

Synthesis Of Zeolite Beta Directly From Rice Husk Ash

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Epoxy Resins Technology Handbook (Manufacturing Process, Synthesis, Epoxy Resin Adhesives and Epoxy Coatings) 2nd Revised Edition. - Dr. H. Panda 2019-04-19

Epoxy is a term used to denote both the basic components and the cured end products of epoxy resins, as well as a colloquial name for the epoxide functional group. Epoxy resin are a class of thermoset materials used extensively in structural and specialty composite applications because they offer a unique combination of properties that are unattainable with other thermoset resins. Epoxies are monomers or prepolymers that further reacts with curing agents to yield high performance thermosetting plastics. They have gained wide acceptance in protecting coatings, electrical and structural applications because of their exceptional combination of properties such as toughness, adhesion, chemical resistance and superior electrical properties. Epoxy resins are characterized by the presence of a three membered cycle ether group commonly referred to as an epoxy group 1,2-epoxide, or oxirane. The most widely used epoxy resins are diglycidyl ethers of bisphenol-A derived from bisphenol-A and epichlorohydrin. The market of epoxy resins are growing day by day. Today the total business of this product is more than 100 crores. Epoxy resins are used for about 75% of wind blades currently produced worldwide, while polyester resins account for the remaining 25%. A standard 1.5-MW (megawatt) wind turbine has approximately 10 tonnes of epoxy in its blades. Traditionally, the markets

for epoxy resins have been driven by demand generated primarily in areas of adhesives, building and civil construction, electrical insulation, printed circuit boards, and protective coatings for consumer durables, amongst others. The major contents of the book are synthesis and characteristics of epoxy resin, manufacture of epoxy resins, epoxide curing reactions, the dynamic mechanical properties of epoxy resins, physical and chemical properties of epoxy resins, epoxy resin adhesives, epoxy resin coatings, epoxy coating give into water, electrical and electronic applications, analysis of epoxides and epoxy resins and the toxicology of epoxy resins. It will be a standard reference book for professionals and entrepreneurs. Those who are interested in this field can find the complete information from manufacture to final uses of epoxy resin. This presentation will be very helpful to new entrepreneurs, technocrats, research scholars, libraries and existing units.

Proceedings - 1996

Biorefinery of Alternative Resources: Targeting Green Fuels and Platform Chemicals - Sonil Nanda 2020-03-31

This book summarizes recent advances in the processing of waste biomass resources to produce biofuels and biochemicals. Worldwide interest in clean energy sources, environmental protection, and mitigating global warming is rapidly gaining momentum and spurring on the search for alternative energy sources, especially for the

transportation and industrial sectors. This book reviews the opportunities presented by low-cost organic waste materials, discussing their suitability for alternative fuel and fine chemical production, physicochemical characterization, conversion technologies, feedstock and fuel chemistry, refining technologies, fuel upgrading, residue management, and the circular economy. In addition, it explores applied aspects of biomass conversion by highlighting several significant thermochemical, hydrothermal and biological technologies. In summary, the book offers comprehensive and representative descriptions of key fuel processing technologies, energy conversion and management, waste valorization, eco-friendly waste remediation, biomass supply chain, lifecycle assessment, techno-economic analysis and the circular bioeconomy.

Encyclopedia of Renewable and Sustainable Materials - 2020-01-09

Encyclopedia of Renewable and Sustainable Materials provides a comprehensive overview, covering research and development on all aspects of renewable, recyclable and sustainable materials. The use of renewable and sustainable materials in building construction, the automotive sector, energy, textiles and others can create markets for agricultural products and additional revenue streams for farmers, as well as significantly reduce carbon dioxide (CO₂) emissions, manufacturing energy requirements, manufacturing costs and waste. This book provides researchers, students and professionals in materials science and engineering with tactics and information as they face increasingly complex challenges around the development, selection and use of construction and manufacturing materials. Covers a broad range of topics not available elsewhere in one resource Arranged thematically for ease of navigation Discusses key features on processing, use, application and the environmental benefits of renewable and sustainable materials Contains a special focus on sustainability that will lead to the reduction of carbon emissions and enhance protection of the natural environment with regard to sustainable materials

