Handbook Of Membrane Separations Chemical Pharmaceutical Food And Biotechnological Applications Second Edition

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Engineering Properties of Foods - M.A. Rao 2014-04-22

It has been nearly a decade since the third edition of Engineering Properties of Foods was published, and food structure/microstructure remains a subject of research interest. In fact, significant developments have taken place in the area of high pressure processing (HPP), which has been approved for pasteurization of food by the Food and Drug Admi

Membrane Technology - Sundergopal Sridhar 2018-09-03

Contributed by multiple experts, the book covers the scientific and engineering aspects of membrane processes and systems. It aims to cover basic concepts of novel membrane processes including membrane bioreactors, microbial fuel cell, forward osmosis, electro-dialysis and membrane contactors. Maintains a pragmatic approach involving design, operation and cost analysis of pilot plants as well as scaled-up counterparts

Alternatives to Conventional Food Processing 2nd Edition - Andrew Proctor 2018-01-17

Traditional thermal and freezing processing techniques have been effective in maintaining a safe high quality food supply. However, increasing energy costs and the desire to purchase environmentally responsible products have been a stimulus for the development of alternative technologies. Furthermore, some products can undergo quality loss at high temperatures or freezing, which can be avoided by many alternative processing methods. This second edition of Alternatives to Conventional Food Processing provides a review of the current major technologies that reduce energy cost and reduce environmental impact while maintaining food safety and quality. New technologies have been added and relevant legal issues have been updated. Each major technology available to the food industry is discussed by leading international experts who outline the main

principles and applications of each. The degree to which they are already in commercial use and developments needed to extend their use further are addressed. This updated reference will be of interest to academic and industrial scientists and engineers across disciplines in the global food industry and in research, and to those needing information in greener or more sustainable technologies.

Membrane Separation Principles and Applications - Ahmad Fauzi Ismail 2018-09-07

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

Integrated Membrane Operations - Alfredo Cassano 2013-12-12

This comprehensive reference work describes in an instructive manner the combination of different membrane operations such as enzyme membrane reactors (EMR's), microfiltration (MF), ultrafiltration (UF), reverse osmosis (RO), nanofiltration (NF) and osmotic distillation (OD) is studied in order to identify their synergistic effects on the optimization of processes in agro-food productions (fruit juices, wines, milk and vegetable beverages) and wastewater treatments within the process intensification strategy. The introduction to integrated membrane operations is followed by applications in the several industries of the food sector, such as valorization of food processing streams, biocatalytic membrane reactors, and membrane emulsification.

Development of Predictive Tools for Membrane Ageing - Pierre LeClech 2014-03-15

This study increases our current understanding on the degradation/ageing mechanisms occurring on porous membranes used in the water and wastewater industries. Accelerated membrane degradation was obtained through both static and consecutive ageing protocols on the pilot-scale, and a range of carefully selected characterisation and analytical techniques was used to characterise the nascent changes faced by the membrane material. The report covers four interrelated sections: Critical assessment of characterisation techniques Static accelerated ageing Consecutive accelerated ageing Consecutive ageing of industrially-aged membranes. This final report summarises the aims, objectives, outcomes and limitations of the individual work packages, along with some recommendations for future work. This book is co-published with Water Research Australia.

Natural Organic Matter in Water - Mika Sillanpää 2014-10-07

Approximately 77 percent of the freshwater used in the United States comes from surface-water sources and is subject to natural organic matter contamination according to the United States

Geological Survey. This presents a distinct challenge to water treatment engineers. An essential resource to the latest breakthroughs in the characterization, treatment and removal of natural organic matter (NOM) from drinking water, Natural Organic Matter in Waters: Characterization and Treatment Methods focuses on advance filtration and treatment options, and processes for reducing disinfection byproducts. Based on the author's years of research and field experience, this book begins with the characterization of NOM including: general parameters, isolation and concentration, fractionation, composition and structural analysis and biological testing. This is followed by removal methods such as inorganic coagulants, polyelectrolytes and composite coagulants. Electrochemical and membranes removal methods such as: electrocoagulation, electrochemical oxidation, microfiltration and ultrafiltration, nanofiltration and membrane fouling. Covers conventional as well as advanced NOM removal methods Includes characterization methods of NOM Explains removal methods such as: removal by coagulation, electrochemical, advanced oxidation, and integrated methods

