

Separation Process Principles Seader Henley Solution

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Fundamental Modeling of Membrane Systems - Patricia Luis 2018-06-29

Fundamental Modelling of Membrane Systems: Membrane and Process Performance summarizes the state-of-the-art modeling approaches for all significant membrane processes, from molecular transport, to process level, helping researchers and students who carry out experimental research save time and accurately interpret experimental data. The book provides an overview of the different membrane technologies, handling micro-, ultra-, and nanofiltration, reverse and forward osmosis, pervaporation, gas permeation, supported liquid membranes, membrane contactors, membrane bioreactors and ion-exchange membrane systems. Examples of hybrid membrane systems are also included. Presents an accessible reference on how to model membranes and membrane processes Provides a clear, mathematical description of mass transfer in membrane systems Written by well-known, prominent authors in the field of membrane science

Separation of Molecules, Macromolecules and Particles - Kamallesh Sirkar 2014-01-16

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

Handbook of Separation Process Technology - Ronald W. Rousseau 1987-05-13

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.

Engineering and Chemical Thermodynamics - Milo D. Koretsky 2012-12-17

Chemical engineers face the challenge of learning the difficult concept and application of entropy and the 2nd Law of Thermodynamics. By following a visual approach and offering qualitative discussions of the role of molecular interactions, Koretsky helps them understand and visualize thermodynamics. Highlighted examples show how the material is applied in the real world. Expanded coverage includes biological content and examples, the Equation of State approach for both liquid and vapor phases in VLE, and the practical side of the 2nd Law. Engineers will then be able to use this resource as the basis for more advanced concepts.

Separation Process Principles - J. D. Seader 1998-01-23

This book examines rate-based and equilibrium-based approaches to separation operations. It describes the fundamentals of all separation operations of commercial interest, and includes theory and application examples in each chapter, as well as over 600 exercises.

Principles and Modern Applications of Mass Transfer

Operations - Jaime Benitez 2016-12-16

A staple in any chemical engineering curriculum New edition has a stronger emphasis on membrane separations, chromatography and other adsorptive processes, ion exchange Discusses many developing topics in more depth in mass transfer operations, especially in the biological engineering area Covers in more detail phase equilibrium since distillation calculations are completely dependent on this principle Integrates computational software and problems using Mathcad Features 25-30 problems per chapter

Product and Process Design Principles - Warren D. Seider 2019-03-18

Fundamentals of Chemical Engineering Thermodynamics, SI Edition - Kevin D. Dahm 2014-02-21

A brand new book, FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS makes the abstract subject of chemical engineering thermodynamics more accessible to undergraduate students. The subject is presented through a problem-solving inductive (from specific to general) learning approach, written in a conversational and approachable manner. Suitable for either a one-semester course or two-semester sequence in the subject, this book covers thermodynamics in a complete and mathematically rigorous manner, with an emphasis on solving practical engineering problems. The approach taken stresses problem-solving, and draws from best practice engineering teaching strategies. FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS uses examples to frame the importance of the material. Each topic begins with a motivational example that is investigated in context to that topic. This framing of the material is helpful to all readers, particularly to global learners who require big picture insights, and hands-on learners who struggle with abstractions. Each worked example is fully annotated with sketches and comments on the thought process behind the solved problems. Common errors are presented and explained. Extensive margin notes add to the book accessibility as well as presenting opportunities for investigation. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Principles of Chemical Separations with Environmental Applications - Richard D. Noble 2004-03-25

Chemical separations are of central importance in many areas of environmental science, whether it is the clean up of polluted water or soil, the treatment of discharge streams from chemical processes, or modification of a specific process to decrease its environmental impact. This book is an introduction to chemical separations, focusing on their use in environmental applications. The authors first discuss the general aspects of separation technology as a unit operation. They also describe how property differences are used to generate separations, the use of separating agents, and the selection criteria for particular separation techniques. The general approach for each technology is to present the chemical and/or physical basis for the process and explain how to evaluate it for design and analysis. The book contains

many worked examples and homework problems. It is an ideal textbook for undergraduate and graduate students taking courses on environmental separations or environmental engineering.