Molecular Sieves - Rosemarie Szostak 2013-06-29

From a report by a Lieutenant Colonel W.A. Ross (Chern. News, Nov.15,

1878, p. 236). Progress did not accelerate during the next 50 years. McBain, in his classic 1932 book, *The Sorption of Gases by Solids*, devoted a chapter to sorption by chabasite, other zeolites, and permeable crystals. McBain remarked that "great interest attaches to the finding of Weigel and Steinhoff [O. Weigel and E. Steinhoff, *Z. Kristallogr.*, 61, 125 (1925)] that chabasite rapidly sorbs the vapors of water, methyl and ethyl alcohol and formic acid, whereas acetone, ether and benzene are largely excluded. The significance of their results was pointed out by McBain [J.W. McBain, *Colloid. Symp. Mon.*, 20, 1 (1926)] and recognized by all later writers. It is evident that the partially dehydrated chabasite forms a nearly perfect molecular sieve or a semipermeable membrane of extremely regular structure ... ". While the significance of the above observation may have been recognized, it had little impact. Thus, an eminent pioneer in the synthesis and characterization of zeolites, Professor R.M. Barrer, spent nearly two decades (following his Ph. D. studies in the 1930s) developing a firm foundation for the rapid growth in scientific understanding and industrial applications of zeolites which has taken place during the last 30 years.

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.

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 the 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.

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

Applications in Industry - 1998-12-17

Volume I contains a brief review of adsorption history and its development for practical purposes up until now. It also presents some important information on adsorbents and catalysts as well as on the methods of their characterization. The part of this volume dealing with practical industrial applications includes chapters presenting advanced technical tools for high capacity adsorption separation of liquid and gas mixtures, development of new adsorbents for removal of hazardous contaminants from combustion flue gases and wastewaters, degasification of coal seams and fabrication of inorganic membranes and their applications. A comprehensive review is also included on contemporary utility of self-assembled monolayers, adsorption proteins and their role in modern industry, adsorption methods in technology of optical fibre glasses, sol-gel technology, solid desiccant dehumidification systems, etc. The articles give both the scientific backgrounds of the phenomena discussed and emphasize their practical aspects. The chapters give not only brief current knowledge about the studied problems, but are also a source of topical literature on the subject. A comprehensive bibliography on adsorption principles, design data and adsorbent materials for industrial applications for the period 1967-1997

concludes the book.

New Trends in Removal of Heavy Metals from Industrial Wastewater - Maulin P. Shah 2021-04-23

New Trends in Removal of Heavy Metals from Industrial Wastewater covers the applicable technologies relating to the removal of heavy metals from wastewater and new and emerging trends in the field, both at the laboratory and industrial scale. Sections explore new environmentally friendly technologies, the principles of sustainable development, the main factors contributing to heavy metal removal from wastewater, methods and procedures, materials (especially low-cost materials originated from industrial and agricultural waste), management of wastewater containing heavy metals and wastewater valorization, recycling, environmental impact, and wastewater policies for post heavy metal removal. This book is an advanced and updated vision of existing heavy metal removal technologies with their limitations and challenges and their potential application to remove heavy metals/environmental pollutants through advancements in bioremediation. Finally, sections also cover new trends and advances in environmental bioremediation with recent developments in this field by an application of chemical/biochemical and environmental biotechnology. Outlines the fate and occurrence of heavy metals in Wastewater Treatment Plants (WWTPs) and potential approaches for their removal Describes the techniques currently available for removing heavy metals from wastewater Discusses the emerging technologies in heavy metal removal Covers biological treatments to remove heavy metals Includes the valorization of heavy metal containing wastewater

Optimization of Biodiesel and Biofuel Process - Diego Luna 2021-09-02

Although the compression ignition (C.I.) engine, invented by Rudolf Diesel, was originally intended to work with pure vegetable oils as fuel, more than a century ago, it was adapted to be used with a fuel of fossil origin, obtained from oil. Therefore, there would be no technical difficulties in returning to the primitive design of using biofuels of renewable origin, such as vegetable oils. The main drawback is found in the one billion C.I. engines which are currently in use, which would have

to undergo a modification in the injection system in order to adapt them to the higher viscosity of vegetable oils in comparison to that of fossil fuels. Thus, the gradual incorporation of biofuels as substitutes of fossil fuels is mandatory.

