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催化学报

Chinese Journal of Catalysis

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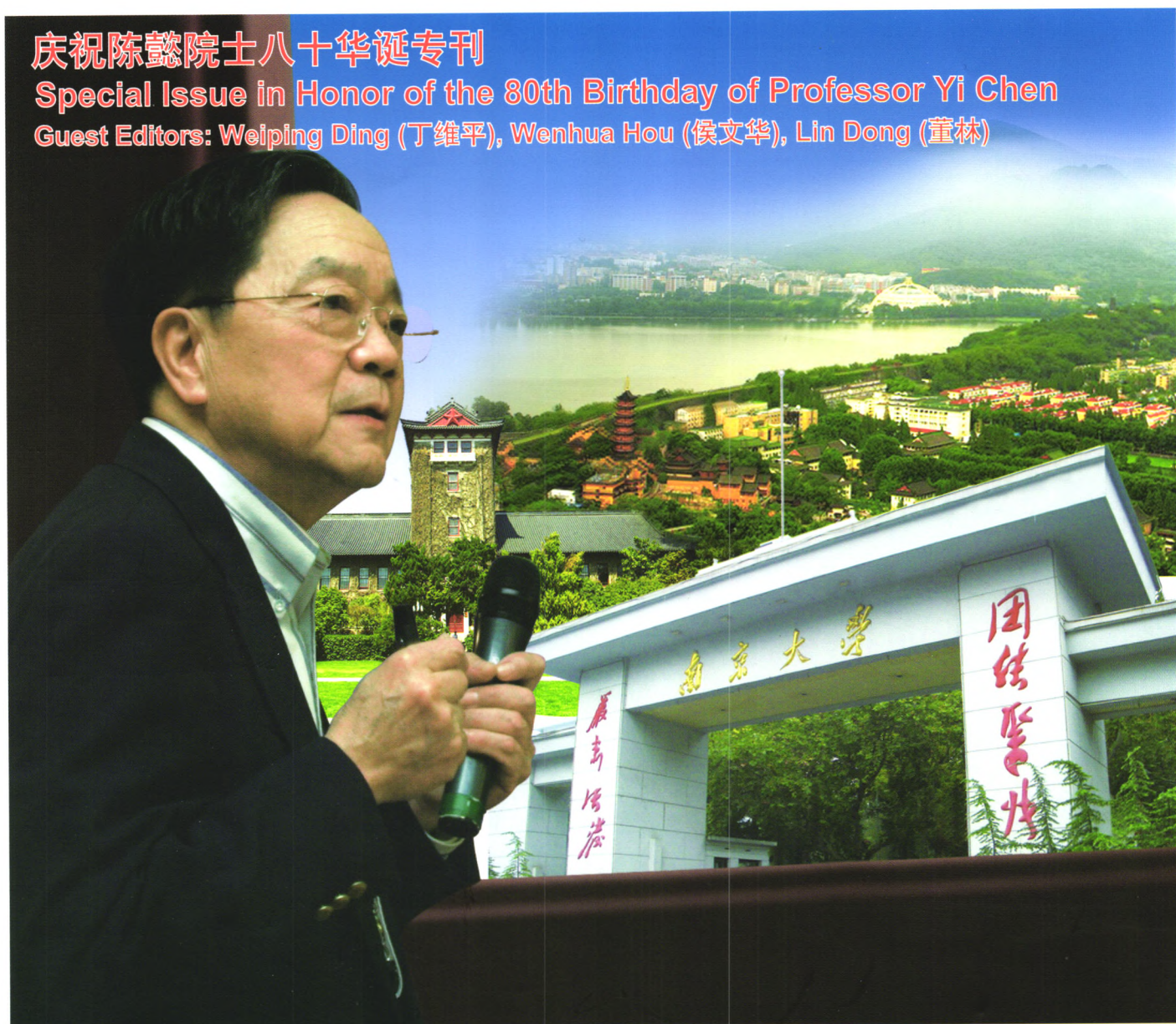
2013