Seven Years of Membranes: Feature Paper 2017 - Spas D. Kolev 2018-08-09

This book is a printed edition of the Special Issue "Seven Years of Membranes: Feature Paper 2017" that was published in Membranes

Synthetic Polymeric Membranes for Advanced Water Treatment, Gas Separation, and Energy Sustainability - Ahmad Fauzi Ismail 2020-05-14

Synthetic Polymeric Membranes for Advanced Water Treatment, Gas Separation, and Energy Sustainability is a cutting-edge guide that focuses on advanced water treatment applications, covering oily wastewater treatment, desalination, removal of dyes and pigments, photodegradation of organic hazardous materials, heavy metal removal,

removal and recovery of nutrients, and volatile organic compounds. Other sections examine the area of gas separation, including acidic gas removal, oxygen enrichment, gas and vapor separation, hydrogen separation, and gas sensing. Final sections cover applications for sustainable energy usage, including the use of synthetic polymer membranes in proton exchange membrane fuel cells (PEMFCs), and more. This is a highly valuable guide for researchers, scientists, and advanced students, working with polymer membranes and films, and across polymer science, polymer chemistry, materials science, chemical e Explains the design, preparation and characterization of synthetic polymer-based membranes for advanced applications Provides a clear picture of the state-of-the-art in the field, including novel fabrication approaches and the latest advances in physico-chemical characterizations Supports the development and implementation of innovative, sustainable solutions to water treatment, gas separation and energy devices

Analytical Separation Science, 5 Volume Set - Jared Anderson 2016-02-29

Leading the way for analytical chemists developing new techniques. This new comprehensive 5 volume set on separation science provides a much needed research-level text for both academic users and researchers who are working with and developing the most current methods, as well as serving as a valuable resource for graduate and post-graduate students. Comprising of five topical volumes it provides a comprehensive overview of the subject, highlighting aspects that will drive research in this field in the years to come. Volume 1: Liquid Chromatography Volume 2: Special Liquid Chromatography Modes and Capillary Electromigration Techniques Volume 3: Gas, Supercritical and Chiral Chromatography Volume 4: Chromatographic and Related Techniques Volume 5: Sample Treatment, Method Validation, and Applications Key

Features: - Comprises over 2,100 pages in 5 volumes – available in print and online - Edited by an international editorial team which has both prominent and experienced senior researchers as well as young and dynamic rising stars - Individual chapters are labeled as either introductory or advanced, in order to guide readers in finding the content at the appropriate level - Fully indexed with cross referencing within and between all 5 volumes

Thin film MOFs (SURMOFs) for application in gas separation - Valadez Sánchez, Elvia Patricia 2019-03-14

Handbook of Membrane Separations - Anil Kumar Pabby 2015-04-09

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

Ceramic Membranes Applied in Separation Processes - Dionisio da Silva Biron 2017-05-18

This book covers diverse types of ceramic membranes applied in separation processes. The authors present the preparation methods and well as the main application of ceramic membranes. Modules, microfiltration and ultrafiltration are topics described within the text. The final chapter focuses on water and wastewater treatment by membranes separation processes.

Process Technology - André B. de Haan 2015-04-24

Process Technology provides a general overview about chemical and biochemical process technology. It focuses on the structure and development of production processes, main technological operations and the important aspects of process economics. The theoretical

foundations in each chapter are supplemented by case studies and examples in a clear and instructive manner to illustrate the practical aspects. The author highlights operating principles, reasons for application and available industrial equipment of technological operations. Aim is to facilitate those without a process technology background in multi-disciplinary cooperation with (bio-) chemical engineers by providing an overview of this exciting field. The textbook is organized into seven distinct parts: Structure of the chemical industry and (bio-) chemical processes (Bio-) Chemical reaction engineering Molecular separations (distillation, extraction, absorption, adsorption) Mechanical separations (filtration, sedimentation, membranes) Particle and final product manufacturing Development, scale-up, design and safety of processes Major industrial process descriptions

Membrane Systems in the Food Production - Alfredo Cassano 2021-07-19

The two-volume work presents applications of integrated membrane operations in agro-food productions with significant focus on product quality, recovery of high added-value compounds, reduction of energy consumption and environmental impact. Volume 1. Dairy, Wine and Oil Processing. Volume 2. Wellness Ingredients and Juice Processing.

