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《催化学报》创刊 30 周年纪念: 同比利时 B. Delmon 教授
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辛勤

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Reviews

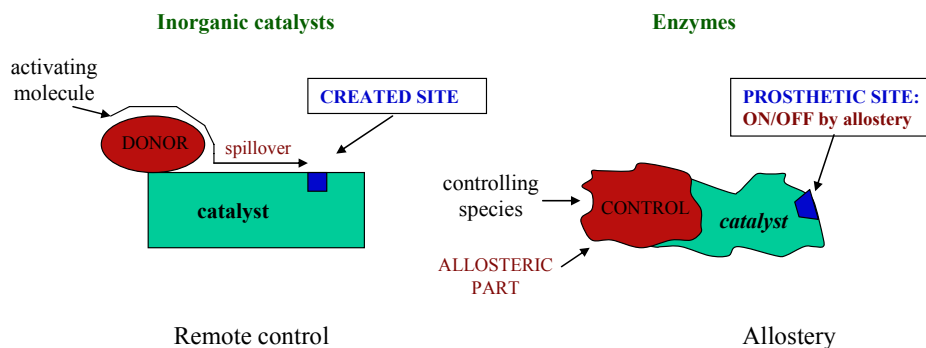
Chin. J. Catal., 2010, 31: 859–871 doi: 10.1016/S1872-2067(09)60088-7

Are Solid Catalysts Successfully Emulating Enzymes?

Bernard DELMON

Université catholique de Louvain, Belgium

CONTROL OF CATALYTIC ACTIVITY



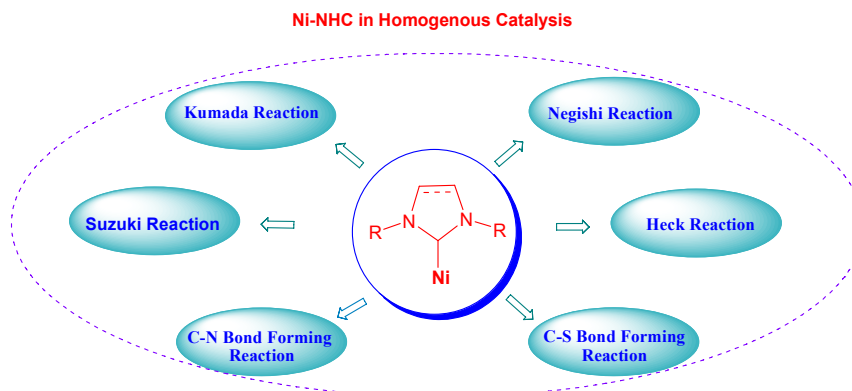
Will inorganic catalysts acquire characteristics of enzymes, extending to different properties the example of remote control and allostery? To what extent will future science develop new materials with catalytic properties approaching those of the enzymes developed by nature? The leading idea is to make a conceptual bridge between robust man-made functional solids and fragile but extremely selective enzymes.

Chin. J. Catal., 2010, 31: 875–886 doi: 10.1016/S1872-2067(09)60089-9

N-Heterocyclic Carbenes: Versatile Reagents for Nickel-Catalyzed Coupling Reactions

GU Shaojin, NI Peng, CHEN Wanzhi*

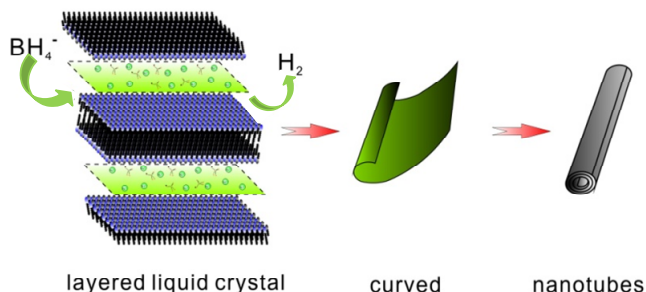
Zhejiang University



This review summarizes the new developments of the catalytic applications of nickel-NHC complexes in coupling reactions including typical cross couplings of organic halides with various organometallic reagents and reductive coupling reactions.

Progress of the Study on the Synthesis and Catalytic Property of Noncrystalline Alloy Nanotubes

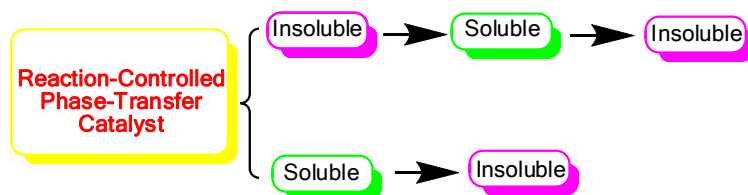
DING Weiping*, GUO Xuefeng, MO Min, ZHU Yan, CHEN Yi
Nanjing University



Noncrystalline alloy nanotubes were prepared using NaBH_4 to reduce the transition metal ions located in the layer structure of lyotropic liquid crystals of nonionic/anionic mixed surfactants. These nanotubes exhibit high efficiency for catalytic hydrogenation because of their characteristics of structure and morphology.

