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Membrane Processes in Separation and Purification

Separation Process Principles with Applications Using Process Simulators, 4th Edition

Industrial Separation Processes

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Separation Process Principles

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Transport Processes and Unit Operations

A Combined Approach

Handbook of Separation Process Technology

Transport Processes and Separation Process Principles

Theories, Problems, and Solutions

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Membrane Processes in Separation and Purification PHI Learning Pvt. Ltd.

A modern separation process textbook written for advanced undergraduate and graduate level courses in chemical engineering.

Separation Process Principles with Applications Using Process Simulators, 4th Edition PHI Learning Pvt. Ltd.

The ultimate reference tool and lab partner for any student of science, durably laminated, authored and designed to fit as much info as possible in this handy 6-page format. Separate property tables are broken out for the ease of locating trends while studying and working while other pages offer

essential notes about the table's organization and history. Consistently, a best seller since it's first creation, the lamination means you will have it for life and it can survive through chem lab. Topics covered include: 11 by 17 Inch Sized Periodic Table Extensive Properties Per Element on the Main Table Color Coded Diagram of a Table Square Defining Properties Major Families of Elements Biochemical Periodic Table Example of Long Version Table Periodic Trend Tables: Electronegativity Atomic Radius 1st Ionization Potential Electron Affinity Chemical Properties & Common Uses Major Natural Isotopes with Percentage of Occurrence Industrial Separation Processes Allyn & Bacon Separation Process Essentials provides

an interactive approach for students to learn the main separation processes (distillation, absorption, stripping, and solvent extraction) using material and energy balances with equilibrium relationships, while referring readers to other more complete works when needed. Membrane separations are included as an example of non-equilibrium processes. This book reviews and builds on material learned in the first chemical engineering courses such as Material and Energy Balances and Thermodynamics as applied to separations. It relies heavily on example problems, including completely worked and explained problems followed by "Try This At Home" guided examples. Most examples have accompanying downloadable Excel spreadsheet

simulations. The book also offers a complementary website, <http://separationsbook.com>, with supplementary material such as links to YouTube tutorials, practice problems, and the Excel simulations. This book is aimed at second and third year undergraduate students in Chemical engineering, as well as professionals in the field of Chemical engineering, and can be used for a one semester course in separation processes and unit operations.

Separation Process Essentials

Pearson Educación

This concise and systematically organized text, now in its second edition, gives a clear insight into various membrane separation processes. It covers the fundamentals as well as the

recent developments of different processes along with their industrial applications and the products. It includes the basic principles, operating parameters, membrane hardware, flux equation, transport mechanism, and applications of membrane-based technologies. Membrane separation processes are largely rate-controlled separations which require rate analysis for complete understanding. Moreover, a higher level of mathematical analysis, along with the understanding of mass transfer, is also required. These are amply treated in different chapters of the book to make the students comprehend the membrane separation principles with ease. This textbook is primarily designed for undergraduate students of chemical engineering,

biochemical engineering and biotechnology for the course in membrane separation processes. Besides, the book will also be useful to process engineers and researchers. **KEY FEATURES** • Provides sufficient number of examples of industrial applications related to chemical, metallurgical, biochemical and food processing industries. • Focuses on important biomedical applications of membrane-based technologies such as blood oxygenator, controlled drug delivery, plasmapheresis, and bioartificial organs. • Includes chapter-end short questions and problems to test students' comprehension of the subject. **NEW TO THIS EDITION** • A new section on membrane cleaning is included. Membrane fabrication methods are

supplemented with additional information (Chapter 2). • Additional information on silt density index, forward osmosis and sea water desalination (Chapter 3). • Physicochemical parameters affecting nanofiltration, determination of various resistances using resistance in series model and few more industrial applications with additional short questions (Chapter 4). • Membrane cross-linking methods used in pervaporation, factors affecting pervaporation and few more applications (Chapter 9). • Membrane distillation, membrane reactor with different modules, types of membranes and reactions for membrane reactor (Chapter 13). Springer Science & Business Media Today, membranes and membrane

processes are used as efficient tools for the separation of liquid mixtures or gases in the chemical and biomedical industry, in water desalination and wastewater purification. Despite the fact that various membrane processes, like reverse osmosis, are described in great detail in a number of books, processes involving ion-exchange membranes are only described in a fragmented way in scientific journals and patents; even though large industrial applications, like electro dialysis, have been around for over half a century. Therefore, this book is emphasizing on the most relevant aspects of ion-exchange membranes. This book provides a comprehensive overview of ion-exchange membrane separation processes covering the fundamentals as well as recent

developments of the different products and processes and their applications. The audience for this book is heterogeneous, as it includes plant managers and process engineers as well as research scientists and graduate students. The separate chapters are based on different topics. The first chapter describes the relevant Electromembrane processes in a general overview. The second chapter explains thermodynamic and physicochemical fundamentals. The third chapter gives information about ion-exchange membrane preparation techniques, while the fourth and fifth chapter discusses the processes as unit operations giving examples for the design of specific plants. First work on the principles and applications of electro dialysis and

related separation processes Presently no other comprehensive work that can serve as both reference work and text book is available Book is suited for teaching students and as source for detailed information

