Customized Synthetic Zeolite Newsletter

Branded Newsletter Sample

Briefs on Synthetic Zeolite from the entire web - Sept. 25--Oct. 26 for zeotech

Top Stories

Intellectual Property

Zeotech secures Japanese patent for synthetic zeolite (MINING.com)

The Japan Patent Office has issued patent 7571058 entitled synthesis of adsorption materials to emerging mineral processing technology company Zeotech (ASX:ZEO) The patent relates to novel and proprietary mineral processing technology held by the company for producing impurity-free synthetic zeolite from aluminosilicate feedstock, such as kaolin and process by-products.

Research & Development

ZEOTECH RECEIVES $905K R&D INCENTIVE PAYMENT (Zeotech)

Emerging mineral processing technology company Zeotech Limited (ASX: ZEO, Zeotech or the Company) is pleased to advise that it has received a cash refund of $905,884.46 from its R&D tax incentive claim for the financial year ended 30 June 2024.

Fund Raising/Grants

SUCCESSFUL PLACEMENT OF $1.82M TO ADVANCE COMPANY PROJECTS (Zeotech)

Emerging mineral processing technology company, Zeotech Limited (ASX: ZEO, Zeotech or the Company) is

pleased to advise it has secured firm commitments to raise $1,820,500 through the issue of 60,683,333 new fully paid ordinary shares at an issue price of $0.03 (3 cents) (issue price) per share (the Shares), by way of a heavily supported Placement to non-related party investors identified by the Company.

Studies/Surveys

Aerobic epoxidation of propylene over Ti-containing zeolites (EurekAlert!)

This study is led by Prof. Landong Li (College of Chemistry, Nankai University) and Prof. Ding Ma (College of Chemistry and Molecular Engineering, Peking University). The direct epoxidation of propylene with molecular oxygen has 100% theoretical atomic economy and is the most ideal route for the production of propylene oxide.

Researchers regulate microenvironment in boron-imidazolate frameworks to enhance CO electroreduction to CH (PHYS.ORG)

Crystalline boron imidazolate frameworks (BIFs) are a lightweight zeolite-like metal-organic framework (MOF) developed to simulate the zeolite molecular sieve structure. BIFs contain both covalent bonds (B-N) and metal coordination bonds (M-N). Therefore, it is also regarded as a unique family of materials between MOFs and covalent organic frameworks (COFs).

Scientists improve catalytic converter efficiency to cut harmful pollution from hydrogen engines (Tech Xplore)

Hydrogen-burning internal combustion engines offer great promise in the fight against climate change because they are powerful without emitting any earth-warming carbon. They can power heavy-duty trucks and buses and are suited for off-road and agricultural equipment and backup power generators, providing cleaner alternatives to diesel engines.

News Stories

Studies/Surveys

What are Mesoporous Silica Nanoparticles? (AZoNano)

Mesoporous silica nanoparticles (MSNs) have a total diameter below 1 m and pores ranging from 2 to 50 nm in diameter. They are categorized as mesoporous (according to the IUPAC definition), making them ideally suited to catalysis, environmental chemical removal, and biomedicine.1

Press Release

Research & Development

University of California scientists cut harmful pollution from hydrogen engines (eurekalert)

Hydrogen-burning internal combustion engines offer great promise in the fight against climate change because they are powerful without emitting any earth-warming carbon. They can power heavy-duty trucks and buses and are suited for off-road and agricultural equipment and backup power generators, providing cleaner alternatives to diesel engines.

Studies/Surveys

Synthetic Zeolites Market 2024 | Analysis by Industry Trends, Size, Share, Company Overview, Growth, Development and Forecast by 2032 (openPR)

The global synthetic zeolites market reached a valuation of USD 5.21 billion in 2022 and is projected to grow at a compound annual growth rate (CAGR) of 2.8% during the forecast period. This growth is fueled by increasing

demand for sustainable, eco-friendly solutions across various industries and rising investments in synthetic zeolites and related technologies.

