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Mass Transfer and Separation Processes McGraw-Hill Science, Engineering & Mathematics

This textbook is targetted 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 indus-try, 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.

Unit Operations in Food Engineering John Wiley & Sons

Completely rewritten to enhance clarity, this third edition provides engineers with a strong understanding of the field. With the help of an additional co-author, the text presents new information on bioseparations throughout the chapters. A new chapter on mechanical separations covers settling, filtration, and centrifugation, including mechanical separations in biotechnology and cell lysis. Boxes help highlight fundamental equations. Numerous new examples and exercises are integrated throughout as well. In addition, frequent references are made to the software products and simulators that will help engineers

find the solutions they need.

Essentials of Chemical Reaction Engineering
Elsevier

Learn and apply heat and mass transfer principles to real-world chemical engineering problems This hands-on textbook provides a concept-based introduction to heat and mass transfer procedures and lays out the foundation to practical applications in a broad range of fields relevant to chemical and biochemical processing. Written by a recognized academic and experienced author, Heat and Mass Transfer for Chemical Engineers: Principles and Applications contains comprehensive discussions on conductive and diffusive processes and the engineering correlations between momentum, heat, and mass transfer. Readers will get Mathematica workbooks that facilitate calculations and explore trends. The book refers extensively to Perry's Chemical Engineers' Handbook, Ninth Edition for data and correlations. Coverage includes: Introduction to heat and mass transfer Thermal conductivity Steady-state, one-dimensional heat conduction Combined conductive and convective heat transfer Multidimensional and transient heat conduction Convective heat transfer Thermal design of heat exchangers Fick ' s law and diffusivity One-dimensional, multi-dimensional, and transient diffusion Convective mass transfer Design of packed gas absorption and stripping columns Multicomponent diffusion and coupled mass transfer processes Mass transfer with chemical reaction

Transport Phenomena and Unit Operations

McGraw Hill Professional

Chemical Engineering and Chemical Process Technology is a theme component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. Chemical engineering is a branch of engineering, dealing with processes in which materials undergo changes in their physical or chemical state. These changes may concern size, energy content, composition and/or other application properties. Chemical engineering deals

with many processes belonging to chemical industry or related industries (petrochemical, metallurgical, food, pharmaceutical, fine chemicals, coatings and colors, renewable raw materials, biotechnological, etc.), and finds application in manufacturing of such products as acids, alkalis, salts, fuels, fertilizers, crop protection agents, ceramics, glass, paper, colors, dyestuffs, plastics, cosmetics, vitamins and many others. It also plays significant role in environmental protection, biotechnology, nanotechnology, energy production and sustainable economical development. The Theme on Chemical Engineering and Chemical Process Technology deals, in five volumes and covers several topics such as:

Fundamentals of Chemical Engineering; Unit Operations – Fluids; Unit Operations – Solids; Chemical Reaction Engineering; Process Development, Modeling, Optimization and Control; Process Management; The Future of Chemical Engineering; Chemical Engineering Education; Main Products, which are then expanded into multiple subtopics, each as a chapter. These five volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

Bioreaction Engineering Principles
Woodhead Publishing

In order to successfully produce food products with maximum quality, each stage of processing must be well-designed. Unit Operations in Food Engineering systematically presents the basic information necessary to design food processes and the equipment needed to carry them out. It covers

the most common food engineering unit operations in detail, in Perry's Chemical Engineers' Handbook, 9th Edition Prentice Hall

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.

Introduction to Adsorption John Wiley & Sons

Engineering Principles of Unit Operations in Food Processing, volume 1 in the Woodhead Publishing Series, In Unit Operations and Processing Equipment in the Food Industry series, presents basic principles of food engineering with an

emphasis on unit operations, such as heat transfer, mass transfer and fluid mechanics. - Brings new opportunities in the optimization of food processing operations - Thoroughly explores applications of food engineering to food processes - Focuses on unit operations from an engineering viewpoint

Unit Operations in Food Processing
Prentice Hall

Specifically developed for food engineers, this is an in-depth reference book that focuses on transport phenomena in food preservation. First it reviews the fundamental concepts regarding momentum, heat, and mass transfer. Then the book examines specific applications of these concepts into a variety of traditional and novel processes and products.

Transport Phenomena in Biological Systems Springer

This best selling text prepares students to formulate and solve material and energy balances in chemical process systems and lays the foundation for subsequent courses in chemical engineering. The text provides a realistic, informative, and positive introduction to the practice of chemical engineering. The Integrated Media Edition update provides a stronger link between the text, media supplements, and new student workbook.

Elements of Chemical Reaction Engineering EOLSS Publications

This long awaited second edition of a popular textbook has a simple and direct approach to the diversity and complexity of food processing. It explains the principles of operations and illustrates them by individual

processes. The new edition has been enlarged to include sections on freezing, drying, psychrometry, and a completely new section on mechanical refrigeration. All the units have been converted to SI measure. Each chapter contains unworked examples to help the student gain a grasp of the subject, and although primarily intended for the student food technologist or process engineer, this book will also be useful to technical workers in the food industry

Chemical Engineering and Chemical Process Technology - Volume V
Prentice Hall

Design and Synthesis of Membrane Separation Processes provides a novel method of design and synthesis for membrane separation. While the main focus of the book is given to gas separation and pervaporation membranes, the theory has been developed in such a way that it is general and valid for any type of membrane. The method, which uses a graphical technique, allows one to calculate and visualize the change in composition of the retentate (non-permeate) phase. This graphical approach is based on Membrane Residue Curve Maps. One of the strengths of this approach is that it is exactly analogous to the method of Residue Curve Maps that has proved so successful in distillation system synthesis and design.