Mass Transfer and Separation Processes - Diran Basmadjian 2007-04-25

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.

Bioprocess Engineering Principles - Pauline M. Doran 1995-04-03

The emergence and refinement of techniques in molecular biology has changed our perceptions of medicine, agriculture and environmental management. Scientific breakthroughs in gene expression, protein engineering and cell fusion are being translated by a strengthening biotechnology industry into revolutionary new products and services. Many a student has been enticed by the promise of biotechnology and the excitement of being near the cutting edge of scientific advancement. However, graduates trained in molecular biology and cell manipulation soon realise that these techniques are only part of the picture. Reaping the full benefits of biotechnology requires manufacturing capability involving the large-scale processing of biological material. Increasingly, biotechnologists are being employed by companies to work in co-operation with chemical engineers to achieve pragmatic commercial goals. For many years aspects of biochemistry and molecular genetics have been included in chemical engineering curricula, yet there has been little attempt until recently to teach aspects of engineering applicable to process design to biotechnologists. This textbook is the first to present the principles of bioprocess engineering in a way that is accessible to biological scientists. Other texts on bioprocess engineering currently available assume that the reader already has engineering training. On the other hand, chemical engineering textbooks do not consider examples from bioprocessing, and are written almost exclusively with the petroleum and chemical industries in mind. This publication explains process analysis from an engineering point of view, but refers exclusively to the treatment of biological systems. Over 170 problems and worked examples encompass a wide range of applications,

including recombinant cells, plant and animal cell cultures, immobilised catalysts as well as traditional fermentation systems. * * First book to present the principles of bioprocess engineering in a way that is accessible to biological scientists * Explains process analysis from an engineering point of view, but uses worked examples relating to biological systems * Comprehensive, single-authored * 170 problems and worked examples encompass a wide range of applications, involving recombinant plant and animal cell cultures, immobilized catalysts, and traditional fermentation systems * 13 chapters, organized according to engineering sub-disciplines, are grouped in four sections - Introduction, Material and Energy Balances, Physical Processes, and Reactions and Reactors * Each chapter includes a set of problems and exercises for the student, key references, and a list of suggestions for further reading * Includes useful appendices, detailing conversion factors, physical and chemical property data, steam tables, mathematical rules, and a list of symbols used * Suitable for course adoption - follows closely curricula used on most bioprocessing and process biotechnology courses at senior undergraduate and graduate levels.

Advances in Membrane Technologies for Water Treatment - Angelo Basile 2015-02-28

Advances in Membrane Technologies for Water Treatment: Materials, Processes and Applications provides a detailed overview of advanced water treatment methods involving membranes, which are increasingly seen as effective replacements for a range of conventional water treatment methods. The text begins with reviews of novel membrane materials and advances in membrane operations, then examines the processes involved with improving membrane performance. Final chapters cover the application of membrane technologies for use in water treatment, with detailed discussions on municipal wastewater and reuse in the textile and paper industries. Provides a detailed overview of advanced water treatment methods involving membranes Coverage includes advancements in membrane materials, improvement in membrane performance, and their applications in water treatment Discusses the use of membrane technologies in the production of drinking water, desalination, wastewater treatment, and recovery

Gibbs Energy and Helmholtz Energy - Emmerich Wilhelm 2021-09-15

This book contains the latest information on all aspects of the most important chemical thermodynamic properties of Gibbs energy and Helmholtz energy, as related to fluids. Both the Gibbs energy and Helmholtz energy are very important in the fields of thermodynamics and material properties as many other properties are obtained from the temperature or pressure dependence. Bringing all the information into one authoritative survey, the book is written by acknowledged world experts in their respective fields. Each of the chapters will cover theory, experimental methods and techniques and results for all types of liquids and vapours. This book is the fourth in the series of *Thermodynamic Properties* related to liquids, solutions and vapours, edited by Emmerich Wilhelm and Trevor Letcher. The previous books were: *Heat Capacities* (2010), *Volume Properties* (2015), and *Enthalpy* (2017). This book fills the gap in fundamental thermodynamic properties and is the last in the series.