Green Materials for Sustainable Water Remediation and Treatment - Anuradha Mishra 2013-09-06

Inadequate access to clean water afflicts people throughout the world, and in developing countries any solution to this challenge must be achieved at a low cost and low energy demand. At the same time, the use of chemicals, and subsequent environmental impact must also be reduced. Green and sustainable water remediation is a rapidly growing field of interest to governments and corporations alike, with considerable input from academics, environmental consultants and public interest groups. This book presents a focused set of articles covering a range of topics in the field, examining not only the adoption of natural products for water remediation, but also the synthesis of new materials and emerging clean technologies. Contributors from across the globe (including some "on the ground" in the developing world) present a comprehensive digest in the form of review-style articles highlighting the current thinking and direction in the field. Interested stakeholders from all sectors will find this book invaluable, and postgraduate students of chemical engineering or environmental science will benefit from the real-world applications presented.

Progress in Zeolite and Microporous Materials - H. Chon 1996-12-04

The proceedings of the 11th Zeolite Conference has been published in three volumes, containing 5 plenary lectures and 274 full papers. Part A comprises Synthesis and Characterization (99 papers), Part B Catalysis and Environment (102 papers) and Part C Adsorption and Diffusion, Modifications, Novel Materials and Theory (78 papers). Zeolite science and technology has been and continues to be an area receiving great attention. Increasing interest in the synthesis and the characterization of zeolite and microporous materials is reflected in the large number of contributions. Other areas gaining recognition include novel materials, adsorption, theory and modeling.

Nanoporous Catalysts for Biomass Conversion - Feng-Shou Xiao 2017-11-06

A comprehensive introduction to the design, synthesis, characterization, and catalytic properties of nanoporous catalysts for the biomass conversion. With the specter of peak oil demand looming on the horizon, and mounting concerns over the environmental impact of greenhouse gas emissions, biomass has taken on a prominent role as a sustainable alternative fuel source. One critical aspect of the biomass challenge is the development of novel catalytic materials for effective and controllable biomass conversion. Edited by two scientists recognized internationally for their pioneering work in the field, this book focuses on nanoporous catalysts, the most promising class of catalytic materials for the conversion of biomass into fuel and other products. Although various catalysts have been used in the conversion of biomass-derived feedstocks, nanoporous catalysts exhibit high catalytic activities and/or unique product selectivities due to their large surface area, open nanopores, and highly dispersed active sites. This book covers an array of nanoporous catalysts currently in use for biomass conversion, including resins, metal oxides, carbons, mesoporous silicates, polydivinylbenzene, and zeolites. The authors summarize the design, synthesis, characterization and catalytic properties of these nanoporous catalysts for biomass conversions, discussing the features of these catalysts and considering future opportunities for developing more efficient catalysts. Topics covered include: Resins for biomass conversion Supported metal oxides/sulfides for biomass oxidation and hydrogenation Nanoporous metal oxides Ordered mesoporous silica-based catalysts Sulfonated carbon catalysts Porous polydivinylbenzene Aluminosilicate zeolites for bio-oil upgrading Rice straw Hydrogenation for sugar conversion Lignin depolymerization Timely, authoritative, and comprehensive, Nanoporous Catalysts for Biomass Conversion is a valuable working resource for academic researchers, industrial scientists and graduate students working in the fields of biomass conversion, catalysis, materials science, green and sustainable chemistry, and chemical/process engineering.

