



Ionic Liquids in Separation Technology

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Ionic Liquids In Separation Technology

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Ionic Liquids In Separation Technology:

Ionic Liquids in Separation Technology Antonia Perez De Los Rios, Francisco Jose Hernandez Fernandez, 2014-08-08
Ionic Liquids in Separation Technology reports on the most important fundamental and technological advances in separation processes using ionic liquids. It brings together the latest developments in this fascinating field, supplements them with numerous practical tips, and thus provides those working in both research and industry with an indispensable source of information. The book covers fundamental topics of physical, thermal, and optical properties of ionic liquids, including green aspects. It then moves on to contexts and applications, including separation of proteins, reduction of environmental pollutants, separation of metal ions, and organic compounds used in electrochromic devices and much more. For the specialist audience, the book serves as a recompilation of the most important knowledge in this field; whereas for starting researchers in ionic liquid separation technology, the book is a great introduction to the field. First book in the marketplace dedicated to ionic liquids in separation technology. Contributions from scientists in academia and researchers in industry ensure the coverage of both scientific fundamentals and industrial applications. Covers a broad collection of applications in separation technology, which makes the book a single source of information. Includes many practical tips for researchers in industry and scientists who apply ionic liquids in their work.

Ionic Liquids for Better Separation Processes Héctor Rodríguez, 2015-12-16
This book discusses capital separation processes of industrial interest and explores the potential for substantial improvement offered by a promising class of substances: ionic liquids. These low melting point salts, with their unique characteristics, have been gaining relevance in the field of separation through a variety of approaches. The chapters are structured from an application perspective and cover the utilisation of ionic liquids in different unit operation contexts: distillation, liquid-liquid extraction, and solid-liquid extraction, giving an idea of their remarkable versatility. The final chapters focus on the use of ionic liquids in analytical applications based on separation procedures. This volume combines the review of the main advances to date with the analysis of the potential future use of ionic liquids in separation processes across a variety of fields, ranging from enhancement of state-of-the-art technologies to a revolution in the technological bases currently in use. It provides a valuable resource for engineers and scientists working in the field of separation, as well as for all readers generally interested in ionic liquids, in particular from an application standpoint. Héctor Rodríguez is a faculty member of the Department of Chemical Engineering at the University of Santiago de Compostela, Spain.

Special Issue on the Ionic Liquids in Separation Technology Conference ILSEPT - 2014, 2015

Ionic Liquid-Based Technologies for Environmental Sustainability Mohammad Jawaid, Akil Ahmad, A. Vijaya Bhaskar Reddy, 2021-12-04
Ionic Liquid based Technologies for Environmental Sustainability explores the range of sustainable and green applications of IL materials achieved in recent years, such as gas solubility, biomass pre-treatment, bio-catalysis, energy storage, gas separation, and purification technologies. The book also provides a reference material for future research in IL-based technologies for environmental and energy applications, which

are much in demand due to sustainable reusable and eco friendly methods for highly innovative and applied materials Written by eminent scholars and leading experts from around the world the book aims to cover the synthesis and characterization of broad range of ionic liquids and their sustainable applications Chapters provide cutting edge research with state of the art developments including the use of IL based materials for the removal of pharmaceuticals dyes and value added metals Describes the fundamentals and major applications of ionic liquid materials Covers up to date developments in novel applications of IL materials Provides practical tips to aid researchers who work on ionic liquid applications

Principles of Multiple-Liquid Separation Systems Kit Wayne Chew, Shir Reen Chia, Pau Loke Show, 2023-01-12

Principles of Multiple Liquid Separation Systems Interaction Application and Advancement describes the basic principles and advancements of multiple liquid separation systems in downstream processing Several important elements are included such as the fundamental process and mechanisms of the multiple liquid separation system key principles of the interaction between different solvents and phase components applications and green solvents for the separation system Furthermore the book gives insights in commercializing this separation technique to industrial scale and making the process environmentally and economically sustainable The book also presents constructive critics of this separation technique for both past and the latest findings Comprehensively reviews several advanced separation methods and their fundamentals in a single source Covers a deep understanding of the interaction between various liquid phase techniques and the latest cases of advanced techniques applied in bioprocesses Provides a critical and constructive judgement of costs and environmental sustainability of multiple liquid separation systems