Synthetic Zeolite Adsorbents Market Poised for Expansion Amid Rising Demand in Industrial and Environmental Applications (openPR)

LOS ANGELES, United States: The global Synthetic Zeolite Adsorbents market is expected to grow at a significant pace, reports QY Research. Its latest research report, titled "Global Synthetic Zeolite Adsorbents Market Research Report 2024". offers a unique point of view about the global market.

Synthetic and Natural Zeolites Market Size, Share, Growth, And Industry Analysis by Type (Natural Zeolite, Synthetic Zeolite, and synthetic and Natural Zeolite) By Application (Refining and Petrochemicals, Emission Control, Agriculture & Aquaculture, Water Filtration, Building & Concrete, Industrial, and Others) Regional Forecast By 2032 Source: https://www.businessresearchinsights.com/market-reports/synthetic-and-natural-zeolites-market-102592 (Business Research Insights)

The global synthetic and natural zeolites market size was USD 3.042 billion in 2023 & the market is expected to reach USD 4.15 billion by 2032, exhibiting a CAGR of 3.5% during the forecast period.

Investor Relations

Application for quotation of securities - ZEO (Zeotech)

Application for quotation of securities - ZEO

Notification regarding unquoted securities - ZEO (Zeotech)

Notification regarding unquoted securities - ZEO

Appendix 4G and Corporate Governance Statement (Zeotech)

Appendix 4G and Corporate Governance Statement

Date of AGM and Closing Date for Director Nominations (Zeotech)

Zeotech Limited (the Company) advises in accordance with ASX Listing Rule 3.13.1, that the Company will hold its Annual General Meeting (AGM) on Friday, 22 November 2024. The closing date for the receipt of nominations from persons wishing to be considered for election as a director is 11 October 2024.

Zeotech Limited (ASX: ZEO) - Trading Halt (Zeotech)

The securities of Zeotech Limited (ZEO) will be placed in trading halt at the request of ZEO, pending it releasing an announcement. Unless ASX decides otherwise, the securities will remain in trading halt until the earlier of the commencement of normal trading on Monday, 14 October 2024 or when the announcement is released to the market.

Reports

Investor Relations

Annual Report to shareholders (Zeotech)

Annual Report to shareholders

Blogs and Forums

Studies/Surveys

Lab Notes (UMass Amherst)

The Auerbach group had an exciting year during 2023 in research and teaching. A research collaboration with Chemical Engineering professor Wei Fan yielded an article on more energy-efficient ways to produce zeolite catalysts the most used synthetic catalysts in the world.

Social Media

Studies/Surveys

Analyzing Zeolite Market Dynamics and Growth Drivers and forecasted for period from 2024 to 2031 (LinkedIn)

This report aims to provide a comprehensive presentation of the global market for Zeolite, with and qualitative analysis, to help readers develop business/growth strategies, assess the market competitive situation, analyze their position in the current marketplace, and make informed business decisions regarding Zeolite.

Sina Rezaei GomariSina Rezaei Gomari (LinkedIn)

Another excellent research outcome from our research team at Teesside University in collaboration with the industrial partner. In this study, a novel approach is introduced using industrial waste material, clay waste, from our industrial partner SCOTTBROS Ltd (Teesside, UK), as a hashtag#sustainable feedstock for hashtag#zeolite-Y synthesis.

Research Paper

Studies/Surveys

Ni-Supported Germanosilicate Zeolite SCM-14 for Efficient Hydrogenolysis of 5-Hydroxymethylfurfural to 2,5-Dimethylfuran (American Chemical Society)

Rational design of highly efficient non-noble-metal catalysts for the selective hydrogenolysis of biomass platform compounds to produce fuels and fine chemicals is a key pursuit for the sustainable chemical industry. In this work, we report for the first time the synthesis of a Ni-supported germanosilicate zeolite (Ni-SCM-14) catalyst by a simple grinding method

Zeolite Framework-Anchored Carbon-Doped White Graphene as Antipoisoning Cathode Materials for Proton-Exchange Membrane Fuel Cells (American Chemical Society)

Efficient, robust, and highly sustainable platinum (Pt)-free electrocatalysts are pivotal for advancing the fuel cell (FC) performance. This study introduces a facile and green approach for synthesizing a rationally designed Co-based zeolite imidazole framework (ZIF) anchored onto carbon (C)-doped white graphene (C-WG) as an electrocatalyst (Z@-C-WG) for the oxygen reduction reaction (ORR).