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庆祝陈懿院士八十华诞专刊

Special Issue in Honor of the 80th Birthday of Professor Yi Chen

Guest Editors: Weiping Ding (丁维平), Wenhua Hou (侯文华), Lin Dong (董林)



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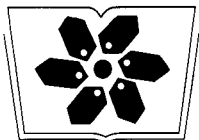


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(CUIHUA XUEBAO)

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客座主编: 丁维平, 侯文华, 董林

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1961 (前言/英/中)

《催化学报》以本期专刊的出版庆祝陈懿先生八十华诞

丁维平, 侯文华, 董林

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1964 (英)

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1975 (英)

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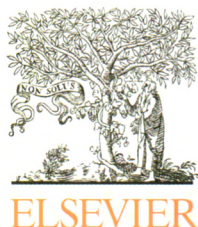
2153 (英)

HZSM-5 沸石中 Lewis 酸与 Brönsted 酸协同作用下的甲基环己烷开环反应
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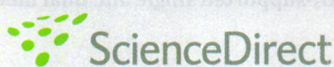
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Special Issue in Honor of the 80th Birthday of Professor Yi Chen

Guest Editors: Weiping Ding, Wenhua Hou, Lin Dong

Chinese Journal of Catalysis

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Editorial

Chin. J. Catal., 2013, 34: 1961–1963 doi: 10.1016/S1872-2067(12)60752-6

Preface to Special Issue of *Chinese Journal of Catalysis* in Honor of the 80th Birthday of Professor Yi Chen

Weiping Ding, Wenhua Hou, Lin Dong
Nanjing University



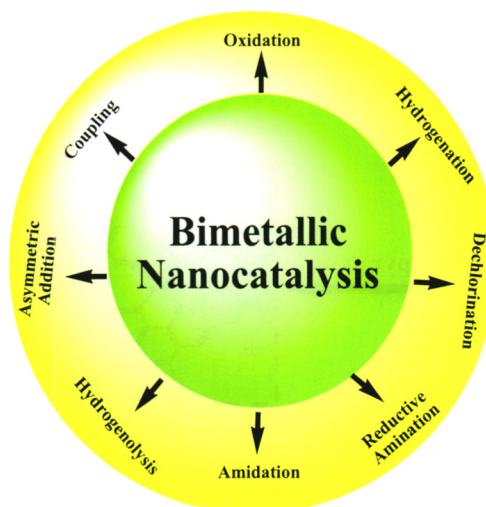
Reviews

Chin. J. Catal., 2013, 34: 1964–1974 doi: 10.1016/S1872-2067(12)60701-3

Progress in organic reactions catalyzed by bimetallic nanomaterials

Shuangfei Cai, Dingsheng Wang, Zhiqiang Niu, Yadong Li*
Tsinghua University;
National Center for Nanoscience and Technology

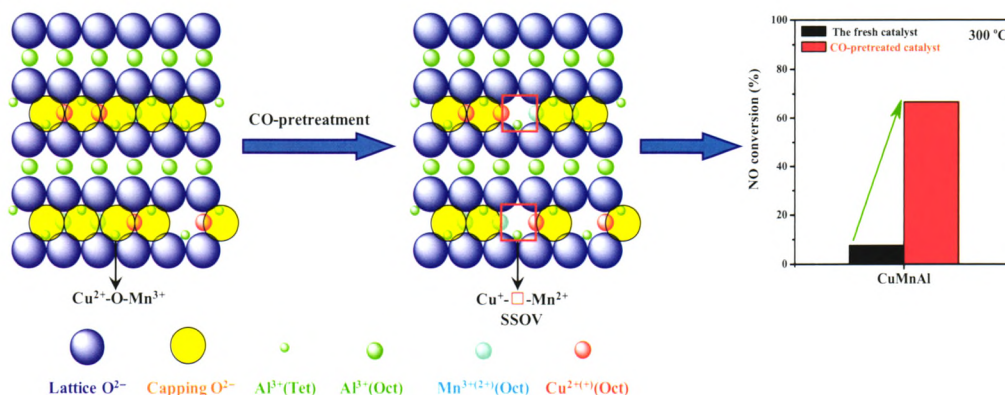
The interest in the bimetallic nanocatalysis is increasing dramatically. This review focuses on the progress in the organic reactions catalyzed by bimetallic nanomaterials.