Progress in Reaction-Controlled Phase-Transfer Catalysis

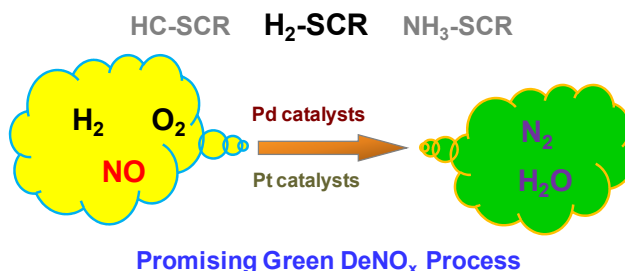
LI Jun, GAO Shuang*, XI Zuwei
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



The progress in the research of reaction-controlled phase transfer catalytic systems and their applications, such as epoxidation of olefins, oxidation of alcohols, hydroxylation, reductive carbonylation of nitroaromatics, esterification, and other reactions, have been summarized and discussed.

Progress in Selective Catalytic Reduction of NO_x by Hydrogen in Excess Oxygen

WU Peng, YU Qing, YAN Jingjing, WU Guangjun, LI Landong*, GUAN Naijia
Beijing Research Institute of China Shenhua Coal to Liquid and Chemical Co. Ltd; Nankai University



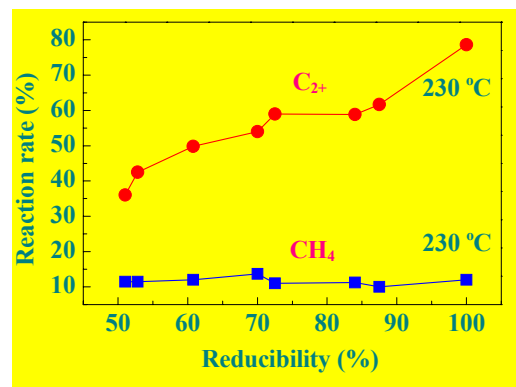
H_2 -SCR is a newly developed promising green process for nitrogen oxide elimination in excess oxygen. State-of-the-art research on H_2 -SCR catalysts and the corresponding H_2 -SCR reaction mechanism are summarized in this paper.

The Development of Cobalt-Based Catalysts for Fischer-Tropsch Synthesis

SUN Yuhan*, CHEN Jiangang*, WANG Jungang, JIA Litao, HOU Bo, LI Debao, ZHANG Juan

*Institute of Coal Chemistry, Chinese Academy of Sciences
Shanghai Advanced Research Institute*

The methane yield over cobalt-based catalyst in Fischer-Tropsch synthesis is insensitive to the reducibility whereas the C₂₊ yield was correlated with reducibility well, suggesting that the C₂₊ products (featured with carbon chain growth) only form on reduced cobalt.

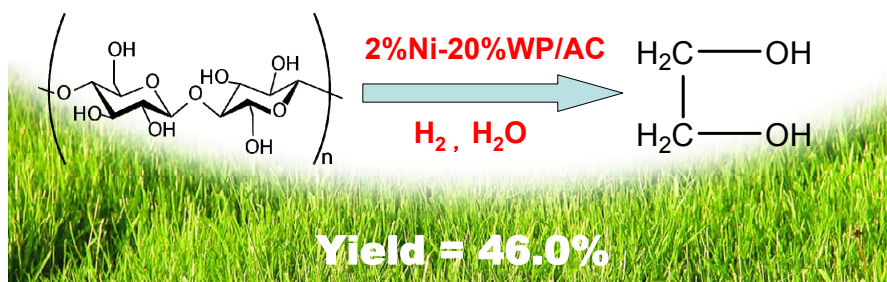


Communications

Catalytic Conversion of Cellulose to Ethylene Glycol over Tungsten Phosphide Catalysts

ZHAO Guanhong, ZHENG Mingyuan, WANG Aiqin, ZHANG Tao*

Dalian Institute of Chemical Physics, Chinese Academy of Sciences

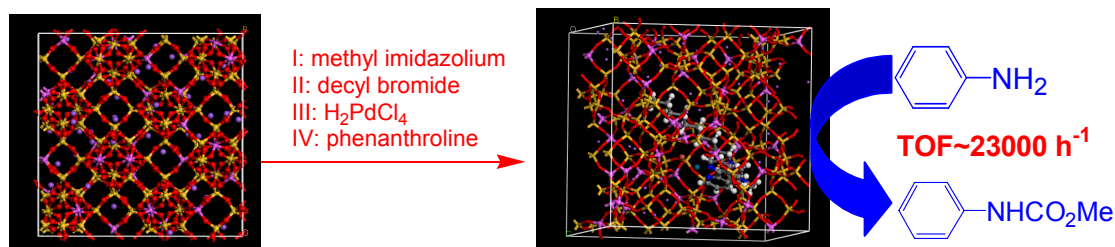


Tungsten phosphide (WP) catalysts have good activity for the selective conversion of cellulose and gave ethylene glycol yields of 25.4 mol% over 20%WP/AC and 46.0 mol% over 2%Ni-20%WP/AC catalysts.

