



中国科学院科学出版基金资助出版

催化学报

(CUIHUA XUEBAO)

CHINESE JOURNAL OF CATALYSIS

月刊 SCI 收录 2010年8月 第31卷 第8期



庆祝《催化学报》创刊30周年专刊

目次

I 与科技创新同步,不断提升《催化学报》的国际化程度——庆祝《催化学报》创刊30周年

本刊编辑部

IV 祝贺《催化学报》创刊30周年题词

闵恩泽,彭少逸,胥海熊,林励吾,沈之荃,陈懿,万惠霖,何鸣元,李灿

综 述

859 (国际版/英文/封面文章)

固体催化剂是否成功地仿效酶催化剂?

Bernard DELMON

875 (国际版/英文)

镍 *N*-杂环卡宾配合物在均相催化偶联反应中的应用
顾绍金,倪鹏,陈万芝

887

非晶态合金纳米管的制备及其催化性能研究进展
丁维平,郭学锋,莫敏,祝艳,陈懿

895

反应控制相转移催化研究的进展

李军,高爽,奚祖威

912

富氧条件下氢气选择催化还原氮氧化物研究的进展
武鹏,于青,严晶晶,武光军,李兰冬,关乃佳

919

费托合成钴基催化剂的研究进展

孙予罕,陈建刚,王俊刚,贾丽涛,侯博,李德宝,张娟

研究快讯

928 (国际版)

磷化钨催化转化纤维素制乙二醇

赵冠鸿,郑明远,王爱琴,张涛

933 (国际版)

NaY 分子筛超笼内离子液体和金属配合物自组装制备溶剂分子和金属配合物一体化催化剂

马昱博,何昱德,张庆华,石峰,马祥元,卢六斤,邓友全

938 (国际版)

用于 NH_3 选择催化还原 NO 反应的新型 Ce-P-O 催化剂

李飞,肖德海,张一波,王德强,潘喜强,杨向光

943 (国际版)

水滑石负载 Au 纳米粒子的制备及其催化醇氧化反应

王亮,孟祥举,肖丰收

948 (国际版)

氮掺杂多壁纳米碳管的合成和定量表征

湛春林,张建,王锐,苏党生,彭峰

955 (国际版)

Pt-Ni/ γ - Al_2O_3 双金属催化剂上 1,3-环己二烯的低温加氢和脱氢反应

齐随涛,俞伟婷,William W. LONERGAN,杨伯伦,陈经广

961 (国际版)

介孔碳负载的 Co-Mo 和 Ni-Mo 加氢脱硫催化剂

石国军,赵鹍,黄玉安,沈俭一

研究论文

965 (国际版/英文)

稀土席夫碱配合物催化己内酯可控开环聚合
倪旭峰,朱伟伟,沈之荃

972 (国际版/英文)

Langmuir-Hinshelwood 动力学的有效实验条件
王德峰

979 (国际版/英文)

Ru/CNFs 催化剂催化氨分解制氢

段学志,周静红,钱刚,李平,周兴贵,陈德

987 (国际版/英文)

甲醇脱水合成二甲醚的 Al_2O_3 -HZSM-5 组合固体酸催化剂
张立伟,王军华,吴佩,侯昭胤,费金华,郑小明

993 (国际版/英文)

CO_2 气氛下 MCF 负载氧化钒催化剂上乙苯脱氢反应

李春光,缪长喜,聂颖颖,乐英红,顾松园,杨为民,华伟明,高滋

999 (国际版/英文)

间歇反应器内醋酸丁酯酯化反应与渗透汽化集成过程的模型计算

邹昀,童张法,刘琨,冯献社

1006 (国际版/英文)

制备方法对 $\text{LaMn}_{0.8}\text{Mg}_{0.2}\text{O}_3$ 钙钛矿型氧化物催化甲烷燃烧反应性能的影响

朱琳琳,卢冠忠,王艳芹,郭耘,郭杨龙

1013 (国际版/英文)

