OMB No. 4800196253865

Mass Transfer Operations Absorption And Extraction

What is Gas Absorption? (Lec041) Absorption working principle, Chemical Engineering, Mass Transfer Principles and Modern Application of Mass Transfer Operations by Jaime Benitez (Book Review) Operating Line equation and Stages for Tray Absorption Two Film Theory Mass Transfer (Lec029) Mass Transfer Operations (Distillation-1) Absorber design Recommended Mass Transfer Reference: Books and e-Books Used (Lec 005) Lecture 08 - Fundamentals to mass transfer. Lecture 57: Fundamentals of absorption and stripping for natural gas processing gas absorption lab Simplifying Fick's law and lung gas exchange Introduction to Drying |Mass Transfer Operations| Heat \u0026 Mass Transfer - Fick's First Law and Thin Film Diffusion Operation of an Absorption Column (Interactive Simulation) Absorption - Diagram Types of Mass Transfer Operations | Evaporation | Drying | Distillation | Absorption | Adsorption | GAS ABSORPTION

Absorption & Stripping
Chemical Engineering and Chemical Process Technology - Volume II
Membrane Engineering for the Treatment of Gases: Gas-separation problems combined with membrane reactors
Mass Transfer Operations for the Practicing Engineer
International Series of Monographs in Chemical Engineering
Mass Transfer and Absorbers
Mass Transfer
Principles and Modern Applications of Mass Transfer Operations
Particle Technology and Separation Processes
Introduction to Computational Mass Transfer
Mass Transfer in Engineering Practice
For Absorption, Desorption, Rectification and Direct Heat Transfer
Mass Transfer Study of Bubbling in Relation to Distillation and Gas Absorption
Fluid Mechanics, Heat Transfer, and Mass Transfer
With Applications to Chemical Engineering
Separation Process Engineering
Volume I: Two-Phase Systems. Volume II: Three-Phase Systems
Heat and Mass Transfer for Chemical Engineers: Principles and Applications
Principles and Modern Applications of Mass Transfer Operations
Absorption
Chemical separation processes - measurement and evaluation of fluid dynamics and mass transfer in packed columns

Mass Transfer Operations Absorption And Extraction ***OMB No. 4800196253865 edited by***

KERR CRISTINA

Absorption & Stripping EOLSS Publications
The Comprehensive Introduction to Standard and Advanced Separation for Every Chemical Engineer Separation Process Engineering, Second Edition helps readers thoroughly master both standard equilibrium staged separations and the latest new processes. The author explains key separation process with exceptional clarity, realistic examples, and end-of-chapter simulation exercises using Aspen Plus. The book starts by reviewing core concepts, such as equilibrium and unit operations; then introduces a step-by-step process for solving separation problems. Next, it introduces each leading processes, including advanced processes such as membrane separation, adsorption, and chromatography. For each process, the author presents essential principles, techniques, and equations, as well as detailed examples. Separation Process Engineering is the new, thoroughly updated edition of the author's previous book, Equilibrium Staged Separations. Enhancements include improved organization, extensive new coverage, and more than 75% new homework problems, all tested in the author's Purdue University classes. Coverage includes Detailed problems with real data, organized in a common format for easier understanding Modular simulation exercises that support courses taught with simulators without creating confusion in courses that do not use them Extensive new coverage of membrane separations, including gas permeation, reverse osmosis, ultrafiltration, pervaporation, and key applications A detailed introduction to adsorption, chromatography and ion exchange: everything students need to understand advanced work in these areas Discussions of standard equilibrium stage processes, including flash distillation, continuous column distillation, batch distillation, absorption, stripping, and extraction

