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Handbook Of Industrial Membranes By K Scott

Membrane-Based Salinity Gradient
Processes for Water Treatment and Power
Generation focuses on the various types of
membrane- based salinity gradient

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processes that can be applied for desalination. Topics cover salinity gradient processes for desalination, such as Forward Osmosis (FO) and Pressure Retarded Osmosis (PRO), with chapters selected exclusively from a number of world-leading experts in various disciplines and from different continents.

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Sections include discussions on the theoretical and fundamental approaches to salinity gradient processes, various types of membrane materials and development, i.e., flat sheet and hollow fiber, various salinity water sources for an economically feasible process, and large-scale applications. Finally, the book focuses on

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economically feasible process optimization when both operational and capital costs are considered. Features specific details on salinity gradient techniques for various desalination applications of industrial and academic interest Contains unique discussions on membrane development and process

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optimization that normally only appear briefly in research articles Includes examples of internationally best practices for the evaluation of several system parameters, including thermodynamic optimization, high power density membrane development, and more Discusses large-scale applications and

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provides examples of such implementations, such as Statkraft, Japanese Megaton, and Korean GMVP Membrane reactors are increasingly replacing conventional separation, process and conversion technologies across a wide range of applications. Exploiting advanced membrane materials, they offer enhanced

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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

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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

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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

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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

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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

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and transport applications of membrane reactors

Industrial desalination of sea and brackish water is becoming an essential part in providing sustainable sources of fresh water for a larger number of communities around the world. Desalination is a main source of fresh water in the Gulf countries,

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a number of the Caribbean and Mediterranean Islands, and several municipalities in a large number of countries. As the industry expands there is a pressing need to have a clear and well-written textbook that focuses on desalination fundamentals and other industrial aspects. This book focuses on

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the processes widely used in industry, which include multistage flash desalination and reverse osmosis. Also, other desalination processes with attractive features and high potential are featured. It includes a large number of solved examples, which are explained in simple and careful matter that allow the reader to

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follow and understand the development. The data used in the development of the examples and case studies are extracted from existing desalination plants. This title also includes comparisons of model predictions against results reported in literature as well as available experimental and industrial data. Several industries

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include similar unit operation processes, i.e., evaporators, condensers, flashing units, membrane separation, and chemical treatment. Examples of such industries include wastewater treatment, food, petroleum, petrochemical, power generation, and pulp and paper. Process fundamentals and design procedures of

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such unit processes follow the same procedures given in this textbook. Emerging Technologies for Sustainable Desalination Handbook provides professionals and researchers with the latest treatment activities in the advancement of desalination technology. The book enables municipalities and

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private companies to custom-design sustainable desalination plants that will minimize discharge, energy costs and environmental footprint. Individual case studies are included to illustrate the benefits and drawback of each technique. Sections discuss a multitude of recently developed, advanced processes, along with

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notable advances made in existing technologies. These processes include adsorption, forward osmosis, humidification and dehumidification, membrane distillation, pervaporation and spray type thermal processes. In addition, theoretical membrane materials, such as nanocomposite and carbon nanotube

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membranes are also explored. Other chapters cover the desalination of shale gas, produced water, forward osmosis for agriculture, desalination for crop irrigation, and seawater for sustainable agriculture. International in its coverage, the chapters of this handbook are contributed by leading authors and

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researchers in all relevant fields. Expertly explains recent advances in sustainable desalination technology, including nanocomposite membranes, carbon nanotube membranes, forward reverse osmosis and desalination by pervaporation Provides state-of-the-art techniques for minimizing system discharge, energy cost

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and environmental footprint Includes individual case studies to illustrate the benefits and drawbacks of each technique Discusses techniques for the custom-design of sustainable desalination plants for municipalities, private companies and industrial operations Applications, Fabrications and Properties

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Emerging Technologies for Sustainable
Desalination Handbook

