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INDUSTRIAL SEPARATION PROCESSES

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2ND EDITION



Industrial Separation Processes De Gruyter Textbook

**André B. de Haan, H. Burak Eral, Boelo
Schoor**



Industrial Separation Processes De Gruyter Textbook:

Industrial Separation Processes André B. de Haan,H. Burak Eral,Boelo Schuur,2020-07-06 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

Industrial Separation Processes André B. de Haan,H. Burak Eral,Boelo Schuur,2025-05-19 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 and makes this book with its wealth of exercises and solutions ideally suited to university teaching The Third edition boasts an even greater number of applied examples and updated chapters on drying adsorption and membranes

Industrial Separation Processes André B. de Haan,Hans Bosch,2013-07-15 Separation operations are crucial throughout the process industry with respect to energy consumption contribution to investments and ability to achieve the desired product with the right specifications Our main objective in creating this graduate level textbook is to present an overview of the fundamentals underlying the most frequently used industrial separation methods We focus on their physical principles and the basic computation methods that are required to assess their technical and economical feasibility The textbook is organized into three main parts Separation processes for homogeneous mixtures are treated in the parts on equilibrium based molecular separations and rate controlled molecular separations The part on mechanical separation technology presents an overview of the most important techniques for heterogeneous mixture separation Each chapter provides a condensed overview of the most commonly used equipment types The textbook is concluded with a final chapter on the main considerations in selecting an appropriate separation process for a separation task As the design of separation processes can only be learned by doing we have included exercises at the end of each chapter Short answers are given at the end of this book detailed solutions are given in a separate solution manual

Reactive and Membrane-Assisted Separations Philip Lutze,Andrzej Górak,2016-07-28 Process intensification aims for increasing efficiency and sustainability of bio chemical production processes This book presents strategies for improving fluid separation such as reactive distillation reactive absorption and membrane assisted separations The authors discuss computer simulation model development methodological approaches for synthesis and the design and scale up of final industrial processes

Textile Engineering Yasir Nawab,2016-07-11 Currently most of the textile industry and textile institutions are located in South Asia The textile industry leads to the development of clothing from fibres yarns and fabrics The industry is growing in this area as it has already been shifted from Europe and is being shifting from China As the textile industry is growing many new textile intuitions are being established to provide for quality textile education This introductory level textbooks is geared towards them This book will provide all

necessary information from fibres to fabrics and their conversion to clothing The importance of textiles in the current era along with the raw materials needed for the textiles are given After that it is explained how the yarn is made from fibres Then the fabrics manufacturing the printing and dyeing of textiles and the conversion of fabrics into the garments is discussed Also the testing of fibres yarns and fabrics along with the description of technical textiles is mentioned This book is beneficial for all readers who are going to start their career in textiles or are going to start the engineering degree in textiles The present book is designed for the first year students especially for the National Textile University Faisalabad of textile engineering

Sustainable Separation Engineering Gyorgy Szekely, Dan Zhao, 2022-04-04 Sustainable Separation Engineering Explore an insightful collection of resources exploring conventional and emerging materials and techniques for separations In Sustainable Separation Engineering Materials Techniques and Process Development a team of distinguished chemical engineers delivers a comprehensive discussion of the latest trends in sustainable separation engineering Designed to facilitate understanding and knowledge transfer between materials scientists and chemical engineers the book is beneficial for scientists practitioners technologists and industrial managers Written from a sustainability perspective the status and need for more emphasis on sustainable separations in the chemical engineering curriculum is highlighted The accomplished editors have included contributions that explore a variety of conventional and emerging materials and techniques for efficient separations as well as the prospects for the use of artificial intelligence in separation science and technology Case studies round out the included material discussing a broad range of separation applications like battery recycling carbon sequestration and biofuel production This edited volume also provides Thorough introductions to green materials for sustainable separations as well as advanced materials for sustainable oil and water separation Comprehensive explorations of the recycling of lithium batteries and ionic liquids for sustainable separation processes Practical discussions of carbon sequestration the recycling of polymer materials and AI for the development of separation materials and processes In depth examinations of membranes for sustainable separations green extraction processes and adsorption processes for sustainable separations Perfect for academic and industrial researchers interested in the green and sustainable aspects of separation science Sustainable Separation Engineering Materials Techniques and Process Development is an indispensable resource for chemical engineers materials scientists polymer scientists and renewable energy professionals Sustainable Manufacturing Processes Henk Akse, 2025-01-27 This book arises from the need inside the European process industry to innovate existing manufacturing processes towards sustainability Next to this sector startups and scale ups of novel manufacturing routes want to do sustainability first time right Methodically the book describes and analyzes technological economical psychological and organizational factors that prevent innovation in companies Subsequently a unique innovation method is presented It is inside out meaning innovation promoting and inhibiting factors are identified and companies are coached to innovate their own process To inspire and motivate a comprehensive set of state of art technologies is interfaced