Encyclopedia of Membranes - Enrico Drioli 2016-07-14

A landmark work covering the major aspects of the science, technology and application of membrane operations and related fields, from basic phenomena to the most advanced applications and future perspectives. Over 1500 concise entries in an A-Z format cover a vibrant field with a multitude of applications in diverse disciplines such as biotechnology, medicine, agro-food and petrochemical industries, environmental

protection, as well as drinking water supply. Coverage includes membrane reactors and catalytic design (catalytic membrane reactors). Practically all unit operations of process engineering can be redesigned as membrane unit operations (e. g. membrane distillation, membrane crystallization, membrane stripping, membrane scrubbing). Entries are provided by an international team of experts from academia, research institutions as well as from industry.

Multicomponent Mass Transfer - Ross Taylor 1993-12-16
Addresses the use of rigorous multicomponent mass transfer models for the simulation and design of process equipment. Deals with the basic equations of diffusion in multicomponent systems. Describes various models and estimations of rates of mass and energy transfer. Covers applications of multicomponent mass transfer models to process design. Includes appendices providing necessary mathematical background. Contains a large number of numerical examples worked out in detail.

Advances in Carbon Nanostructures - Adrián Silva 2016-10-05

Carbon atoms have the amazing ability to bond in remarkable different manners that can assume distinct astonishing dimensional arrangements from which absolutely diverse and interesting nanostructured carbon materials are obtained. This book aims to cover the most recent advances in (i) Graphene and derivatives, including graphene-based magnetic composites, membranes, wafer devices, and nanofibers for several applications, as well as some particular properties, such as light emission from graphene; (ii) Carbon nanotubes heaters and fibers for reinforcement of cement and diamond-based thin films; and (iii) Nanofluids consisting of both graphene and carbon nanotubes, apart from reporting some important case studies dealing with carbon nanostructures and their use in sensors, coatings, or electromagnetic wave absorbers.

PRINCIPLES OF MASS TRANSFER AND SEPERATION PROCESSES - BINAY K. DUTTA 2007-01-21

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.

Fundamentals of Machine Elements - Bernard J. Hamrock 2007-02-01

Provides undergraduates and practicing engineers with an understanding of the theory and applications behind the fundamental concepts of machine elements. This text includes examples and homework problems designed to test student understanding and build their skills in analysis

and design.

Fundamentals of Industrial Chemistry - John A. Tyrell 2014-04-28

This book discusses the connectivity between major chemicals, showing how a chemical is made along with why and some of the business considerations. The book helps smooth a student's transition to industry and assists current professionals who need to understand the larger picture of industrial chemistry principles and practices. The book: Addresses a wide scope of content, emphasizing the business and polymer / pharmaceutical / agricultural aspects of industrial chemistry Covers patenting, experimental design, and systematic optimization of experiments Written by an author with extensive industrial experience but who is now a university professor, making him uniquely positioned to present this material Has problems at the end of chapters and a separate solution manual available for adopting professors Puts chemical industry topics in context and ties together many of the principles chemistry majors learn across more specific courses

Equilibrium-Stage Separation Operations in Chemical Engineering - Ernest J. Henley 1981

Uses a large number of industrially-significant problems to convey an in-depth understanding of modern calculation procedures. Includes numerous topical examples and problems, and both conventional and SI units.

