

Zeolites In Industrial Separation And Catalysis

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Nuclear Magnetic Resonance Spectroscopy -

Teresa Lehmann 2018-06-13

Nuclear Magnetic Resonance Spectroscopy.

[Handbook of Zeolite Science and Technology](#) -

Scott M. Auerbach 2003-07-31

The Handbook of Zeolite Science and Technology offers effective analyses of salient cases selected expressly for their relevance to current and prospective research. Presenting the principal theoretical and experimental

underpinnings of zeolites, this international effort is at once complete and forward-looking, combining fundamental Emerging Research in Science and Engineering Based on Advanced Experimental and Computational Strategies - Felipe de Almeida La Porta 2020-01-02

In this book, the authors discuss some of the main challenges and new opportunities in science and engineering research, which involve combining computational and experimental approaches as a promising strategy for arriving at new insights into composition-structure-property relations, even at the nanoscale. From a practical standpoint, the authors show that significant improvements in the material/biomolecular foresight by design, including a fundamental understanding of their physical and chemical properties, are vital and will undoubtedly help us to reach a new technological level in the future.

From Energy Storage to Photofunctional

zeolites-in-industrial-separation-and-catalysis

Materials - Rainer Pöttgen 2022-12-05

This work provides the broad range of applications of inorganic compounds. Due to their well defined properties they play an important role in many fields either on a large scale in our daily life or as niche products. Experts from industry and academia present the vast amount of distinguished materials focusing on their synthesis and function. Volume 1 covers e.g. coatings, (inter)metallics, technical gases, ionic solids, catalytic materials.

Zeolites and Zeolite-like Materials - Bert Sels 2016-07-29

Zeolites and Zeolite-like Materials offers a comprehensive and up-to-date review of the important areas of zeolite synthesis, characterization, and applications. Its chapters are written in an educational, easy-to-understand format for a generation of young zeolite chemists, especially those who are just starting research on the topic and need a reference that not only reflects the current state

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of zeolite research, but also identifies gaps and opportunities. The book demonstrates various applications of zeolites in heterogeneous catalysis and biomass conversion and identifies the endless possibilities that exist for this class of materials, their structures, functions, and future applications. In addition, it demonstrates that zeolite-like materials should be regarded as a living body developing towards new modern applications, thereby responding to the needs of modern technology challenges, including biomass conversion, medicine, laser techniques, and nanomaterial design, etc. The book will be of interest not only to zeolite-focused researchers, but also to a broad scientific and non-scientific audience. Provides a comprehensive review of the literature pertaining to zeolites and zeolite-like materials since 2000 Covers the chemistry of novel zeolite-like materials such as Metal-Organic Frameworks (MOFs), Covalent Organic Frameworks (COFs), hierarchical zeolite

materials, new mesoporous and composite zeolite-like micro/mesoporous materials Presents essential information of the new zeolite-like structures, with a balanced coverage of the most important areas of the zeolite research (synthesis, characterization, adsorption, catalysis, new applications of zeolites and zeolite-like materials) Contains chapters prepared by known specialists who are members of the International Zeolite Association [Heterogeneous Catalysis for Today's Challenges](#) - Brian Trewyn 2015-07-06

This book presents the latest research in the field of heterogeneous catalysis. Heterogeneous catalysis and homogeneous catalysis are important factors in increasing the development of green chemistry. Some of the challenges that we are responsible for are directing research efforts toward increasing the kinetics of heterogeneous catalysis to homogeneous catalysis levels, improving the recyclability of the catalysts, and developing new supports that

can act as catalysts or cocatalysts. Following reaction kinetics and mechanisms on supported catalysts provides the degree of precision and accuracy already enjoyed by the homogeneous catalysis community. The editors present an easily-accessible digest for researchers and a reference aimed at offering guidance to new researchers in the field. Priced at £110.00 or US\$180.00.