单层 FeO 薄膜表面周期性氧缺陷结构的形成

马腾,傅强,姚运喜,崔义,谭大力,翟润生,包信和

1019

OMS-2/堇青石整体式催化剂的制备及其对二甲醚燃烧的催化性能

那秀辉,余林,孙明,刁贵强,杨霞卿,史利涛,潘鹏飞

1025

纳米孔炭负载 MnO_x 催化剂上苯甲醇氧化反应性能
刘钢, 张秀艳, 徐跃, 张敏, 贾明君, 张文祥, 吴通好

1031

碳酸氢钠溶液中微量 Mn^{2+} 离子催化氧化降解有机污染物
徐爱华, 邵科杰, 吴文利, 范兢, 崔金久, 尹国川

1037

Mg-Al 类水滑石/二氧化钛异质复合纳米晶光催化氧化苯的性能
陈伟, 李旦振, 何顺辉, 邵宇, 黄艳, 付贤智

1044

钯催化 1,3-丁二烯羧酯化合成 3-戊烯酸甲酯
王连弟, 吴小伟, 赫巍, 刘子双, 余正坤

1049

乙醇水汽重整制氢反应中钯铜合金膜的透氢性能
张小亮, 王卫平, 熊国兴, 杨维慎

1054

介孔氧化铝负载钒催化剂上丙烷氧化脱氢制丙烯
汪玉, 谢颂海, 岳斌, 冯素姣, 贺鹤勇

1061

水滑石负载钯催化剂上的醇无氧脱氢反应
陈静, 张庆红, 方文浩, 王野, 万惠霖

1071

混合胺体系中 MCM-49/ZSM-35 复合分子筛的晶化过程
谢素娟, 刘克峰, 刘盛林, 刘勇, 张维萍, 徐龙伢

1077

二醚型 Ziegler-Natta 催化剂催化丙烯与极性单体共聚
黄河, 张辽云, 李化毅, 胡友良

1083

有机胺在离子热合成 LTA 型磷酸铝分子筛中的助模板作用
裴仁彦, 徐云鹏, 魏莹, 温国栋, 李科达, 王磊, 马怀军, 田志坚, 林励吾

国际合作交流

872

《催化学报》创刊 30 周年纪念: 同比利时 B. Delmon 教授
科技合作 20 年回顾
辛勤

相关信息

1090 作者索引

www.chxb.cn



Supported by the Science Publication
Foundation of the CAS

催化学报
(CUIHUA XUEBAO)

CHINESE JOURNAL OF CATALYSIS

Monthly Vol. 31 No. 8 August 2010



In celebration of the 30th anniversary of *Chinese Journal of Catalysis*

Contents

Reviews

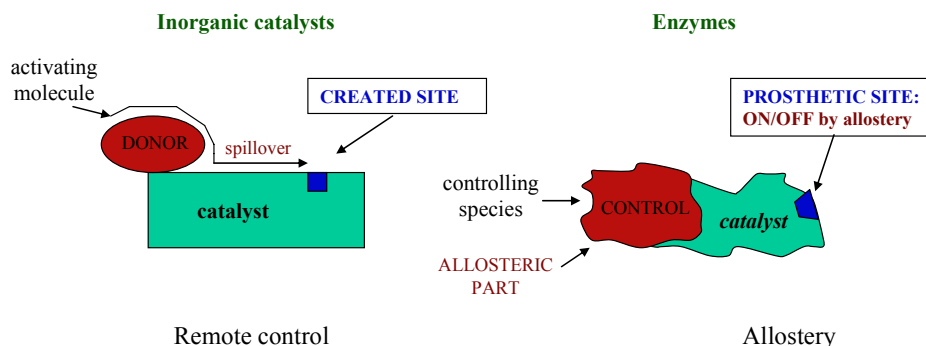
Chin. J. Catal., 2010, 31: 859–871 doi: 10.1016/S1872-2067(09)60088-7

Are Solid Catalysts Successfully Emulating Enzymes?

Bernard DELMON

Université catholique de Louvain, Belgium

CONTROL OF CATALYTIC ACTIVITY



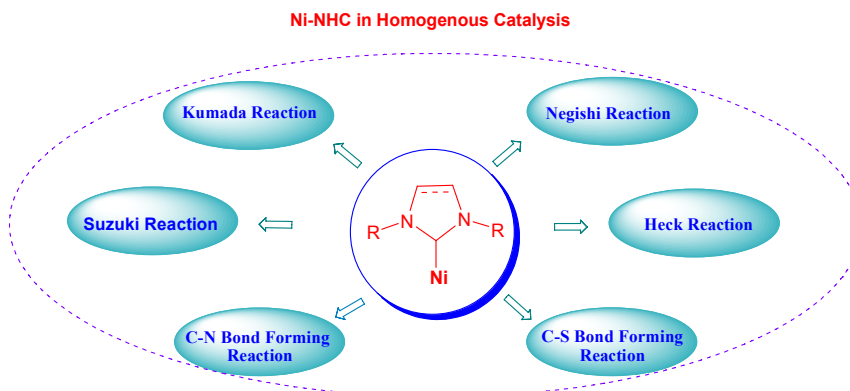
Will inorganic catalysts acquire characteristics of enzymes, extending to different properties the example of remote control and allostery? To what extent will future science develop new materials with catalytic properties approaching those of the enzymes developed by nature? The leading idea is to make 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*