with company manufacturing processes The uniqueness of the method lies in the fact it is structured yet leaves room for creativity It builds on fundamental driving forces encountered in physics and chemistry It starts in reality reaches technological abstractness and then comes back with a realistic innovation Finally it is the company itself that innovates This book can support companies dealing with innovating their existing manufacturing processes and for start scale ups that want to be sustainable right from the start

Advanced Process Engineering Control Paul Serban Agachi,Mircea Vasile Cristea,Alexandra Ana Csavdari,Botond Szilagyi,2023-11-20 As a mature topic in chemical engineering the book provides methods problems and tools used in process control engineering It discusses process knowledge sensor system technology actuators communication technology and logistics design and construction of control systems and their operation The knowledge goes beyond the traditional process engineering field by applying the same principles to biomedical processes energy production and management of environmental issues The book explains all the determinations in the chemical systems or process systems starting from the beginning of the processes going through the intricate interdependency of the process stages analyzing the hardware components of a control system and ending with the design of an appropriate control system for a process parameter or a whole process The book is first addressed to the students and graduates of the departments of Chemical or Process Engineering Second to the chemical or process engineers in all industries or research and development centers because they will notice the resemblance in approach from the system and control point of view between different fields which might seem far from each other but share the same control philosophy

Industrial Chemical Separation Timothy C. Frank,Bruce S. Holden,2023-08-07 A fresh new treatment written by industry insiders this work gives readers a remarkably clear view into the world of chemical separation The authors review distillation extraction adsorption crystallization and the use of membranes providing historical perspective explaining key features and offering insights from personal experience The book is for engineers and chemists with current or future responsibility for chemical separation on a commercial scale in its design operation or improvement or for anyone wanting to learn more about chemical separation from an industrial point of view The result is a compelling survey of popular technologies and the profession one that brings the art and craft of chemical separation to life Ever wonder how popular separation technologies came about how a particular process functions or how mass transfer units differ from theoretical stages Or perhaps you want some pointers on how to begin solving a separation problem You will find clear explanations and valuable insights into these and other aspects of industrial practice in this refreshing new survey

Biofuels and Biorefining Claudia Gutierrez-Antonio,Fernando Israel Gomez Castro,2022-05-27 Biofuels and Biorefining Volume Two Intensified Processes and Biorefineries considers intensification and optimization processes for biofuels and biomass derived products in single and biorefinery schemes Chapters cover production processes for liquid biofuels introducing all feasible intensification alternatives for each process process intensification methods for the production of value added products the importance of

detailed CFD based studies controllability studies strategies for risk analysis in intensified processes the concept of biorefinery for the co production of biofuels biomass derived value added products and the importance of process intensification in the biorefinery scheme Final chapters discuss how to ensure the sustainability of the intensified process and minimize the societal impact of biorefineries through various strategies including supply chain optimization and lifecycle analysis Each chapter is supported by industry case studies that address key aspects and impacts of intensification and optimization processes Integrates basic concepts of process intensification and its application to the production of biofuels in a single resource Includes case studies related to modeling safety control supply chain lifecycle analysis and the CFD of biofuel production processes Provides a sustainability assessment of biorefinery systems from a lifecycle perspective