Technology and Applications

Zeolites in Industrial Separation and
Catalysis

Membrane-Based Salinity Gradient

Processes for Water Treatment and Power
Generation

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This is a first attempt to provide a general analysis of developments in polyimide membrane synthesis and applications. It will serve as a valuable reference for those with an interest in

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synthesis of polyimides, the chemistry and physical chemistry of polyimide compounds, the separation properties of membranes and in their preparation and application. It is intended as

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a summary of the current status of polyimide membrane research for the specialist as well as a teaching aid for graduate studies in polymer chemistry. The authors

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*collaboration demonstrates
the high level of scientific
research in Russia and the
active development of
applied research in Japan.
“... the best handbook on
membrane technology,*

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which is currently on the market... ” -Membrane News (on the previous edition) Building on the success of the previous edition, Membrane Technology and Applications

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Third Edition provides a comprehensive overview of separation membranes, their manufacture and their applications. Beginning with a series of general chapters on membrane preparation,

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transport theory and concentration polarization, the book then surveys several major areas of membrane application in separate chapters. Written in a readily accessible style,

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*each chapter covers its
membrane subject
thoroughly, from historical
and theoretical backgrounds
through to current and
potential applications.
Topics include reverse*

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*osmosis, ultrafiltration,
pervaporation,
microfiltration, gas
separation and coupled and
facilitated transport;
chapters on electrodialysis
and medical applications*

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round out the coverage.

NEW TO THE THIRD

*EDITION New sections on
the use of membranes in the
chlor-alkali industry,
membrane distillation,
pressure retarded osmosis*

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*and constant flux-variable
pressure ultrafiltration
Zeolite and ceramic
membranes, submerged
membrane modules, and fuel
cell membranes
Substantially enhanced*

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*chapters on ultrafiltration,
pervaporation and
membrane contactors*

*Updates to every chapter to
reflect the developments in
the field*

The Handbook of Membrane

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*Separations: Chemical,
Pharmaceutical, and
Biotechnological
Applications provides
detailed information on
membrane separation
technologies as they have*

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evolved over the past decades. To provide a basic understanding of membrane technology, this book documents the developments dealing with these technologies. It

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*explores chemical,
pharmaceutical, food
processing and
biotechnological
applications of membrane
processes ranging from
selective separation to*

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solvent and material recovery. This text also presents in-depth knowledge of membrane separation mechanisms, transport models, membrane permeability computations,

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*membrane types and
modules, as well as
membrane reactors.*

*Soon after its publication in
1987, the first edition of
Ultrafiltration Handbook
became recognized as the*

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*leading handbook on
ultrafiltration technology.
Reviews in professional
journals praised it as an
authoritative and
substantive information
resource on this technology.*

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*Now a completely, updated
and expanded edition is
available under the titl
Membrane Technologies and
Applications
Design, Optimization and
Troubleshooting Guide*

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Reverse Osmosis Systems
Electro-Spun and Phase
Inverted Membranes
Current and Emerging
Research Trends in
Membrane Technology
Membranes processing

Page 43/223

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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-

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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

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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

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Membrane Technology for Food Processing Industries introduces membrane processing techniques, presenting principles, theory and operational conditions for achieving efficient quality

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product. It discusses different types of membrane processing techniques viz. reverse osmosis, nanofiltration, ultrafiltration, electro dialysis, microfiltration, pervaporation,

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including its applications,
advantages and
disadvantages. Key Features:
Deals with the retention of
antioxidants by using novel
membrane processing
techniques Includes the

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application of membrane
processing techniques in
whey processing Explains the
method for degumming,
dewaxing and decolorization
of edible crude oils Narrates
application of membrane

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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

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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

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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

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

Membrane technologies play an increasingly important role

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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

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bioseparation applications. Membrane Technologies and Applications provides essential data and background information on various dimensions of membrane technologies, with a major

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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

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interested in water and wastewater treatment, membrane suppliers, as well as students and academics studying the field.

The Handbook of Membrane Separations: Chemical,

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Pharmaceutical, Food, and
Biotechnological Applications,
Second Edition provides
detailed information on
membrane separation
technologies from an
international team of experts.