Separation Process Principles with Applications Using Process Simulators - J. D. Seader 2016

Carbon Capture - Jennifer Wilcox 2012-03-27

This book approaches the energy science sub-field carbon capture with an interdisciplinary discussion based upon fundamental chemical concepts ranging from thermodynamics, combustion, kinetics, mass transfer, material properties, and the relationship between the chemistry and process of carbon capture technologies. Energy science itself is a broad field that spans many disciplines -- policy, mathematics, physical chemistry, chemical engineering, geology, materials science and mineralogy -- and the author has selected the material, as well as end-of-chapter problems and policy discussions, that provide the necessary tools to interested students.

Principles of Water Treatment - Kerry J. Howe 2012-11-06
Principles of Water Treatment has been developed from the best selling reference work Water Treatment, 3rd edition by the same author team. It maintains the same quality writing, illustrations, and worked examples as the larger book, but in a smaller format which focuses on the treatment processes and not on the design of the facilities.

Process Analysis and Simulation in Chemical Engineering - Iván Darío Gil Chaves 2015-11-27

This book offers a comprehensive coverage of process simulation and flowsheeting, useful for undergraduate students of Chemical Engineering and Process Engineering as theoretical and practical support in Process Design, Process Simulation, Process Engineering, Plant Design, and Process Control courses. The main concepts related to process simulation and application tools are presented and discussed in the framework of typical problems found in engineering design. The topics presented in the chapters are organized in an inductive way, starting from the more simplistic simulations up to some complex problems.

Carbon Capture - Jennifer Wilcox 2012-03-28

This book approaches the energy science sub-field carbon capture with an interdisciplinary discussion based upon fundamental chemical concepts ranging from thermodynamics, combustion, kinetics, mass transfer, material properties, and the relationship between the chemistry and process of carbon capture technologies. Energy science itself is a broad field that spans many

disciplines -- policy, mathematics, physical chemistry, chemical engineering, geology, materials science and mineralogy -- and the author has selected the material, as well as end-of-chapter problems and policy discussions, that provide the necessary tools to interested students.

Mass Transfer - Anthony L. Hines 1985

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

Introduction to Chemical Engineering: Tools for Today and Tomorrow, 5th Edition - Kenneth A. Solen 2010-08-04

This concise book is a broad and highly motivational introduction for first-year engineering students to the exciting of field of chemical engineering. The material in the text is meant to precede the traditional second-year topics. It provides students with, 1) materials to assist them in deciding whether to major in chemical engineering; and 2) help for future chemical engineering majors to recognize in later courses the connections between advanced topics and relationships to the whole discipline. This text, or portions of it, may be useful for the chemical engineering portion of a broader freshman level introduction to engineering course that examines multiple engineering fields.

Distillation Design - Henry Z. Kister 1992-02-22

Providing coverage of design principles for distillation processes, this text contains a presentation of process and equipment design procedures. It also highlights limitations of some design methods, and offers guidance on how to overcome them.

Separation Process Engineering - Phillip C. Wankat 2012

The Definitive, Fully Updated Guide to Separation Process Engineering-Now with a Thorough Introduction to Mass Transfer Analysis Separation Process Engineering, Third Edition, is the most comprehensive, accessible guide available on modern separation processes and the fundamentals of mass transfer. Phillip C. Wankat teaches each key concept through detailed, realistic examples using real data-including up-to-date simulation practice and new spreadsheet-based exercises. Wankat thoroughly covers each of today's leading approaches, including flash, column, and batch distillation; exact calculations and shortcut methods for multicomponent distillation; staged and packed column design; absorption; stripping; and more. In this edition, he also presents the latest design methods for liquid-liquid extraction. This edition contains the most detailed coverage available of membrane separations and of sorption separations (adsorption, chromatography, and ion exchange). Updated with new techniques and references throughout, Separation Process Engineering, Third Edition, also contains more than 300 new homework problems, each tested in the author's Purdue University classes. Coverage includes Modular, up-to-date process simulation examples and homework problems, based on Aspen Plus and easily adaptable to any simulator Extensive new coverage of mass transfer and diffusion, including both Fickian and Maxwell-Stefan approaches Detailed discussions of liquid-liquid extraction, including McCabe-Thiele, triangle and computer simulation analyses; mixer-settler design; Karr columns; and related mass transfer analyses Thorough introductions to adsorption, chromatography, and ion exchange-designed to prepare students for advanced work in these areas Complete coverage of membrane separations, including gas permeation, reverse osmosis, ultrafiltration, pervaporation, and key applications A full chapter on economics and energy conservation in distillation Excel spreadsheets offering additional practice with problems in distillation, diffusion, mass transfer, and membrane separation