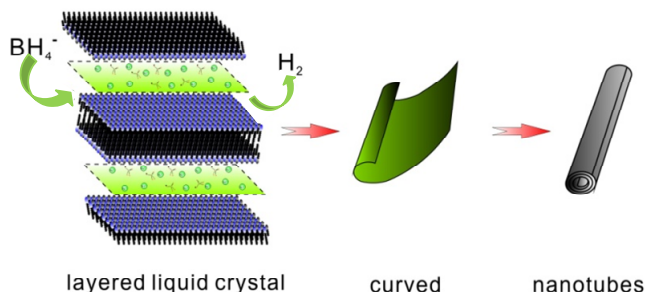
Zhejiang University



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

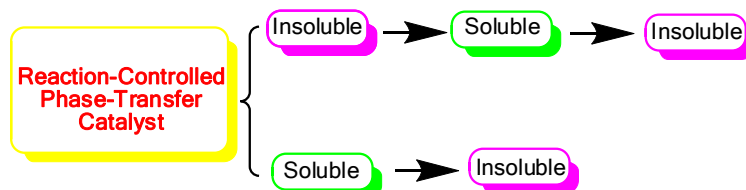
DING Weiping*, GUO Xuefeng, MO Min, ZHU Yan, CHEN Yi
Nanjing University



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

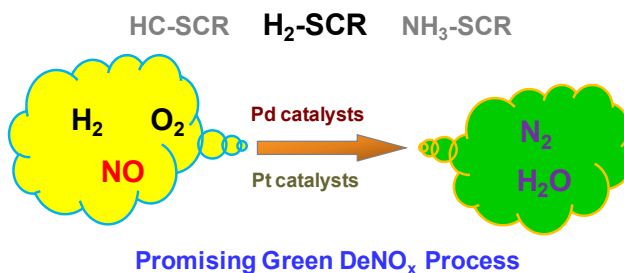
LI Jun, GAO Shuang*, XI Zuwei
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



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



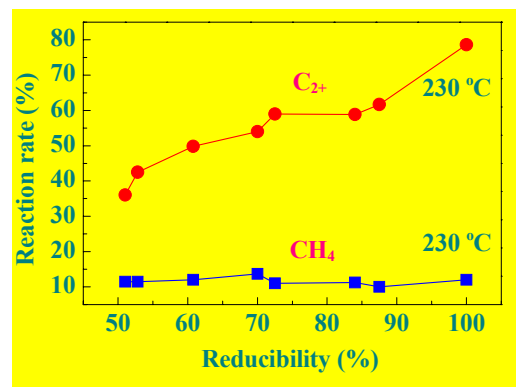
H_2 -SCR is a newly developed promising green process for nitrogen oxide elimination in excess oxygen. State-of-the-art research on H_2 -SCR catalysts and the corresponding H_2 -SCR reaction mechanism are summarized in this paper.

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.

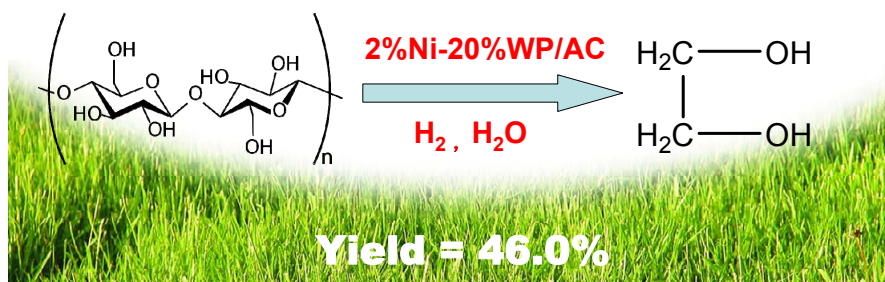


Communications

Catalytic Conversion of Cellulose to Ethylene Glycol over Tungsten Phosphide Catalysts

ZHAO Guan hong, ZHENG Mingyuan, WANG Aiqin, ZHANG Tao*

Dalian Institute of Chemical Physics, Chinese Academy of Sciences

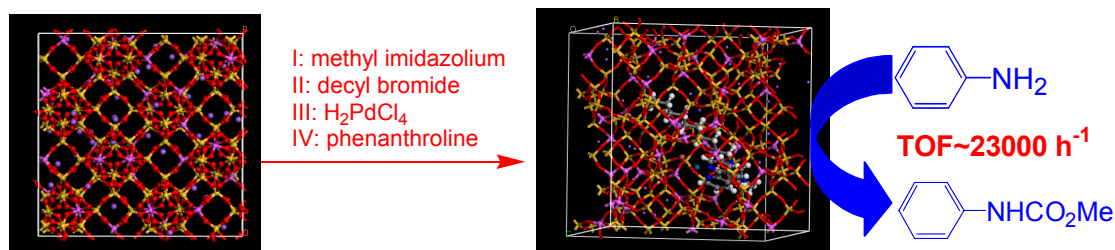


Tungsten phosphide (WP) catalysts have good activity for the selective conversion of cellulose and gave ethylene glycol yields of 25.4 mol% over 20%WP/AC and 46.0 mol% over 2%Ni-20%WP/AC catalysts.