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The handbook fills an important gap in the current literature by providing a comprehensive discussion of membrane application
Industrial Water Treatment
Process Technology begins

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with a brief overview of the challenges in water resource management, covering issues of plenty and scarcity-spatial variation, as well as water quality standards. In this book, the author includes a clear and

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rigorous exposition of the various water resource management approaches such as: separation and purification (end of discharge pipe), zero discharge approach (green process development), flow

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management approach, and preservation and control approach. This coverage is followed by deeper discussion of individual technologies and their applications. Covers water treatment approaches

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including: separation and purification—end of discharge pipe; zero discharge approach; flow management approach; and preservation and control approach

Discusses water treatment

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process selection, trouble
shooting, design, operation,
and physico-chemical and
treatment Discusses industry-
specific water treatment
processes

Sustainable Solutions in

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Water, Health, Energy and
Environmental Sectors

Fluorinated Ionomers

Fundamental Materials

Science, Design and

Optimisation

Handbook of Nonwoven Filter

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Media

Handbook of Industrial
Membrane Technology

***This handbook
emphasizes the use of
sythetic membranes for
separations involving***

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***industrial or municipal
process streams.***

***Discussions on theory,
engineering aspects,
membrane preparation,
and typical and projected
applications of the***

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***various membrane
processes are included.
Membranes and
membrane separation
techniques have grown
from a simple laboratory
tool to an industrial***

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***process with considerable
technical and commercial
impact. The book deals
with both the
fundamental concepts of
preparation,
characterization and***

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modification, practical applications along with recent advancements of electro-spun and phase inverted polymeric membranes. Divided into two parts, part one of this

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***book covers the
fundamental concepts
and practical applications
of novel electro-spun
membranes while the
latter covers basic
concepts and further***

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***advancements of the
conventional phase
inverted membranes
extensively. Key Features
Covers fundamental
concepts and practical
applications of electro-***

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***spun and phase inverted
polymeric membranes
Includes general
properties,
characterization,
preparation and
modification of polymeric***

Page 74/223

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***membranes Discusses
advanced modification of
polymeric membranes
(functionalization,
grafting) using phase
inversion process, and
effects of solubility***

Page 75/223

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***parameter and additives
on the phase inversion
process Reviews electro-
spun membranes for
biomedical applications,
industrial effluents
treatment and removal of***

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water contaminants

Explores a separate

economic analysis section

for the discussed

membranes

This handbook

emphasizes the use of

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synthetic membranes for separations involving industrial or municipal process streams. The ten chapters are authored by some of the world's leading experts in the

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***field of membrane
science and technology.
Discussions on theory,
engineering aspects,
membrane preparation
and typical and projected
applications of the***

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***various membrane
processes are included.
In this essential new
volume, Volume 13:
Membrane and
Desalination
Technologies, a panel of***

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***expert researchers
provide a wealth of
information on membrane
and desalination
technologies. An
advanced chemical and
environmental***

Page 81/223

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engineering textbook as well as a comprehensive reference book, this volume is of high value to advanced graduate and undergraduate students, researchers, scientists,

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***and designers of water
and wastewater treatment
systems. This is an
essential part of the
Handbook of
Environmental
Engineering series, an***

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incredible collection of methodologies that study the effects of pollution and waste in their three basic forms: gas, solid, and liquid. Chapters adopt the series format,

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***employing methods of
practical design and
calculation illustrated by
numerical examples,
including pertinent cost
data whenever possible,
and exploring in great***

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***detail the fundamental
principles of the field.
Volume 13: Membrane
and Desalination
Technologies is an
essential guide for
researchers, highlighting***

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***the latest developments
in principles of
membrane technology,
membrane systems
planning and design,
industrial and municipal
waste treatments,***

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desalination

***requirements, wastewater
reclamation, biofiltration,
and more.***

***Membrane Technology
for CO2 Sequestration
Application, Systems***

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***Design and Operation
Membrane Technology
and Applications
Industrial Water
Treatment Process
Technology
Engineering Aspects of***