Zeolite Microporous Solids: Synthesis, Structure, and Reactivity - E.G. Derouane
2012-11-05

Intensive research on zeolites, during the past thirty years, has resulted in a deep understanding of their chemistry and in a true zeolite science, including synthesis, structure, chemical and physical properties, and catalysis. These studies are the basis for the development and growth of several industrial processes applying zeolites for selective sorption, separation, and catalysis. In 1983, a NATO Advanced Study Institute was organized in

Alcabideche (portugal) to establish the State-of-the-Art in Zeolite Science and Technology and to contribute to a better understanding of the structural properties of zeolites, the configurational constraints they may exert, and their effects in adsorption, diffusion, and catalysis. Since then, zeolite science has witnessed an almost exponential growth in published papers and patents, dealing with both fundamentals issues and original applications. The proposal of new procedures for zeolite synthesis, the development of novel and sophisticated physical techniques for zeolite characterization, the discovery of new zeolitic and related microporous materials, progresses in quantum chemistry and molecular modeling of zeolites, and the application of zeolites as catalysts for organic reactions have prompted increasing interest among the scientific community. An important and harmonious interaction between various domains of Physics, Chemistry, and Engineering resulted therefrom.

Handbook of Humidity Measurement, Volume 3 -
Ghenadii Korotcenkov 2020-02-11

Because of unique water properties, humidity affects materials and many living organisms, including humans. Humidity control is important in various fields, from production management to creating a comfortable living environment. The range of materials that can be used in the development of humidity sensors is very broad, and the third volume of the Handbook of Humidity Measurement offers an analysis on various humidity-sensitive materials and sensor technologies used in the fabrication of humidity sensors and methods acceptable for their testing. Additional features include: □ numerous strategies for the fabrication and characterization of humidity-sensitive materials and sensing structures used in sensor applications, □ methods and properties to develop smaller, cheaper, more robust, and accurate devices with better sensitivity and stability, □ a guide to sensor selection and an

overview of the humidity sensor market, and □ new technology solutions for integration, miniaturization, and specificity of the humidity sensor calibration. Handbook of Humidity Measurement, Volume 3: Sensing Materials and Technologies provides valuable information for practicing engineers, measurement experts, laboratory technicians, project managers in industries and national laboratories, and university students and professors interested in solutions to humidity measurement tasks. Despite the fact that this book is devoted to the humidity sensors, it can be used as a basis for understanding fundamentals of any gas sensor operation and development.

Supported Ionic Liquids - Rasmus Fehrmann
2014-03-24

This unique book gives a timely overview about the fundamentals and applications of supported ionic liquids in modern organic synthesis. It introduces the concept and synthesis of SILP materials and presents important applications in

the field of catalysis (e.g. hydroformylation, hydrogenation, coupling reactions, fine chemical synthesis) as well as energy technology and gas separation. Written by pioneers in the field, this book is an invaluable reference book for organic chemists in academia or industry.

Photofunctional Rare Earth Hybrid

Materials - Bing Yan 2017-08-28

This book presents the main research advances in the field of photofunctional rare earth hybrid materials. The first chapter discusses the fundamental principles, ranging from rare earth, rare earth luminescence, luminescent rare earth compounds and photofunctional rare earth hybrid materials. The main body of the book consists of six chapters exploring different kinds of photofunctional hybrid materials, such as hybrids based on organically modified silica; organically modified mesoporous silica; functionalized microporous zeolite and metal-organic frameworks; polymer or polymer/silica composite; and multi-component assembly of

hybrids. It also includes a chapter introducing the photofunctional application of these hybrid materials. It is a valuable resource for a wide readership in various fields of rare earth chemistry, chemical science and materials science.

Modern Petrochemical Technology - Santi Kulprathipanja 2021-03-30

Modern Petrochemical Technology A text that explores the essence of petrochemicals and petrochemical technology Modern Petrochemical Technology: Methods, Manufacturing and Applications is a comprehensive resource that provides an overview of the uses for common petrochemical building blocks, a review of the marketplaces, and offers a survey of the technology used to make the key petrochemical building blocks. The book contains both critical information the technologies used to produce petrochemicals, how the various petrochemicals are applied in industry, and provides illustrative examples and problems designed to reinforce

the learning about the basic science, engineering, and use of petrochemicals. The book explores three separate petrochemical building blocks—olefin complexes, aromatic complexes and synthesis gas complexes—and examines the “interconnected” nature of these building blocks. The authors also include information on the olefins productions using steam cracking, paraffin dehydrogenation, and methanol to olefins technologies and describes various methods, commercial processes to produce aromatics such as benzene, toluene and xylene, and much more. This important book: Offers a guide to the critical information on petrochemical producing technologies Includes material on various petrochemicals from the industrial point-of-view Explores the separation processes, membrane technology, absorption technology, liquid-liquid extraction, and more Contains material from a team of noted experts Provides a survey of examples of commercialization applications of

petrochemicals Written for chemical engineers, chemists in industry, membrane scientists, and process engineers, Modern Petrochemical Technology provides an overview of markets and uses for common petrochemical building blocks as well as includes a survey of the technology used to make the key petrochemical building blocks.