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*

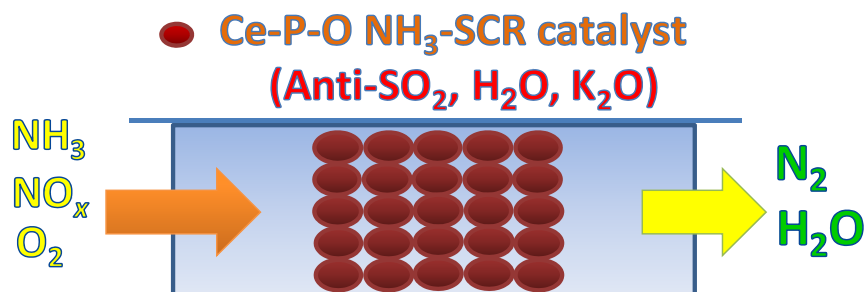
Lanzhou Institute of Chemical Physics



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

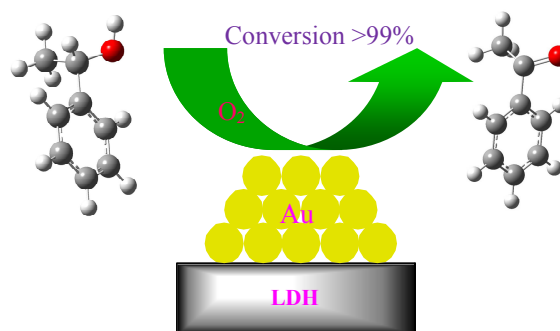


The new highly active Ce-P-O catalyst for the selective catalytic reduction (SCR) of NO with NH₃ in the presence of excess O₂ was developed, and the catalyst was resistant to steam and SO₂.

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

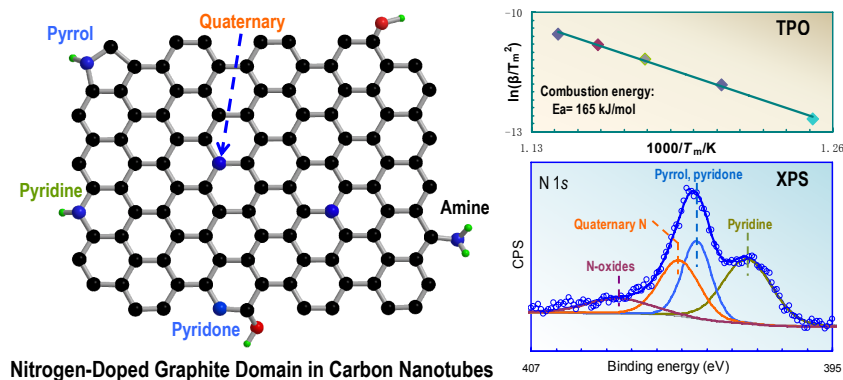
WANG Liang, MENG Xiangju, XIAO Fengshou*
Jilin University; Zhejiang University

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

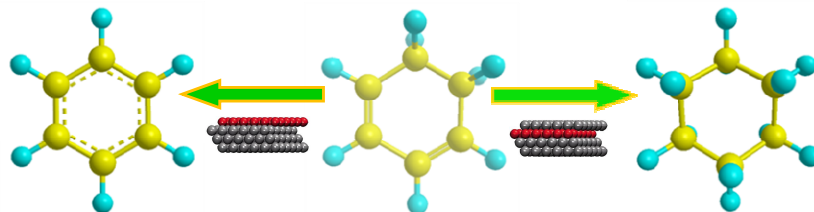
CHEN Chunlin, ZHANG Jian*, WANG Rui, SU Dangsheng*, PENG Feng*
Institute of Metal Research, Chinese Academy of Sciences; South China University of Technology



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

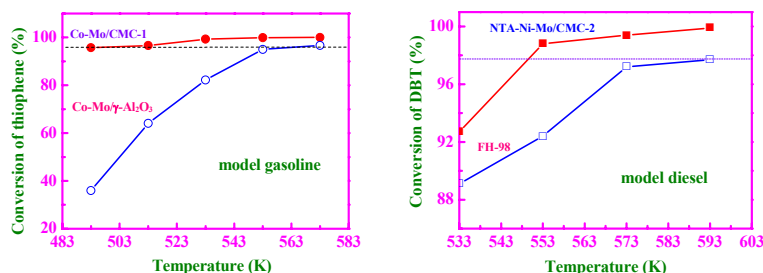
QI Suitao, YU Weiting, William W. LONERGAN, YANG Bolun, CHEN Jingguang G*
Xi'an Jiaotong University; University of Delaware, USA



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

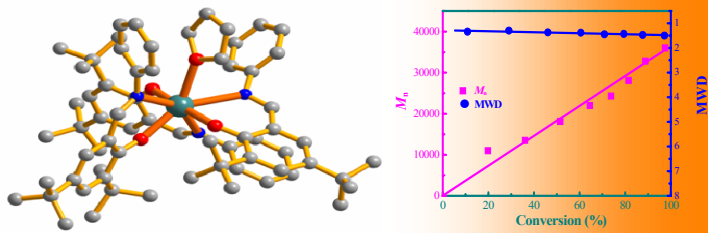


Mesoporous carbon supported Co-Mo-S and Ni-Mo-S catalysts are shown to exhibit high activity for the hydrodesulfurization of thiophene in a model gasoline and of dibenzothiophene (DBT) in a model diesel, respectively.