Biodiesel Production - Samuel Lalthazuala Rokhum 2022-05-17

An incisive discussion of biofuel production from an economically informed technical perspective that addresses sustainability and commercialization together In Biodiesel Production: Feedstocks, Catalysts and Technologies, renowned chemists Drs Rokhum, Halder, Ngaosuwan and Assabumrungrat present an up-to-date account of the most recent developments, challenges, and trends in biodiesel production. The book addresses select feedstocks, including edible and non-edible oils, waste cooking oil, microalgae, and animal fats, and highlights their advantages and disadvantages from a variety of perspectives. It also discusses several catalysts used in each of their methods of preparation, as well as their synthesis, reactivity, recycling techniques, and stability. The contributions explore recently developed technologies for sustainable production of biodiesel and provides robust treatments of their sustainability, commercialization, and their prospects for future biodiesel production. A thorough introduction to the various catalysts used in the preparation of biodiesel and their characteristics Comprehensive explorations of biofuel production from technical and economic perspectives, with complete treatments of their sustainability and commercialization Practical discussions of the development of new strategies for sustainable and economically viable biodiesel production In-depth examinations of biodiesel feedstocks, catalysts, and technologies Perfect for academic researchers and industrial scientists working in fields that involve biofuels, bioenergy, catalysis, and materials science, Biodiesel Production: Feedstocks, Catalysts and Technologies will also earn a place in the libraries of bioenergy regulators.

Catalysis for Clean Energy and Environmental Sustainability - K. K. Pant 2021-05-13

This book is part of a two-volume work that offers a unique blend of information on realistic evaluations of catalyst-based synthesis processes using green chemistry principles and the environmental sustainability applications of such processes for biomass conversion, refining, and petrochemical production. The volumes provide a comprehensive resource of state-of-the-art technologies and green chemistry

methodologies from researchers, academics, and chemical and manufacturing industrial scientists. The work will be of interest to professors, researchers, and practitioners in clean energy catalysis, green chemistry, chemical engineering and manufacturing, and environmental sustainability. This volume focuses on the potentials, recent advances, and future prospects of catalysis for biomass conversion and value-added chemicals production via green catalytic routes. Readers are presented with a mechanistic framework assessing the development of product selective catalytic processes for biomass and biomass-derived feedstock conversion. The book offers a unique combination of contributions from experts working on both lab-scale and industrial catalytic processes and provides insight into the use of various catalytic materials (e.g., mineral acids, heteropolyacid, metal catalysts, zeolites, metal oxides) for clean energy production and environmental sustainability.

Environmental Protection and Resources Exploitation II - Zi Li Liu 2014-08-13

Collection of selected, peer reviewed papers from the 2014 2nd International Conference on Advances in Energy and Environmental Science (ICAEES 2014), June 21-22, 2014, Guangzhou, China. The 398 papers are grouped as follows: Chapter 1: Environmental Chemistry and Biology, Chapter 2: Environmental Materials, Chapter 3: Environmental Safety and Health, Chapter 4: Environmental Planning and Assessment, Chapter 5: Environmental Analysis and Monitoring, Chapter 6: Environmental Restoration Engineering, Chapter 7: Environmental Protection and Ecological Environment Construction, Chapter 8: Pollution Control Engineering, Chapter 9: Waste Disposal and Recycling, Chapter 10: Water Supply and Drainage, Chapter 11: Hydrology and Water Resources Engineering, Chapter 12: Soil and Water Conservation and Desertification Control, Chapter 13: Forest Cultivation, Protection and Plant Protection, Chapter 14: Geographic Information Science and Remote Sensing, Chapter 15: Land Resources Environment and Urban Planning, Chapter 16: Mineral Prospecting and Exploration, Chapter 17: Mining Engineering, Chapter 18: Mineral Processing Engineering,

Chapter 19: Oil and Gas Well Development Projects, Chapter 20: Storage and Processing of Agricultural Products, Chapter 21: Energy Saving, Environmental Protection, Low Carbon Ideas, Chapter 22: Environmental Protection and Economic Development, Chapter 23: Eco-Economy, Circular Economy, Low Carbon Economy

Zeolite Catalysts - Subhash Bhatia 1989-12-21

Presented in an easy-to-read form, this book on zeolite catalysis cover all aspects of the subject. It focuses on synthesis, structure, diffusion, deactivation, and industrial applications. This book is an ideal text for courses on catalysis or as a supplementary text for those studying applied or industrial chemistry. It is also a useful resource for anyone who works with zeolites as catalysts in the laboratory, pilot plants, or commercial installations.