Snippet

Studies/Surveys

Zeolite Market Expected to Experience Remarkable Growth from 2024 to 2032 (openPR)

Investor Relations

Disclosure Document (Zeotech)

Notification of cessation of securities (Zeotech)

Proposed issue of securities - ZEO (Zeotech)

Journal

Studies/Surveys

Fluoride- and OSDA-free synthesis of ZSM-5 with controllable b-axis orientation: Insights into the role of medium alkalinity and seed induction (Advanced Powder Technology)

MFI-topology nanosheets with a b-axis-oriented structure are valuable catalysts in diffusion-controlled acid-catalyzed reactions. Therefore, b-axis-oriented ZSM-5 nanosheets were synthesized herein in a fluoride-free solution without using special additives and complex methods.

Cyanuric chloride as a linker towards the synthesis of covalent triazine polymers: a review (Materials Advances)

Covalent triazine polymers represent a promising class of materials composed of aromatic electron deficient 1,3,5-triazine repeating units. They are synthesized from different triazine monomers, where cyanuric chloride is one such monomer. It is known for its high reactivity and easy availability and has garnered significant attention due to its nitrogen-rich,

Single atoms in environmental catalysis: Breakthroughs in synthesis and application (Journal of Water Process Engineering)

Due to their outstanding catalytic properties of high stability, high selectivity, and high activity, single-atom catalysts (SACs) have attracted the attention of research teams worldwide. The synthesis and application breakthroughs of single atom in environmental catalysis have been systematically reviewed in this study.

Zeolitic imidazolate framework-67/barium zirconate titanate nanocomposite, Part I: Synthesis, characterization, and boosted photocatalytic activity (Journal of Molecular Liquids)

Using BaTi0.85Zr0.15O3/ZIF-67 (BTZ/ZIF-67) nanocomposite, tetracycline (TC) was photodegraded. Characterization of the samples was carried out using a variety of techniques, including XRD, FESEM-EDS (Field Emission Scanning Electron Microscopy Energy Dispersive X-ray Spectroscopy), FT-IR (Fourier Transform Infra-Red),

Development of zeolite 5A-incorporated polyvinyl alcohol membrane for desalination by pervaporation (journal Materials Testing)

With the rapid depletion of potable and useable water resources globally due to population growth and the effects of global warming, the desalination of seawater the worlds largest source of water to acceptable quality levels is critical to meeting future water needs.

Synthesis of Cu-Supported ZSM-5/UiO-66 Composite Catalysts for Efficient Degradation of Methylene Blue (Korean Journal of Chemical Engineering)

Cu-supported composite catalysts consisting of metal organic frameworks (UiO-66) and ZSM-5 zeolite (Cu/ZSM-5/UiO-66, Cu ZSM-5/UiO-66, and (Cu/ZSM-5)/UiO-66, respectively) were synthesized for the efficient catalytic wet peroxide oxidation (CWPO) of methylene blue (MB) wastewater.

One-Pot Synthesis and Characterization of Dapsone-Loaded Zeolitic Imidazolate Framework-8 (Journal of Cluster Science)

Dapsone (DAP) is used to treat leprosy, a Neglected tropical diseases (NTDs). However, its low solubility often leads to low efficacy. In this work, ZIF-8 nanostructures loaded with DAP (DAP@ZIF-8) were successfully synthesized with suitable drug loading (DL) through a one-pot synthesis.

Preparation of fly ash zeolite supported ZnO/Co3O4 catalyst for the photocatalytic degradation of xanthate under visible light (Optical Materials)

The development of high-value utilization technology of fly ash plays an important role in promoting environmental protection and social and economic development. In this paper, a novel composite photocatalyst Z-ZnO/Co3O4 is synthesized by loading ZnO/Co3O4 on the surface of fly ash zeolite.