Novel Catalytic and Separation Processes Based on Ionic Liquids Dickson Ozokwelu, Suojiang Zhang, Obiefuna Okafor, Weiguo Cheng, Nicholas Litombe, 2017-03-20 Novel Catalytic and Separation Process Based on Ionic Liquids presents the latest progress on the use of ionic liquids ILs in catalytic and separation processes The book discusses the preparation of ILs the characterization of IL catalysts by spectroscopic techniques catalytic reactions over IL catalysts separation science and technology of ILs applications in biomass utilization and synthesis of fine chemicals Scientists engineers graduate students managers decision makers and others interested in ionic liquids will find this information very useful The book can be used as a springboard for more advanced work in this area as it contains both theory and recent applications research conducted and developments in separation techniques and catalysis using ionic liquids Presents new preparation and advanced characterization of ionic liquids catalysts Outlines catalytic reactions using ionic liquid thus showing higher yields and selectivity Presents novel separation science and technology based on ionic liquids and non thermal processes

Ionic Liquids UnCOILed Kenneth R. Seddon, Natalia V. Plechkova, 2012-10-26 Ionic Liquids UnCOILed presents decisively important reviews on new processes and recent developments in ionic liquid technology with an emphasis on commercial applications in which ionic liquids are replacing or may replace processes currently using conventional solvents Ranging from applied to theoretical synthetic to analytical and biotechnological to

electrochemical the book features eleven chapters written by an international group of key academic and industrial chemists exercising the judicious evaluation which they are uniquely qualified to do This book is a must for R D chemists in industrial governmental and academic laboratories and for commercial developers of environmentally friendly sustainable processes

Ion Exchange and Solvent Extraction Bruce A Moyer,2019-06-18 This volume will capture transformational changes in both the chemistry and engineering side of solvent extraction creating new directions and deepening our understanding of the structure and dynamics of liquid liquid systems from the molecular to nano to meso to bulk scale Reviews will cover advances in microfluidics new tools for understanding the structure and dynamics of the liquid liquid interface ionic liquids in liquid liquid extraction molecular dynamics to visualize interactions in the solvent phase liquid liquid electrochemistry to interrogate the energetics of interfacial transport and complexation design of new extractants and the streamlining of process applications

Ionic Liquid in Process Intensification Suojang Zhang,2024-12-06 Ionic Liquids in Process Intensification focuses on ionic liquids to carry out process intensification research The book uses computational simulation methods of ionic liquids as well as the structural design prediction and structure regulation to describe the process of ionic liquids intensify reaction separation photochemistry and materials synthesis related to chemical processes It analyzes and discusses the latest research results and typical application cases and provides new research ideas and methods for the correlation of different scales from molecular to chemical engineering Users will find a comprehensive resource that combines computational chemistry physical chemistry chemical engineering materials science and many other basic and applied disciplines Treats the structure of ionic liquids as the core to carry out process intensification research Embraces a multidisciplinary approach to IL research Written by leading scientist in the field

Green Sustainable Process for Chemical and Environmental Engineering and Science Tariq Altalhi,Inamuddin,2023-01-11 Green Sustainable Process for Chemical and Environmental Engineering and Science Green Solvents and Extraction Technology provides information on the use of green solvents and their applications in the synthesis of pharmaceutical drugs energy conversion and storage catalysis biodiesel synthesis multicomponent reactions waste valorization and more The book features introductory chapters related to the applications of green solvents and related extraction technology for sustainable development including research trends technical development environment issues and related concerns The book provides examples covering the extraction of nanocellulose from agricultural wastes polysaccharides phenolic compounds antioxidants from vegetables biomolecules and green solvents from biomass and precious metals Provides an overview of the applicability of green solvents for sustainable development Delivers in depth literature on the use of green solvents for industrial processes Highlights issues related to research trends sustainable development and the environment Focuses on extraction technology Offers an overview of the use of green solvent based extraction Presents in depth literature on the extraction of a variety of substances using green solvents

Process Systems and Materials for CO2 Capture Athanasios I. Papadopoulos,Panos

Seferlis,2017-05-01 This comprehensive volume brings together an extensive collection of systematic computer aided tools and methods developed in recent years for CO₂ capture applications and presents a structured and organized account of works from internationally acknowledged scientists and engineers through Modeling of materials and processes based on chemical and physical principles Design of materials and processes based on systematic optimization methods Utilization of advanced control and integration methods in process and plant wide operations The tools and methods described are illustrated through case studies on materials such as solvents adsorbents and membranes and on processes such as absorption desorption pressure and vacuum swing adsorption membranes oxycombustion solid looping etc Process Systems and Materials for CO₂ Capture Modelling Design Control and Integration should become the essential introductory resource for researchers and industrial practitioners in the field of CO₂ capture technology who wish to explore developments in computer aided tools and methods In addition it aims to introduce CO₂ capture technologies to process systems engineers working in the development of general computational tools and methods by highlighting opportunities for new developments to address the needs and challenges in CO₂ capture technologies *Comprehensive Membrane Science and Engineering*