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***Membrane Separation
and Application in Food
Processing***

The Handbook of Nonwoven
Filter Media, Second
Edition provides readers
with a fundamental

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understanding of
nonwoven filter media.
It is one of the few
books dealing
exclusively with the
subject, and is
primarily intended as a

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reference for people in the nonwovens industry (industry and academic researchers, technical, marketing , and quality control personnel) and universities offering

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courses in filtration
theory and practice and
nonwovens technology.
The book includes
applications for gas,
liquid, and engine
filtration, and

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identifies the types of filter media used in these applications. The various separation technologies that can be achieved with nonwoven filter media are

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revealed and discussed.
Theoretical presentation
is based on flow through
porous media, and is
developed around a
nonwovens or engineered
fabrics orientation.

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Presents the latest
information on
legislative, regulatory,
environmental and
sustainability issues
affecting the nonwovens
and filtration

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industries Includes a
comprehensive discussion
of Computational Flow
Dynamics (CFD) by Dr.
George Chase, University
of Akron, USA Includes
the latest Global and

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North American marketing
statistics for filters
and filter media
prepared by Brad Kalil
of INDA.

Fluorinated ionomer
polymers form

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impermeable membranes
that conduct
electricity, properties
that have been put to
use in large-scale
electrochemical
applications,

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revolutionizing the
chlor-alkali industry
and transforming
production methods of
some of the world's
highest-production
commodity chemicals:

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chlorine, sodium hydroxide and potassium hydroxide. The use of fluorinated ionomers such as Nafion have removed the need for mercury and asbestos in

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these processes and led to a massive reduction in electricity usage in these highly energy-intensive processes.

Polymers in this group have also found uses in

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fuel-cells, metal-ion
recovery, water
electrolysis, plating,
surface treatment of
metals, batteries,
sensors, drug release
technologies, gas drying

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and humidification, and super-acid catalysis used in the production of specialty chemicals.

Walther Grot, who invented Nafion while working for DuPont, has

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written this book as a practical guide to engineers and scientists working in electrochemistry, the fuel cell industry and other areas of

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application. His book is a unique guide to this important polymer group and its applications, in membranes and other forms. The 2e expands this handbook by over a

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third, with new sections covering developments in electrolysis and membranes, additional information about the synthesis and science of the polymer group, and

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an enhanced provision of
reference data. An
essential reference for
scientists working with
electrolysis and
electrochemical
processes (the use of

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this polymer group in industrial chemistry processes is credited with a 1% reduction in global electricity usage) Covers the techniques involved in

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the growing range of applications for fluorinated ionomers, including fuel cells, batteries and drug delivery The only book on this important

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polymer group, written
by Walther Grot, the
inventor of the leading
fluorinated ionomer,
Nafion from DuPont
Membrane Modification:
Technology and

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Applications is written
for engineers,
scientists, graduate
students, and
researchers in the field
of membrane science and
technology, materials

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science, applied physics, chemistry, and environmental science. The book presents the complete range of membrane modification techniques used to

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increase efficiency of
membrane processes. The
book starts with an
examination of the use
of membrane modification
to optimize the
performance of membranes

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used in industry. It concludes by demonstrating how membrane modification can improve separation processes in industrial sectors that are

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recognized as global
polluters of water
sources. Features
Illustrates the use of
Electrochemical
Impedance Spectroscopy
(EIS) in the

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characterization of
commercial and novel
membranes Overviews
various surface
modification techniques
applied to enhance the
bulk and surface

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properties of nanofiber
membranes Covers the
factors affecting
membrane fouling and the
use of nanoparticles in
membrane modification
processes Explores the

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use of plasma treatment
for the modification of
polymeric membranes
Written by professors,
engineers, and
researchers in the
field, the book covers

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recent advances and
comprehensively
describes novel and most-
used membrane
characterization
techniques. Modification
of different materials

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and geometrics include flat-sheet, hollow-fiber, and nano-fiber membranes as well as different membrane processes such as reverse osmosis,

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membrane distillation,
gas separation,
pervaporation, and
membrane fuel cells.