Membrane Technology and Applications - Richard Baker 2004-05-31

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.

Membrane Fabrication - Nidal Hilal 2015-03-02

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

Petrochemical Catalyst Materials, Processes, and Emerging Technologies - Al-Megren, Hamid 2016-02-17

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Membrane Separation of Food Bioactive Ingredients Seid Mahdi Jafari 2022-03-11

This book covers current developments in membrane-based technologies for the successful recovery of food bioactive ingredients and molecules. Chapters explore emerging technologies, such as microfiltration, ultrafiltration, nanofiltration, and membrane distillation, for the selective concentration and food ingredients from food by-products, as well as techniques, such as pervaporation, for the selective separation and recovery of aroma compounds. The text provides one of the first examinations of other membrane-based technologies, such as liquid membranes (microemulsions), membrane distillation (MD) and pervaporation (PV), as thermal driven membrane processes. The separation of metabolites from microalgae and fermentation broths using membrane technologies is also

covered. Researchers in food science, pharmaceutics and biotechnology looking to stay up-to-date on bioactive recovery, as well as membranologists exploring new applications for membrane-based technologies, will find this text a useful resource.

Ceramic Membranes - Vitaly Gitis 2016-08-22

This textbook gives a clear and coherent overview of ceramic membranes, from preparation methods all the way to applications and economics. The authors, who are known for their clear writing style, combine their expertise in environmental engineering and porous materials to cover a wide range of examples, with over 1000 references. Chapters 1, 2 and 3 give a detailed introduction to membrane synthesis, transport mechanisms, and characterisation. Building on this, Chapter 4 outlines the state-of-the-art in ceramic membrane applications, including fuel cells, water purification, gas separation, and the making of cheeses, fruit juice, wine and beer. The final chapter deals with the economics of ceramic membrane processes, using industrial case studies to examine market barriers and opportunities. Ceramics are known throughout history, but now, after thousands of years, they're making a comeback. Indeed, they may hold the key for addressing three of today's biggest challenges: clean energy, drinking water and air pollution. This book is a must-have for anyone who wants to enter the ceramic membranes field, or keep up-to-date with the latest developments and applications. This textbook gives a clear and coherent overview of ceramic membranes, from preparation methods all the way to applications and economics. The authors, who are known for their clear writing style, combine their expertise in environmental engineering and porous materials to cover a wide range of examples, with over 1000 references. Chapters 1, 2 and 3 give a detailed introduction to membrane synthesis, transport mechanisms, and characterisation. Building on

this, Chapter 4 outlines the state-of-the-art in ceramic membrane applications, including fuel cells, water purification, gas separation, and the making of cheeses, fruit juice, wine and beer. The final chapter deals with the economics of ceramic membrane processes, using industrial case studies to examine market barriers and opportunities. Ceramics are known throughout history, but now, after thousands of years, they're making a comeback. Indeed, they may hold the key for addressing three of today's biggest challenges: clean energy, drinking water and air pollution. This book is a must-have for anyone who wants to enter the ceramic membranes field, or keep up-to-date with the latest developments and applications.

Current Trends and Future Developments on (Bio-) Membranes - Angelo Basile 2018-07-18

Current Trends and Future Developments on (Bio-) Membranes: Carbon Dioxide Separation/Capture by Using Membranes explores the unique property of membranes to separate gases with different physical and chemical properties. The book covers both polymeric and inorganic materials for CO2 separation and explains their mechanism of action, allowing for the development and most appropriate and efficient processes. It also lists the advantages of using membranes instead of other separation techniques, i.e., their low operating costs and low energy consumption. This book offers a unique opportunity for scientists working in the field of membrane technology for CO2 separation and capture. Outlines numerous membrane-based technologies for CO2 separation and capture Lists new, advanced separation techniques and production processes Includes various applications, modelling, and the economic considerations of each process Covers advanced techniques for the separation of CO2 in natural gas

Hollow Fiber Membrane Contactors - Anil K.

Pabby 2020-11-23

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.