Chin. J. Catal., 2013, 34: 1975–1985 doi: 10.1016/S1872-2067(12)60708-6

The application of incorporation model in γ - Al_2O_3 -supported single and dual metal oxide catalysts: A review

Xiaojiang Yao, Fei Gao, Lin Dong*
Nanjing University



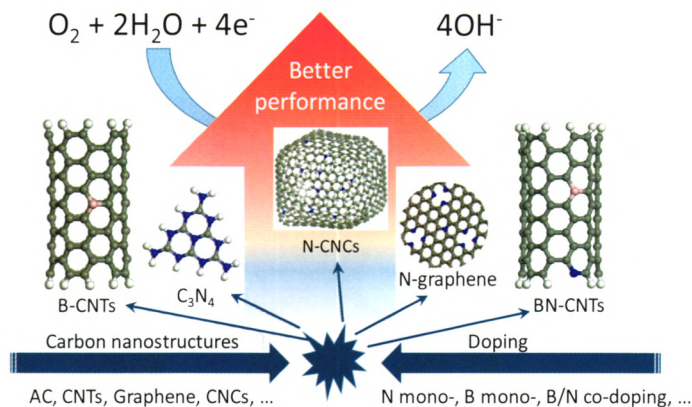
This review summarizes the research progress of the Incorporation Model in γ - Al_2O_3 -supported single and dual metal oxide catalysts for $\text{CO}+\text{O}_2$ and $\text{NO}+\text{CO}$ model reactions and proposes a reaction mechanism involving SSOV.

Chin. J. Catal., 2013, 34: 1986–1991 doi: 10.1016/S1872-2067(12)60713-X

A mini review on carbon-based metal-free electrocatalysts for oxygen reduction reaction

Lijun Yang, Yu Zhao, Shen Chen, Qiang Wu, Xizhang Wang,
Zheng Hu*
Nanjing University

Advanced metal-free carbon-based oxygen reduction reaction (ORR) electrocatalysts are reviewed in combination with updates from studies in our laboratory, and the correlation between ORR activity and the electronic structure of sp^2 carbon materials is highlighted.

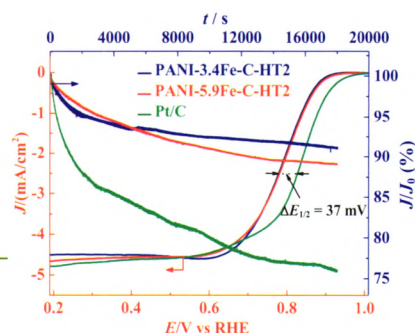
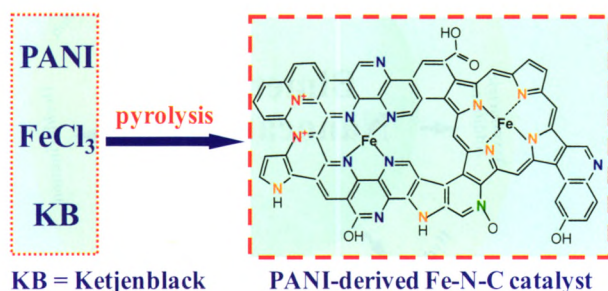


Communications

Chin. J. Catal., 2013, 34: 1992–1997 doi: 10.1016/S1872-2067(12)60714-1

Performance of polyaniline-derived Fe-N-C catalysts for oxygen reduction reaction in alkaline electrolyte

Xiang-Hui Yan, Gui-Rong Zhang, Bo-Qing Xu*
Tsinghua University



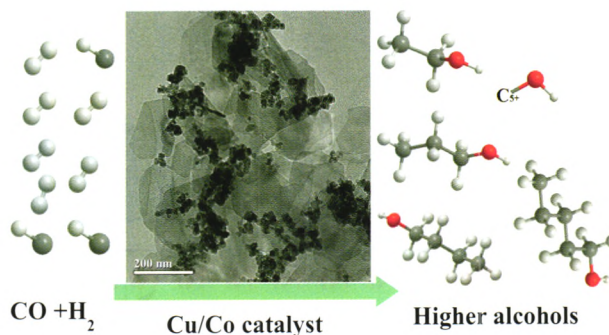
The onset and half-wave potentials of PANI-derived Fe-N-C catalysts are found close to conventional Pt/C catalyst for cathodic ORR in alkaline electrolyte; the Fe-N-C catalysts show even significantly higher stabilities.