Self-Assembly of Ionic Liquids and Metal Complexes in Super-Cages of NaY: Integration of Free Catalysts and Solvent Molecules into Confined Catalytic Sites

MA Yubo, HE Yude, ZHANG Qinghua, SHI Feng*, MA Xiangyuan, LU Liujin, DENG Youquan*

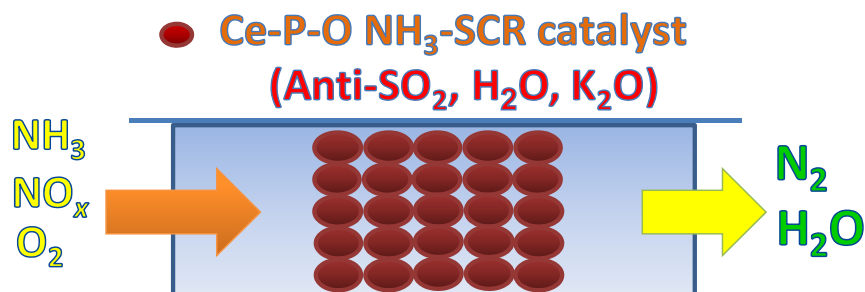
Lanzhou Institute of Chemical Physics



The integration of a free palladium complex and an ionic liquid molecule into the super-cage of a NaY zeolite to form an effective catalytic site was developed by a molecular self-assembly/ship-in-bottle method. Much higher catalytic activity was achieved for the carbonylation of aniline with much lower amounts of the ionic liquid and palladium complex.

A Novel Ce-P-O Catalyst for Selective Catalytic Reduction of NO with NH₃

LI Fei, XIAO Dehai, ZHANG Yibo, WANG Deqiang, PAN Xiqiang, YANG Xiangguang*
Changchun Institute of Applied Chemistry, Chinese Academy of Sciences

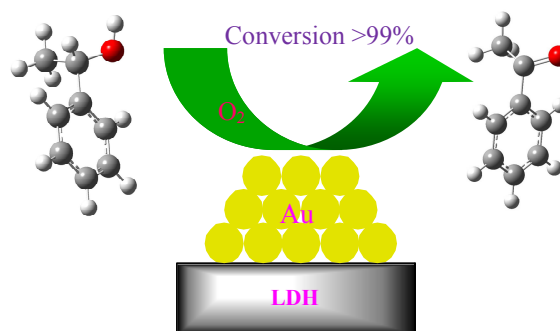


The new highly active Ce-P-O catalyst for the selective catalytic reduction (SCR) of NO with NH₃ in the presence of excess O₂ was developed, and the catalyst was resistant to steam and SO₂.

Au Nanoparticles Supported on a Layered Double Hydroxide with Excellent Catalytic Properties for the Aerobic Oxidation of Alcohols

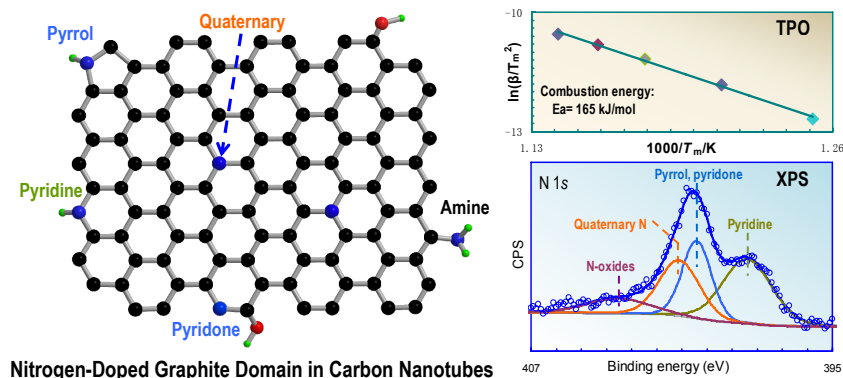
WANG Liang, MENG Xiangju, XIAO Fengshou*
Jilin University; Zhejiang University

Small Au nanoparticles that are highly dispersed on layered double hydroxide (LDH) show excellent catalytic properties for the aerobic oxidation of a series of alcohols with molecular oxygen.



Preparation and Quantitative Characterization of Nitrogen-Functionalized Multi-walled Carbon Nanotubes

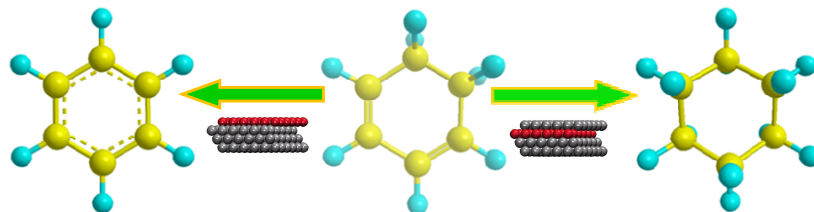
CHEN Chunlin, ZHANG Jian*, WANG Rui, SU Dangsheng*, PENG Feng*
Institute of Metal Research, Chinese Academy of Sciences; South China University of Technology



Functionalities on nitrogen-doped carbon nanotubes were identified and quantified, which is important for the clarification of structure-performance relationships in metal-free catalysis. A simple route to a closed cup-like carbon nanostructure is also reported.