Chapters contain tables,
figures, photographs,
and theoretical

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equations to aid with
reader comprehension.

An Introduction to
Filter Media -- Textiles
-- Filter Papers and
Filter Sheets -- Media
for air and gas filters

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-- Screens and Meshes --
Porous Sheets and Tubes
(excluding Membranes) --
Membranes -- Cartridges
and Special Fabrications
-- Loose Powders,
granules and fibres --

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Testing filter media.

Reactor Types and

Industrial Applications

Polymeric Membrane

Synthesis, Modification,

and Applications

Handbook of Membrane

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Reactors

Membrane Technology and
Engineering for Water
Purification

The MBR Book

*Membrane processes have wide
industrial ap This handbook reviews*

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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

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treatment, pharmaceutical, medical, food, dairy, beverage, paper, textiles concepts under development. It is intended for, and electronic industries. The existing aim to be a single source of underlying principles, membranes, membrane modules, process developments include: (1) dialysis for the

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purification of human blood (the artificial kidney), (2) sign, applications, and cost estimates. It is also electro dialysis 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

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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

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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

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reference for the entire field.

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

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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

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review of this important field. Volume 1 explores fundamental materials science, design and optimisation, beginning with a review of polymeric, dense metallic and composite membranes for membrane reactors in part one. Polymeric and nanocomposite membranes for

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membrane reactors, inorganic membrane reactors for hydrogen production, palladium-based composite membranes and alternatives to palladium-based membranes for hydrogen separation in membrane reactors are all discussed. Part two goes on to investigate zeolite,

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ceramic and carbon membranes and catalysts for membrane reactors in more depth. Finally, part three explores membrane reactor modelling, simulation and optimisation, including the use of mathematical modelling, computational fluid dynamics, artificial neural networks and non-equilibrium

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thermodynamics to analyse varied aspects of membrane reactor design and production enhancement. 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

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reactor researchers and materials scientists, chemical and biochemical manufacturers, industrial separations and process engineers, and academics in this field. Considers polymeric, dense metallic and composite membranes for membrane reactors Discusses ceramic and

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*carbon for membrane reactors in detail
Reactor modelling, simulation and
optimisation is also discussed
Engineering Aspects of Membrane
Separation and Application in Food
Processing presents an overview and
introduction to a wide range of
membrane processes, their unique*

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characteristics and challenges. In the food industry, as in many industries, membranes have an environmental advantage over conventional processes that they displace, because they are less energy intensive. The processing at near-ambient conditions also retains flavors and nutritional

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value. These advantages, together with significant reductions in the cost of membrane modules, augers well for their future not only in the dairy industry but in other parts of the food industry, such as alcohol processing, animal product processing, and fruit and vegetable processing. Chapters

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address a wide range of membranes separations in the food and beverage industries, and applications are provided that will be of value not only to food engineers but also to process engineers working in other areas. The processing of food is now a highly interdisciplinary science, and anyone

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concerned with food processing will benefit from reading this book and understanding what membrane processes of the twenty-first century have to offer.

This manual contains necessary and useful information and data in an easily accessible format relating to the use of

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membranes. Membranes are among the most important engineering components in use today, and each year more and more effective uses for membrane technologies are found - for example: water purification, industrial effluent treatment, solvent dehydration by per-vaporation, recovery of volatile

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organic compounds, protein recovery, bioseparations and many others. The pace of change in the membrane industry has been accelerating rapidly in recent years, occasioned in part by the demand of end-users, but also as a result of the investment in R&D by manufacturers. To reflect these

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changes the author has obtained the latest information from some of the leading suppliers in the business. In one complete volume this unique handbook gives practical guidance to using selected membrane processes in individual industries while also providing a useful guide to equipment

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selection and usage.