Chin. J. Catal., 2013, 34: 1998–2003 doi: 10.1016/S1872-2067(12)60649-4

Cu nanoclusters supported on Co nanosheets for selective hydrogenation of CO

Dong Lü, Yan Zhu*, Yuhua Sun*

Shanghai Advanced Research Institute, Chinese Academy of Sciences



A catalyst consisting of Cu nanoclusters supported on Co nanosheets has a functional interface of Cu(111) surfaces and Co(100) surfaces and shows shape specificity in CO hydrogenation, enhancing selectivity for higher alcohols and decreasing that for methane.

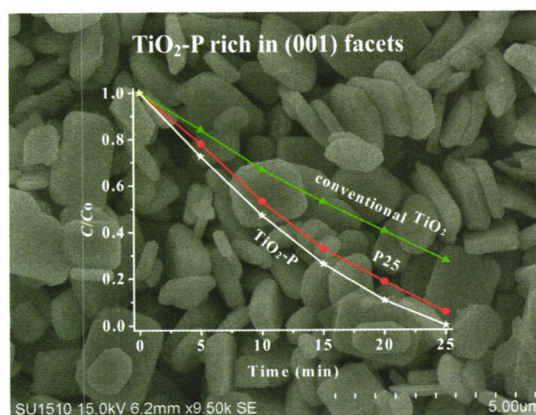
Chin. J. Catal., 2013, 34: 2004–2008 doi: 10.1016/S1872-2067(12)60679-2

Fluoride-free synthesis of anatase TiO₂ crystals rich in (001) facets in the presence of cationic polymer

Weiwei Chang, Yan Liu, Qi Sun, Xiangju Meng*, Feng-Shou Xiao*

Zhejiang University

Anatase TiO₂ crystals rich in (001) facets were successfully synthesized in the presence of a cationic polymer under fluoride-free conditions. The crystals had high photocatalytic activity and good recyclability.



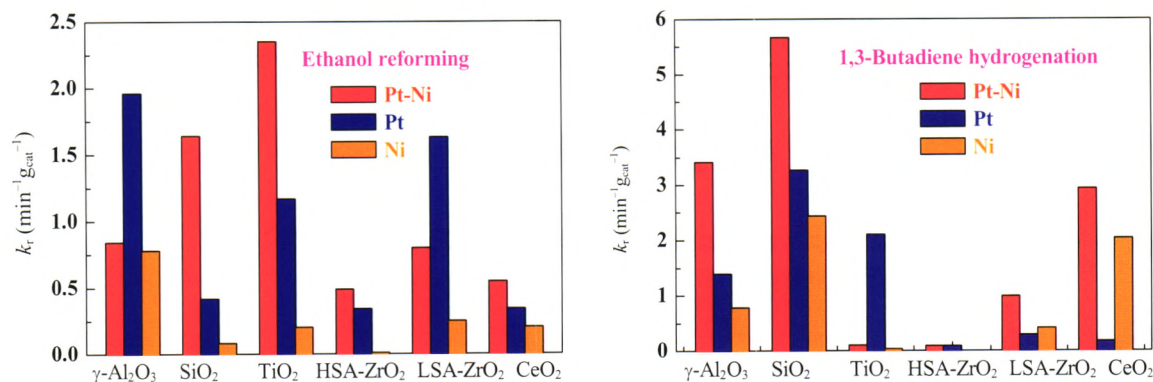
Articles

Chin. J. Catal., 2013, 34: 2009–2017 doi: 10.1016/S1872-2067(12)60715-3

Selection of oxide supports to anchor desirable bimetallic structures for ethanol reforming and 1,3-butadiene hydrogenation