Low-Temperature Hydrogenation and Dehydrogenation of 1,3-Cyclohexadiene on Pt/Ni Bimetallic Catalysts

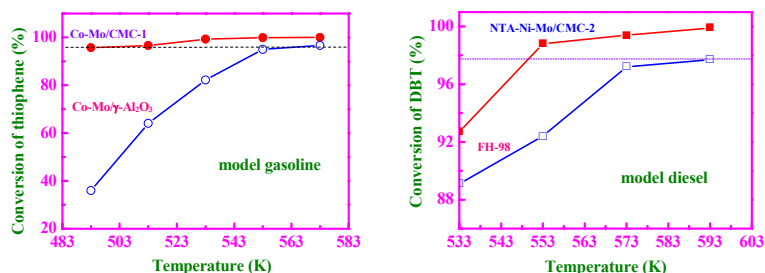
QI Suitao, YU Weiting, William W. LONERGAN, YANG Bolun, CHEN Jingguang G*
Xi'an Jiaotong University; University of Delaware, USA



The subsurface of Pt-Ni-Pt bimetallic structure has the lowest binding energy for 1,3-cyclohexadiene, leading to the highest hydrogenation activity. The surface of Ni-Pt-Pt structure shows the highest binding energy for 1,3-cyclohexadiene, promoting the dehydrogenation pathway.

Mesoporous Carbon Supported Co-Mo and Ni-Mo Catalysts for Hydrodesulfurization

SHI Guojun, ZHAO Yu, HUANG Yu'an, SHEN Jianyi*
Nanjing University

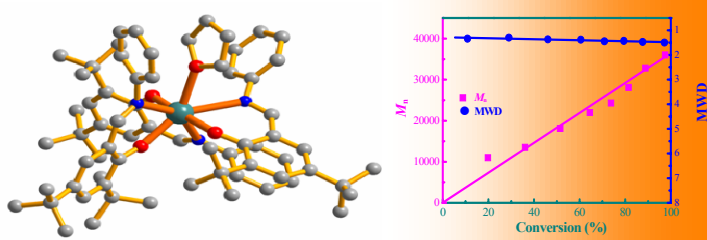


Mesoporous carbon supported Co-Mo-S and Ni-Mo-S catalysts are shown to exhibit high activity for the hydrodesulfurization of thiophene in a model gasoline and of dibenzothiophene (DBT) in a model diesel, respectively.

Articles

Controlled Ring-Opening Polymerization of ϵ -Caprolactone Catalyzed by a Rare Earth Schiff-Base Complex

NI Xufeng*, ZHU Weiwei, SHEN Zhiquan*
Zhejiang University

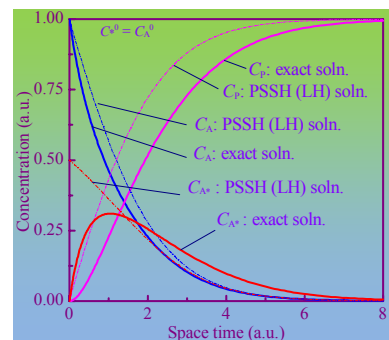


The neodymium Schiff-base complex $[3,5-t\text{Bu}_2-2-(\text{O})\text{C}_6\text{H}_2\text{CH}=\text{NC}_6\text{H}_5]_3\text{Nd}(\text{THF})$ has a distorted pentagonal bipyramidal geometry and it can catalyze the controlled ring-opening polymerization of ϵ -caprolactone giving poly(ϵ -caprolactone) with a high molecular weight and a narrow molecular weight distribution.

Experimental Conditions for Valid Langmuir-Hinshelwood Kinetics

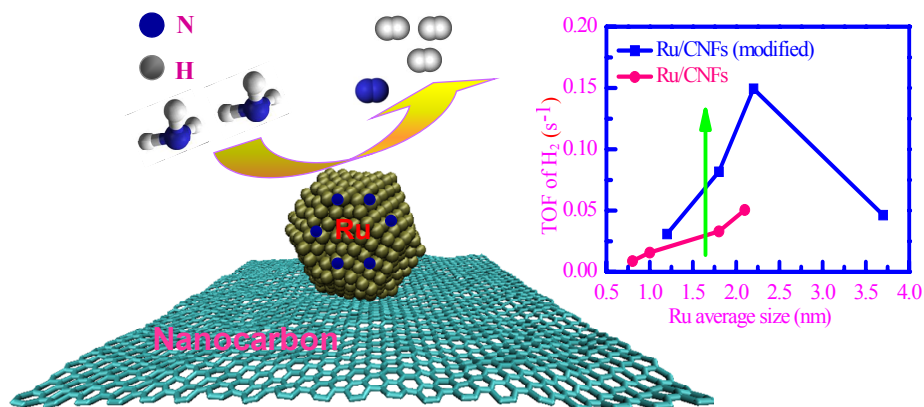
WANG Dezheng
Tsinghua University

Langmuir-Hinshelwood kinetics invoke the pseudo-steady state hypothesis for all adsorbed species. Their valid use are limited by this, thus, they may be invalid with high surface area catalysts.



Carbon Nanofiber-Supported Ru Catalysts for Hydrogen Evolution by Ammonia Decomposition

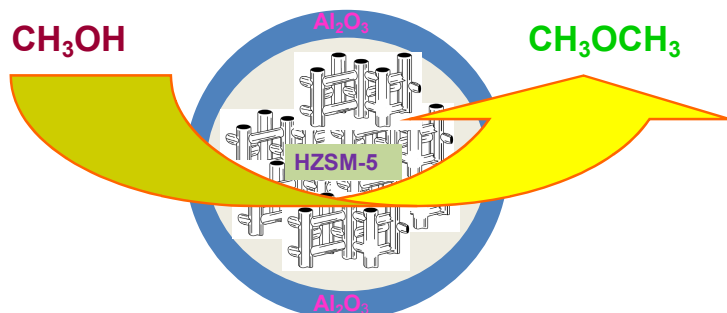
DUAN Xuezhi, ZHOU Jinghong, QIAN Gang, LI Ping, ZHOU Xinggui*, CHEN De*
East China University of Science and Technology; Norwegian University of Science and Technology, Norway



Ru/CNFs and Ru/CNTs catalysts were prepared and used for ammonia decomposition. Surface defects and surface oxygen complexes on the CNFs remarkably enhance the activity of the Ru catalysts.