Membrane Handbook - Winston Ho 2012-12-06

Membrane processes have wide industrial ap This handbook reviews the published litera plications covering many existing and emerging ture, presents an in-depth description of com uses in the chemical, petrochemical, petroleum, mercialized membrane processes, and gives a state-of-the-art review of new membrane pro environmental, water treatment, pharmaceutic al, medical, food, dairy, beverage, paper, tex cess concepts under development. It is intended tile, and electronic industries. The existing ap to be a single source of underlying principles, membranes, membrane modules, process de plications include: (1) dialysis for the purifica tion of human blood (the artificial kidney), (2) sign, applications, and cost estimates. It is also electrodialysis for the desalination of brackish a first attempt to bridge the gap between the water to produce potable water, (3) reverse theory and practice. osmosis for the desalination of seawater, (4) There are several groups which may benefit ultrafiltration for the concentration of large pro from this handbook. It can be used as educa tein molecules from cheese, casein whey, and tional material for industrial personnel engaged milk, and (5) microfiltration for the sterilization in membrane separations. For scientists and of pharmaceutical and medical products, beer, engineers active in research and development in wine, and soft drinks. Since membrane pro synthetic membranes, it will serve as a single cesses generally have low capital investment, as source of reference for the entire field.

Handbook of Membrane Reactors - Angelo Basile 2013-04-04

Membrane reactors are increasingly replacing conventional separation, process and conversion

technologies across a wide range of applications. Exploiting advanced membrane materials, they offer enhanced efficiency, are very adaptable and have great economic potential. There has therefore been increasing interest in membrane reactors from both the scientific and industrial communities, stimulating research and development. The two volumes of the Handbook of membrane reactors draw on this research to provide an authoritative review of this important field. Volume 2 reviews reactor types and industrial applications, beginning in part one with a discussion of selected types of membrane reactor and integration of the technology with industrial processes. Part two goes on to explore the use of membrane reactors in chemical and large-scale hydrogen production from fossil fuels. Electrochemical devices and transport applications of membrane reactors are the focus of part three, before part four considers the use of membrane reactors in environmental engineering, biotechnology and medicine. Finally, the book concludes with a discussion of the economic aspects of membrane reactors. With its distinguished editor and international team of expert contributors, the two volumes of the Handbook of membrane reactors provide an authoritative guide for membrane reactor researchers and materials scientists, chemical and biochemical manufacturers, industrial separations and process engineers, and academics in this field. Discusses integration of membrane technology with industrial processes Explores the use of membrane reactors in chemical and large-scale hydrogen production from fossil fuels Considers electrochemical devices and transport applications of membrane reactors

Membrane Processes in Biotechnology and Pharmaceutics - Catherine Charcosset 2012-01-25

Membrane processes are increasingly used in pharmaceutical and biochemical engineering and biotechnology for concentration and

purification, synthesis of molecules and drug delivery systems, and support for biochemical reactions. This book provides a state-of-the art overview of the classical membrane processes used in pharmaceutical and biochemical engineering and biotechnology, such as ultrafiltration, microfiltration, virus filtration, membrane chromatography, membrane emulsification, liquid membranes and membrane bioreactors. It describes the general rules (principles, choice of configurations, membranes, parameters, etc.), recent developments (fouling control, increase permeate flux and selectivity, etc.), applications, and theoretical descriptions. Further, it presents emerging processes such as solvent resistant nanofiltration and membrane crystallization. Presents classical membrane processes such as ultrafiltration, microfiltration, virus filtration, membrane chromatography, membrane emulsification, liquid membranes and membrane bioreactors Presents emerging processes such as solvent resistant nanofiltration and membrane crystallization Gives a complete description of each technique (principles, membrane materials and devices, fouling control, and theoretical description) Contains numerous examples of applications Includes a uniform notation throughout the book enhancing the presentation and understanding of the content Includes extensive list of references

