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Hemicellulose Biorefinery: A Sustainable Solution for Value Addition to Bio-Based Products and Bioenergy

Reaction Engineering for Pollution Prevention

26th European Symposium on Computer Aided Process Engineering

Advances in Carbon Management Technologies

Ion Exchange and Solvent Extraction

The Role of Carbon Capture and Storage (CCS) Technologies in a Net-Zero Carbon Future

Fossil Energy Update

SOUVENIR of 1st International Science Congress (ISC-2011)

Separation Process Principles

Status and Future Directions

Chemical Engineering Process Simulation

A Series of Advances, Volume 17

Integrated Design and Simulation of Chemical Processes

22nd European Symposium on Computer Aided Process Engineering

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JOSEPH CANTRELL

Aspen Plus John Wiley & Sons

Computer aided process engineering (CAPE) plays a key design and operations role in the process industries. This conference features presentations by CAPE specialists and addresses strategic planning, supply chain issues and the increasingly important area of sustainability audits. Experts collectively highlight the need for CAPE practitioners to embrace the three components of sustainable development: environmental, social and economic progress and the role of systematic and sophisticated CAPE tools in delivering these goals.

Hemicellulose Biorefinery: A Sustainable Solution for Value Addition to Bio-Based Products and Bioenergy John Wiley & Sons

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.

Reaction Engineering for Pollution Prevention Wiley-AIChE

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.

26th European Symposium on Computer Aided Process Engineering Pearson Education

International Science Congress Association organized 3rd International Science Congress (ISC-2013), with "Innovation with Global Responsibility" as its Focal Theme. ISC-2013 is divided in 20 sections. A total number of 900 Research Papers and 1000 registrations from 36 countries all over the world have been received. They are mainly from India, Iran, Sudan, Iraq, South Africa, Phillipines, Pakistan, Nighana, Erode, Czech Republic, Bangladesh, Swaziland, Jordan, USA, Thailand, Japan, Malaysia, Kazakhstan, UK, Colombia, Nepal, Italy, Bulgariya, Cameroun, France, Greece, Kazakhstan, Korea, Lithuania, Nigeria, Poland, Romania, Slovakiya, Ukraine, Venezuela and Turkey.

Advances in Carbon Management Technologies Aspen Plus Chemical Engineering Applications
This comprehensive work shows how to design and develop innovative, optimal and sustainable chemical processes by applying the principles of process systems engineering, leading to integrated sustainable processes with 'green' attributes. Generic systematic methods are employed, supported by intensive use of computer simulation as a powerful tool for mastering the complexity of physical models. New to the second edition are chapters on product design and batch processes with applications in specialty chemicals, process intensification methods for designing compact equipment with high energetic efficiency, plantwide control for managing the key factors affecting

the plant dynamics and operation, health, safety and environment issues, as well as sustainability analysis for achieving high environmental performance. All chapters are completely rewritten or have been revised. This new edition is suitable as teaching material for Chemical Process and Product Design courses for graduate MSc students, being compatible with academic requirements world-wide. The inclusion of the newest design methods will be of great value to professional chemical engineers. Systematic approach to developing innovative and sustainable chemical processes Presents generic principles of process simulation for analysis, creation and assessment Emphasis on sustainable development for the future of process industries

Ion Exchange and Solvent Extraction Elsevier

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

The Role of Carbon Capture and Storage (CCS) Technologies in a Net-Zero Carbon Future Springer
Stochastic Process Optimization using Aspen® Plus Bookshop Category: Chemical Engineering
Optimization can be simply defined as "choosing the best alternative among a set of feasible options". In all the engineering areas, optimization has a wide range of applications, due to the high number of decisions involved in an engineering environment. Chemical engineering, and particularly process engineering, is not an exception; thus stochastic methods are a good option to solve optimization problems for the complex process engineering models. In this book, the combined use of the modular simulator Aspen® Plus and stochastic optimization methods, codified in MATLAB, is presented. Some basic concepts of optimization are first presented, then, strategies to use the simulator linked with the optimization algorithm are shown. Finally, examples of application for process engineering are discussed. The reader will learn how to link the process simulator Aspen® Plus and stochastic optimization algorithms to solve process design problems. They will gain ability to perform multi-objective optimization in several case studies. Key Features: • The book links

simulation and optimization through numerical analyses and stochastic optimization techniques • Includes use of examples to illustrate the application of the concepts and specific guidance on the use of software (Aspen® Plus, Excel, MATLAB) to set up and solve models representing complex problems. • Illustrates several examples of applications for the linking of simulation and optimization software with other packages for optimization purposes. • Provides specific information on how to implement stochastic optimization with process simulators. • Enable readers to identify practical and economic solutions to problems of industrial relevance, enhancing the safety, operation, environmental, and economic performance of chemical processes.