Determination of Zeolite NaA (LTA) Synthesis Parameters from Technogenic Silica Gel for Water Softening (Silicon)

Utilization of fluoride-containing waste from aluminium fluoride production is an important strategic issue. Here, we use technogenic silica gel containing about 30 wt. % of fluoride and aluminum for zeolite NaA (LTA) synthesis. The process consists of two steps: silica gel acid purification up to a silica content of 95 wt. % and hydrothermal synthesis.

Synthesis of biomass-mediated hierarchical Zeolite socony Mobil 5 and their selectivity for lignin conversion to bio-oils: Review and perspective (Renewable and Sustainable Energy Reviews)

Conversion of lignin biomass to bio-oil is currently a very industrially attractive strategy due to energy shortages and resource scarcity. Combining the advantages of mesoporous structure and strong acidity, hierarchical zeolites are considered the promising catalytic materials that have attracted great attention in the field of crude oil cracking.

In situ Synthesis of Zeolitic Imidazolate Framework-11@ZnO Heterostructures for Enhanced Antimicrobial Activity and Biological Preservation (Chemistry of Materials)

Storage and transportation are critical processes that significantly affect food quality, with bacterial proliferation serving as a major contributor to deterioration. Preservative films are commonly used in food transportation and preservation. However, the approval process for contact-type preservative films remains challenging due to inconclusive toxicity assessments.

Tuning metal-support interactions in nickel zeolite catalysts leads to enhanced stability during dry reforming of methane (Nature Communications)

Ni-based catalysts are highly reactive for dry reforming of methane (DRM) but they are prone to rapid deactivation due to sintering and/or coking. In this study, we present a straightforward approach for anchoring dispersed Ni sites with strengthened metal-support interactions

Solar-driven calcination of clays for sustainable zeolite production: CO2 capture performance at ambient conditions (Journal of Cleaner Production)

This study presents the environmentally sustainable synthesis of zeolites from solar-calcined kaolin and halloysite, emphasizing their application in CO2 capture due to their distinctive porous structures and chemical attributes. Expanding upon prior research that utilized solar energy for kaolin calcination

Study on cesium crystallization solidification in fly ash based cesium zeolite (Journal of Radioanalytical and Nuclear Chemistry)

To solidify make 137Cs with long half-life solidified in high level waste liquid, cesium zeolite was synthesized from fly ash without adding template. The effects of basic cations (Na+ or K+) on the binding force and interaction mechanism of cesium zeolite and Cs(I) were calculated and evaluated by first principles.

Novel synthesis and application of zeolite-Y from waste clay for efficient CO2 capture and water purification (Colloids and Surfaces A: Physicochemical and Engineering Aspects)

In the present study, the microwave-assisted hydrothermal method using sodium hydroxide (NaOH) has been used to synthesise zeolite-Y from three different waste clays (WC) from Teesside, Northeast of England, UK. The effects of microwave time intervals and WC type were investigated to produce crystalline zeolite-Y.

Hydrothermal synthesis of zeolite-a from natural rhyolite for effective removal of Cr(VI) from wastewater (International Journal of Environmental Science and Technology)

Hexavalent chromium (Cr(VI)) is a toxic and carcinogenic pollutant that can adversely affect bone formation during fetal development and damage kidneys. Technologies, such as chemical precipitation, oxidation, and reduction, have been explored for removing Cr(VI) from wastewater.

MFI-Type Zeolite Nanosheets with Controllable Length along the b-Axis for Methanol-to-Propylene ReactionsClick to copy article link (ACS Applied Nano Materials)

The lifetime of a catalyst and the selectivity of a product are inevitable and key issues in catalytic reactions. These two issues can be settled by synthesizing the MFI-type zeolite nanosheet and regulating the length along the b-axis of the MFI-type zeolite nanosheet when MFI-type zeolites are employed in catalytic reactions.