Membrane Contactor Technology - Mohammad Younas 2022-04-18

An eye-opening exploration of membrane contactors from a group of industry leaders In Membrane Contactor Technology: Water Treatment, Food Processing, Gas Separation, and Carbon Capture, an expert team of researchers delivers an up-to-date and insightful explanation of membrane contactor technology, including transport phenomena, design aspects, and diverse process applications. The book also includes explorations of membrane synthesis, process, and module design, as well as rarely

discussed process modeling and simulation techniques. The authors discuss the technical and economic aspects of this increasingly important technology and examine the geometry, flow, energy and mass transport, and design aspects of membrane contactor modules. They also cover a wide range of application opportunities for this technology, from the materials sciences to process engineering. Membrane Contactor Technology also includes: A thorough introduction to the membrane contactor extraction process, including dispersion-free membrane extraction processes and supported liquid membrane processes Comprehensive explorations of membrane transport theory, including discussions of diffusional mass and heat transfer modeling, as well as numerical modeling In-depth examinations of module configuration and geometry, including design and flow configuration Practical discussions of modes or operation, including membrane distillation, osmotic evaporation, and forward osmosis Perfect for process engineers, biotechnologists, water chemists, and membrane scientists, Membrane Contactor Technology also belongs in the libraries of chemical engineers, polymer chemists, and chemists working in the environmental industry.

Nanocomposite Membranes for Water and Gas Separation - Mohtada Sadrzadeh 2019-11-13

Nanocomposite Membranes for Water and Gas Separation presents an introduction to the application of nanocomposite membranes in both water and gas separation processes. This in-depth literature review and discussion focuses on state-of-the-art nanocomposite membranes, current challenges and future progress, including helpful guidelines for the further improvement of these materials for water and gas separation processes. Chapters address material development, synthesis protocols, and the numerical simulation of nanocomposite

membranes, along with current challenges and future trends in the areas of water and gas separation. Explains the development of nanocomposite membranes through bio-mimicking nanomaterials Discusses the surface modification of nanomaterials to fabricate robust nanocomposite membranes Outlines the environmental and operational challenges for the application of nanocomposite membranes

Encyclopedia of Analytical Science - 2019-04-02 The third edition of the Encyclopedia of Analytical Science is a definitive collection of articles covering the latest technologies in application areas such as medicine, environmental science, food science and geology. Meticulously organized, clearly written and fully interdisciplinary, the Encyclopedia of Analytical Science provides foundational knowledge across the scope of modern analytical chemistry, linking fundamental topics with the latest methodologies. Articles will cover three broad areas: analytical techniques (e.g., mass spectrometry, liquid chromatography, atomic spectrometry); areas of application (e.g., forensic, environmental and clinical); and analytes (e.g., arsenic, nucleic acids and polycyclic aromatic hydrocarbons), providing a one-stop resource for analytical scientists. Offers readers a one-stop resource with access to information across the entire scope of modern analytical science Presents articles split into three broad areas: analytical techniques, areas of application and and analytes, creating an ideal resource for students, researchers and professionals Provides concise and accessible information that is ideal for non-specialists and readers from undergraduate levels and higher

Inorganic Polymeric and Composite Membranes - S. Ted Oyama 2011-07-13 Inorganic, Polymeric and Composite Membranes: Structure-Function and Other Correlations covers the latest technical advances in topics such as structure-function relationships for polymeric, inorganic, and composite

membranes. Leading scientists provide in depth reviews and disseminate cutting-edge research results on correlations but also discuss new materials, characterization, modelling, computational simulation, process concepts, and spectroscopy. Unified by fundamental general correlations theme Many graphical examples Covers all major membrane types

Organic-inorganic Composite Membranes For Molecular Separation - Jin Wanqin 2017-09-27

This book gives comprehensive information on the design, preparation and application of organic-inorganic composite membranes that are used for molecular separation. Various membrane types with different materials are highlighted, including polymer/ceramic composite membranes, mixed matrix membranes, metal-organic frameworks membranes and graphene-based membranes. Physical and chemical properties, morphologies, interfacial behaviors, transport characteristics and separation performance of the organic-inorganic composite membranes are thoroughly discussed based on advanced characterization techniques. Meanwhile, the book contains several typical applications of the membranes in fields such as bio-fuels production, organic compounds recovery, solvent dehydration, carbon dioxide capture and others. In addition, large-scale production and industrial implementation of the organic-inorganic composite membranes are briefly introduced. Contents: IntroductionPrinciples of Pervaporation and Gas Separation in Membrane ProcessPolymer/Ceramic Composite MembranesMetal-Organic Frameworks MembranesGraphene-Based MembranesMixed Matrix MembranesNovel Characterization TechniquesScale-Up Fabrication and Industrial ApplicationConclusion and Prospective Readership: Researchers, academics, professionals and graduate students in chemical engineering, materials engineering, surface chemistry, new materials and polymers.

