge with modern technology with novel approaches including involvement of social enterprises and corporate social responsibility to achieve the Sustainable Development Goals. This is an important document for researchers and policy makers working in multidisciplinary fields of sustainability sciences.

Production, Isolation and Purification of Industrial Products MIT Press

This book discusses one of the biggest challenges of the food industry, which is waste management. Food industries generate high amounts of waste, both solid and liquid, resulting from the production, processing and consumption of food. Stringent environmental legislators have made the task of waste management more challenging. Through the three sections of this book, the readers are introduced to the different types of wastes generated, utilization of waste through food processing industry and sustainable waste management technologies. The different chapters describe how the biomass and the valuable nutrients from food industry wastes could

be used to develop value-added products. The book reiterates that food wastes and their by-products are an excellent source of sugars, minerals, dietary fiber, organic acids, bio active compounds such as polyphenols, carotenoids and phytochemicals etc. This book is an excellent resource for industry experts, researchers and students in the field of food science, food processing and food waste management.

Expanded Hemodialysis Morgan & Claypool Publishers

The brief primarily focuses on the performance analysis of CNT based interconnects in current research scenario. Different CNT structures are modeled on the basis of transmission line theory. Performance comparison for different CNT structures illustrates that CNTs are more promising than Cu or other materials used in global VLSI interconnects. The brief is organized into five chapters which mainly discuss: (1) an overview of current research scenario and basics of interconnects; (2) unique crystal structures and the basics of physical properties of CNTs, and the production, purification and applications of CNTs; (3) a brief technical review, the geometry and equivalent RLC parameters for different single and bundled CNT structures; (4) a comparative analysis of crosstalk and delay for different single and bundled CNT structures; and (5) various unique mixed CNT bundle structures and their equivalent electrical models.

Basic Principles of Membrane Technology BoD – Books on Demand

Seeds provide more than half of the world's intake of dietary protein and energy and thus are of immense economic, cultural and nutritional importance. Proteins can account for up to 40% of the dry weight of various types of seeds, thereby making a large contribution to the nutritional quality and processing properties of seeds. It is, therefore, not surprising that seed proteins were among the first plant components to be systematically studied, some 250 years ago, and have been a major focus of research over the past 100 years. The properties and behaviour of seed proteins pervade modern life in numerous ways. For example, legume and cereal proteins are used in

the production of a wide range of meat-free foods; the process of bread-making is dependent on the physical chemical properties of wheat seed proteins; and in developed, as well as developing, countries, nutritional deficiencies among vegetarian diets are avoided through balancing legume and cereal seeds as sources of dietary proteins. Understanding seed proteins, in order to improve their composition and properties and to increase their concentrations, will thus continue to be an important research objective for the future. The present volume represents the culmination of a long-discussed plan of the editors, to bring together the best international authorities in order to compile a definitive monograph on biological, biochemical, molecular and genetic aspects of seed proteins.

Plant and Animal Based Composites MEMBRANE SEPARATION PROCESSES

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 Contractors: 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.

Membrane Separations Technology PHI Learning Pvt. Ltd. Modern membrane science and technology aids engineers in developing and designing more efficient and environmentally-friendly processes. The optimal material and membrane selection as well as applications in the many involved industries are provided. This work is the ideal introduction for engineers working in membrane science and applications (wastewater, desalination, adsorption, and

catalysis), process engineers in separation science, biologists and biochemists, environmental scientists, and most of all students. Its multidisciplinary approach also stimulates thinking of hybrid technologies for current and future life-saving applications (artificial organs, drug delivery).

CRC Press

Green Sustainable Process for Chemical and Environmental Engineering and Science: Switchable Solvents explores the preparation, properties, chemical processes and applications of this class of green solvents. The book provides an in-depth overview on the area of switchable solvents in various industrial applications, focusing on the purification and extraction of chemical compounds utilizing green chemistry protocols that include liquid-liquid, solid-liquid, liquid-gas and lipids separation technologies. In addition, it includes recent advances in greener extraction and separation processes. This book will be an invaluable guide to students, professors, scientists and R&D industrial specialists working in the field of sustainable chemistry, organic, analytical, chemical engineering, environmental and pharmaceutical sciences. Provides a broad overview of switchable solvents in sustainable chemical processes Compares the use of switchable solvents as greener solvents over conventional solvents Outlines eco-friendly organic synthesis and chemical processes using switchable solvents Lists various industrial separations/extraction processes using switchable solvents

Membranes For Gas Separations Springer Nature

This study concentrates on a general optimization of a particular class of membrane separation processes: those involving batch diafiltration. Existing practices are explained and operational improvements based on optimal control

theory are suggested. The first part of the book introduces the theory of membrane processes, optimal control and dynamic optimization. Separation problems are defined and mathematical models of batch membrane processes derived. The control theory focuses on problems of dynamic optimization from a chemical-engineering point of view. Analytical and numerical methods that can be exploited to treat problems of optimal control for membrane processes are described. The second part of the text builds on this theoretical basis to establish solutions for membrane models of increasing complexity. Each chapter starts with a derivation of optimal operation and continues with case studies exemplifying various aspects of the control problems under consideration. The authors work their way from the limiting flux model through increasingly generalized models to propose a simple numerical approach to the general case of optimal operation for batch diafiltration processes. Researchers interested in the modelling of batch processes or in the potential industrial applications of optimal control theory will find this monograph a valuable source of inspiration, instruction and ideas.