Synthesis of Dimethyl Ether via Methanol Dehydration over Combined Al₂O₃-HZSM-5 Solid Acids

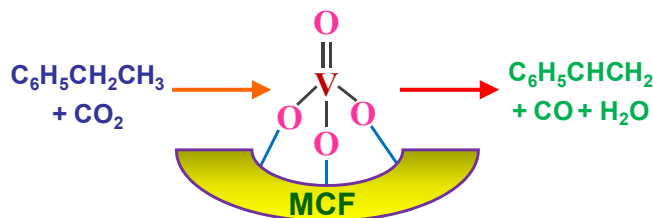
ZHANG Liwei, WANG Junhua, WU Pei, HOU Zhaoyin, FEI Jinhua*, ZHENG Xiaoming
Zhejiang University



Combined Al₂O₃-HZSM-5 solid acids exhibit higher methanol dehydration activity and higher stability at lower temperature (235 °C) and a higher LHSV (30 h⁻¹).

Ethylbenzene Dehydrogenation in the Presence of CO₂ over MCF-Supported Vanadium Oxide Catalysts

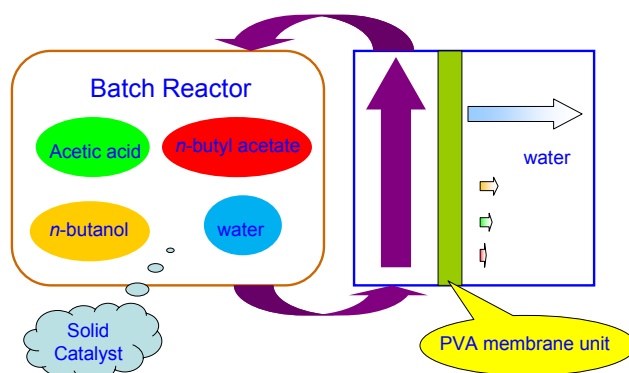
LI Chunguang, MIAO Changxi, NIE Yingying, YUE Yinghong, GU Songyuan, YANG Weimin, HUA Weiming*, GAO Zi*
Fudan University; Shanghai Research Institute of Petrochemical Technology, SINOPEC



We found much higher activity for ethylbenzene dehydrogenation using CO₂ over V/MCF catalysts than for V/MCM-41 and this can be attributed to the higher reducibility and better diffusion of the reactants and products in the former catalysts.

Modeling of Esterification in a Batch Reactor Coupled with Pervaporation for Production of *n*-Butyl Acetate

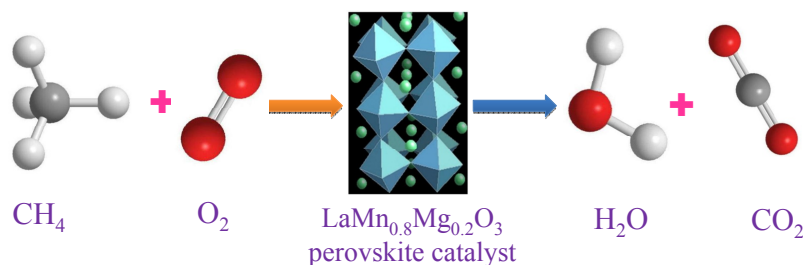
ZOU Yun, TONG Zhangfa*, LIU Kun, FENG Xianshe
Guangxi University; University of Waterloo, Canada



An accurate mathematical model was developed for esterification in a batch reactor coupled with pervaporation by taking into account the non-ideal thermodynamic behavior of the components involved in the reaction.

Effects of Preparation Methods on the Catalytic Performance of LaMn_{0.8}Mg_{0.2}O₃ Perovskite for Methane Combustion

ZHU Linlin, LU Guanzhong*, WANG Yanqin, GUO Yun, GUO Yanglong
East China University of Science and Technology

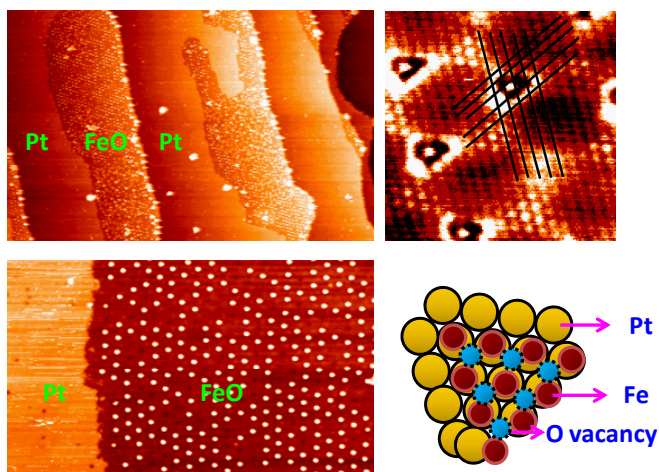


$LaMn_{0.8}Mg_{0.2}O_3$ perovskite catalyst prepared by the glycine-nitrate method and calcined at 700 °C shows the best activity for methane combustion. This is attributed to its smaller crystalline size, larger surface area, and more Mn⁴⁺ cations on its surface.