Applied Homogeneous Catalysis Arno Behr, Thomas Seidensticker, Dieter Vogt, 2025-04-03 One stop reference on homogeneous catalysis from general concepts through detailed examples and industrial applications Accessible and richly illustrated Applied Homogeneous Catalysis provides a concise overview of the broad field of homogeneous transition metal catalysis and its applications in the chemical industry This newly revised and updated second edition puts special emphasis on green chemistry sustainable resources and processes The book is divided into five parts Part I presents the basics of transition metal catalysis Part II focuses on process engineering aspects Part III provides details of the most important catalytic reactions Part IV describes catalytic conversions closely related to classical homogeneous transition metal catalysis such as nano electro photo and organocatalysis Part V covers new feedstocks and other topics concluding with an outlook on future challenges of homogeneous catalysis The book contains numerous mechanistic details technical information and illustrative examples The chapters are enlivened by various excursions that relate the content to everyday life or introduce important personalities Didactically the book is completed with learning objectives and take home messages for each chapter as well as more than 400 questions and answers for self testing Written by a team of internationally renowned experts in the field with a wealth of experience in industry and teaching Applied Homogeneous Catalysis includes information on Economic importance of industrial homogeneously catalyzed reactions and basics of organometallic chemistry including types of bonds elemental steps and mechanisms Common approaches for separating the homogeneous catalyst from the products after the reaction and using combinatorial chemistry and high throughput screening to achieve optimal results Activating inactive molecules such as carbon dioxide and nitrogen and harnessing homogeneous catalysis for feedstock diversification by recycling polymers or using renewables Providing expansive coverage of the subject Applied Homogeneous Catalysis is an essential guide for researchers and professionals in the pharmaceutical polymer and fine and bulk chemicals industries working on catalysis or entering the field as well as for Master s and PhD students in organic chemistry chemical engineering and related fields

Electromembrane Processes Luboš Novák, 2021-12-20 The book is a comprehensive view of all electromembrane processes including electromembrane processes for energy conversion a currently very significant problem

The necessary theory and basic information needed for understanding the technology are explained in Part I Materials used for ion selective membranes and separation processes are described in Part II and the applications for synthesis and energy conversion in Part III

Lignocellulosic Biomass Refining for Second Generation Biofuel Production Ponnusami V.,Kiran Babu Uppuluri,Rangabhashiyam S,Pardeep Singh,2023-07-14 This book compiles research aspects of second generation 2G biofuel production derived specifically from lignocellulose biomass using biorefinery methods It focuses on the valorization of different sources of 2G biofuels and their relative importance The constituents of lignocelluloses and their potential characteristics different methods of treating lignocellulose various means of lignocellulose bioconversion and biofuel production strategies are discussed Features Describes technological advancements for bioethanol production from lignocellulosic waste Provides the roadmap for the production and utilization of 2G biofuels Introduces the strategic role of metabolic engineering in the development of 2G biofuels Discusses technological advancements life cycle assessment and prospects Explores the novel potential lignocellulosic biomass for 2G biofuels This book is aimed at researchers and professionals in renewable energy biofuel bioethanol lignocellulose conversion fermentation and chemical engineering

Industrial & Engineering Chemistry ,1926 *Industrial Waste* Herbert Pöllmann,2021-08-23 Industrial residues are obtained from all treatments of raw materials in industry during the process of mining raw materials treatment and final usage During these processes of enrichment optimization and utilization of raw materials only part of the original material can be used for the dedicated application and some left over parts remain This contribution focuses on residues like mining overburdens ore residues and ore processing residues like slags but also on incineration ashes and water purification muds Natural materials like pozzolanes due to their potential of CO₂ reduction are also included Based on this knowledge secondary reusable materials due to their chemical physical and mineralogical properties can be identified Also different characterization methods for analysing the potential for further application of these residues are included **28th European Symposium on Computer Aided Process Engineering** Stefan Radl,Jiří Jaromír Klemeš,Petar Sabevarbanov,Thomas Wallek,2018-06-26 28th European Symposium on Computer Aided Process Engineering Volume 43 contains the papers presented at the 28th European Society of Computer Aided Process Engineering ESCAPE event held in Graz Austria June 10 13 2018 It is a valuable resource for chemical engineers chemical process engineers researchers in industry and academia students and consultants for chemical industries Presents findings and discussions from the 28th European Society of Computer Aided Process Engineering ESCAPE event **Applications in Design and Simulation of Sustainable Chemical Processes** Alexandre C. Dimian,Costin Sorin Bildea,Anton A. Kiss,2019-08-08 Applications in Design and Simulation of Sustainable Chemical Processes addresses the challenging applications in designing eco friendly but efficient chemical processes including recent advances in chemistry and catalysis that rely on renewable raw materials Grounded in the fundamental knowledge of chemistry thermodynamics chemical reaction engineering and unit operations