Articles

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

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

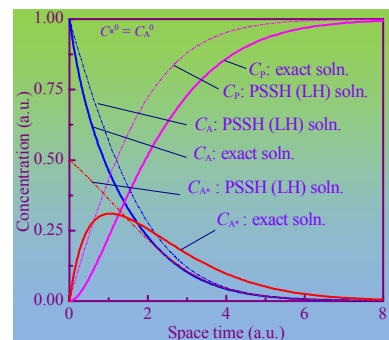


The neodymium Schiff-base complex $[3,5-t\text{Bu}_2-2-(\text{O})\text{C}_6\text{H}_2\text{CH}=\text{NC}_6\text{H}_5]_3\text{Nd}(\text{THF})$ has a distorted pentagonal bipyramidal geometry and it can catalyze the controlled ring-opening polymerization of ϵ -caprolactone giving poly(ϵ -caprolactone)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

Experimental Conditions for Valid Langmuir-Hinshelwood Kinetics

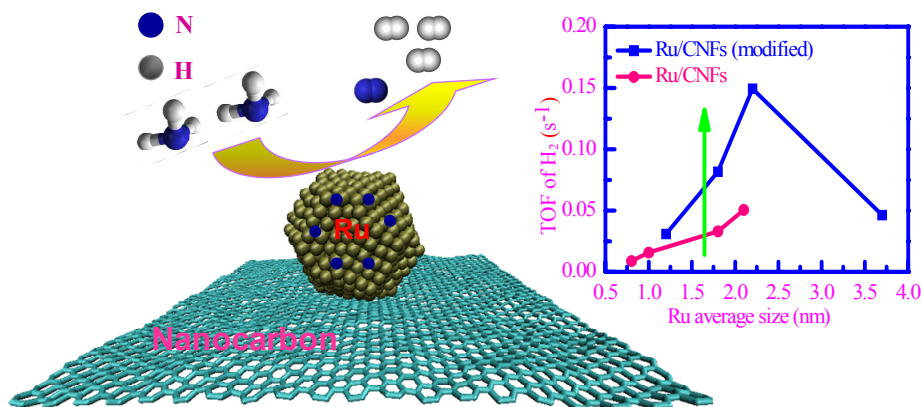
WANG Dezheng
Tsinghua University

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

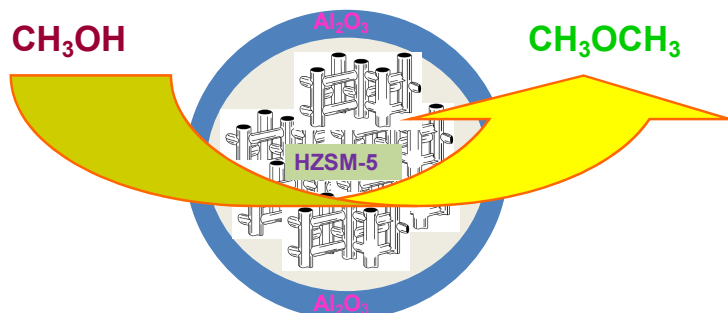
DUAN Xuezhi, ZHOU Jinghong, QIAN Gang, LI Ping, ZHOU Xinggui*, CHEN De*
East China University of Science and Technology; Norwegian University of Science and Technology, Norway



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 Al_2O_3 -HZSM-5 Solid Acids

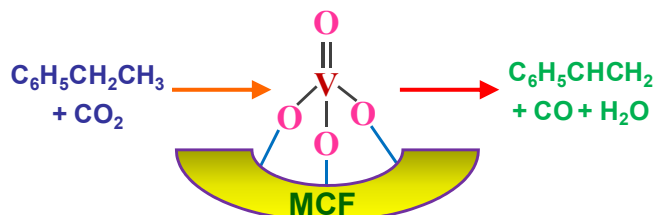
ZHANG Liwei, WANG Junhua, WU Pei, HOU Zhaoyin, FEI Jinhua*, ZHENG Xiaoming
Zhejiang University



Combined Al_2O_3 -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

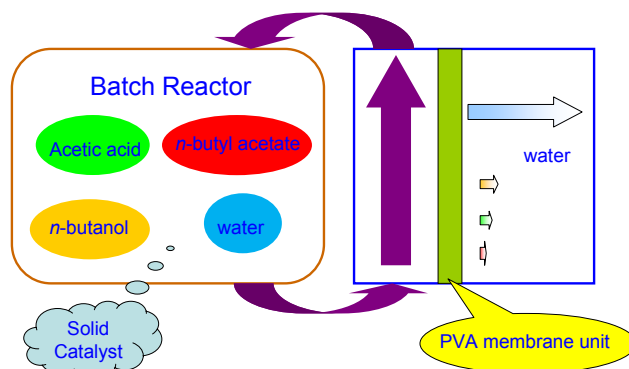
LI Chunguang, MIAO Changxi, NIE Yingying, YUE Yinghong, GU Songyuan, YANG Weimin, HUA Weiming*, GAO Zi*
Fudan University; Shanghai Research Institute of Petrochemical Technology, SINOPEC