Tiefeng Wang*, William Lonergan, Jingguang G. Chen*

Tsinghua University, China; University of Delaware, USA; Columbia University, USA



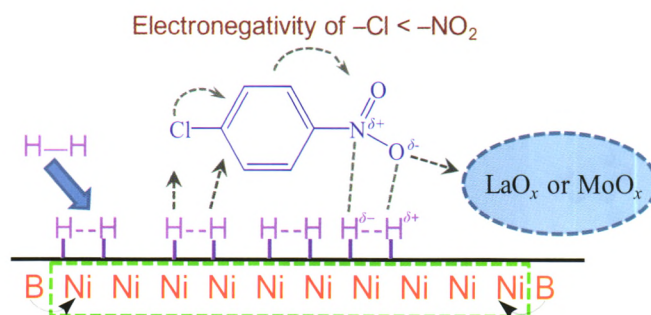
For ethanol reforming, the Pt-Ni bimetallic catalyst activity is in the order TiO₂ > SiO₂ > γ-Al₂O₃ ≈ LSA-ZrO₂ > CeO₂ > HSA-ZrO₂; while for 1,3-butadiene hydrogenation, the activity follows the trend of SiO₂ > CeO₂ > γ-Al₂O₃ > LSA-ZrO₂ > HSA-ZrO₂ ≈ TiO₂.

Chin. J. Catal., 2013, 34: 2018–2028 doi: 10.1016/S1872-2067(12)60687-1

Hydrogenation of *p*-chloronitrobenzene on La-doped NiMoB nanocluster catalysts

Der-Shing Lee, Yu-Wen Chen*

National Central University, Taiwan, China



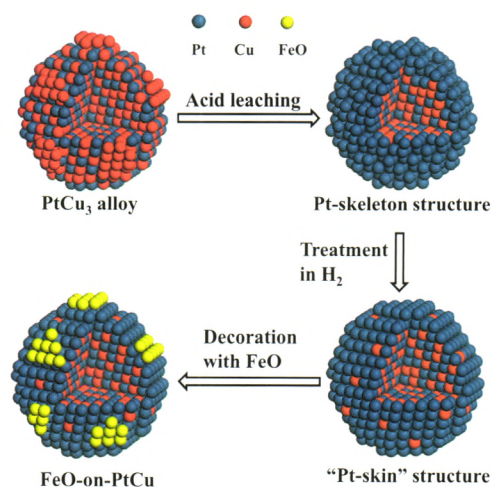
A series of La-Mo-doped, nanosized NiMoB catalysts with various La contents were prepared and characterized. Doping of La had a positive effect on the NiMoB catalyst properties and activity in the hydrogenation of *p*-chloronitrobenzene.

Chin. J. Catal., 2013, 34: 2029–2035 doi: 10.1016/S1872-2067(12)60673-1

Nanosized FeO_x overlayers on Pt-skin surfaces for low temperature CO oxidation

Hong Xu, Qiang Fu*, Xinhe Bao*

Dalian Institute of Chemical Physics, Chinese Academy of Sciences



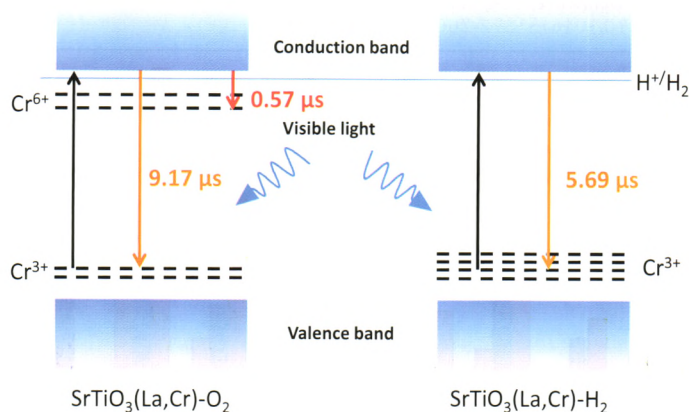
The structural transformation of Pt-Cu catalysts upon reduction-leaching treatment is reported. Pt skin surfaces decorated with surface FeO_x nanostructures exhibit enhanced reactivity in CO preferential oxidation and use less Pt than Pt-Fe catalysts.