Separation Process Principles John Wiley & Sons

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.

Elementary Principles of Chemical Processes, 3rd Edition 2005 Edition Integrated Media and Study Tools, with Student Workbook Wiley

Global oilseeds industry is expected to expand in the future but would also constitute a platform for a variety of other products from processing waste such as protein meals and aromatic compounds.

Edible Oils: Extraction, Processing, and Applications intends to present up to date technologies that are currently used for the extraction and refining of Edible Oils while proposing potential applications for its derivatives. This contribution pushes to consider market transformation driven by environmental concerns and customer ' s envy to bring quality attributes, energy efficiency and waste disposal into the heart of innovation. This work is aimed at professionals and academics including researchers, engineers and managers engaged in food and green engineering disciplines and ambitions to stand as a reference for students and lecturers. The readers will find a wealth of knowledge about the fundamentals of unit operations such as extraction and separation while presenting concepts of biorefinery for product and value creation from certain edible seeds. Novelties includes novel approaches for green solvent development in extraction, and examples of life cycle

assessment of production systems for certain vegetable oils comprising product, service and waste management systems. Furthermore, this book focuses attention to production, processing, and current applications of palm oil, as an important commodity in Asia and addresses global market changes and important factors that influence its future prospects.

Transport Processes and Separation Process Principles (Includes Unit Operations) John Wiley & Sons Separation Process Principles with Applications Using Process Simulator, 4th Edition is the most comprehensive and up-to-date treatment of the major separation operations in the chemical industry. The 4th edition focuses on using process simulators to design separation processes and prepares readers for professional practice. Completely rewritten to enhance clarity, this fourth edition provides engineers with a strong understanding of the field. With the help of an additional co-author, the text presents new information on bioseparations throughout the chapters. A new chapter on mechanical separations covers settling, filtration and centrifugation including mechanical separations in biotechnology and cell lysis. Boxes help highlight fundamental equations. Numerous new examples and exercises are integrated throughout as well.

Conceptual Design of Chemical Processes Elsevier

This text explains the concepts behind process design. It uses a case study approach, guiding readers through realistic design problems, and referring back to these cases at the end of each chapter. Throughout, the author uses shortcut techniques that allow engineers to obtain the whole

focus for a design in a very short period (generally less than two days). Transport Processes and Unit Operations CRC Press

Fundamentals of Chemical Engineering Thermodynamics is the clearest and most well-organized introduction to thermodynamics theory and calculations for all chemical engineering undergraduates. This brand-new text makes thermodynamics far easier to teach and learn. Drawing on his award-winning courses at Penn State, Dr. Themis Matsoukas organizes the text for more effective learning, focuses on "why" as well as "how," offers imagery that helps students conceptualize the equations, and illuminates thermodynamics with relevant examples from within and beyond the chemical engineering discipline. Matsoukas presents solved problems in every chapter, ranging from basic calculations to realistic safety and environmental applications.

Fundamentals of Chemical Engineering Thermodynamics Prentice Hall

The All-in-One Guide to Mass Transport Phenomena: From Theory to Examples and Computation Mass transfer processes exist in practically all engineering fields and many biological systems; understanding them is essential for all chemical engineering students, and for practitioners in a broad range of practices, such as biomedical engineering, environmental engineering, material engineering, and the like. Mass Transfer Processes combines a modern, accessible introduction to modeling and computing these processes with demonstrations of their application in designing reactors and separation systems. P. A. Ramachandran 's integrated approach balances all the knowledge readers need to be effective, rather than merely paying

lip service to some crucial topics. He covers both analytical and numerical solutions to mass transfer problems, demonstrating numerical problem-solving with widely used software packages, including MATLAB and CHEBFUN. Throughout, he links theory to realistic examples, both traditional and contemporary. Theory, examples, and in-depth coverage of differential, macroscopic, and mesoscopic modeling Physical chemistry aspects of diffusion phenomena Film models for calculating local mass transfer rates and diffusional interaction in gas – solid and gas – liquid reaction systems Application of mass transfer models in rate-based separation processes, and systems with simultaneous heat and mass transfer Convective mass transfer: empirical correlation, internal and external laminar flows, and turbulent flows Heterogeneous systems, from laminar flow reactors, diffusion-reaction models, reactive membranes, and electrochemical reactors Computations of mass transfer effects in multicomponent systems Solid – gas noncatalytic reactions for chemical, metallurgical, environmental, and electronic processes Applications in electrochemical and biomedical systems Design calculations for humidification, drying, and condensation systems and membrane-based separations Analysis of adsorption, chromatography, electrodialysis, and electrophoresis Transport Phenomena in Food Processing PHI Learning Pvt. Ltd. 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.

Mass Transfer Processes John Wiley & Sons

This text is intended to provide students with a solid grounding in basic principles of biochemical engineering. Beginning with a historical review and essential concepts of biochemical engineering in part I, the next three parts are devoted to a comprehensive discussion of various topics in the areas of life sciences, kinetics of biological reactions and engineering principles. Having described the different building blocks of life, microbes, metabolism

and bioenergetics, the book proceeds to explain enzymatic kinetics and kinetics of cell growth and product formation. The engineering principles cover transport phenomena in bioprocess systems and various bioreactors, downstream processing and environmental technology. Finally, the book concludes with an introduction to recombinant DNA technology. This textbook is designed for B.Tech. courses in biotechnology, B.Tech. courses in chemical engineering and other allied disciplines, and M.Sc. courses in biotechnology.

Unit Operations-II Prentice Hall

The comprehensive, unified, up-to-date guide to transport and separation processes Today, chemical engineering professionals need a thorough understanding of momentum, heat, and mass transfer processes, as well as separation processes. Transp