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

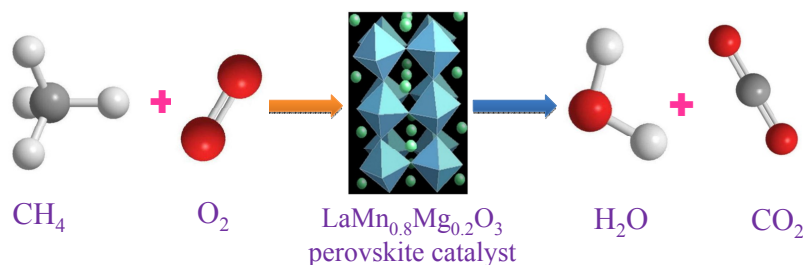
ZOU Yun, TONG Zhangfa*, LIU Kun, FENG Xianshe
Guangxi University; University of Waterloo, Canada



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



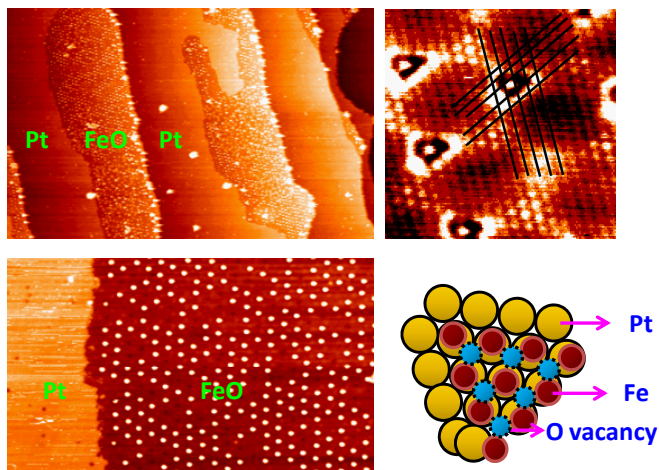
LaMn_{0.8}Mg_{0.2}O₃ perovskite catalyst prepared by the glycine-nitrate method and calcined at 700 °C shows the best activity for methane combustion. This is attributed to its smaller crystalline size, larger surface area, and more Mn⁴⁺ cations on its surface.

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

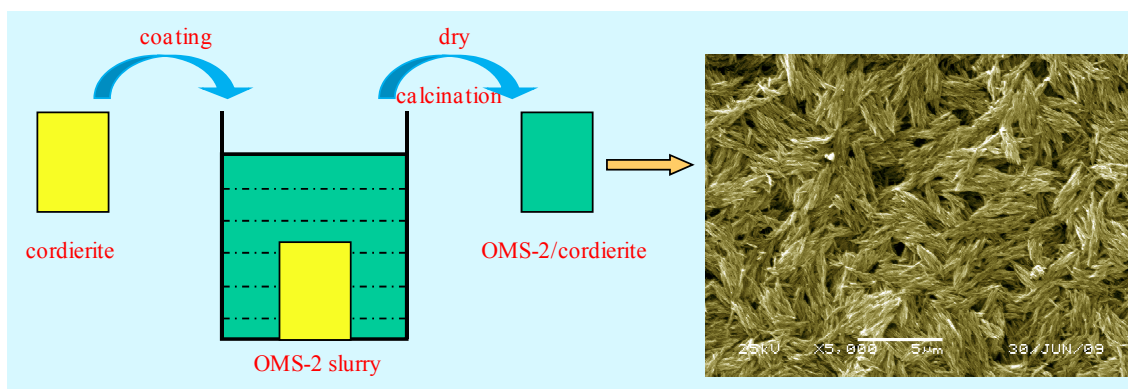
The annealing at 850 K and in an oxygen atmosphere of a Pt surface with 0.4 ML subsurface Fe resulted in exposed monolayer FeO islands with periodic arrays of oxygen vacancy defects.



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



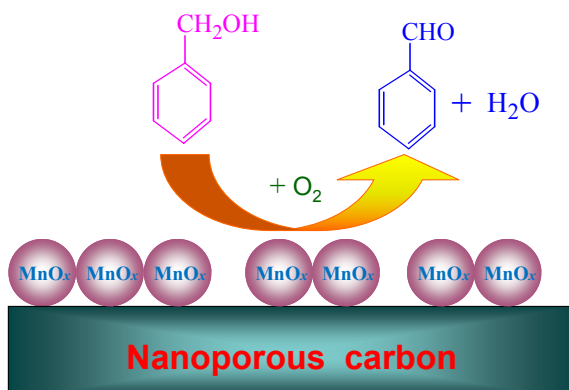
Manganese oxide octahedral molecular sieve (OMS-2)/cordierite monolithic catalysts were prepared by a coating method with common polymers as the binders. The catalyst prepared with 3%PVA-1799 showed higher catalytic activity for DME combustion and better reusability.