Zeolite Synthesis - Mario L. Occelli 1989

This volume is a complete progress report on the various aspects of zeolite synthesis on a molecular level. It provides many examples that illustrate how zeolites can be crystallized and what the important parameters are that control crystallization. Forty-two chapters cover such topics as: crystallization techniques; gel chemistry; crystal size and morphology; the role of organic compounds; and novel synthesis procedures. It offers a complete review of zeolite synthesis as well as the latest finding in this important field. Contains benchmark contributions from many notable pioneers in the field, including R.M. Barrer, H. Robson, and Robert Milton.

Hydrothermal Chemistry of Zeolites - R. M. Barrer 1982

Advances in Synthesis Gas: Methods, Technologies and Applications - Mohammad Reza Rahimpour 2022-10-28

Advances in Synthesis Gas: Methods, Technologies and Applications: Syngas Production and Preparation is a collection of various chapters concerning many aspects of syngas production technologies, including common methods like gasification, steam/dry/autothermal reforming, membrane technology, etc., along with novel methods like plasma technology, micro-reactors, electrolysis processes as well as

photocatalytic systems. In addition, different sources for producing syngas, including oil, crude oil, heavy oil, microalgae, black liquor, tar and bitumen, as well as municipal, agricultural, food, plastic, wood and cardboard wastes are described in detail. Introduces syngas characteristics and its properties Describes various methods and technologies for producing syngas Discusses syngas production from different roots and feedstocks

Waste Recycling Technologies for Nanomaterials Manufacturing - Abdel Salam Hamdy Makhlouf 2021-06-10

This book discusses the recent advances in the wastes recycling technologies to provide low-cost and alternative ways for nanomaterials production. It shows how carbon nanomaterials can be synthesized from different waste sources such as banana fibers, argan (*Argania spinosa*) seed shells, corn grains, camellia oleifera shell, sugar cane bagasse, oil palm (empty fruit bunches and leaves) and palm kernel shells. Several nanostructured metal oxides (MnO_2 , Co_3O_4 , ...) can be synthesized via recycling of spent batteries. The recovered nanomaterials can be applied in many applications including: Energy (supercapacitors, solar cells, etc.) water treatments (heavy metal ions and dyes removal) and other applications. Spent battery and agriculture waste are rich precursors for metals and carbon, respectively. The book also explores the various recycling techniques, agriculture waste recycling, batteries recycling, and different applications of the recycled materials.

Verified Synthesis of Zeolitic Materials - H. Robson 2001-06-26

Zeolite synthesis is an active field of research. As long as this continues, new phases will be discovered and new techniques for preparing existing phases will appear. This edition of Verified Synthesis of Zeolitic Materials contains all the recipes from the first edition plus 24 new recipes. Five new introductory articles have been included plus those from the first edition, some of which have been substantially revised. The XRD patterns have been recorded using different instrument settings from those in the first edition and are intended to conform to typical X-ray diffraction practice. In most cases, only the XRD pattern for the product as synthesised is printed here. The exceptions are those phases which show

marked changes in the XRD pattern upon calcination.