Formation of Periodic Arrays of O Vacancy Clusters on Monolayer FeO Islands Grown on Pt(111)

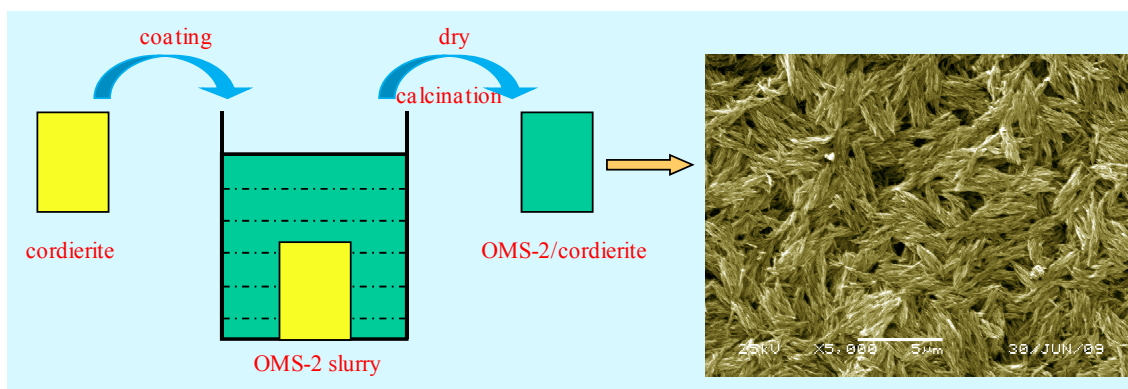
MA Teng, FU Qiang*, YAO Yunxi, CUI Yi, TAN Dali, ZHAI Runsheng, BAO Xinhe*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences

The annealing at 850 K and in an oxygen atmosphere of a Pt surface with 0.4 ML subsurface Fe resulted in exposed monolayer FeO islands with periodic arrays of oxygen vacancy defects.



Preparation of OMS-2/Cordierite Monolithic Catalysts and Their Catalytic Performance for Dimethyl Ether Combustion

NA Xiuhui, YU Lin*, SUN Ming, DIAO Guiqiang, YANG Xiaqing, SHI Litao, PAN Jifei
Guangdong University of Technology

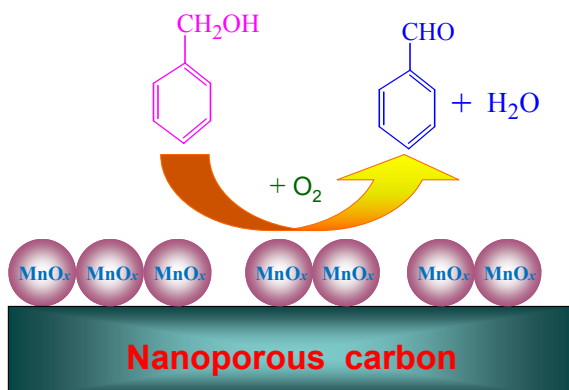


Manganese oxide octahedral molecular sieve (OMS-2)/cordierite monolithic catalysts were prepared by a coating method with common polymers as the binders. The catalyst prepared with 3%PVA-1799 showed higher catalytic activity for DME combustion and better reusability.

Nanoporous Carbon-Supported MnO_x Catalysts for Oxidation of Benzyl Alcohol

LIU Gang, ZHANG Xiuyan, XU Yue, ZHANG Min, JIA Mingjun*, ZHANG Wenxiang, WU Tonghao*
Jilin University

Nanoporous carbon-supported MnO_x catalysts (MnO_x/NC) exhibit higher activity for the oxidation of benzyl alcohol using air as the oxygen source. This can be mainly assigned to the formation of highly dispersed and easily reduced MnO_x species on the surface of NC support.

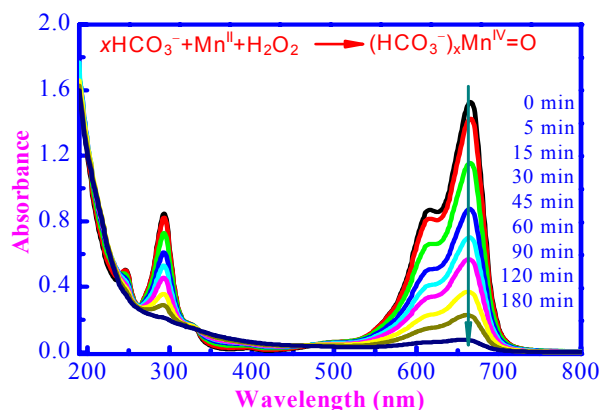


Oxidative Degradation of Organic Pollutants Catalyzed by Trace Manganese (II) Ion in Sodium Bicarbonate Solution

XU Aihua, SHAO Kejie, WU Wenli, Fan Jing, CUI Jinjiu, YIN Guochuan*

Huazhong University of Science and Technology; Environment Protection Science Research and Design Institute of Ningbo