SEPARATION PROCESS PRINCIPLES, 2ND ED - Seader 2006-08

Market_Desc: · Chemical Engineers · Students of Engineering Special Features: · A new section on

Dimensions and Units to facilitate the use of the SI, AE, and CGS systems, which permeate applications to separation processes.· Increased emphasis on the many ways used to express the composition of chemical mixtures.· New material on the thermodynamics of difficult mixtures, including electrolytes, polymer solutions, and mixtures of light gases and polar organic compounds.· New sections on the hybrid systems and membrane cascades.· New section on optimal control as a third mode of operation for batch distillation.· New discussion on concentration polarization and fouling. About The Book: Updated to reflect advances in the field, the second edition of this highly respected text examines rate-based and equilibrium-based approaches to separation operations. It describes the fundamentals of all separation operations of commercial interest, and includes theory and application examples in each chapter, as well as over 600 exercises.

Chemical Reactor Design - Juan A. Conesa 2019-12-04

A guide to the technical and calculation problems of chemical reactor analysis, scale-up, catalytic and biochemical reactor design Chemical Reactor Design offers a guide to the myriad aspects of reactor design including the use of numerical methods for solving engineering problems. The author - a noted expert on the topic - explores the use of transfer functions to study residence time distributions, convolution and deconvolution curves for reactor characterization, forced-unsteady-state-operation, scale-up of chemical reactors, industrial catalysis, design of multiphase reactors, biochemical reactors design, as well as the design of multiphase gas-liquid-solid reactors. Chemical Reactor Design contains several examples of calculations and it gives special emphasis on the numerical solutions of differential equations by using the finite differences approximation, which offers the background information for understanding other more complex methods. The book is designed for the chemical engineering academic community and includes case studies on mathematical modeling by using of MatLab software. This important book: - Offers an up-to-date insight into the most important developments in the field of chemical, catalytic, and biochemical reactor engineering - Contains new aspects such as the use of numerical methods for solving engineering problems, transfer functions to study residence time distributions, and more - Includes illustrative case studies on MatLab approach, with emphasis on numerical solution of differential equations using the finite differences approximation Written for chemical engineers, mechanical engineers, chemists in industry, complex chemists, bioengineers, and process engineers, Chemical Reactor Design addresses the technical and calculation problems of chemical reactor analysis, scale-up, as well as catalytic and biochemical reactor design.

Separation Process Principles - Ernest J. Henley 2011

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.

The ChemSep Book - Harry A. Kooijman 2000

Principles of Bioseparations Engineering - Raja Ghosh 2006-10-23

Bioseparations engineering deals with the scientific and engineering principles involved in large-scale

separation and purification of biological products. It is a key component of most chemical engineering/biotechnology/bioprocess engineering programmes. This book discusses the underlying principles of bioseparations engineering written from the perspective of an undergraduate course. It covers membrane based bioseparations in much more detail than some of the other books on bioseparations engineering. Based largely on the lecture notes the author developed to teach the course, this book is especially suitable for use as an undergraduate level textbook, as most other textbooks are targeted at graduate students.

Separation Process Principles - J. D. Seader 2016-01-20
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.