Mesoporous Zeolites - Javier García-Martínez
2015-05-26

Authored by a top-level team of both academic and industrial researchers in the field, this is an up-to-date review of mesoporous zeolites. The leading experts cover novel preparation methods that allow for a purpose-oriented fine-tuning of zeolite properties, as well as the related materials, discussing the specific characterization methods and the applications in close relation to each individual preparation approach. The result is a self-contained treatment of the different classes of mesoporous zeolites. With its academic insights and practical

relevance this is a comprehensive handbook for researchers in the field and related areas, as well as for developers from the chemical industry.

Nanotechnology in Catalysis - Bert Sels
2017-06-20

Reflecting the R&D efforts in the field that have resulted in a plethora of novel applications over the past decade, this handbook gives a comprehensive overview of the tangible benefits of nanotechnology in catalysis. By bridging fundamental research and industrial development, it provides a unique perspective on this scientifically and economically important field. While the first three parts are devoted to preparation and characterization of nanocatalysts, the final three provide in-depth insights into their applications in the fine chemicals industry, the energy industry, and for environmental protection, with expert authors reporting on real-life applications that are on the brink of commercialization. Timely reading for

catalytic chemists, materials scientists, chemists in industry, and process engineers.

Zeolites in Catalysis - Jiří Čejka 2017-06-07
Covering the breadth of zeolite chemistry and catalysis, this book provides the reader with a complete introduction to field, covering synthesis, structure, characterisation and applications. Beginning with the history of natural and synthetic zeolites, the reader will learn how zeolite structures are formed, synthetic routes, and experimental and theoretical structure determination techniques. Their industrial applications are covered in-depth, from their use in the petrochemical industry, through to fine chemicals and more specialised clinical applications. Novel zeolite materials are covered, including hierarchical zeolites and two-dimensional zeolites, showcasing modern developments in the field. This book is ideal for newcomers who need to get up to speed with zeolite chemistry, and also experienced researchers who will find this a

modern, up-to-date guide.

Zeolites for Cleaner Technologies - Michel Guisnet 2002-09-19

This book, written and edited by leading authorities from academia and industrial groups, covers both preventive- and curative-zeolite-based technologies in the field of chemical processing. The opening chapter presents the state of the art in zeolite science. The two subsequent chapters summarize the chemistries involved in the processes and the constraints imposed on the catalyst/adsorbent. Three major areas are covered: oil refining, petrochemicals and fine chemicals. A chapter on the (curative) use of zeolites in pollution abatement completes this overview. In the area of oil refining, a general lecture sets the scene for present and future challenges. It is followed by in-depth case studies involving FCC, hydrocracking and light naphtha isomerization. Also, an entire chapter is devoted to the often-overlooked subject of base oils. In the area of petrochemicals, the

processing of aromatics and olefins is described and special attention is paid to the synergy between catalysis and separation on molecular sieves. Contents: Introduction to Zeolite Science and Technology (M Guisnet & J-P Gilson) The Chemistry of Catalytic Processes (A Corma & A Martínez) Preparation of Zeolite Catalysts (T G Roberie et al.) Refining Processes: Setting the Scene (R H Jensen) Advances in Fluid Catalytic Cracking (E T Habib et al.) Hydrocracking (J A R Van Veen) C4-C6 Alkane Isomerisation (F Schmidt & E Köhler) Base Oil Production and Processing (M Daage) Para-Xylene Manufacturing Catalytic Reactions and Processes (F Alario & M Guisnet) Separation of Paraxylene by Adsorption (A Méthivier) Aromatic Alkylation: Towards Cleaner Processes (J S Beck et al.) Methanol to Olefins (MTO) and Beyond (P Barger) Zeolite Effects on Catalytic Transformations of Fine Chemicals (D E De Vos & P A Jacobs) Functionalization of Aromatics over Zeolite Catalysts (P Marion et al.) Zeolites

and 'Non-Zeolite' Molecular Sieves in the Synthesis of Fragrances and Flavors (W F Hoelderich & M C Laufer) Pollution Abatement Using Zeolites: State of the Art and Further Needs (G Delahay & B Coq) Readership: Undergraduates, graduate students, academics and researchers in catalyst chemistry.