Enhanced pozzolanic reactivity in hydrogen-form zeolites as supplementary cementitious materials (Cement and Concrete Composites)

Pozzolans rich in silica and alumina react with lime to form cementing compounds and are incorporated into portland cement as supplementary cementitious materials (SCMs). However, pozzolanic reactions progress slower than portland cement hydration, limiting their use in modern construction due to insufficient early-age strength.

Synthesis of Zeolites via Dehydrative Condensation of Preorganized Composite Building Units (Chemistry of Materials)

The synthesis of high-performance zeolites with precisely controlled structures has led to the development of high-efficiency industrial catalysts, adsorbents, and separation membranes. Consequently, intense research efforts have been devoted to the development of novel high-performance zeolites.

In-depth study on the good resistance to coke deposition of SAPO-34/ZSM-5/quartz composite zeolite film with hierarchical structure in MTA reaction (Fuel)

In our previous research, SAPO-34/ZSM-5/quartz (SZ-F) composite zeolite was successfully prepared and used in MTA reaction, which greatly improved the selectivity of BTX. However, the anti-coking mechanism of SZ-F has not been subjected to further in-depth investigation.

Intensifying cyclopentanone synthesis from furfural using supported copper catalysts (ChemSusChem)

This work addresses catalytic strategies to intensify the synthesis of cyclopentanone, a bio-based platform chemical and a potential SAF precursor, via Cu-catalyzed furfural hydrogenation in aqueous media. When performed in a single step, using either uniform or staged catalytic bed configuration, high temperature and hydrogen pressures

Unraveling the Nanosheet Zeolite-Catalyzed Combustion of Aluminum Nanoparticles-Doped exo-Tetrahydrodicyclopentadiene (JP-10) Energetic Fuel (ACS Applied Materials & Interfaces)

Nanosheet MFI zeolites (Zeolite Socony Mobil, five) have grown in popularity in cracking catalysis considering their tunability in porous topologies, acidic sites, and sheet thickness, thus allowing them to selectively adsorb molecules of specific sizes, shapes, and polarities, resulting in improved cracking performance for a specific fuel.

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Synthesis of AlPO-18 Zeolite Membrane by Sonication-Assisted Hydrothermal Method for H2 Separation from Blast Furnace Flue Gas (Transactions of the Indian Ceramic Society)

In this study, AlPO-18 zeolite has been synthesized at temperatures ranging from 140deg to 180degC and varying synthesis time from 3 to 20 h using sonication mediated hydrothermal process. The characterization results of the synthesized powders and membranes revealed that phase pure AlPO-18 zeolite has been formed at 150degC for 15 h under sonication energy of 250 W.

Facile synthesis of zeolitic-imidazole framework-67 (ZIF-67) for the adsorption of indigo carmine dye (The Canadian Journal of Chemical Engineering)

This study aims to synthesize ZIF-67 for the adsorption of indigo carmine (I.C.) dye. ZIF-67 materials were synthesized under different conditions and the synthesis condition of ZIF-67 giving the best adsorption efficiency was obtained. In batch adsorption studies, pH, adsorbent amount, contact time, initial dye concentration,

Highly efficient radium removal from mine wastewater with fly ash NaP1 zeolite (Separation and Purification Technology)

This study investigates the application of NaP1 zeolite, synthesized hydrothermally from F-class fly ash, for treating radium-contaminated mine water. The objective was to assess the efficiency of NaP1 zeolite in removing radium ions from real mine water samples.

Synthesis, structure, and acidity regulation of ZSM-12 zeolite in alkane isomerization (Fuel)

ZSM-12 zeolite features with one-dimensional pore channel and MTW topology structure has drawn widespread attention for isomerization (ISO) reactions involving long-chain alkanes due to their regulatable morphology, pore structure, and acidity. Hitherto, ZSM-12 has been synthesized by hydrothermal and self-assembly methods.