Process Intensification - David Reay 2013-06-05
Process Intensification: Engineering for Efficiency, Sustainability and Flexibility is the first book to provide a practical working guide to understanding process intensification (PI) and developing successful PI solutions and applications in chemical process, civil, environmental, energy, pharmaceutical, biological, and biochemical systems. Process intensification is a chemical and process design approach that leads to substantially smaller, cleaner, safer, and more energy efficient process technology. It improves process flexibility, product quality, speed to market and inherent safety, with a reduced environmental footprint. This book represents a valuable resource for engineers working with leading-edge process technologies, and those involved research and development of chemical, process, environmental, pharmaceutical, and bioscience systems. No other reference covers both the technology and application of PI, addressing fundamentals, industry applications, and including a development and implementation guide Covers hot and high growth topics, including emission prevention, sustainable design, and pinch analysis World-class authors: Colin Ramshaw pioneered PI at ICI and is widely credited as the father of the technology

Algebra and Trigonometry - Sheldon Axler 2011-03-08
Axler Algebra & Trigonometry is written for the two semester course. The text provides students with the skill and understanding needed for their coursework and for participating as an educated citizen in a complex society. Axler Algebra & Trigonometry focuses on depth, not breadth of topics by exploring necessary topics in greater detail. Readers will benefit from the straightforward definitions and plentiful examples of complex concepts. The Student Solutions Manual is integrated at the end of every section. The proximity of the solutions encourages students to go back and read the main text as they are working through the problems and exercises. The inclusion of the manual also saves

students money. Axler Algebra & Trigonometry is available with WileyPLUS; an innovative, research-based, online environment for effective teaching and learning. WileyPLUS sold separately from text.

Advanced Physicochemical Treatment Processes - Lawrence K. Wang 2007-11-10

The past thirty years have witnessed a growing worldwide desire that positive actions be taken to restore and protect the environment from the degrading effects of all forms of pollution—air, water, soil, and noise. Because pollution is a direct or indirect consequence of waste, the seemingly idealistic demand for “zero discharge” can be construed as an unrealistic demand for zero waste. However, as long as waste continues to exist, we can only attempt to abate the subsequent pollution by converting it to a less noxious form. Three major questions usually arise when a particular type of pollution has been identified: (1) How serious is the pollution? (2) Is the technology to abate it available? and (3) Do the costs of abatement justify the degree of abatement achieved? This book is one of the volumes of the Handbook of Environmental Engineering series. The principal intention of this series is to help readers formulate answers to the last two questions above. The traditional approach of applying tried-and-true solutions to specific pollution problems has been a major contributing factor to the success of environmental engineering, and has accounted in large measure for the establishment of a “methodology of pollution control.” However, the realization of the ever-increasing complexity and interrelated nature of current environmental problems renders it imperative that intelligent planning of pollution abatement systems be undertaken.

Introduction to Chemical Processes - Regina M. Murphy 2022

"Introduction to Chemical Processes: Principles, Analysis, Synthesis, 2e is intended for use in an introductory, one-semester course for students in chemical engineering and related disciplines"--

Mass Transfer - Diran Basmadjian 2003-12-15

In recent years, the subject of mass transfer has been treated as a minor player in the larger field of transport phenomena and taken a back seat to its more mature "brother," heat transfer. Yet mass transfer is sufficiently mature as a discipline and sufficiently distinct from other transport processes to merit a separate treatment, particularly one that does not overwhelm readers with an abundance of high-level mathematics. Mass Transfer: Principles and Applications takes an integrated approach that uses a wealth of real-world examples, organizes the material according to mode of operation, and highlights the importance of modeling. The author begins by introducing diffusion rates, Fick's Law, film theory, and mass transfer coefficients, then develops these concepts in complementary stages. The treatment of phase equilibria covers topics generally not addressed in thermodynamics courses, and these concepts are then used to analyze compartmental models and staged processes as well as continuous contact operations. The final chapter offers a concise survey of simultaneous mass and heat transfer. Throughout the book, discussions transition smoothly between theory and practice and clearly reflect the author's many years of engineering experience and the breadth of mass transfer applications. Mass Transfer: Principles and Applications is a unique and accessible treatment of this relatively complicated topic that will fill a significant gap as both a textbook and professional reference.