Reviews: "Chapter authors have provided a teaching text that gives excellent introductory chapters to zeolites, and to the nature and significance of the processes that they can catalyse ... This excellent book should be required reading for all scientists who have an interest in improving the

environment." *Chemistry & Industry*
Chemistry of Zeolites and Related Porous Materials - Ruren Xu 2009-05-29

Widely used in adsorption, catalysis and ion exchange, the family of molecular sieves such as zeolites has been greatly extended and many advances have recently been achieved in the field of molecular sieves synthesis and related

porous materials. *Chemistry of Zeolites and Related Porous Materials* focuses on the synthetic and structural chemistry of the major types of molecular sieves. It offers a systematic introduction to and an in-depth discussion of microporous, mesoporous, and macroporous materials and also includes metal-organic frameworks. Provides focused coverage of the key aspects of molecular sieves Features two frontier subjects: molecular engineering and host-guest advanced materials Comprehensively covers both theory and application with particular emphasis on industrial uses This book is essential reading for researchers in the chemical and materials industries and research institutions. The book is also indispensable for researchers and engineers in R&D (for catalysis) divisions of companies in petroleum refining and the petrochemical and fine chemical industries. *Zeolites and Catalysis* - Jiri Cejka 2010-05-27 This indispensable two-volume handbook covers everything on this hot research field. The first

part deals with the synthesis, modification, characterization and application of catalytic active zeolites, while the second focuses on such reaction types as cracking, hydrocracking, isomerization, reforming and other industrially important topics. Edited by a highly experienced and internationally renowned team with chapters written by the "Who's Who" of zeolite research.

Industrial Catalysis - Jens Hagen 2015-09-24
Now in its 3rd Edition, *Industrial Catalysis* offers all relevant information on catalytic processes in industry, including many recent examples. Perfectly suited for self-study, it is the ideal companion for scientists who want to get into the field or refresh existing knowledge. The updated edition covers the full range of industrial aspects, from catalyst development and testing to process examples and catalyst recycling. The book is characterized by its practical relevance, expressed by a selection of over 40 examples of catalytic processes in

industry. In addition, new chapters on catalytic processes with renewable materials and polymerization catalysis have been included. Existing chapters have been carefully revised and supported by new subchapters, for example, on metathesis reactions, refinery processes, petrochemistry and new reactor concepts. "I found the book accessible, readable and interesting - both as a refresher and as an introduction to new topics - and a convenient first reference on current industrial catalytic practice and processes." Excerpt from a book review for the second edition by P. C. H. Mitchell, *Applied Organometallic Chemistry* (2007)

Industrial Catalysis and Separations - K. V. Raghavan 2014-07-01

With contributions from experts from both the industry and academia, this book presents the latest developments in the identified areas. In addition, a thorough and updated coverage of the traditional aspects of heterogeneous

catalysis such as preparation, characterization and use in well-established technologies such as nitration, ammoxidation and hydrofluorination is included. This book incorporates appropriate case studies, explanatory notes, and schematics for more clarity and better understanding.

Handbook of Gas Sensor Materials - Ghenadii Korotcenkov 2013-11-08

The two volumes of Handbook of Gas Sensor Materials provide a detailed and comprehensive account of materials for gas sensors, including the properties and relative advantages of various materials. Since these sensors can be applied for the automation of myriad industrial processes, as well as for everyday monitoring of such activities as public safety, engine performance, medical therapeutics, and in many other situations, this handbook is of great value. Gas sensor designers will find a treasure trove of material in these two books.

Carbon Capture and Storage - Mai Bui
2019-12-04

Carbon capture and storage (CCS) and "negative emissions" technologies will play an essential role in mitigating the impact of global warming and meeting the temperature targets set by the IPCC and by COP21. Identifying the role and value of CCS relative to other mitigation technologies is of vital importance. This book provides a comprehensive, up-to-date overview of the major sources of carbon dioxide emission, capture and storage, as well as negative emissions technologies, and provides insight into the role and value of CCS in the industrial and power sectors. The issues associated with commercial deployment of CCS are discussed, providing potential approaches to overcome these hurdles through a combination of political, economic and R&D strategies. Carbon Capture and Storage provides the latest global perspective on the role and value of CCS in delivering temperature targets and reducing the impact of global warming. With contributions from internationally recognised leaders, this

book will appeal to graduate students and researchers in academia and industry, working in chemical engineering, mechanical engineering, and energy policy.