New and Future Developments in Catalysis - Steven L Suib

2013-07-18

New and Future Developments in Catalysis is a package of seven books that compile the latest ideas concerning alternate and renewable energy sources and the role that catalysis plays in converting new renewable feedstock into biofuels and biochemicals. Both homogeneous and heterogeneous catalysts and catalytic processes will be discussed in a unified and comprehensive approach. There will be extensive cross-referencing within all volumes. This volume covers the synthesis of hybrid materials and composites using organocatalysts. All available catalytic processes are listed and a critical comparison is made between homogeneous versus heterogeneous catalytic processes. The economic pros and cons of the various processes are also discussed and recommendations are made for future research needs. Offers in-depth coverage of all catalytic topics of current interest and outlines future challenges and research areas A clear and visual description of all parameters and conditions, enabling the reader to draw conclusions for a particular case Outlines the catalytic processes applicable to energy generation and design of green processes

Collection of Simulated XRD Powder Patterns for Zeolites Fifth (5th) Revised Edition - M.M.J. Treacy 2007-11-21

This 5th edition of the Zeolite Powder Pattern Collection contains calculated patterns of 218 zeolite materials representing 174 framework topologies. The almost exponential growth of new zeolite topologies reflects the continued success of zeolite synthesis researchers in producing novel materials. Collection of Simulated XRD Powder Patterns for Zeolites includes materials of interest to zeolite scientists following the policies established at recent IZA conferences. The materials included have corner-sharing tetrahedral frameworks with no restrictions on chemical composition. Covers an increase of 41 new topologies since the 4th edition in 2001 Data collected from diverse literature sources Represents an extensive compilation of data

Solid Acids and Bases - Kozo Tanabe 2012-12-02

Solid Acids and Bases: Their Catalytic Properties reviews developments in the studies of acidic and basic properties of solids, including the efficacy and special characteristics of solid acid and base catalysts. This book discusses the determination of basic and acidic properties on solid surfaces and relationship between acid strength and acid amount. The structure and acid-base properties of mixed metal oxides and correlation between acid-base properties and catalytic activity and selectivity are also deliberated. This publication is useful to professional chemists and graduate students in the fields of organic, inorganic and physical chemistry, petroleum chemistry and catalysis, including readers interested in the acidic and basic properties on solid surfaces.

Emerging Carbon Capture Technologies - Mohammad Khalid

2022-04-22

Carbon dioxide (CO₂) capture and conversion to value added products, such as chemicals, polymers, and carbon-based fuels represents a promising approach to transform a potential threat to the environment into a value-added product for long term sustainability. Emerging Carbon Capture Technologies: Towards a Sustainable Future provides a multidisciplinary view of the research that is being carried out in this field, covering materials and processes for CO₂ capture and utilization and including a broad discussion of the impact of novel technologies in carbon capture on the energy landscape, society and climate. Of interest to students, researchers and professionals in industries related to greenhouse gas mitigation, post-combustion CO₂ capture processes, coal-fired power plants, environmental sustainability, green solvents, green technologies, and the utilization of clean energy for environmental protection, this book covers both the experimental and theoretical aspects of novel materials and process development providing a holistic approach toward a sustainable energy future. Includes a wide range of processes and their applications Covers the experimental and theoretical aspects of novel materials and process development Includes techno-economics analysis, regulation, policies and future prospects

NAC 2019 - Ri-Ichi Murakami 2020-01-07

This book presents selected articles from the 2nd International

Conference on Nanomaterials and Advanced Composites, which brings together leading researchers and professionals from academia and industry to present their findings and provides a platform for the exchange of ideas and future collaboration. The book covers eight topics, including nanomaterials, polymer materials, mechanical materials, materials chemistry, materials physics, ceramics, recycling materials and green composites.

Ceramic Abstracts - 2000

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.

High Resolution Solid-State NMR of Silicate and Zeolites - Gunter Engelhardt 1987

Covers the dramatic developments in the past decade in the applications of high-resolution NMR to the study of solid materials such as inorganic silicates, aluminosilicates, and in particular, zeolites. Also covers a variety of NMR methods, including conventional FT NMR techniques, used to investigate sorbate-sorbent interactions and the structure of adsorbed molecules. Gives an historical background to the subject and a concise survey of basic principles and methods of high-resolution solid-state NMR. Then covers ^{29}Si NMR of silicate solutions; general aspects of ^{29}Si and ^{27}Al NMR of the silicate and aluminosilicate framework; application of ^{29}Si and ^{27}Al NMR to silicates, aluminosilicates, and zeolites; NMR studies of nuclei other than ^{29}Si and ^{27}Al in zeolites and non-zeolitic silicates; high-resolution studies of adsorbed molecules, and

much more.