Fossil Energy Update Elsevier

Acrylic acid (AA) is an unsaturated organic acid, very toxic and hazardous to the environment. Unfortunately, dilute acrylic acid (AA) has commonly produced as a by-product in many chemical and petrochemical processes such as manufacturing of acrylic esters. The recovery of dilute AA from the wastewater streams has become a growing concern among researchers due to its economic and environmental issues. There are several conventional separation techniques such as adsorption, distillation and extraction were developed to treat the wastewater from the industries; however, they have their own drawbacks respectively. One of the promising methods to purify the wastewater and economically sustainable is through esterification process of the recovery acrylic acid with alcohols via reactive distillation column. To date, study about esterification by using dilute AA has not been reported in literature. In this present work, a simulation study of esterification reaction of 2-ethylhexan-1-ol and dilute AA via reactive distillation system in the presence of ion exchange resin catalyst was performed using Aspen Plus RADFRAC incorporated with thermodynamic model of UNIFAC. The effect of different operating variables such as Acrylic Acid concentration, reflux ratio, bottom rate, catalyst weight and optimum column configuration were studied in this present work. The best operating conditions and column configuration were identified with maximum recovery of acrylic acid was 83% for the feed concentration of 10wt% AA, 0.1 reflux molar ratio, 0.13kg/h bottom rate and 1.5kg/m of catalyst weight. The best column configuration for the esterification system of acrylic acid and 2-ethylhexanol consisted of 4 reactive stages, 10 stripping stages and 4 rectifying stages, contributing to 18 numbers of stages with each stage of condenser and reboiler. [SOUVENIR of 1st International Science Congress \(ISC-2011\)](#) Elsevier

26th European Symposium on Computer Aided Process Engineering contains the papers presented at the 26th European Society of Computer-Aided Process Engineering (ESCAPE) Event held at Portorož Slovenia, from June 12th to June 15th, 2016. Themes discussed at the conference include Process-product Synthesis, Design and Integration, Modelling, Numerical analysis, Simulation and Optimization, Process Operations and Control and Education in CAPE/PSE. Presents findings and discussions from the 26th European Society of Computer-Aided Process Engineering (ESCAPE) Event [Separation Process Principles](#) CRC Press

Volume 17 in the Ion Exchange and Solvent Extraction series represents the vanguard of research on solvent extraction. It covers the principles of electrolyte extraction and other subjects of increasing interest to the field. This volume begins with pharmaceutical applications of supercritical fluid solvents, particularly supercritical carbon dioxide

Status and Future Directions John Wiley & Sons

Facilitates the process of learning and later mastering Aspen Plus® with step by step examples and succinct explanations Step-by-step textbook for identifying solutions to various process engineering problems via screenshots of the Aspen Plus® platforms in parallel with the related text Includes end-of-chapter problems and term project problems Includes online exam and quiz problems for instructors that are parametrized (i.e., adjustable) so that each student will have a standalone version Includes extra online material for students such as Aspen Plus®-related files that are used in the working tutorials throughout the entire textbook

Chemical Engineering Process Simulation John Wiley & Sons

The 29th European Symposium on Computer Aided Process Engineering, contains the papers presented at the 29th European Symposium of Computer Aided Process Engineering (ESCAPE) event held in Eindhoven, The Netherlands, from June 16-19, 2019. 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 29th European Symposium of Computer Aided Process Engineering (ESCAPE) event

A Series of Advances, Volume 17 Elsevier

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

Integrated Design and Simulation of Chemical Processes Springer Science & Business Media

This book defines environmental reaction engineering principles, including reactor design, for the development of processes that provide an environmental benefit. With regard to pollution prevention, the focus is primarily on new reaction and reactor technologies that minimize the production of undesirable side-products (pollutants), but the use of reaction engineering as a means of treating wastes that are produced through other means is also considered. First is a section on environmentally benign combustion. The three papers discuss methods of reducing the formation of PAHs and NO_x, as well as other environmentally sensitive combustion products. The next section contains a collection of contributions that involve the use of a catalyst to support the reaction. Following this is a section on the use of supercritical fluid solvents as environmentally friendly media for chemical reactions. Finally, a series of papers is presented in which novel reactor designs are utilized to obtain product yields not possible in conventional reactor systems. These include the use

of reactor-absorber systems, reactive distillation, and reactive membranes. The book concludes with a chapter contributed by the editors which discusses the educational aspects of pollution prevention. It is necessary for future generations of engineers to be trained to design processes that are inherently environmentally benign. This chapter assembles resource materials for educators which will spark the creative instincts of the researchers using the materials contained within this book to develop new resources for pollution prevention education. The broad spectrum of topics included in this book indicates the diversity of this area, and the vibrant nature of the ongoing research. The possibilities of producing desirable products without the formation of waste byproducts are bounded only by the creativity of the reaction engineer.