Membrane Technology for CO₂ Sequestration - Zeinab Abbas Jawad 2019-03-26

This book addresses the fundamentals of CO₂ storage for long-term sequestration in a subsurface geologic formation. In general, membrane gas separation can find a large room of application in flue gas. To achieve the development of this technology on a larger scale than which is possible in the lab we have to use membrane engineering. Consequently, greater emphasis is placed on novel materials for gas separation. Possible design strategies and role of novel materials are discussed. Additionally, the latest progress in design and preparation of asymmetric membranes for natural gas purification are highlighted. In fact, further development should focus on module and process design in order to bring gas separation

membrane technology into commercial application. Therefore, the key issues to propel current research towards industrial application are examined. Besides, the feasibility of implementing polyimide membrane for CO₂ removal under real industrial conditions and its economic viability are highlighted. In order to exhibit excellent film-forming properties, zeolite membrane and cellulose acetate butyrate membrane are addressed. Interestingly, it was found that the most accurate theoretical three-phase model is arguably revised Pal model with average percentage error of 0.74%.

Hydrocarbon Chemistry, 2 Volume Set - George A. Olah 2017-09-08

This book provides an unparalleled contemporary assessment of hydrocarbon chemistry - presenting basic concepts, current research, and future applications. • Comprehensive and updated review and discussion of the field of hydrocarbon chemistry • Includes literature coverage since the

publication of the previous edition • Expands or adds coverage of: carboxylation, sustainable hydrocarbons, extraterrestrial hydrocarbons • Addresses a topic of special relevance in contemporary science, since hydrocarbons play a role as a possible replacement for coal, petroleum oil, and natural gas as well as their environmentally safe use • Reviews of prior edition: "...literature coverage is comprehensive and ideal for quickly reviewing specific topics...of most value to industrial chemists..." (Angewandte Chemie) and "...useful for chemical engineers as well as engineers in the chemical and petrochemical industries." (Petroleum Science and Technology)

Introduction to Reticular Chemistry - Omar M. Yaghi 2019-08-05

A concise introduction to the chemistry and design principles behind important metal-organic frameworks and related porous materials Reticular chemistry has been applied to synthesize new classes of porous materials

that are successfully used for myriad applications in areas such as gas separation, catalysis, energy, and electronics. Introduction to Reticular Chemistry gives an unique overview of the principles of the chemistry behind metal-organic frameworks (MOFs), covalent organic frameworks (COFs), and zeolitic imidazolate frameworks (ZIFs). Written by one of the pioneers in the field, this book covers all important aspects of reticular chemistry, including design and synthesis, properties and characterization, as well as current and future applications Designed to be an accessible resource, the book is written in an easy-to-understand style. It includes an extensive bibliography, and offers figures and videos of crystal structures that are available as an electronic supplement. Introduction to Reticular Chemistry: -Describes the underlying principles and design elements for the synthesis of important metal-organic frameworks (MOFs) and related materials -Discusses both real-life

and future applications in various fields, such as clean energy and water adsorption -Offers all graphic material on a companion website - Provides first-hand knowledge by Omar Yaghi, one of the pioneers in the field, and his team. Aimed at graduate students in chemistry, structural chemists, inorganic chemists, organic chemists, catalytic chemists, and others, Introduction to Reticular Chemistry is a groundbreaking book that explores the chemistry principles and applications of MOFs, COFs, and ZIFs.

Environmentally Friendly Zeolites - Rafael Chaves Lima 2019-05-24

This book details zeolites, their structures and the parameters that influence their synthesis, providing a new and actual perspective of this field. Following this, the authors show different processes used to synthesize zeolites using residues, natural materials, and other eco-friendly materials such as raw powder glass, clays, aluminum cans, diatomites, rice ashes or

coal ashes. Finally, this book gives the reader a wide range of different synthesis methods that they can be applied to several industrial processes.