Proceedings of the Royal Society of London - Royal Society (Great Britain) 1988

Sustainable Nanoscale Engineering - Gyorgy Szekely 2019-09-18

Sustainable Nanoscale Engineering: From Materials Design to Chemical Processing presents the latest on the design of nanoscale materials and their applications in sustainable chemical production processes. The newest achievements of materials science, in particular nanomaterials, opened new opportunities for chemical engineers to design more efficient, safe, compact and environmentally benign processes. These materials include metal-organic frameworks, graphene, membranes, imprinted polymers, polymers of intrinsic microporosity, nanoparticles, and nanofilms, to name a few. Topics discussed include gas separation, CO₂ sequestration, continuous processes, waste valorization, catalytic processes, bioengineering, pharmaceutical manufacturing, supercritical CO₂ technology, sustainable energy, molecular imprinting, graphene, nature inspired chemical engineering, desalination, and more. Describes new, efficient and environmentally accepted processes for nanomaterials design Includes a large array of materials, such as metal-organic frameworks, graphene, imprinted polymers, and more Explores the contribution of these materials in the development of sustainable chemical processes

Catalysis and Zeolites - Jens Weitkamp 2013-04-17

Zeolites occur in nature and have been known for almost 250 years as aluminosilicate minerals. Examples are clinoptilolite, mordenite, offretite, ferrierite, erionite and chabazite. Today, most of these and many other zeolites are of great interest in heterogeneous catalysis, yet their naturally occurring forms are of limited value as catalysts because nature has not optimized their properties for catalytic applications and the naturally occurring zeolites almost always contain undesired impurity phases. It was only with the advent of synthetic zeolites in the period from about 1948 to 1959 (thanks to the pioneering work of R. M. Barrer and R. M. Milton) that this class of porous materials began to play a role

in catalysis. A landmark event was the introduction of synthetic faujasites (zeolite X at first, zeolite Y slightly later) as catalysts in fluid catalytic cracking (FCC) of heavy petroleum distillates in 1962, one of the most important chemical processes with a worldwide capacity of the order of 500 million t/a. Compared to the previously used amorphous silica-alumina catalysts, the zeolites were not only orders of magnitude more active, which enabled drastic process engineering improvements to be made, but they also brought about a significant increase in the yield of the target product, viz. motor gasoline. With the huge FCC capacity worldwide, the added value of this yield enhancement is of the order of 10 billion US \$ per year.

New and Future Developments in Catalysis - Eng-Poh Ng 2013-07-18

Industrial Applications Of Electron Microscopy - Zhigang Li 2002-12-04

Providing proven strategies for solutions to research, development, and production dilemmas, this reference details the instrumentation and underlying principles for utilization of electron microscopy in the manufacturing, automotive, semiconductor, photographic film, pharmaceutical, chemical, mineral, forensic, glass, and pulp and paper industries. The book covers safety, calibration, and troubleshooting techniques, as well as methods in sample preparation and image collection, interpretation, and analysis. It includes contributions from microscopy experts based at major corporations and scientists from universities and major research centers.

Zeolites and Related Materials: Trends Targets and Challenges(SET) - Antoine Gedeon 2008-08-19

The present book "Zeolites and Related Materials: Trends, Targets and Challenges" reports the communications that have been presented at the 4th International FEZA (Federation of European Zeolite Associations) Conference in Paris, September 3-6, 2008. It gives an excellent overview of the present state of the art of ordered nanoporous solids including zeolites as well as synthetic layered materials (clays), nanosized molecular sieves, ordered mesoporous solids, metal-organic-framework