22nd European Symposium on Computer Aided Process Engineering International E Publication

A comprehensive and example oriented text for the study of chemical process design and simulation. *Chemical Process Design and Simulation* is an accessible guide that offers information on the most important principles of chemical engineering design and includes illustrative examples of their application that uses simulation software. A comprehensive and practical resource, the text uses both Aspen Plus and Aspen Hysys simulation software. The author describes the basic methodologies for computer aided design and offers a description of the basic steps of process simulation in Aspen Plus and Aspen Hysys. The text reviews the design and simulation of individual simple unit operations that includes a mathematical model of each unit operation such as reactors, separators, and heat exchangers. The author also explores the design of new plants and simulation of existing plants where conventional chemicals and material mixtures with measurable compositions are used. In addition, to aid in comprehension, solutions to examples of real problems are included. The final section covers plant design and simulation of processes using nonconventional components. This important resource: Includes information on the application of both the Aspen Plus and Aspen Hysys software that enables a comparison of the two software systems. Combines the basic theoretical principles of chemical process and design with real-world examples. Covers both processes with conventional organic chemicals and processes with more complex materials such as solids, oil blends, polymers and electrolytes. Presents examples that are solved using a new version of Aspen software, ASPEN One 9. Written for students and academics in the field of process design, *Chemical Process Design and Simulation* is a practical and accessible guide to the chemical process design and simulation using proven software.

SOUVENIR of 3rd International Science Congress ISC-2013 Springer Science & Business Media. Facilitates the process of learning and later mastering Aspen Plus® with step by step examples and succinct explanations. Step-by-step textbook for identifying solutions to various process engineering problems via screenshots of the Aspen Plus® platforms in parallel with the related text. Includes end-of-chapter problems and term project problems. Includes online exam and quiz problems for instructors that are parametrized (i.e., adjustable) so that each student will have a standalone version. Includes extra online material for students such as Aspen Plus®-related files that are used in the working tutorials throughout the entire textbook.

Chemical Process Design and Simulation: Aspen Plus and Aspen Hysys Applications Walter de Gruyter GmbH & Co KG

Aspen Plus Chemical Engineering Applications John Wiley & Sons

27th European Symposium on Computer Aided Process Engineering International E Publication

This booklet is designed to bridge the gap between handbooks and technical literature and aims at graduate students or experienced readers. Commercial flow sheeting simulation software is increasingly available and is used in the early steps of process design in industry. As to this, more sophisticated and precise models based on activities instead of concentrations should be used. After an introductory chapter there is in Chapter 2 an intensive discussion of reactive phase equilibria of ionic and non-ionic solutes based on chemical potentials. Chapter 3 introduces to multicomponent diffusion and mass transfer. However, the main focus is on the reactive mass transfer on rigid and mobile surfaces where the interfacial reaction, molecular diffusion and adsorption layers are decisive. The respective extraction of zinc with a cation exchanger and of acetic acid with an anion exchanger is discussed as case studies. Since adsorption layers and surfactants have a major impact on liquid-liquid extraction efficiency, the final chapter reviews several techniques which make use of polymeric species in an extractive process. A short review is also given on extraction apparatus and the hydrodynamics (hydraulic design, droplet population balances) of columns. Much of the booklet is based on the PhD works of C. Czapla (2000), G. Modes (2000), H. Klocker (1996), T. Kronberger (1995), M. Marters (2000), M. Roos (2000), M. Traving (2000) and B. Wachter (1996) who I wish to thank for their fruitful contributions.

Reactive Distillation CRC Press

Hydrometallurgy '94 contains the 78 papers that were presented at the international symposium organized by the Institution of Mining and Metallurgy and the Society of Chemical Industry and held in Cambridge, England, in July 1994. In the papers specific attention is paid to the concept of sustainable development and the associated ideas of cleaner technology, recycling and waste minimization that have particular relevance to the extraction and processing of metals and other mineral products. The papers, by authors from 30 countries, are grouped under the headings: Hydrometallurgy and Sustainable Development; Materials Production and the Environment; Fundamentals; Leaching; Bioprocessing; Gold Solution Purification; Effluent Treatment; Processes; and Recycling.

Reactive Extraction Elsevier

Reactor Process Design in Sustainable Energy Technology compiles and explains current developments in reactor and process design in sustainable energy technologies, including optimization and scale-up methodologies and numerical methods. Sustainable energy technologies that require more efficient means of converting and utilizing energy can help provide for burgeoning global energy demand while reducing anthropogenic carbon dioxide emissions associated with energy production. The book, contributed by an international team of academic and industry experts in the field, brings numerous reactor design cases to readers based on their valuable experience from lab R&D scale to industry levels. It is the first to emphasize reactor engineering in sustainable energy technology discussing design. It provides comprehensive tools and information to help engineers and energy professionals learn, design, and specify chemical reactors and processes confidently. Emphasis on reactor engineering in sustainable energy technology. Up-to-date overview

of the latest reaction engineering techniques in sustainable energy topics Expert accounts of reactor concepts and procedures Hundreds of citations drawing on many most recent and previously types, processing, and optimization Figures and tables designed to comprehensively present published works on the subject

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