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.

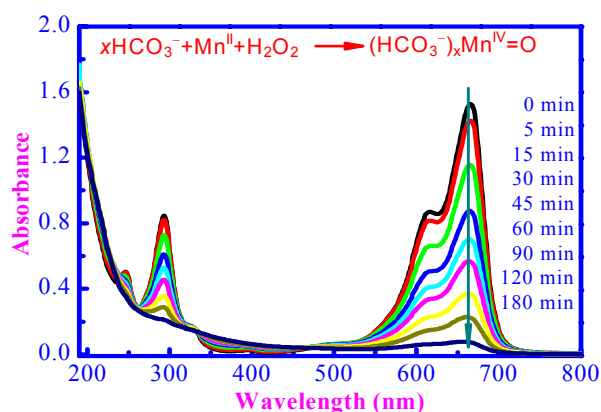


Oxidative Degradation of Organic Pollutants Catalyzed by Trace Manganese (II) Ion in Sodium Bicarbonate Solution

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

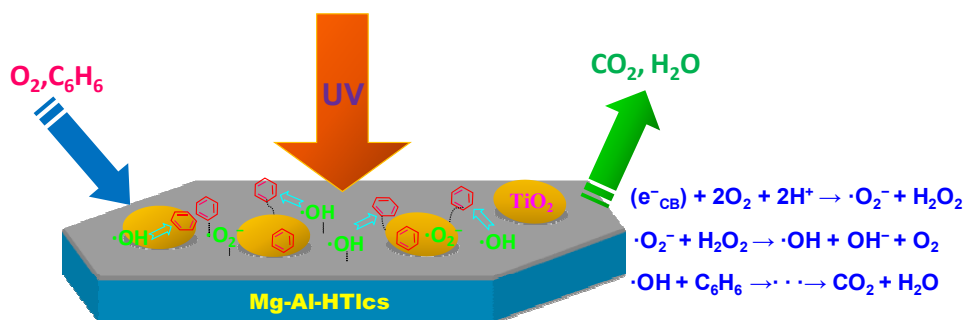
A simple and environmental method for degradation of organic dyes was explored using trace manganese (II) ion as the catalyst with H_2O_2 oxidant in a sodium bicarbonate solution under mild conditions.



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

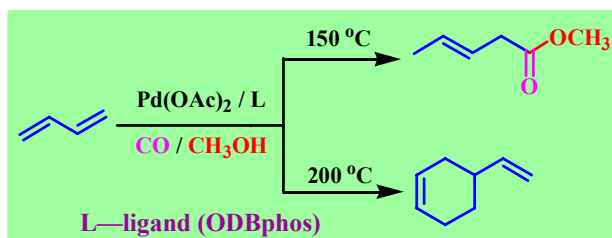


Under UV light irradiation, a large number of $\cdot\text{OH}$ was generated on the surface of Mg-Al-HT (hydrotalcite-like compound) TiO₂ heterocompounds, which is the key factor in the oxidation of benzene.

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

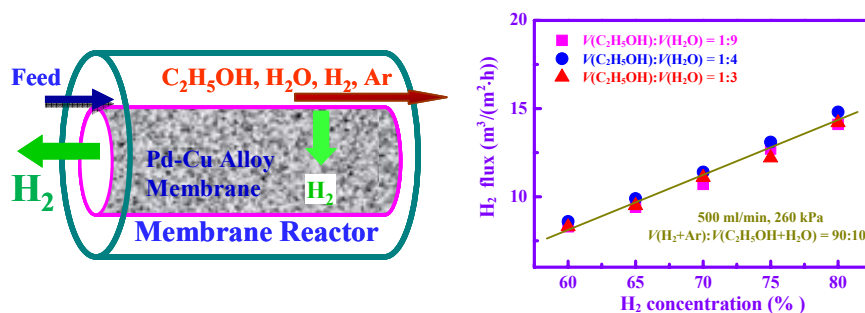


Carboxylation of 1,3-butadiene catalyzed by $\text{Pd}(\text{OAc})_2$ /(oxydi-2,1- phenylene)bis(diphenylphosphine) catalyst in the presence of CO and MeOH was carried out, reaching 90.4% conversion of 1,3-butadiene and 91.6% selectivity for methyl 3-pentenoate, while dimerization occurred at 200 °C 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.