Keywords: Organic-Inorganic Membrane;Pervaporation;Gas Separation;Mixed Matrix Membrane;Graphene Membrane;MOF MembraneReview:0

Alternatives to Conventional Food Processing Andrew Proctor 2011

This multi-authored book is edited by an expert in the field and includes chapters from international contributors. It is fully cross disciplinary relating green principles to the food industry, covering legal and policy issues, engineering, food processing and food science. It addresses the alternatives to conventional food processing that have reduced energy requirements or solvent use and how they affect final food quality. Initially, the principles of green chemistry and technologies are outlined to provide a justification and basis for the processing methods that are addressed. This is followed by a discussion of legal and policy issues in both the EU and the US which provide further justification for the need for such technologies and the constraints and benefits of current policies and regulations. The major green technologies available to the food industry are discussed, outlining the main principles and applications of each. The degree to which they are already in commercial use and developments needed to extend their use further are also covered.

Industrial Separation Processes - André B. de Haan 2020-07-06

Separation processes on an industrial scale account for well over half of the capital and operating costs in the chemical industry. Knowledge of these processes is key for every student of chemical or process engineering. This book is ideally suited to university teaching, thanks to its wealth of exercises and solutions. The second edition boasts an even greater number of applied examples and case studies as well as references for further reading.

Handbook of Membrane Separations - Anil Kumar Pabby 2020-06-30

This well-regarded handbook provides detailed information on membrane separation technologies from an international team of experts. It provides a comprehensive discussion of membrane applications in the chemical, food, pharmaceutical, and biotechnology industries as well as in the treatment of toxic industrial effluents. It also includ

Bioprocess Engineering - Pau Loke Show 2019-05-24

Bioprocess Engineering: Downstream Processing is the first book to present the principles of bioprocess engineering, focusing on downstream bioprocessing. It aims to provide the latest bioprocess technology and explain process analysis from an engineering point of view, using worked examples related to biological systems. This book introduces the commonly used technologies for downstream processing of biobased products. The covered topics include centrifugation, filtration, membrane separation, reverse osmosis, chromatography, biosorption, liquid-liquid separation, and drying. The basic principles and mechanism of separation are covered in each of the topics, wherein the engineering concept and design are emphasized. This book is aimed at bioprocess engineers and professionals who wish to perform downstream processing for their feedstock, as well as students.

Applications of Membrane Technology for Food Processing Industries - M. SELVAMUTHUKUMARAN 2020-10-14

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.

Membrane Handbook - Winston Ho 1992-06-30

Membrane processes have wide industrial ap This handbook reviews the published litera plications covering many existing and emerging ture, presents an in-depth description of com uses in the chemical, petrochemical, petroleum, mercialized membrane processes, and gives a state-of-the-art review of new membrane pro environmental, water treatment, pharmaceutic

al, medical, food, dairy, beverage, paper, tex cess concepts under development. It is intended tile, and electronic industries. The existing ap to be a single source of underlying principles, membranes, membrane modules, process de plications include: (1) dialysis for the purifica tion of human blood (the artificial kidney), (2) sign, applications, and cost estimates. It is also electrodialysis for the desalination of brackish a first attempt to bridge the gap between the water to produce potable water, (3) reverse theory and practice. osmosis for the desalination of seawater, (4) There are several groups which may benefit ultrafiltration for the concentration of large pro from this handbook. It can be used as educa tein molecules from cheese, casein whey, and tional material for industrial personnel engaged milk, and (5) microfiltration for the sterilization in membrane separations. For scientists and of pharmaceutical and medical products, beer, engineers active in research and development in wine, and soft drinks. Since membrane pro synthetic membranes, it will serve as a single cesses generally have low capital investment, as source of reference for the entire field.