compounds (MOFs), carbons, etc. with emphasis on the synthesis, comprehensive characterization and advanced applications. The significant research activities in this domain are due to the outstanding properties of those nanoporous materials that concentrate the collaborative efforts of researchers from material science, chemistry, physical chemistry and physics. The understanding and development of the unique properties of porous materials relies on a unique blend of multidisciplinary knowledge covering material science, with the implication of organic and colloid chemistry, to prepare micro- and mesoporous materials; surface and adsorption sciences sustained by theory and modelling to understand the peculiar behaviour of molecules in confined systems; special branches of catalysis, physics, chemical engineering and life science to design novel applications. * This book summarizes the developments in the area of nanoporous solids at the dawn of the 21st century, useful for both students/young researchers entering the field of nanoporous materials, as well as for senior scientists * Also summarizes the new family of porous compounds, e.g. MOF's and ordered porous carbon * The present state-of-the-art and prospects of nanoporous solids for advanced applications is discussed

Green Approaches to Biocomposite Materials Science and Engineering - Verma, Deepak 2016-06-16

Industrial ecology, eco-efficiency, and green chemistry are guiding the development of the next generation of materials, products, and processes. Considerable growth has been seen in the use of biocomposites in the domestic sector, building materials, aerospace industry, circuit boards, and automotive applications over the past decade, but application in other sectors until now has been limited. *Green Approaches to Biocomposite Materials Science and Engineering* explores timely research on the various available types of natural fibers and the use of these fibers as a sustainable alternative to synthetic fibers and polymers. Emphasizing research-based solutions for sustainability across various industries, this publication is an essential reference source for engineers, researchers, environmental scientists, and graduate-level students.

Multifunctional Hybrid Nanomaterials for Sustainable Agri-food and Ecosystems - Kamel A. Abd-Elsalam 2020-03-30

Multifunctional Hybrid Nanomaterials for Sustainable Agrifood and Ecosystems shows how hybrid nanomaterials (HNMs) are being used to enhance agriculture, food and environmental science. The book discusses the synthesis and characterization of HNMs before exploring agrifoods and environmental functions. It shows how novel HNMs are being used for the detection and separation of heavy metal ions, for destroying and sensing of insecticides, in managed release fertilizer and pesticide formulations, plant protection, plant promotions, purification, detection, and to control mycotoxins. Further, the book describes the use of silica-based total nanosystems, carbon nanotubes, nanocellulose-based, and polymer nanohybrids for agricultural and biological applications. This book is an important reference source for materials scientists, engineers and food scientists who want to gain a greater understanding on how multifunctional nanomaterials are being used for a range of agricultural and environmental applications. Outlines the major nanomaterial types that are being used in agriculture Explains why the properties of multifunctional nanomaterials are particularly efficient for use in agriculture Assesses the major challenges of using multifunctional nanomaterials on an industrial scale

Advanced Functional Solid Catalysts for Biomass Valorization -

Chaudhery Mustansar Hussain 2020-05-29

Advanced Functional Solid Catalysts for Biomass Valorization presents

the basic concepts in catalysis (homogeneous, heterogeneous, and enzymatic) and the properties of various kinds of heterogeneous solid catalysts, including their structure, porosity, particle size, BET surface area, acid-base, and redox properties. Useful information about biorefineries, types of biomass feedstocks, their structures and properties as well as about several potential catalytic routes for biomass upgrading to useful fuels and chemicals is provided in this book. Importantly, this book covers the most recent developments toward functionalization of various solid catalysts, optimization of catalysts' properties, developing cascade catalytic strategies, exploring reaction kinetics/mechanisms, and evaluating catalysts' stability/reusability during biomass upgrading. Current challenges and opportunities for the future biorefineries as well as for the design of advanced functional solid catalysts are critically discussed. Describes catalysis as a promising technology for the development of eco-friendly and economically viable strategies for several important energy and environmental applications. Covers heterogeneous solid catalysts because of their versatile benefits in terms of catalysts' synthesis, production cost, stability, and reusability as compared to homogeneous liquid catalysts. Provides promising strategies for the design of new catalytic materials, such as carbon materials, metal-organic frameworks, zeolites, and mesoporous silicas. Describes functional solid catalysts for developing one-pot cascade processes for efficient biomass valorization and other vital chemical transformations.