*Membrane and Desalination
Technologies*

*A Practical Guide to Membrane
Technology and Applications in Food
and Bioprocessing*

*Membranes with Functionalized
Nanomaterials*

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Polyimide Membranes Membrane Technology

The use of membranes is increasing throughout industry, and particularly the water industry. The municipal water industry, which is concerned with the provision of clean drinking water to the population, is a big user and developer of

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membrane technology which helps it to provide water free of pathogens, chemicals, odours and unwanted tastes. Municipal authorities also have to process sewage and waste water, and membranes are used extensively in these processes. The MBR Book covers all important aspects of Membrane BioReactors in

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*water and waste water treatment, from the fundamentals of the processes via design principles to MBR technologies. Industrial case studies help interpret actual results and give pointers for best practice. Useful appendices provide data on commercial membranes and international membrane organisations. * Major growth area in the*

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*water industries * Internationally-known author * Principles and practice, backed by case studies*

This book addresses the fundamentals of CO₂ storage for long-term sequestration in a subsurface geologic formation. In general, membrane gas separation can find a large room of application in flue

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gas. To achieve the development of this technology on a larger scale than which is possible in the lab we have to use membrane engineering. Consequently, greater emphasis is placed on novel materials for gas separation. Possible design strategies and role of novel materials are discussed. Additionally, the

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latest progress in design and preparation of asymmetric membranes for natural gas purification are highlighted. In fact, further development should focus on module and process design in order to bring gas separation membrane technology into commercial application. Therefore, the keys issues to propel

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current research towards industrial application are examined. Besides, the feasibility of implementing polyimide membrane for CO₂ removal under real industrial conditions and its economic viability are highlighted. In order to exhibit excellent film-forming properties, zeolite membrane and cellulose acetate

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butyrate membrane are addressed.

Interestingly, it was found that the most accurate theoretical three-phase model is arguably revised Pal model with average percentage error of 0.74%.

Advanced membranes-from fundamentals and membrane chemistry to manufacturing and applications A hands-

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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

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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);

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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

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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

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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

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separations and membranes and related fields.

Handbook of Polymer Nanocomposites for Industrial Applications summarizes the properties of polymer nanocomposites, discusses their industrial scale fabrication methods, and presents their applications for various industrial sectors at both

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experimental and theoretical models scales. The book also addresses existing challenges for the use of polymer nanocomposites in major industrial sectors. Overall, the aim of this book is to summarize the recent advancements in the use of PNCs in a variety of industry sectors. Particular attention is paid to

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those approaches that enable green and sustainable industrial developments. The legal, economical and toxicity aspects of polymer nanocomposite are also presented in detail. Comprehensively explores how polymer nanocomposites are being used to create more efficient products and devices in a variety of industry sectors Explores

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the environmental, legal, health and safety issues of using polymer nanocomposites in an industrial context Develops a roadmap to the wider commercial utilization of polymer nanocomposites Emphasizes the use of polymer nanocomposites in green and sustainable technologies

Principles and Applications of Membrane

Page 164/223

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*Bioreactors for Water and Wastewater
Treatment*

Handbook of Filter Media

*Chemical, Pharmaceutical, Food, and
Biotechnological Applications*

Membrane Handbook

*Ultrafiltration and Microfiltration
Handbook*

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Membranes play a crucial role in ensuring the optimum use and recovery of materials in manufacturing. In the process industries, they are required for

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*efficient production and
minimization of
environmental impact.
They are also essential
for the efficient
production of clean
water, a significant*

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*global issue. Membrane
Fabrication brings
together ex
Membrane Technology and
Engineering for Water
Purification, Second
Edition is written in a*

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*practical style with
emphasis on: process
description; key unit
operations; systems
design and costs; plant
equipment description;
equipment installation;*

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*safety and maintenance;
process control; plant
start-up; and operation
and troubleshooting. It
is supplemented by case
studies and engineering
rules-of-thumb. The*