Solvent-free synthesis of hierarchical tungsten-doped MFI zeolite for cyclohexene epoxidation reaction (Microporous and Mesoporous Materials)

Solvent-free synthesis method in zeolite preparation can largely decrease the generation of wastewater and improve the zeolite yield by simply grinding and hydrothermal treatment for the solid raw materials, and accordingly is considered as one of the most promisingly green and sustainable synthesis strategy for the metal-doped zeolite materials.

Mixed Matrix Membranes Incorporated with Small Pore Zeolite UZM-5 for Enhanced CO2/CH4 Separation. (Results in Engineering)

Mixed matrix membranes (MMMs), which is polymeric matrix incorporated with inorganic filler materials, appear to be potential candidate for CO2 separation. Current work focuses on fabrication of MMMs incorporated with varying loading of small pore zeolite UZM-5 and modified UZM-5 for CO2/CH4 separation.

Review on recent development in catalytic cracking of waste polyolefins: Effect of zeolite-based catalysts and reaction parameters (Fuel)

Plastics are deeply integrated into human life in various forms, especially in household applications and the food

industry. The production of plastic has increased due to rising demand and population growth. Unfortunately, less than 10 % of plastic is recycled after use. The remainder is either disposed of in landfills, bodies of water, or incinerated.

Oxidative Desulfurization of Kerosene in Batch Reactor using Magnetite Mesoporous Silica Composite Zeolite Catalyst (Journal of Petroleum Research and Studies)

The petroleum refining sector has increasingly prioritized the creation of clean fuel as a crucial priority. The objective of this project is to generate environmentally friendly fuel through the use of a straightforward and uncomplicated method. Using a novel synthetic nano-catalyst, batch oxidative desulfurization (ODS) eliminates sulfur compounds in Kerosene.

Selective Production of Para-Xylene from Biomass-derived 2,5-Dimethylfuran through Tandem Diels Alder/Dehydration Reactions with a Bifunctional Ga,Al-Zeolite Catalyst (Reaction Chemistry & Engineering)

Here we demonstrate that Ga,Al-*BEA zeolites are effective bifunctional catalysts for para-xylene (p-xylene) production from bio-derived 2,5-dimethylfuran (DMF) through tandem Diels-Alder/dehydration reactions. A series of catalysts was synthesized via direct (one-pot) and post-synthesis techniques to introduce BrÃ¸nsted and Lewis acid sites.

Capturing Different Intermediate Phases during Zeolite Synthesis (Journal of the American Chemical Society)

Despite extensive efforts over the past several decades, the current mechanistic understanding of zeolite crystallization is still far from satisfactory, thus precluding the synthesis of designer zeolites. Here we show that the nucleation and in situ transformation pathways during the synthesis

Zeolitic imidazolate frameworks (ZIF-8 & ZIF-67): Synthesis and application for wastewater treatment (Separation and Purification Technology)

Taking appropriate measures for waste-water treatment is important in order to respect everyones fundamental right to clean and safe water on Earth. Current review encapsulates the newest approaches of fabricating Zeolitic imidazolate frameworks (ZIFs)-based nanocomposites for wastewater treatment.

Bisphenol F Synthesis from Formaldehyde and Phenol over Zeolite Y Extrudate Catalysts in a Catalyst Basket Reactor and a Fixed-Bed Reactor (Catalysts)

The objective of this study was to evaluate the applicability of zeolite Y as a catalyst for producing bisphenol F (BPF) from phenol and formaldehyde. Catalyst extrudates were prepared by extrusion after adding pseudoboehmite sol (PS) and Ludox (Lu) as alumina and silica binders, respectively.

Removal of Pb2+ and Cu2+ from artificial geothermal brine by zeolite at various salinity and temperature conditions (Applied Geochemistry)

Natural zeolite (predominantly clinoptilolite - Ca) was tested for application in geothermal facilities to remove copper (Cu2+) and lead (Pb2+) from formation fluids. Batch and dynamic flow-through (only for lead ions) experiments were performed at different salinities (I = 0.1 and 1 mol/L) in NaCl or CaCl2 solutions at up to 115 degC (batch experiments)

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