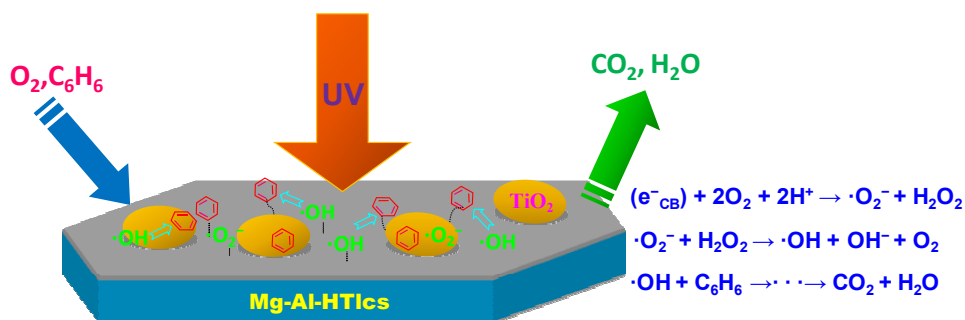
A simple and environmental method for degradation of organic dyes was explored using trace manganese (II) ion as the catalyst with H₂O₂ oxidant in a sodium bicarbonate solution under mild conditions.



Photocatalytic Oxidation of Benzene on Nano-crystalline Mg-Al-HT/TiO₂ Heterocompounds

CHEN Wei, LI Danzhen*, HE Shunhui, SHAO Yu, HUANG Yan, FU Xianzhi*

Fuzhou University

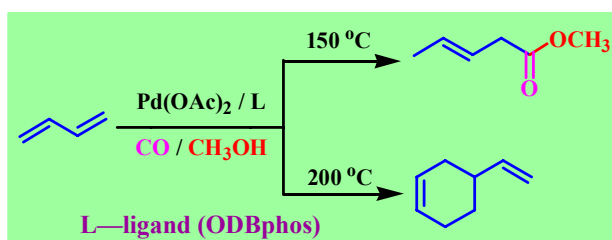


Under UV light irradiation, a large number of $\cdot\text{OH}$ was generated on the surface of Mg-Al-HT (hydrotalcite-like compound) TiO₂ heterocompounds, which is the key factor in the oxidation of benzene.

Palladium Catalyzed Carboxylation of 1,3-Butadiene to Methyl 3-Pentenoate

WANG Liandi, WU Xiaowei, HE Wei, LIU Zishuang, YU Zhengkun*

Dalian Institute of Chemical Physics, Chinese Academy of Sciences; Dalian Nationalities University

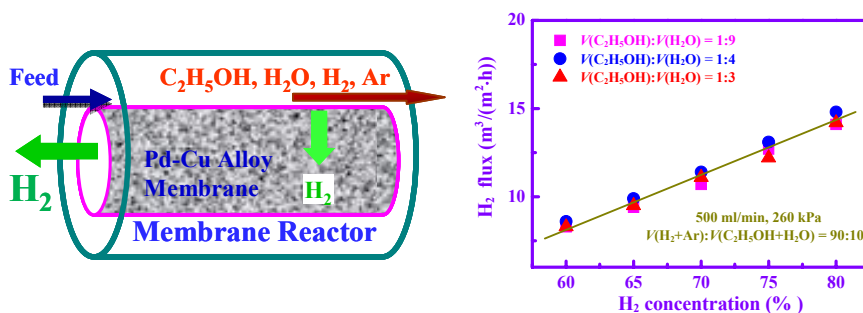


Carboxylation of 1,3-butadiene catalyzed by Pd(OAc)₂/(oxydi-2,1-phenylene)bis(diphenylphosphine) catalyst in the presence of CO and MeOH was carried out, reaching 90.4% conversion of 1,3-butadiene and 91.6% selectivity for methyl 3-pentenoate, while dimerization occurred at 200 °C to form 4-vinyl-1-cyclohexene in 96% yield.

Hydrogen Permeation in a Thin Pd-Cu Alloy Membrane Reactor for Steam Reforming of Ethanol

ZHANG Xiaoliang, WANG Weiping, XIONG Guoxing*, YANG Weishen*

Dalian Institute of Chemical Physics, Chinese Academy of Sciences; Jiangxi Normal University.

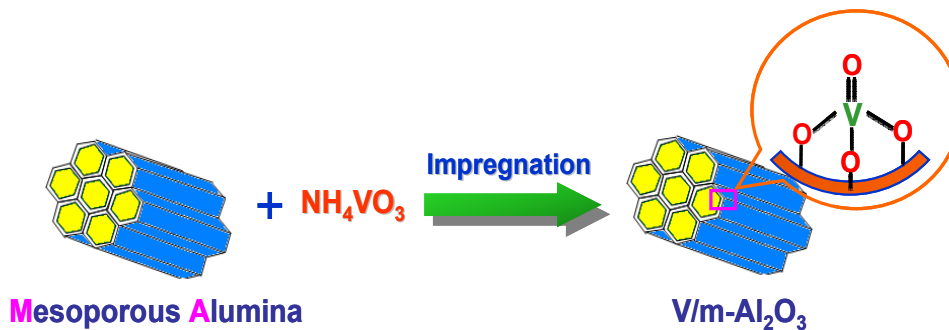


Pd-Cu alloy membrane exhibited good performance in a membrane reactor with H₂-Ar-C₂H₅OH-H₂O modeling mixture for steam reforming of ethanol and showed potential application for pure hydrogen production from the reforming reaction.