Handbook of Membrane Separations - Anil K. Pabby 2008-07-07

The Handbook of Membrane Separations: Chemical, Pharmaceutical, and Biotechnological Applications provides detailed information on membrane separation technologies as they have evolved over the past decades. To provide a basic understanding of membrane technology, this book documents the developments dealing with these technologies. It explores chemical, pharmaceutical, food processing and biotechnological applications of membrane processes ranging from selective separation to solvent and material recovery. This text also presents in-depth knowledge of membrane separation mechanisms, transport models, membrane permeability computations, membrane types and modules, as well as

membrane reactors.

Fermentation and Biochemical Engineering Handbook, 2nd Ed. - Henry C. Vogel 1996-12-31

This is a well-rounded handbook of fermentation and biochemical engineering presenting techniques for the commercial production of chemicals and pharmaceuticals via fermentation. Emphasis is given to unit operations fermentation, separation, purification, and recovery. Principles, process design, and equipment are detailed. Environment aspects are covered. The practical aspects of development, design, and operation are stressed. Theory is included to provide the necessary insight for a particular operation. Problems addressed are the collection of pilot data, choice of scale-up parameters, selection of the right piece of equipment, pinpointing of likely trouble spots, and methods of troubleshooting. The text, written from a practical and operating viewpoint, will assist development, design, engineering and production personnel in the fermentation industry. Contributors were selected based on their industrial background and orientation. The book is illustrated with numerous figures, photographs and schematic diagrams.

Drying in the Dairy Industry - Cécile Le Floch-Fouéré 2020-11-25

With more than 12M tons of dairy powders produced each year at a global scale, the drying sector accounts to a large extent for the processing of milk and whey. It is generally considered that 40% of the dry matter collected overall ends up in a powder form. Moreover, nutritional dairy products presented in a dry form (eg, infant milk formulae) have grown quickly over the last decade, now accounting for a large share of the profit of the sector. Drying in the Dairy Industry: From Established Technologies to Advanced Innovations deals with the market of dairy powders issues, considering both final product and process as well as their

interrelationships. It explains the different processing steps for the production of dairy powders including membrane, homogenisation, concentration and agglomeration processes. The book includes a presentation of the current technologies, the more recent development for each of them and their impact on the quality of the final powders. Lastly, one section is dedicated to recent innovations and methods directed to more sustainable processes, as well as latter developments at lab scale to go deeper in the understanding of the phenomena occurring during spray drying. Key Features: Presents state-of-the-art information on the production of a variety of different dairy powders Discusses the impact of processing parameters and drier design on the product quality such as protein denaturation and viability of probiotics Explains the impact of drying processes on the powder properties such as solubility, dispersibility, wettability, flowability, floodability, and hygroscopicity Covers the technology, modelling and control of the processing steps This book is a synthetic and complete reference work for researchers in academia and industry in order to encourage research and development and innovations in drying in the dairy industry.

New Generation Studies in Electromembrane Extraction - Canan ONAÇ 2020-10-08

There is a great interest in electro membrane extraction technique and the number of research papers is increasing exponentially. This book provides a comprehensive and detailed summary a general overview on the electro membrane (EME) system and working principle of this technique. The electro membrane extraction is a combination of liquid phase micro extraction and more traditional electro extraction systems. It was first designed to prepare samples for the liquid chromatography, capillary electrophoresis and mass spectrometry methods, but the field of use is not limited to these methods. The

available studies in the literature of EME focus on technical development and applications of electro membrane and discuss the future of this technology critically. So, this book emphasize basic and theory of electro membrane technique and use of supported liquid membrane (SLM) in electro membrane applications and working parameters of this technique as a potential, extraction time, sample solution, acceptor phase and pH, stirring and other parameters. One of major of this book to reveal out an answer to why researchers prefer to use polymer inclusion membrane (PIM) rather than supported liquid membrane in EME applications in recent years. The advantages of polymer inclusion membrane and supported liquid membrane over each other in electro membrane applications were compared. EME studies base on polymer inclusion membrane on stability and permeability are discussed and detailed according to the various parameters. Another important issue addressed in this book is the use of nanomaterials in membrane process and new generation membranes in electro membrane studies. New generation nano materials are among the most important additives affecting the membrane performance in the production of nano strong membranes. Due to their extraordinary features, this book provides the latest carbon nanotubes (CNT) studies were used as the additive of CNT in PIM and electro membrane extraction process and presents new application fields. This presents many facilities and possibilities to develop this technology in an advanced level.