this book is an indispensable resource for developing and designing innovating chemical processes by employing computer simulations as an efficient conceptual tool Targeted to graduate and post graduate students in chemical engineering as well as to professionals the book aims to advance their skills in process innovation and conceptual design The work completes the book Integrated Design and Simulation of Chemical Processes by Elsevier 2014 authored by the same team Includes comprehensive case studies of innovative processes based on renewable raw materials Outlines Process Systems Engineering approach with emphasis on systematic design methods Employs steady state and dynamic process simulation as problem analysis and flowsheet creation tool Applies modern concepts as process integration and intensification for enhancing the sustainability

Waste-Derived Nanoparticles Jeenat Aslam, Ruby Aslam, Chaudhery Mustansar Hussain, 2024-07-05 Waste derived Nanoparticles Synthesis Applications and Sustainability embarks on an illuminating exploration at the intersection of waste management and nanotechnology Delving deep into the realm of nanoparticle synthesis this comprehensive volume meticulously examines various waste sources ranging from industrial residues to electronic waste uncovering their potential for sustainable innovation Through detailed discussions on synthesis methodologies and characterization techniques each chapter offers insights into the intricate processes involved in transforming waste materials into functional nanoparticles Beyond synthesis the book ventures into the diverse applications of waste derived nanoparticles offering transformative solutions to pressing environmental challenges From revolutionizing wastewater treatment to combating air pollution and advancing energy technologies these applications hold promise for a greener future With a forward looking perspective this book envisions a shift toward a circular economy where waste materials are not only repurposed but also contribute to a more sustainable and environmentally conscious world This book serves as a beacon guiding us toward a future where waste becomes a valuable resource in our quest for a cleaner and healthier planet Discusses the synthesis of nanoparticles made from waste as well as their uses in contemporary industrial platforms Offers researchers an influential framework for a fundamental multidisciplinary study as the use of waste derived nanoparticles as sustainable materials has changed modern industrial processes Reviews the most cutting edge industrial uses of waste derived nanoparticles as well as current manufacturing problems Maintains a current study on nanoparticles made from waste along with fresh advancements in a variety of related fields

Process Intensification Mirko Skiborowski, Andrzej Górak, 2022-10-03 Process intensification aims for increasing efficiency and sustainability of bio chemical production processes The second book of our two book series focusses entirely on process intensification by centrifugally enhanced reactive separations The book provides an overview of the main applications of rotating packed beds RPBs in liquid liquid gas liquid and vapor liquid contacting within academic research and industrial applications The book addresses current design rules and modeling frameworks including the tailored design of functional packings by means of additive manufacturing Rotating packed beds are widely applicable and flexible mass transfer machines for process intensification Applications

design rules and advanced modeling for rotating packed beds are presented in an interconnected way **Process**

Technology André B. de Haan, 2015-04-24 Process Technology provides a general overview about chemical and biochemical process technology. It focuses on the structure and development of production processes, main technological operations, and the important aspects of process economics. The theoretical foundations in each chapter are supplemented by case studies and examples in a clear and instructive manner to illustrate the practical aspects. The author highlights operating principles, reasons for application, and available industrial equipment of technological operations. Aim is to facilitate those without a process technology background in multi-disciplinary cooperation with bio-chemical engineers by providing an overview of this exciting field. The textbook is organized into seven distinct parts: Structure of the chemical industry and bio-chemical processes; Bio-chemical reaction engineering; Molecular separations: distillation, extraction, absorption, adsorption; Mechanical separations: filtration, sedimentation, membranes; Particle and final product manufacturing; Development, scale up, design, and safety of processes; Major industrial process descriptions.

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