Separation Process Principles Prentice Hall

This textbook is targeted to undergraduate students in chemical engineering, chemical technology, and biochemical engineering for courses in mass transfer, separation processes, transport processes, and unit operations. The principles of mass transfer, both diffusional and convective have been comprehensively discussed. The application of these principles to separation processes is explained. The more common separation processes

used in the chemical industries are individually described in separate chapters. The book also provides a good understanding of the construction, the operating principles, and the selection criteria of separation equipment. Recent developments in equipment have been included as far as possible. The procedure of equipment design and sizing has been illustrated by simple examples. An overview of different applications and aspects of membrane separation has also been provided. 'Humidification and water cooling', necessary in every process industry, is also described. Finally, elementary principles of 'unsteady state diffusion' and mass transfer accompanied by a chemical reaction are covered. SALIENT FEATURES : • A balanced coverage of

theoretical principles and applications. • Important recent developments in mass transfer equipment and practice are included. • A large number of solved problems of varying levels of complexities showing the applications of the theory are included. • Many end-chapter exercises. • Chapter-wise multiple choice questions. • An Instructors manual for the teachers.

PRINCIPLES AND APPLICATIONS McGraw Hill Professional

A thorough introduction to the fundamentals and applications of microscopic and macroscopic mass transfer.

Transport Processes and Unit Operations
Prentice Hall

Originally published: New York: McGraw-Hill, 1971. 2nd ed. Includes a new

introduction.

A Combined Approach Wiley

Mass transfer along with separation processes is an area that is often quite challenging to master, as most volumes currently available complicate the learning by teaching mass transfer linked with heat transfer, rather than focusing on more relevant techniques. With this thoroughly updated second edition, *Mass Transfer and Separation Processes: Principles and Applications* presents a highly thoughtful and instructive introduction to this sophisticated material by teaching mass transfer and separation processes as unique though related entities. In an ever increasing effort to demystify the subject, with this edition, the author—
Avoids more complex separation

processes Places a greater emphasis on the art of simplifying assumptions Conveys a greater sense of scale with the inclusion of numerous photos of actual installations Makes the math only as complicated as necessary while reviewing fundamental principles that may have been forgotten The book explores essential principles and reinforces the concepts with classical and contemporary illustrations drawn from the engineering, environmental, and biological sciences. The theories of heat conduction and transfer are utilized not so much to draw analogies but rather to make fruitful use of existing solutions not seen in other texts on the subject. Both an introductory resource and a reference, this important text serves environmental, biomedical, and

engineering professionals, as well as anyone wishing to gain a grasp on this subject and its increasing relevance across a number of fields. It fills a void in traditional chemical engineering literature by providing access to the principles and working practices that allow mass transfer theory to be applied to separation processes.

Handbook of Separation Process Technology Cengage Learning
Up-to-Date Coverage of All Chemical Engineering Topics—from the Fundamentals to the State of the Art Now in its 85th Anniversary Edition, this industry-standard resource has equipped generations of engineers and chemists with vital information, data, and insights. Thoroughly revised to reflect the latest technological advances and processes,

Perry's Chemical Engineers' Handbook, Ninth Edition, provides unsurpassed coverage of every aspect of chemical engineering. You will get comprehensive details on chemical processes, reactor modeling, biological processes, biochemical and membrane separation, process and chemical plant safety, and much more. This fully updated edition covers: Unit Conversion Factors and Symbols • Physical and Chemical Data including Prediction and Correlation of Physical Properties • Mathematics including Differential and Integral Calculus, Statistics, Optimization • Thermodynamics • Heat and Mass Transfer • Fluid and Particle Dynamics • Reaction Kinetics • Process Control and Instrumentation • Process Economics • Transport and Storage of Fluids • Heat

Transfer Operations and Equipment • Psychrometry, Evaporative Cooling, and Solids Drying • Distillation • Gas Absorption and Gas-Liquid System Design • Liquid-Liquid Extraction Operations and Equipment • Adsorption and Ion Exchange • Gas-Solid Operations and Equipment • Liquid-Solid Operations and Equipment • Solid-Solid Operations and Equipment • Chemical Reactors • Bio-based Reactions and Processing • Waste Management including Air, Wastewater and Solid Waste Management* Process Safety including Inherently Safer Design • Energy Resources, Conversion and Utilization* Materials of Construction Transport Processes and Separation Process Principles (includes Unit Operations)