Enrico Drioli,Lidietta Giorno,Enrica Fontananova,2017-07-20 Comprehensive Membrane Science and Engineering Second Edition Four Volume Set is an interdisciplinary and innovative reference work on membrane science and technology Written by leading researchers and industry professionals from a range of backgrounds chapters elaborate on recent and future developments in the field of membrane science and explore how the field has advanced since the previous edition published in 2010 Chapters are written by academics and practitioners across a variety of fields including chemistry chemical engineering material science physics biology and food science Each volume covers a wide spectrum of applications and advanced technologies such as new membrane materials e g thermally rearranged polymers polymers of intrinsic microporosity and new hydrophobic fluoropolymer and processes e g reverse electrodialysis membrane contractors membrane crystallization membrane condenser membrane dryers and membrane emulsifiers that have only recently proved their full potential for industrial application This work covers the latest advances in membrane science linking fundamental research with real life practical applications using specially selected case studies of medium and large scale membrane operations to demonstrate successes and failures with a look to future developments in the field Contains comprehensive cutting edge coverage helping readers understand the latest theory Offers readers a variety of perspectives on how membrane science and engineering research can be best applied in practice across a range of industries Provides the theory behind the limits advantages future developments and failure expectations of local membrane operations in emerging countries *Bioprocess Engineering*

Pau Loke Show,Chien Wei Ooi,Tau Chuan Ling,2019-05-24 Bioprocess Engineering Downstream Processing is the first book to present the principles of bioprocess engineering focusing on downstream bioprocessing It aims to provide the latest bioprocess technology and explain process analysis from an engineering point of

view using worked examples related to biological systems This book introduces the commonly used technologies for downstream processing of biobased products The covered topics include centrifugation filtration membrane separation reverse osmosis chromatography biosorption liquid liquid separation and drying The basic principles and mechanism of separation are covered in each of the topics wherein the engineering concept and design are emphasized This book is aimed at bioprocess engineers and professionals who wish to perform downstream processing for their feedstock as well as students

Handbook of Membrane Separations Anil K. Pabby, S. Ranil Wickramasinghe, Ana-Maria Sastre, 2023-12-22

The third edition of the Handbook of Membrane Separations Chemical Pharmaceutical Food and Biotechnological Applications provides a comprehensive discussion of membrane applications Fully updated to include the latest advancements in membrane science and technology it is a one of its kind overview of the existing literature This fully illustrated handbook is written by experts and professionals in membrane applications from around the world Key Features Includes entirely new chapters on organic solvent resistant nanofiltration membrane condensers membrane reactors in hydrogen production membrane materials for haemodialysis and integrated membrane distillation Covers the full spectrum of membrane technology and its advancements Explores membrane applications in a range of fields from biotechnological and food processing to industrial waste management and environmental engineering This book will appeal to both newcomers to membrane science as well as engineers and scientists looking to expand their knowledge on upcoming advancements in the field

Nanostructured Polymer Membranes, Volume 1 Visakh P. M., Olga B. Nazarenko, 2016-11-11

This book is intended to serve as a one stop reference resource for important research accomplishments in the area of nanostructured polymer membranes and their processing and characterizations It will be a very valuable reference source for university and college faculties professionals post doctoral research fellows senior graduate students and researchers from R D laboratories working in the area of polymer nanobased membranes The various chapters are contributed by prominent researchers from industry academia and government private research laboratories across the globe and comprise an up to date record on the major findings and observations in the field

Thermodynamics, Solubility and Environmental Issues Trevor Letcher, 2007-04-20 Environmental problems are becoming an important aspect of our lives as industries grow apace with populations throughout the world Thermodynamics Solubility and Environmental Issues highlights some of the problems and shows how chemistry can help to reduce these them The unifying theme is Solubility the most basic and important of thermodynamic properties This informative book looks at the importance and applications of solubility and thermodynamics in understanding and in reducing chemical pollution in the environment Written by experts in their respective fields and representing the latest findings in this very important and broad area A collection of twenty five chapters cover a wide range of topics including mining polymer manufacture and applications radioactive wastes industries in general agro chemicals soil pollution and biology together with the basic theory and recent developments in the modelling