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*author is a chemical
engineer with extensive
experience in the field,
and his technical
knowledge and practical
know-how in the water
purification industry*

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are summarized

*succinctly in this new
edition. This book will
inform you which
membranes to use in
water purification and
why, where and when to*

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*use them. It will help
you to troubleshoot and
improve performance and
provides case studies to
assist understanding
through real-life
examples. Membrane*

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*Technology section
updated to include
forward osmosis,
electrodialysis, and
diffusion dialysis
Hybrid Membrane Systems
expanded to cover zero*

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*liquid discharge, salt
recovery and removal of
trace contaminants*

*Includes a new section
on plant design, energy,
and economics*

This first book to offer

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*a practical overview of
zeolites and their
commercial applications
provides a practical
examination of zeolites
in three capacities.
Edited by a globally*

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*recognized and acclaimed
leader in the field with
contributions from major
industry experts, this
handbook and ready
reference introduces
such novel separators as*

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*zeolite membranes and
mixed matrix membranes.
The first part of the
book discusses the
history and chemistry of
zeolites, while the
second section focuses*

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*on separation processes.
The third and final
section treats zeolites
in the field of
catalysis. The three
sections are unified by
an examination of how*

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the unique properties of zeolites allow them to function in different capacities as an adsorbent, a membrane and as a catalyst, while also discussing their

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*impact within the
industry.*

*This book describes in
depth knowledge of
designing and operating
reverse osmosis (RO)
systems for water*

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desalination, and covers issues which will effect the probability for the long-standing success of the application. It also provides guidelines that will increase the

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*performance of seawater
RO desalination systems
by avoiding errors in
the design and operation
and suggest corrective
measures and
troubleshooting of the*

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*problems encountered
during RO operation.
This book also provides
guidelines for the best
RO design and
operational performance.
In the introductory*

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section, the book covers the history of RO along with the fundamentals, principles, transport models, and equations. Following sections cover the practical areas such

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*as pretreatment
processes, design
parameters, design
software programs (WAVE,
IMSDesign, TORAYDS2,
Lewaplust, ROAM Ver. 2.0,
Winflows etc.), RO*

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*performance monitoring,
normalization software
programs (RODataXL and
TorayTrak),
troubleshooting as well
as system engineering.
Simplified methods to*

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*use the design software
programs are also
properly illustrated and
the screenshots of the
results, methods etc.
are also given here
along with a video*

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tutorial. The final section of the book includes the frequently asked questions along with their answers.

Moreover, various case studies carried out and

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recent developments related to RO system performance, membrane fouling, scaling, and degradation studies have been analyzed. The book also has several work

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out examples, which are detailed in a careful as well as simple manner that help the reader to understand and follow it properly. The information presented in

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*some of the case studies
are obtained from
existing commercial RO
desalination plants.
These topics enable the
book to become a perfect
tool for engineers and*

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plant

*operators/technicians,
who are responsible for
RO system design,
operation, maintenance,
and troubleshooting.*

With the right system

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*design, proper
operation, and
maintenance program, the
RO system can offer high
purity water for several
years. Provides
guidelines for the*

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*optimum design and
operational performance
of reverse osmosis
desalination plants.
Presents step-by-step
procedure to design
reverse osmosis system*

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*with the latest design
software programs along
with a video tutorial
Analyzes some of the
issues faced during the
design and operation of
the reverse osmosis*

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*desalination systems,
suggest corrective
measures and its
troubleshooting.*

*Discusses reverse
osmosis desalination
pretreatment processes,*

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*design parameters,
system performance
monitoring, and
normalization software
programs Examines recent
developments related to
system performance,*

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*membrane fouling, and
scaling studies Presents
case studies related to
commercial reverse
osmosis desalination
plants Perfect training
guide for engineers and*

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*plant operators, who are
responsible for reverse
osmosis system design,
operation and
maintainance*

*Handbook of Industrial
Membranes*

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*Fundamentals of Salt
Water Desalination
The Guidebook to
Membrane Technology for
Wastewater Reclamation
Wastewater Treatment,
Pollutants, Membrane*