Mass Transfer Springer Nature

Membrane technologies are currently the most effective and sustainable methods utilized in diversified water filtration, wastewater treatment, as well as industrial and sustainable energy applications. This book covers essential subsections of membrane separation and bioseparation processes from the perspectives of technical innovation, novelty, and sustainability.

The book offers a comprehensive overview of the latest improvements and concerns with respect to membrane fouling remediation techniques, issues of bioincompatibility for biomedical applications, and various subareas of membrane separation processes, which will be an efficient resource for engineers.

Hollow Fiber Membrane Contactors World Scientific

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/parafins 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

Polyimides and Other High-temperature Polymers Elsevier
Biopolymeric Nanomaterials: Fundamentals and Applications outlines the fundamental design concepts and emerging applications of biopolymeric nanomaterials. The book also provides information on emerging applications of biopolymeric nanomaterials, including in biomedicine, manufacturing and water purification, as well as assessing their physical, chemical and biological properties. This is an important reference source for materials scientists, engineers and biomedical scientists who are seeking to increase their understanding of how polymeric nanomaterials are being used for a range of biomedical and industrial applications. Biopolymeric nanomaterials refer to biocompatible nanomaterials, consisting of biopolymers, such as protein (silk, collagen, gelatin, β -casein, zein, and albumin), protein-mimicked polypeptides and polysaccharides (chitosan, alginate, pullulan, starch, and heparin). Biopolymeric nanomaterials may be used as i) delivery systems for bioactive compounds in food application, (ii) for delivery of therapeutic

molecules (drugs and genes), or for (iii) tissue engineering. Provides information on the design concepts and synthesis of biopolymeric nanomaterials in biomedical and industrial applications Highlights the major properties and processing methods for biopolymeric nanomaterials Assesses the major challenges of producing biopolymeric nanomaterials on an industrial scale

Current Developments in Biotechnology and Bioengineering
John Wiley & Sons

Advanced Separations by Specialized Sorbents opens a new window into sorbent materials, presenting fundamental principles for their syntheses and adsorption properties. The book presents advanced techniques used to create specialized sorbents with a wide range of functions that can be used to enhance the separation and/or purification of useful bio

Membrane Engineering BoD – Books on Demand

Cold atmospheric plasma (CAP) emerges as a possible new modality for cancer treatment. This book provides a comprehensive introduction into fundamentals of the CAP and plasma devices used in plasma medicine. An analysis of the mechanisms of plasma interaction with cancer and normal cells including description of possible mechanisms of plasma selectivity is included. Recent advances in the field, the primary challenges and future directions are presented.

Membrane Processes CRC Press

The petroleum, natural gas, and the chemical & petrochemical process industries, variously require the separation of mixtures

-- whether of raw feedstream materials, reactants, intermediates, or products -- as comprising gases, liquids, or solutions. Membrane separations add another weapon to the arsenal of separation methods, including the upgrading of subquality natural gas reserves. This book furnishes the necessary derivations and calculations for numerically predicting the separations that can be obtained, based on the known respective membrane permeabilities of the pure components. A versatile text, Membrane Separations Technology is suitable both as a reference and a textbook for the practicing process engineer, the researcher, and chemical & petrochemical engineering faculty and students. Has cutting-edge scientific methods for liquifying and transporting natural gas Written for the engineer in the field, for easy access to important information Also contains problems and solutions for the student and professor in chemical engineering departments

MEMBRANE SEPARATION PROCESSES Springer

This unique compendium describes research progress on metal-organic framework (MOF) membranes for different relevant industrial gas separations. Specifically, the book focuses mainly on gas separations which are important in flue gas treatment, natural gas purification, hydrogen purification, and nuclear reprocessing. The advantages of using MOFs in mixed matrix membranes are discussed. Some of the pressing challenges in the field, and strategies to potentially overcome them are also distinctly outlined. This volume is a useful reference materials for professionals, academics, researchers and postgraduate students in chemical engineering and materials engineering.

Organic Solvent Nanofiltration Walter de Gruyter GmbH & Co KG

This book presents comprehensive reviews on the latest

developments of nanotechnologies to detect and remove pollutants in water, air and food. Polymer nanocomposites, nanoparticles from microbes and the application of nanotechnologies for desalination and agriculture are also discussed. Pollution of water and air by contaminants and diseases is a major health issue leading globally to millions of deaths yearly according to the World Health Organization. Such issue requires advanced methods to clean environmental media.

Advances in Membrane Technologies Elsevier

This systematically organized and well-balanced book compresses within the covers of a single volume the theoretical principles and techniques involved in bio-separations, also called downstream processing. These techniques are derived from a range of subjects, for example, physical chemistry, analytical chemistry, bio-chemistry, biological science and chemical engineering. Organized in its 15 chapters, the text covers in the first few chapters topics related to chemical engineering unit operations such as filtration, centrifugation, adsorption, extraction and membrane separation as applied to bioseparations. The use of chromatography as practiced at laboratory as well as industrial scale operation and related techniques such as gel filtration, affinity and pseudoaffinity chromatography, ion-exchange chromatography, electrophoresis and related methods have been discussed. The important applications of these techniques have also been highlighted.