Chin. J. Catal., 2013, 34: 2036–2040 doi: 10.1016/S1872-2067(12)60702-5

Time-resolved infrared spectroscopic investigation of roles of valence states of Cr in (La,Cr)-doped SrTiO₃ photocatalysts

Shuai Shen, Yushuai Jia, Fengtao Fan, Zhaochi Feng*, Can Li*

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



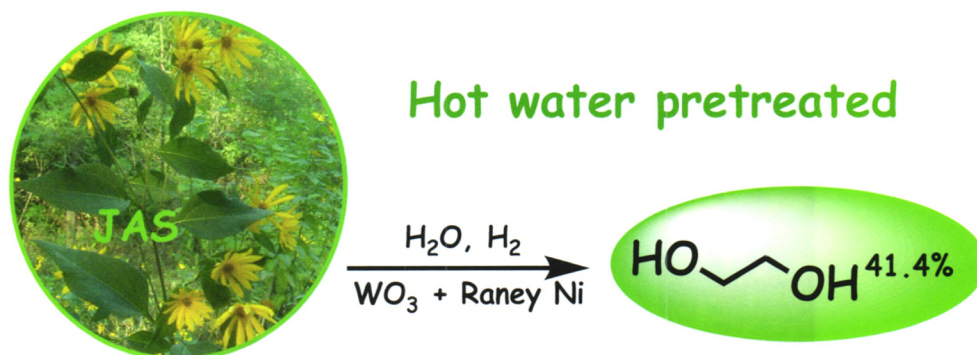
The Cr valence state plays an important role in H₂ production under irradiation in the visible light region. Electrons are quickly trapped by Cr⁶⁺ ions and cannot contribute to H₂ production.

Chin. J. Catal., 2013, 34: 2041–2046 doi: 10.1016/S1872-2067(12)60686-X

Catalytic conversion of Jerusalem artichoke stalk to ethylene glycol over a combined catalyst of WO_3 and Raney Ni

Likun Zhou, Jifeng Pang, Aiqin Wang, Tao Zhang*

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



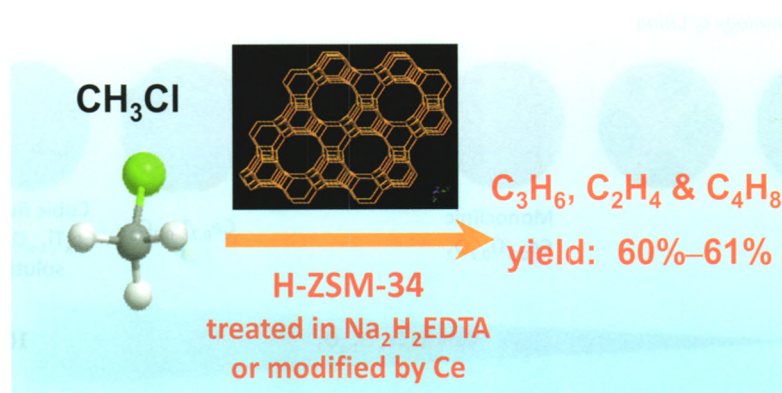
Over the combined catalyst of WO_3 and Raney Ni hot water-treated Jerusalem artichoke stalk (JAS) was selectively converted into ethylene glycol with a yield of 41.4%.