Comprehensive Energy Systems - 2018-02-07
Comprehensive Energy Systems provides a unified source of information covering the entire spectrum of energy, one of the most significant issues humanity has to face. This comprehensive book describes traditional and novel energy systems, from single generation to multi-generation, also covering theory and applications. In addition, it also presents high-level coverage on energy policies, strategies, environmental impacts and sustainable development. No other published work covers such breadth of topics in similar depth. High-level sections include Energy Fundamentals, Energy Materials, Energy Production, Energy Conversion, and Energy Management. Offers the most comprehensive resource available on the topic of energy systems Presents an

authoritative resource authored and edited by leading experts in the field Consolidates information currently scattered in publications from different research fields (engineering as well as physics, chemistry, environmental sciences and economics), thus ensuring a common standard and language

Modern Inorganic Synthetic Chemistry - Ruren Xu 2017-02-11

Modern Inorganic Synthetic Chemistry, Second Edition captures, in five distinct sections, the latest advancements in inorganic synthetic chemistry, providing materials chemists, chemical engineers, and materials scientists with a valuable reference source to help them advance their research efforts and achieve breakthroughs. Section one includes six chapters centering on synthetic chemistry under specific conditions, such as high-temperature, low-temperature and cryogenic, hydrothermal and solvothermal, high-pressure, photochemical and fusion conditions. Section two focuses on

the synthesis and related chemistry problems of highly distinct categories of inorganic compounds, including superheavy elements, coordination compounds and coordination polymers, cluster compounds, organometallic compounds, inorganic polymers, and nonstoichiometric compounds. Section three elaborates on the synthetic chemistry of five important classes of inorganic functional materials, namely, ordered porous materials, carbon materials, advanced ceramic materials, host-guest materials, and hierarchically structured materials. Section four consists of four chapters where the synthesis of functional inorganic aggregates is discussed, giving special attention to the growth of single crystals, assembly of nanomaterials, and preparation of amorphous materials and membranes. The new edition's biggest highlight is Section five where the frontier in inorganic synthetic chemistry is reviewed by focusing on biomimetic synthesis and rationally designed synthesis. Focuses on

the chemistry of inorganic synthesis, assembly, and organization of wide-ranging inorganic systems Covers all major methodologies of inorganic synthesis Provides state-of-the-art synthetic methods Includes real examples in the organization of complex inorganic functional materials Contains more than 4000 references that are all highly reflective of the latest advancement in inorganic synthetic chemistry Presents a comprehensive coverage of the key issues involved in modern inorganic synthetic chemistry as written by experts in the field
Membrane Reactor Engineering - Angelo Basile
2016-08-01

Uniquely focussed on the engineering aspects of membrane reactors Provides tools for analysis with specific regard to sustainability Applications include water treatment, wastewater recycling, desalination, biorefineries, agro-food production Membrane reactors can bring energy saving, reduced environmental impact and lower operating costs

Applied Biocatalysis - Lutz Hilterhaus
2016-07-27

This reference book originates from the interdisciplinary research cooperation between academia and industry. In three distinct parts, latest results from basic research on stable enzymes are explained and brought into context with possible industrial applications. Downstream processing technology as well as biocatalytic and biotechnological production processes from global players display the enormous potential of biocatalysts. Application of "extreme" reaction conditions (i.e. unconventional, such as high temperature, pressure, and pH value) - biocatalysts are normally used within a well defined process window - leads to novel synthetic effects. Both novel enzyme systems and the synthetic routes in which they can be applied are made accessible to the reader. In addition, the complementary innovative process technology under unconventional conditions is highlighted

by latest examples from biotech industry. Ceramic Membranes - Vitaly Gitis 2016-06-27 This textbook gives a clear and coherent overview of ceramic membranes, from preparation methods all the way to applications and economics. The authors, who are known for their clear writing style, combine their expertise in environmental engineering and porous materials to cover a wide range of examples, with over 1000 references. Chapters 1, 2 and 3 give a detailed introduction to membrane synthesis, transport mechanisms, and characterisation. Building on this, Chapter 4 outlines the state-of-the-art in ceramic membrane applications, including fuel cells, water purification, gas separation, and the making of cheeses, fruit juice, wine and beer. The final chapter deals with the economics of ceramic membrane processes, using industrial case studies to examine market barriers and opportunities. Ceramics are known throughout history, but now, after thousands of years,