Appropriate for one-year transport phenomena (also called transport processes) and separation processes course. First semester covers fluid mechanics, heat and mass transfer; second semester covers separation process principles (includes unit operations). The title of this Fourth Edition has been changed from Transport Processes and Unit Operations to Transport Processes and Separation Process Principles (Includes Unit Operations). This was done because the term Unit Operations has been largely superseded by the term Separation Processes which better reflects the present modern nomenclature being used. The main objectives and the format of the Fourth Edition remain the same. The sections on momentum

transfer have been greatly expanded, especially in the sections on fluidized beds, flow meters, mixing, and non-Newtonian fluids. Material has been added to the chapter on mass transfer. The chapters on absorption, distillation, and liquid-liquid extraction have also been enlarged. More new material has been added to the sections on ion exchange and crystallization. The chapter on membrane separation processes has been greatly expanded especially for gas-membrane theory. Transport Processes and Separation Process Principles Springer Science & Business Media
Today's Definitive, Undergraduate-Level Introduction to Chemical Reaction Engineering Problem-Solving For 30 years, H. Scott Fogler's Elements of

Chemical Reaction Engineering has been the #1 selling text for courses in chemical reaction engineering worldwide. Now, in *Essentials of Chemical Reaction Engineering, Second Edition*, Fogler has distilled this classic into a modern, introductory-level guide specifically for undergraduates. This is the ideal resource for today's students: learners who demand instantaneous access to information and want to enjoy learning as they deepen their critical thinking and creative problem-solving skills. Fogler successfully integrates text, visuals, and computer simulations, and links theory to practice through many relevant examples. This updated second edition covers mole balances, conversion and reactor sizing, rate laws and stoichiometry, isothermal reactor design,

rate data collection/analysis, multiple reactions, reaction mechanisms, pathways, bioreactions and bioreactors, catalysis, catalytic reactors, nonisothermal reactor designs, and more. Its multiple improvements include a new discussion of activation energy, molecular simulation, and stochastic modeling, and a significantly revamped chapter on heat effects in chemical reactors. To promote the transfer of key skills to real-life settings, Fogler presents three styles of problems: Straightforward problems that reinforce the principles of chemical reaction engineering Living Example Problems (LEPs) that allow students to rapidly explore the issues and look for optimal solutions Open-ended problems that encourage students to use inquiry-based learning to

practice creative problem-solving skills
About the Web Site
(umich.edu/~elements/5e/index.html)
The companion Web site offers extensive enrichment opportunities and additional content, including Complete PowerPoint slides for lecture notes for chemical reaction engineering classes Links to additional software, including Polymath, MATLAB, Wolfram Mathematica, AspenTech, and COMSOL Multiphysics Interactive learning resources linked to each chapter, including Learning Objectives, Summary Notes, Web Modules, Interactive Computer Games, Computer Simulations and Experiments, Solved Problems, FAQs, and links to LearnChemE Living Example Problems that provide more than 75 interactive simulations, allowing students to explore

the examples and ask “what-if ” questions Professional Reference Shelf, containing advanced content on reactors, weighted least squares, experimental planning, laboratory reactors, pharmacokinetics, wire gauze reactors, trickle bed reactors, fluidized bed reactors, CVD boat reactors, detailed explanations of key derivations, and more Problem-solving strategies and insights on creative and critical thinking Register your product at informit.com/register for convenient access to downloads, updates, and/or corrections as they become available. *Theories, Problems, and Solutions* Prentice Hall Master the principles and applications of today’s renewable energy sources and systems Written by a team of recognized

experts and educators, this authoritative textbook offers comprehensive coverage of all major renewable energy sources. The book delves into the main renewable energy topics such as solar, wind, geothermal, hydropower, biomass, tidal, and wave, as well as hydrogen and fuel cells. By stressing real-world relevancy and practical applications, *Fundamentals and Applications of Renewable Energy* helps prepare students for a successful career in renewable energy. The text contains detailed discussions on the thermodynamics, heat transfer, and fluid mechanics aspects of renewable energy systems in addition to technical and economic analyses. Numerous worked-out example problems and over 850 end-of-chapter review questions reinforce main concepts, formulations,

design, and analysis. Coverage includes: Renewable energy basics Thermal sciences overview Fundamentals and applications of Solar energy Wind energy Hydropower Geothermal energy Biomass energy Ocean energy Hydrogen and fuel cells • Economics of renewable energy • Energy and the environment

Routledge Handbook of the Horn of Africa Springer Nature

This book presents recent research in the field of transport phenomena in porous materials, including heat and mass transfer, drying and adsorption. Covering a comprehensive range of topics related to the transport phenomenon in engineering (including state-of-the-art, theory and technological applications), it discusses some of the most important theoretical advances,

computational developments and applications in porous materials domain. Providing an update on the current state of knowledge, this self-contained reference resource will appeal to scientists, researchers and engineers in a variety of disciplines, such as chemical, civil, agricultural and mechanical engineering.