Chemical Engineering and Chemical Process Technology - Volume II John Wiley & Sons
Get Cutting-Edge Coverage of All Chemical Engineering Topics—from Fundamentals to the Latest Computer Applications First published in 1934, Perry's Chemical Engineers' Handbook has equipped generations of engineers and chemists with an expert source of chemical engineering information and data. Now updated to reflect the latest technology and processes of the new millennium, the Eighth Edition of this classic guide provides unsurpassed coverage of every aspect of chemical engineering-from fundamental principles to chemical processes and equipment to new computer applications. Filled with over 700 detailed illustrations, the Eighth Edition of Perry's Chemcial Engineering Handbook features: Comprehensive tables and charts for unit conversion A greatly expanded section on physical and chemical data New to this edition: the latest advances in distillation, liquid-liquid extraction, reactor modeling, biological processes, biochemical and membrane separation processes, and chemical plant safety practices with accident case histories Inside This Updated Chemical Engineering Guide - Conversion Factors and Mathematical Symbols • Physical and Chemical Data • Mathematics • Thermodynamics • Heat and Mass Transfer • Fluid and Particle Dynamics Reaction Kinetics • Process Control • Process Economics • Transport and Storage of Fluids • Heat

Transfer 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 • Size Reduction and Size Enlargement • Handling of Bulk Solids and Packaging of Solids and Liquids • Alternative Separation Processes • And Many Other Topics!

Membrane Engineering for the Treatment of Gases: Gas-separation problems combined with membrane reactors Springer

Packed bed columns are largely employed for absorption, desorption, rectification and direct heat transfer processes in chemical and food industry, environmental protection and also processes in thermal power stations like water purification, flue gas heat utilization and SO2 removal. These Separation processes, are estimated to account for 40%-70% of capital and operating costs in process industry. Packed bed columns are widely employed in this area. Their usage also for direct heat transfer between gas and liquid, enlarge their importance. They are the best apparatuses, from thermodynamical point of view, for mass and heat transfer processes between gas and liquid phase. Their wide spreading is due to low capital investments and operating costs. Since 1995 there has not been published a specialised book in this area, and this is a period of quick development of packed columns. Packed Bed Columns reflects the state of this field including the author's experience on creating and investigating of new packings, column internals and industrial columns. Considers the theories of mass transfer processes and shows how they help the construction of highly effective packings Complete information about the performance characteristics of different modern types of highly effective packings Considers the models for calculation and areas of their application

Mass Transfer Operations for the Practicing Engineer John Wiley & Sons

In A Simple And Systematic Manner, This Book Presents An Exhaustive Account Of Various Mass Transfer Operations Involved In Chemical Engineering.Emphasising The Basic Concepts And Techniques, The Book Discusses In Detail Material And Energy Balances, Distillation, Absorption And Stripping And Extraction.The Book Also Explains The Relevant Aspects Of Equipment Design.Recent Developments Like Permeation, Ion Exchange And Froth Floatation Have Also Been Discussed.A Large Number Of Digital Computer Programs Are Included To Illustrate Computer-Aided Techniques.Several Solved Examples And Practice Problems Are Presented In Each Chapter To Illustrate The Theory.With All These Features, This Is An Ideal Text For Undergraduate Chemical Engineering Students. Practising Engineers And Students Of Pharmacy And Metallurgy Would Also Find The Book A Useful Reference Source.

International Series of Monographs in Chemical Engineering Royal Society of Chemistry

In conjunction with the work on interfacial area and contact time, an investigation was carried out to study the factors affecting mass transfer coefficients in vapor-liquid contacting. Measurements of point efficiency on the distillation of a systems of acetone and water determined both the liquid and vapor mass transfer coefficients under various operating conditions. The study was conducted on a 4" diameter column using the same type of single-slotted 1.5" diameter cap employed in the previous work. The range of physical properties and operating variables included: vapor rate: G=5000 to 25,000 lbs./sq.ft.(hr.); liquid rate: L=500 to 3,600 lbs./sq.ft.(hr.) ; vapor Reynolds number: 6400 to 24,100; liquid Reynolds number: 35 to 800 ; vapor Schmidt number: 0.27 to 0.42; liquid Schmidt number: 50 to 330. Both vapor and liquid mass transfer coefficients were correlated as "jD" factors, with their respective Reynolds numbers. The equations developed were: [....]. In combination with the results on interfacial area and contact time, a generalized correlation for point efficiency data reported in the literature (30,53) and found it to be in excellent agreement. Based upon analysis of this and other studies reported in the literature (21,22) an explanation of the mechanisms involved in bubble plate mass transfer operations was presented. Since the efficiencies measured in this study were uniformly high, even in the absence of a froth zone, it was indicated that a substantial portion of the mass transfer occurring on a bubble cap plate takes place in the bubble formation region.