they're making a comeback. Indeed, they may hold the key for addressing three of today's biggest challenges: clean energy, drinking water and air pollution. This book is a must-have for anyone who wants to enter the ceramic membranes field, or keep up-to-date with the latest developments and applications. This textbook gives a clear and coherent overview of ceramic membranes, from preparation methods all the way to applications and economics. The authors, who are known for their clear writing style, combine their expertise in environmental engineering and porous materials to cover a wide range of examples, with over 1000 references. Chapters 1, 2 and 3 give a detailed introduction to membrane synthesis, transport mechanisms, and characterisation. Building on this, Chapter 4 outlines the state-of-the-art in ceramic membrane applications, including fuel cells, water purification, gas separation, and the making of cheeses, fruit juice, wine and beer. The final chapter deals with the economics of

ceramic membrane processes, using industrial case studies to examine market barriers and opportunities. Ceramics are known throughout history, but now, after thousands of years, they're making a comeback. Indeed, they may hold the key for addressing three of today's biggest challenges: clean energy, drinking water and air pollution. This book is a must-have for anyone who wants to enter the ceramic membranes field, or keep up-to-date with the latest developments and applications.

Advances in Chromatography, Volume 57 - Nelu Grinberg 2020-08-05

For more than five decades, scientists and researchers have relied on the Advances in Chromatography series for the most up-to date information on a wide range of developments in chromatographic methods and applications. The clear presentation of topics and vivid illustrations for which this series has become known makes the material accessible and engaging to analytical, biochemical, organic,

polymer, and pharmaceutical chemists at all levels of technical skill. This volume considers the achievements and legacy of Lloyd R. Snider in separation science and analytical chemistry. Key Features: • Provides a historical perspective of the evolution of SMB technology together with a theoretical analysis of the most relevant underlying phenomena. • Presents a brief survey of the polar columns suitable for HILIC separations and pays special attention to the role of the mobile phase in RP and HILIC modes. • Describes recent strategies of method development in Kosmotropic chromatography. • Surveys the many approaches to avert the effects of temperature in reversed-phase liquid chromatographic separations. • Reviews separation of isotopic compounds by HPLC in relation to the advances of columns and stationary phases.

Advances in Refining Catalysis - Deniz Uner 2017-03-16

To meet changing market demands that have

stringent emission standards and to ensure proper performance in refinery units, evaluation of novel catalyst designs and results from material characterization and testing of catalysts are of crucial importance for refiners as well as for catalyst manufacturers. This book highlights recent developments in the application of refinery catalysts in selected units such as fluid catalytic cracking (FCC), hydrogen production for hydroprocessing units, hydrotreating, hydrocracking, and sustainable processing of biomass into biofuels.

Zeolites as Catalysts, Sorbents and Detergent Builders - H.G. Karge 1989-05-01

This new book will be welcomed by companies involved in catalysis and catalyst manufacturing, sorbent and detergent production, chemical and petroleum refining, and by research scientists in academia. It contains 76 original contributions of recent work on fundamental and technological aspects of zeolite research and application. Particular attention is paid to novel

developments in zeolite catalysis, sorption on zeolites and use of zeolites as detergent builders. Problems of zeolite synthesis, structure, modification, ion exchange, diffusion and novel applications are also dealt with. Topics which are the subject of much current interest are also treated, e.g. new catalytic applications of zeolites in the synthesis of fine chemicals, novel formulations of detergent builders and industrially developed zeolite-based separation processes. The application of zeolites is also discussed from both economic and ecological points of view. The contributions cover a wide range of materials and results which are organised, to a large extent, in tables and figures and are identified by appropriate keywords. The meeting at which these contributions were presented was the latest in a series of smaller, more specialized zeolite meetings which are held in between the large International Zeolite Conferences. Participating in the symposium were experts from both

industry and academia who gave invited lectures, oral and poster presentations. The resulting book provides a large body of helpful information for present and future work and development in zeolite research and applications.

Zeolites in Industrial Separation and Catalysis - Santi Kulprathipanja 2010-01-26

This first book to offer a practical overview of zeolites and their commercial applications provides a practical examination of zeolites in three capacities. Edited by a globally recognized and acclaimed leader in the field with contributions from major industry experts, this handbook and ready reference introduces such novel separators as zeolite membranes and mixed matrix membranes. The first part of the book discusses the history and chemistry of zeolites, while the second section focuses on separation processes. The third and final section treats zeolites in the field of catalysis. The three sections are unified by an examination of how

the unique properties of zeolites allow them to function in different capacities as an adsorbent, a membrane and as a catalyst, while also discussing their impact within the industry.