Periodic Table Advanced Cambridge University Press

The present book contains a comparison of existing theoretical models developed in order to describe membrane separation processes. In general, the permeation equations resulting from these models give inaccurate predictions of the mutual effects of the permeants involved, due to the simplifications adopted in their derivation. It is

concluded that an optimum description of transport phenomena in tight (diffusion-type) membranes is achieved with the "solution-diffusion" model. According to this model each component of a fluid mixture to be separated dissolves in the membrane and passes through by diffusion in response to its gradient in the chemical potential. A modified Flory-Huggins equation has been derived to calculate the solubility of the permeants in the membrane material. Contrary to the original Flory-Huggins equation, the modified equation accounts for the large effect on solubility of crystallinity and elastic strain of the polymer chains by swelling. The equilibrium sorption of liquids computed with this equation was found to be in good agreement with experimental

results. Also, the sorption of gases in both rubbery and glassy polymers could be described quantitatively with the modified Flory-Huggins equation without any need of the arbitrary Langmuir term, as required in the conventional "dual-mode" sorption model. Furthermore, fewer parameters are required than with the at least identical accuracy.

Mass Transfer and Separation

Processes Courier Corporation
The subject of transport phenomena has long been thoroughly and expertly addressed on the graduate and theoretical levels. Now *Transport Phenomena and Unit Operations: A Combined Approach* endeavors not only to introduce the fundamentals of the discipline to a broader, undergraduate-level audience but also to apply itself to

the concerns of practicing engineers as they design, analyze, and construct industrial equipment. Richard Griskey's innovative text combines the often separated but intimately related disciplines of transport phenomena and unit operations into one cohesive treatment. While the latter was an academic precursor to the former, undergraduate students are often exposed to one at the expense of the other. *Transport Phenomena and Unit Operations* bridges the gap between theory and practice, with a focus on advancing the concept of the engineer as practitioner. Chapters in this comprehensive volume include: *Transport Processes and Coefficients*, *Frictional Flow in Conduits*, *Free and Forced Convective Heat Transfer*, *Heat*

Exchangers Mass Transfer; Molecular Diffusion Equilibrium Staged Operations Mechanical Separations Each chapter contains a set of comprehensive problem sets with real-world quantitative data, affording students the opportunity to test their knowledge in practical situations. Transport Phenomena and Unit Operations is an ideal text for undergraduate engineering students as well as for engineering professionals.

Fundamentals of Chemical Engineering Thermodynamics, SI Edition John Wiley & Sons

Transport Processes and Separation Process Principles(includes Unit Operations)Prentice Hall

Elements of Chemical Reaction Engineering Prentice Hall

With a detailed analysis of the mass

transport through membrane layers and its effect on different separation processes, this book provides a comprehensive look at the theoretical and practical aspects of membrane transport properties and functions. Basic equations for every membrane are provided to predict the mass transfer rate, the concentration distribution, the convective velocity, the separation efficiency, and the effect of chemical or biochemical reaction taking into account the heterogeneity of the membrane layer to help better understand the mechanisms of the separation processes. The reader will be able to describe membrane separation processes and the membrane reactors as well as choose the most suitable membrane structure for separation and

for membrane reactor. Containing detailed discussion of the latest results in transport processes and separation processes, this book is essential for chemistry students and practitioners of chemical engineering and process engineering. Detailed survey of the theoretical and practical aspects of every membrane process with specific equations Practical examples discussed in detail with clear steps Will assist in planning and preparation of more efficient membrane structure separation

Transport Processes and Separation Technologies PHI Learning Pvt. Ltd. Surveys the selection, design, and operation of most of the industrially important separation processes. Discusses the underlying principles on which the processes are based, and

provides illustrative examples of the use of the processes in a modern context. Features thorough treatment of newer separation processes based on membranes, adsorption, chromatography, ion exchange, and chemical complexation. Includes a review of historically important separation processes such as distillation, absorption, extraction, leaching, and crystallization and considers these techniques in light of recent developments affecting them.

[Transport Processes and Separation Process Principles \(includes Unit Operations\)](#) John Wiley & Sons 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.

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