Mass Transfer and Absorbers

John Wiley & Sons

This book gives a practical account of the modern theory of calculation of absorbers for binary and multicomponent physical absorption and absorption with simultaneous chemical reaction. The book consists of two parts: the theory of absorption and the calculation of absorbers. Part I covers basic knowledge on diffusion and the theory of mass transfer in binary and multicomponent systems. Significant stress is laid on diffusion theory because this forms the basis for the absorption process. In the next chapters the fundamentals of simultaneous mass transfer and chemical reaction, the theory of the desorption of gases from liquids and the formulation of differential mass balances are discussed. Part II is devoted to the calculation of absorbers and the classification of absorbers. The chapters present calculation methods for the basic types of absorber with a detailed analysis of the calculation methods for packed, plate and bubble columns. The authors illustrate the presented material with a large number of examples, starting with simple ones for binary systems and ending with column calculation for multicomponent systems.

Mass Transfer

McGraw Hill Professional

This book offers several solutions or approaches in solving mass transfer problems for different practical chemical engineering applications: measurements of the diffusion coefficients, estimation of the mass transfer coefficients, mass transfer limitation in separation processes like drying, extractions, absorption, membrane processes, mass transfer in the microbial fuel cell design, and problems of the mass transfer coupled with the heterogeneous combustion. I believe this book can provide its readers with interesting ideas and inspirations or direct solutions of their particular problems.

Principles and Modern Applications of Mass Transfer Operations

John Wiley & Sons

Mass transfer describes the net movement of mass from one location, usually meaning stream, phase, fraction or component, to another. Mass transfer happens in many processes, such as absorption, evaporation, adsorption, drying, precipitation, membrane filtration, and distillation. Mass transfer is used by different scientific disciplines for different processes and mechanisms. The phrase is commonly used in engineering for physical processes that involve diffusive and convective transport of chemical species within physical systems. The theory of mass transfer allows for the computation of mass flux in a system and the distribution of the mass of different species over time and space in such a system, also when chemical reactions are

present. The purpose of such computations is to understand, and possibly design or control, such a system. Some usual phenomenon of mass transfer processes are the evaporation of water from a pond to the atmosphere, the purification of blood in the kidneys and liver, and the distillation of alcohol. In industrial processes, mass transfer operations include separation of chemical components in distillation columns. Mass transfer is frequently attached to additional transport processes, such as in industrial cooling towers. These towers combine heat transfer to mass transfer by sanctioning hot water to flow in dealings with hotter air and evaporate as it grips heat from the air. This book entitled Mass Transfer in Chemical Engineering Processes compromises several approaches in solving mass transfer problems for different practical chemical engineering applications. The book should be of great importance to its readers with interesting ideas and inspirations or direct solutions of their particular problems.

Particle Technology and Separation Processes BoD – Books on Demand

Osmotically driven membrane processes (ODMPs) including forward osmosis (FO) and pressure-retarded osmosis (PRO) have attracted increasing attention in fields such as water treatment, desalination, power generation, and life science. In contrast to pressure-driven membrane processes, e.g., reverse osmosis, which typically employs applied high pressure as driving force, ODMPs take advantages of naturally generated osmotic pressure as the sole source of driving force. In light of this, ODMPs possess many advantages over pressure-driven membrane processes. The advantages include low energy consumption, ease of equipment maintenance, low capital investment, high salt rejection, and high water flux. In the past decade, over 300 academic papers on ODMPs have been published in a variety of application fields. The number of such publications is still rapidly growing. The ODMPs' approach, fabrications, recent development and applications in wastewater treatment, power generation, seawater desalination, and gas absorption are presented in this book.