Page 201/223

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*Filtration, Membrane
Bioreactors, Reverse
Osmosis, Fouling, UV
Oxidation, Process
Control, Implementation,
Economics, Commercial
Plants Design*

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***Handbook Of Industrial
Membrane Technology***

Membrane technology is a rapidly developing area, with key growth accross the process sector, including biotech separation and biomedical applications (e.g. haemodialysis,

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artificial lungs), through to large scale industrial applications in the water and waste-water processing and the food and drink industries. As processes mature, and the cost of membranes continues to dramatically reduce, so their applications and use are set to expand. Process engineers

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need access to the latest information in this area to assist with their daily work and to help to develop and apply new and ever more efficient liquid processing solutions. This book covers the latest technologies and applications, with contributions from leading figures in the field.

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Throughout, the emphasis is on delivering solutions to practitioners. Real world case studies and data from leading organizations -- including Cargill, Lilly, Microbach, ITT -- mean this book delivers the latest solutions as well as a critical working reference to filtration and separation

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professionals. Covers the latest technologies and applications in this fast moving bioprocessing sector
Presents a wide range of case studies that ensure readers benefit from the hard-won experience of others, saving time, money and effort World class author team headed up by the Chair

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of Chemical Engineering at Oxford University, UK and the VP of Plant Operations and Process Technology at Cargill Corp, the food services company and largest privately owned company in the US
Contributed by multiple experts, the book covers the scientific and

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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

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design, operation and cost analysis of
pilot plants as well as scaled-up
counterparts

Table of Contents Preface

Acknowledgments for the first edition

Acknowledgments for the second
edition 1 Overview of Membrane

Science and Technology 1 2

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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

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Carrier Facilitated Transport 425 12
Medical Applications of Membranes
465 13 Other Membrane Processes
491 Appendix 523 Index 535.

Membrane science and technology is an expanding field and has become a prominent part of many activities within the process industries. It is

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relatively easy to identify the success stories of membranes such as desalination and microfiltration and to refer to others as developing areas. This, however, does not do justice to the wide field of separations in which membranes are used. No other 'single' process offers the same potential and

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versatility as that of membranes. The word separation classically conjures up a model of removing one component or species from a second component, for example a mass transfer process such as distillation. In the field of synthetic membranes, the terminology 'separation' is used in a

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wider context. A range of separations of the chemical/mass transfer type have developed around the use of membranes including distillation, extraction, absorption, adsorption and stripping, as well as separations of the physical type such as filtration. Synthetic membranes are an integral

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part of devices for analysis, energy generation and reactors (cells) in the electrochemical industry.

Handbook of Membrane Separations
Applications of Membrane
Technology for Food Processing
Industries

Chemical, Pharmaceutical, Food, and

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Biotechnological Applications, Second
Edition

Advanced Membrane Technology and
Applications

Membrane Modification

**Membranes with
Functionalized Nanomaterials:
Current and Emerging**

Page 217/223

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Research Trends in Membrane Technology provides researchers and practitioners with basic and advanced knowledge of sustainable membrane technology. The book summarizes recent progress made in novel

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functionalized nanomaterials (FNMs) used in modern membrane technology. It gives a comprehensive overview of state-of-the-art technologies in the field of nanomaterial-based membranes and provides in

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an in-depth and step-by-step way the foundational scientific knowledge on various sustainable membranes with FNMs technologies and their impact on society and in various industries. In addition,

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readers get a handbook in a compact form with various aspects of FNMs-based sustainable membranes. Explores innovative strategies to fabricate functionalized nanomaterials-based membranes Evaluates the

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**advanced functionalized
nanomaterials-based
membranes and other
transformational options
Offers a detailed spectrum of
applications of sustainable
functionalized nanomaterials-
based membranes**

Page 222/223

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**Membrane Fabrication
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Nanocomposites for Industrial
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Industrial Membrane
Separation Technology**