Oxidative Dehydrogenation of Propane to Propene over Mesoporous Alumina-Supported Vanadium Oxide Catalyst

WANG Yu, XIE Songhai, YUE Bin*, FENG Sujiao, HE Heyong*

Fudan University



The impregnated vanadia catalyst supported on mesoporous alumina exhibits high performance for the oxidative dehydrogenation of propane to propene, because of highly dispersed vanadium active species and the weak acidity of the catalyst.

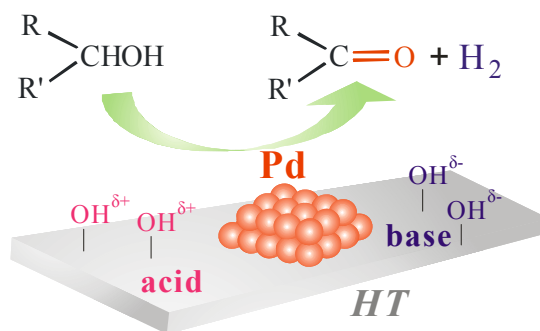
Oxidant-Free Dehydrogenation of Alcohols over Hydrotalcite-Supported Palladium Catalysts

CHEN Jing, ZHANG Qinghong, FANG Wenhao, WANG Ye*, WAN Huilin

Xiamen University

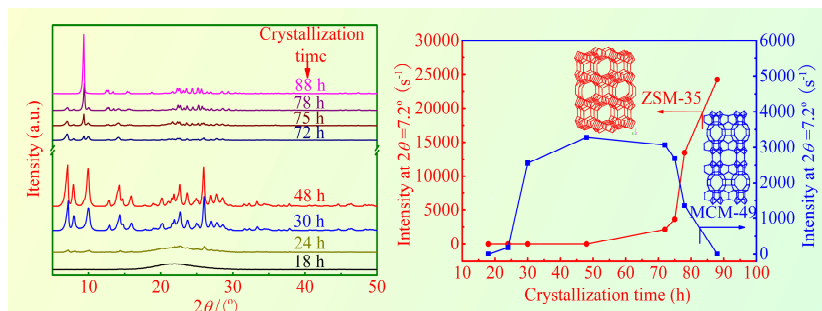
Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences

Pd nanoparticles supported on an acid-base bifunctional hydrotalcite are highly efficient and reusable catalysts for the oxidant-free dehydrogenation of various alcohols to carbonyl compounds.



The Crystallization Process of MCM-49/ZSM-35 Composite Zeolites in a Mixed-Amine System

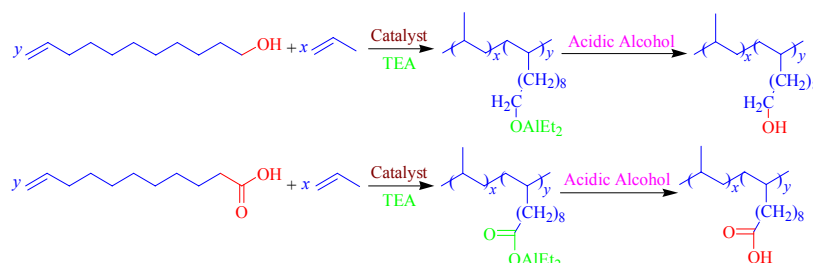
XIE Sujuan, LIU Kefeng, LIU Shenglin, LIU Yong, ZHANG Weiping, XU Longya*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



In a hexamethylenimine-cyclohexamine system, MCM-49 was obtained first, then MCM-49/ZSM-35 composite zeolites were gradually formed with increasing ZSM-35 content upon the crystallization time, and finally ZSM-35 was produced.

Copolymerization of Propylene and Polar Monomers by a New Ziegler-Natta Catalyst System with Diether as Internal Donor

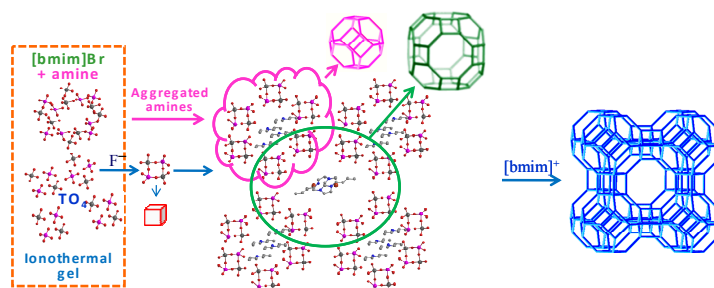
HUANG He, ZHANG Liaoyun, LI Huayi, HU Youliang*
Institute of Chemistry, Chinese Academy of Sciences



Using triethylaluminum as protection reagent to protect the active hydrogen on the polar group, copolymerization of propylene with polar monomer 10-undecen-1-ol and 10-undecenoic acid was performed with $\text{TiCl}_4/\text{MgCl}_2/\text{diether}/\text{Al}(\text{C}_2\text{H}_5)_3$ catalysis system.

The Cooperative Templating Effect of Organic Amine in the Ionothermal Synthesis of LTA Type Aluminophosphate Molecular Sieves

PEI Renyan, XU Yunpeng, WEI Ying, WEN Guodong, LI Keda, WANG Lei, MA Huaijun, TIAN Zhijian*, LIN Liwu
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



The LTA type framework with cage structure was ionothermally synthesized through the synergetic effect of the introduced amine of an aggregated state together with the cation of the ionic liquid.