Introduction to Computational Mass Transfer Prentice Hall

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

Mass Transfer in Engineering Practice

Asian Books Private Limited

The new subtitle of Volume 2, reflects both the emphasis of the new edition and the importance of these topics in chemical engineering. It contains new chapters on, 'Adsorption', 'ion exchange', 'Chromatographic separations' and 'Membrane separations'. This volume is concerned with the physical nature of the processes that take place in industrial units, and in particular, with the factors that influence the rate of transfer of material. Particle technology which relates to the basic properties of systems of particles and their preparation by comminution, is covered in Chapters 1 and 2. Subsequent chapters deal with the interaction between fluids and particles under varying conditions. Fluid-solids separation processes are discussed in the chapters on, 'Sedimentation', 'Filtration', 'Gas Cleaning' and 'Centrifugal Separations'. The chapters on Leaching, Drying and Crystallisation are concerned with the mass transfer from solids; and Distillation, Gas Absorption and Liquid-Liquid Extraction on mass transfer in fluids. This volume, along with the rest of the series, will continue to be a valuable text, both for those teaching and studying chemical engineering and for scientists and engineers in industry.

For Absorption, Desorption, Rectification and Direct Heat Transfer

Wiley Global Education

This book offers an easy-to-understand introduction to the computational mass transfer (CMT) method. On the basis of the contents of the first edition, this new edition is characterized by the following additional materials. It describes the successful application of this method to the simulation of the mass transfer process in a fluidized bed, as well as recent investigations and computing methods for predictions for the multi-component mass transfer process. It also demonstrates the general issues concerning computational methods for simulating the mass transfer of the rising bubble process. This new edition has been reorganized by moving the preparatory materials for Computational Fluid Dynamics (CFD) and Computational Heat Transfer into appendices, additions of new chapters, and including three new appendices on, respectively, generalized representation of the two-equation model for the CMT, derivation of the equilibrium distribution function in the lattice-Boltzmann method, and derivation of the Navier-Stokes equation using the lattice-Boltzmann model. This book is a valuable resource for researchers and graduate students in the fields of computational methodologies for the numerical simulation of fluid dynamics, mass and/or heat transfer involved in separation processes (distillation, absorption, extraction, adsorption etc.), chemical/biochemical reactions, and other related processes.

Mass Transfer Study of Bubbling in Relation to Distillation and Gas Absorption McGraw Hill Professional

Mass Transfer OperationsNew Age International

Fluid Mechanics, Heat Transfer, and Mass Transfer Nirali Prakashan

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.

With Applications to Chemical Engineering

John Wiley & Sons
Mass Transfer and Absorbers deals with absorption and mass transfer processes and the factors to consider in designing absorbers. Calculations are supported by a uniform, generalized process driving force, complying with Maxwell's equation, and the coefficients are made as independent as possible in terms of the kind of diffusion and of the values of the concentrations. This volume is comprised of seven chapters and begins with an overview of the general principles of diffusional mass transfer, absorption and stripping, and equilibrium between gas and liquid phases. Steady-state mass transfer by diffusion is then discussed, along with mass transfer in a single phase (forced flow and unforced flow). Subsequent chapters explore design considerations for mass transfer equipment and related problems; adsorption accompanied by a chemical reaction; and problems relating to hydrodynamics. The final chapter is devoted to some practical issues, including economic flow velocity and mechanical features of packed, plate, and spray tower designs. This book is intended for practicing designers and engineers.