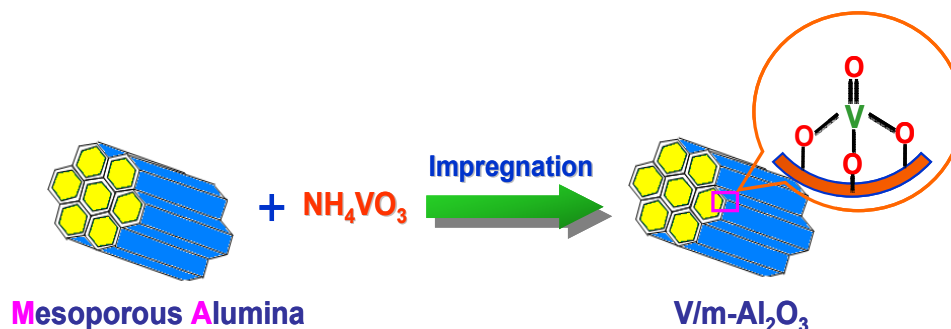


Pd-Cu alloy membrane exhibited good performance in a membrane reactor with H_2 -Ar- C_2H_5OH - H_2O modeling mixture for steam reforming of ethanol and showed potential application for pure hydrogen production from the reforming reaction.

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.

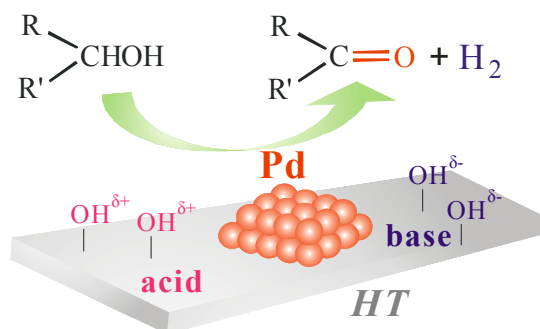
Oxidant-Free Dehydrogenation of Alcohols over Hydrotalcite-Supported Palladium Catalysts

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

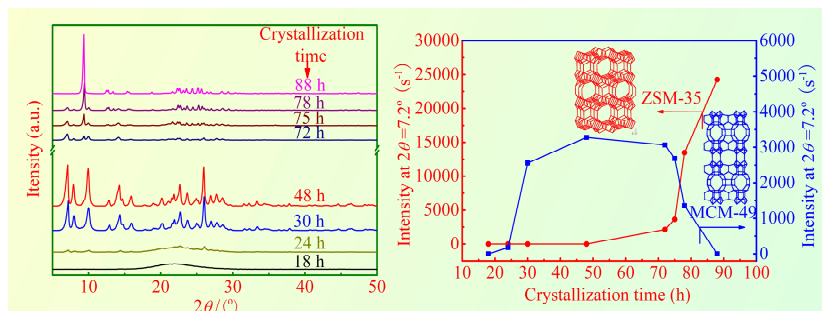
Pd nanoparticles supported on an acid-base bifunctional hydrotalcite are highly efficient and reusable catalysts for the oxidant-free dehydrogenation of various alcohols to carbonyl compounds.



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

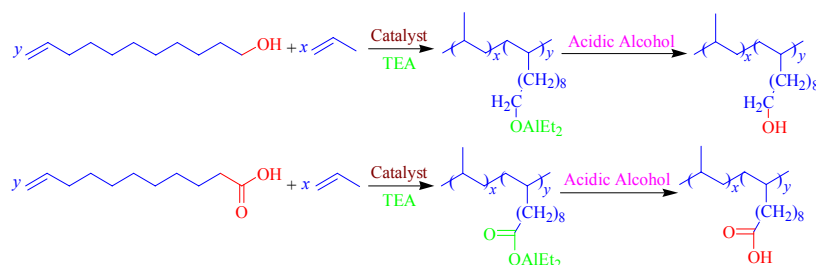


In a hexamethylenimine-cyclohexamine system, MCM-49 was obtained first, then MCM-49/ZSM-35 composite zeolites were gradually formed with increasing ZSM-35 content upon the crystallization time, and finally ZSM-35 was produced.

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

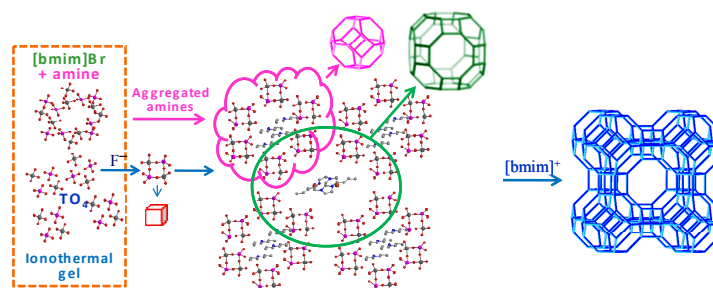


Using triethylaluminum as protection reagent to protect the active hydrogen on the polar group, copolymerization of propylene with polar monomer 10-undecen-1-ol and 10-undecenoic acid was performed with TiCl₄/MgCl₂/diether/Al(C₂H₅)₃ catalysis system.

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.