Advanced Catalytic Materials: Current Status and Future Progress - José Manuel Domínguez-Esquivel 2019-10-02

This book presents advances in computational methods, experimental synthesis, and advanced characterizations for novel catalytic materials. The authors show how catalytical materials can be used for various engineering oil & gas applications - mainly in low contaminants fuel production. All contributors, describe in detail novel experimental and theoretical techniques techniques and concepts for synthesis, evaluation and scaling catalytic materials and research advances in evaluation, extensive characterization and theoretical modeling using computer assisted methods and algorithms. Describes computational methods, experimental synthesis and advanced characterization for

novel catalytic materials; Examines catalytic materials and corresponding engineering applications with a focus on low contaminant fuel production and derivatives; Covers the application of computer assisted quantum mechanical for fundamental understanding of electronic structure of molecular dimension catalytic materials.

Catalytic Hydroarylation of Carbon-Carbon Multiple Bonds - Lutz Ackermann 2018-02-20

Filling a gap in the literature, this book comprehensively reviews catalytic C-H addition reactions of (hetero)aromatic hydrocarbons across carbon-carbon multiple bonds. In so doing, it summarizes both the scope as well as the limitations of different catalyst systems and building blocks, while highlighting their application to the synthesis of pharmaceuticals as well as commodity chemicals. Focusing on the latest developments, the team of authors comprising leaders in the field covers such topics as the hydroarylation of olefins, alkyne

hydroarylation in the presence of transition metal catalysts, reaction of alkynes with arylboronic acids, and allene hydroarylation, as well as the synthesis of functionalized arenes and heteroaromatics. A must-have for synthetic chemists in academia and industry dealing with catalysis, organometallic chemistry, the synthesis of natural products, fine chemicals, pharmaceuticals, products of the chemical industry and organic materials.

Ion Exchange Technology II - Dr. Inamuddin 2012-06-05

Ion-exchange Technology II: Applications presents an overview of the numerous industrial applications of ion-exchange materials. In particular, this volume focuses on the use of ion-exchange materials in various fields including chemical and biochemical separations, water purification, biomedical science, toxic metal recovery and concentration, waste water treatment, catalysis, alcohol beverage, sugar and milk technologies, pharmaceuticals industry

and metallurgical industries. This title is a highly valuable source not only to postgraduate students and researchers but also to industrial R&D specialists in chemistry, chemical, and biochemical technology as well as to engineers and industrialists.

IAENG Transactions on Engineering Sciences - Ao Sio-iong 2017-11-17

Two large international conferences on Advances in Engineering Sciences were held in London, UK, 29 June - 1 July, 2016, under the World Congress on Engineering (WCE 2016), and San Francisco, USA, 19-21 October, 2016, under the World Congress on Engineering and Computer Science (WCECS 2016) respectively. This volume contains 42 revised and extended research articles written by prominent researchers participating in the conferences. Topics covered include electrical engineering, manufacturing engineering, industrial engineering, computer science, engineering mathematics and industrial applications. The

book offers state-of-the-art advances in engineering sciences and also serves as an excellent reference work for researchers and graduate students working with/on engineering sciences.

Advances in Carbon Capture - Mohammad Reza Rahimpour 2020-08-04

Advances in Carbon Capture reviews major implementations of CO₂ capture, including absorption, adsorption, permeation and biological techniques. For each approach, key benefits and drawbacks of separation methods and technologies, perspectives on CO₂ reuse and conversion, and pathways for future CO₂ capture research are explored in depth. The work presents a comprehensive comparison of capture technologies. In addition, the alternatives for CO₂ separation from various feeds are investigated based on process economics, flexibility, industrial aspects, purification level and environmental viewpoints. Explores key CO₂ separation and compare

technologies in terms of provable advantages and limitations Analyzes all critical CO2 capture methods in tandem with related technologies Introduces a panorama of various applications of CO2 capture

Reactive Separation Processes -

Kulprathipanja 2019-01-15

This book summarizes the available information in six known areas of reactive separation: reaction/distillation, reaction/extraction, reaction/absorption, reaction/adsorption, reaction/membrane, and reaction/crystallization.