of environmental pollutants Latest research into solving some of the most important environmental problems Covering new technologies new chemicals and new processes eg biodegradable polymers ionic liquids and green chemistry Contains the basic theories and underlying importance of solubility *Modern Environmental Analysis Techniques for Pollutants* Chaudhery Mustansar Hussain, Rustem Kecili, 2019-08-20 *Modern Environmental Analysis Techniques for Pollutants* presents established environmental analysis methods rapidly emerging technologies and potential future research directions As methods of environmental analysis move toward lower impact lower cost miniaturization automation and simplicity new methods emerge and ultimately improve the accuracy of their analytical results This book gives in depth step by step descriptions of a variety of techniques including methods used in sampling field sample handling sample preparation quantification and statistical evaluation *Modern Environmental Analysis Techniques for Pollutants* aims to deliver a comprehensive and easy to read text for students and researchers in the environmental analysis arena and to provide essential information to consultants and regulators about analytical and quality control procedures helpful in their evaluation and decision making procedures Bridges the gap in current literature on analytical chemistry techniques and their application to environmental analysis Covers the use of nanomaterials in environmental analysis as well as the monitoring and analysis of nanomaterials in the environment Looks to the past present and future of environmental analysis with chapters on historical background established and emerging techniques and instrumentation and predictions *Membrane Technologies and Applications* Kaustubha Mohanty, Mihir K. Purkait, 2011-12-19 Compiling recent advances in membrane separations technology this highly relevant book introduces cost effective solutions for separation problems in a wide range of industries It discusses membrane use in water and wastewater treatment food and dairy industry and fuel cell applications It describes the role of membrane technologies in resource recovery pollution prevention and energy production as well as environmental monitoring and quality control A concise resource for emerging technologies this book provides the tools to implement effective production processes improve environmental protection and public health and explore new opportunities for the industry **Advances and Technology Development in Greenhouse Gases: Emission, Capture and Conversion** Mohammad Reza Rahimpour, Mohammad Amin Makarem, Maryam Meshksar, 2024-07-20 *Advances and Technology Development in Greenhouse Gases Emission Capture and Conversion* is a comprehensive seven volume set of books that discusses the composition and properties of greenhouse gases and introduces different sources of greenhouse gases emission and the relation between greenhouse gases and global warming The comprehensive and detailed presentation of common technologies as well as novel research related to all aspects of greenhouse gases makes this work an indispensable encyclopedic resource for researchers in academia and industry Volume 4 titled *Carbon Capture Technologies* is devoted to efficient technologies utilized for separation that are the heart of controlling carbon made greenhouse gases GHGs The book starts with a review of carbon capture concepts with a focus on energy penalties as well as the operating

pilots and plants followed by a meticulous investigation of different classes of capture methods Section 2 surveys the absorption process including amines physical absorbents alkaline solvents ionic liquids and deep eutectic solvents nanoparticle enhanced solvents as well as a number of novel materials and structures that are employed to eliminate GHGs utilizing absorption Section 3 addresses adsorption based strategies with a focus on the role of different solid adsorbents introduces technologies that benefit from membranes and considers different materials utilized in the fabrication of membranes The final section deals with other as state of the art alternatives in carbon capture Moreover each section reviews the economic assessments and environmental challenges Introduces carbon capture concepts and challenges Describes various absorption and adsorption processes for carbon capture Includes various membrane technologies for carbon capture

Nonthermal Food Processing, Safety, and Preservation Anand Prakash, Arindam Kuila, 2024-05-21

NONTHERMAL FOOD PROCESSING SAFETY AND PRESERVATION This book is essential for learning how biological processes are translated into commercial products and services under food biotechnology and will significantly broaden users scope capabilities and application of bioprocess engineering food processes biochemical engineering nanotechnology biotechnology and microbiology Food engineering involves a variety of processes and technologies that deal with the construction design operations and associated engineering principles to produce valuable edible goods and byproducts There is a dearth of published cutting edge high quality original studies in the engineering and science of all types of processing technologies from the beginning of the food supply chain to the consumer s dinner table This book seeks to address multidisciplinary experimental and theoretical discoveries that have the potential to improve process efficiency improve product quality and extend the shelf life of fresh and processed food and associated industries This book is for the students and researchers who are interested in learning how biological processes are translated into commercial products and services with food biotechnology

Ionic Liquids In Separation Technology Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**Ionic Liquids In Separation Technology**," written by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we will delve to the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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Ionic Liquids In Separation Technology Introduction

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