Separation Process Engineering

Nova Publishers
This book addresses the specific needs of undergraduate chemical engineering students for the two courses in Mass Transfer I and Mass Transfer II. It is also suitable for a course in Downstream Processing for biotechnology students. This self-contained textbook is designed to provide single-volume coverage of the full spectrum of techniques for chemical separations. The operations covered include vapour distillation, fluid adsorption, gas absorption, liquid extraction, solid leaching, gas humidification, solid drying, foam separation, solution crystallization, metal alloying, reverse osmosis, molecular sieves, electrodialysis, and ion exchange. The text also discusses emerging applications such as drug delivery, gel electrophoresis, bleaching, membrane separations, polymer devolatilization, solution crystallization, and gas chromatography. Equipment selection is discussed for different operations. A table of industrial applications for each and every mass transfer unit operation is provided. The worked examples illustrate problems from chemical process and biotechnology industries. Review questions encourage critical thinking, and end-of-chapter problems emphasize grasping of the fundamentals as well as illustrate applications of theory to a wide variety of scenarios. KEY FEATURES • Includes several case studies ranging from manufacture of vitamin C, prilling tower to granulate urea to vanaspati discolouration and wilting of the lettuce. • Introduces generalized Fick’s law of diffusion. • Discusses hollow fibre mass exchangers. • Introduces new concepts such as cosolvent factor, Z step procedure for multistage cross-current extraction.
Volume I: Two-Phase Systems. Volume II: Three-Phase Systems Mass Transfer Operations
This broad-based book covers the three major areas of Chemical Engineering. Most of the books in the market involve one of the individual areas, namely, Fluid Mechanics, Heat Transfer or Mass Transfer, rather than all the three. This book presents this material in a single source. This avoids the user having to refer to a number of books to obtain information. Most published books covering all the three areas in a single source emphasize theory rather than practical issues. This book is written with emphasis on practice with brief theoretical concepts in the form of questions and answers, not adopting stereo-typed question-answer approach practiced in certain books in the market, bridging the two areas of theory and practice with respect to the core areas of chemical engineering. Most parts of the book are easily understandable by those who are not experts in the field. Fluid Mechanics chapters include basics on non-Newtonian systems which, for instance find importance in polymer and food processing, flow through piping, flow measurement, pumps, mixing technology and fluidization and two phase flow. For example it covers types of pumps and valves, membranes and areas of their use, different equipment commonly used in chemical industry and their merits and drawbacks. Heat Transfer chapters cover the basics involved in conduction, convection and radiation, with emphasis on insulation, heat exchangers, evaporators, condensers, reboilers and fired heaters. Design methods, performance, operational issues and maintenance problems are highlighted. Topics such as heat pipes, heat pumps, heat tracing, steam traps, refrigeration, cooling of electronic devices, NOx control find place in the book. Mass transfer chapters cover basics such as diffusion, theories, analogies, mass transfer coefficients and mass transfer with chemical reaction, equipment such as tray and packed columns, column internals including structural packings, design, operational and installation issues, drums and separators are discussed in good detail. Absorption, distillation, extraction and leaching with applications and design methods, including emerging practices involving Divided Wall and Petluk column arrangements, multicomponent separations, supercritical solvent extraction find place in the book.
Heat and Mass Transfer for Chemical Engineers: Principles and Applications Elsevier
In the recent decades, efficiency enhancement of refineries and chemical plants has been become a focus of research and development groups. Use of nanofluids in absorption, regeneration, liquid-liquid extraction and membrane processes can lead to mass transfer and heat transfer enhancement in processes which results in an increased efficiency in all these processes. Nanofluids and Mass Transfer introduces the role of nanofluids in improving mass transfer phenomena and expressing their characteristics and properties. The book also covers the theory and modelling procedures in details and finally illustrates various applications of Nanofluids in mass transfer enhancement in various processes such as absorption, regeneration, liquid-liquid extraction and membrane processes and how can nanofluids increase mass transfer in processes. Introduces specifications of nanofluids and mechanisms of mass transfer enhancement by nanofluids in various mass transfer processes Discusses mass transfer enhancement in various mass transfer processes such as: absorption, regeneration, liquid-liquid extraction and membrane processes Offers modelling mass transfer and flow in nanofluids Challenges industrialization and scale up of nanofluids

Principles and Modern Applications of Mass Transfer Operations

Pergamon
The phenomenon of "mass transfer with chemical reaction" takes

place whenever one phase is brought into contact with one or more other phases not in chemical equilibrium with it. This phenomenon has industrial, biological and physiological importance. In chemical process engineering, it is encountered in both separ ation processes and reaction engineering. In some cases, a chemical reaction may deliberately be employed for speeding up the rate of mass transfer and/or for increasing the capacity of the solvent; in other cases the multiphase reaction system is a part of the process with the specific aim of product formation. Finally, in some cases, for instance "distillation with chemical reaction", both objectives are involved. Although the subject is clearly a chemical engineering undertakin~, it requires often a good understanding of other subjects, such as chemistry and fluid mechanics etc., leading to publications in diversified areas. On the other har.d, the subject has always been a major field and one of the most fruitful for chemical engineers.

Absorption PHI Learning Pvt. Ltd.

This two volume set presents the state-of-the-art, and potential for future developments, in membrane engineering for the separation of gases.