Chin. J. Catal., 2013, 34: 2047–2056 doi: 10.1016/S1872-2067(12)60681-0

Catalytic conversion of methyl chloride to lower olefins over modified H-ZSM-34

Ting Xu, Hang Song, Weiping Deng*, Qinghong Zhang, Ye Wang*

Xiamen University



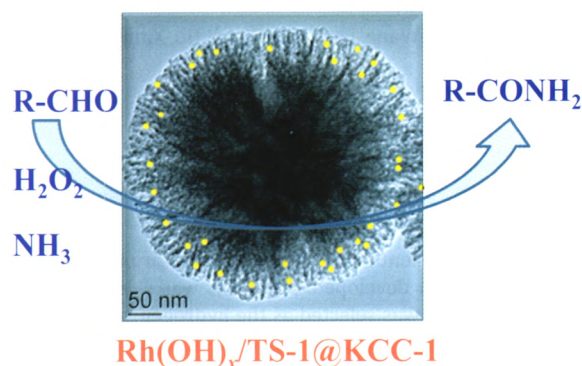
H-ZSM-34 was an efficient catalyst for the conversion of methyl chloride to lower olefins. The treatment of H-ZSM-34 with $\text{Na}_2\text{H}_2\text{EDTA}$ or modification with Ce further enhanced the lower olefin yield to 60%–61%.

Chin. J. Catal., 2013, 34: 2057–2065 doi: 10.1016/S1872-2067(12)60670-6

One-pot synthesis of primary amides on bifunctional $\text{Rh}(\text{OH})_x/\text{TS-1}@KCC-1$ catalysts

Honggen Peng, Darui Wang, Le Xu, Peng Wu*

East China Normal University

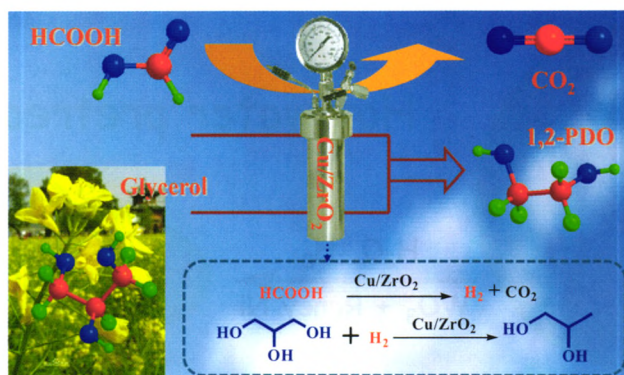


A novel bifunctional tandem catalyst for the one-pot synthesis of primary amides directly from aldehydes, ammonia, and hydrogen peroxide was synthesized.

Chin. J. Catal., 2013, 34: 2066–2074 doi: 10.1016/S1872-2067(12)60656-1

Efficient catalytic hydrogenolysis of glycerol using formic acid as hydrogen source

Jing Yuan, Shushuang Li, Lei Yu, Yongmei Liu, Yong Cao*
Fudan University

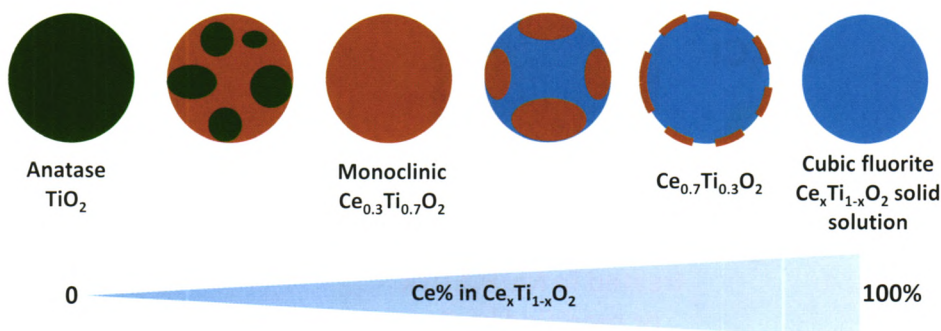


Biorenewable formic acid as a convenient H₂ source and cheap and earth-abundant Cu-based catalysts can be used for the facile conversion of glycerol to 1,2-propanediol (PDO). The present findings form the basis of cost-competitive production of 1,2-PDO from glycerol and the development of new sustainable, affordable processes for the targeted conversion of bio-derived feedstock, with minimum use of external fossil-fuel-based H₂ sources.

Chin. J. Catal., 2013, 34: 2075–2083 doi: 10.1016/S1872-2067(12)60667-6

Evolution of surface and bulk structures of Ce_xTi_{1-x}O₂ oxide composites

Jun Fang, Fucheng Shi, Huizhi Bao, Kun Qian, Zhiquan Jiang, Weixin Huang*
University of Science and Technology of China



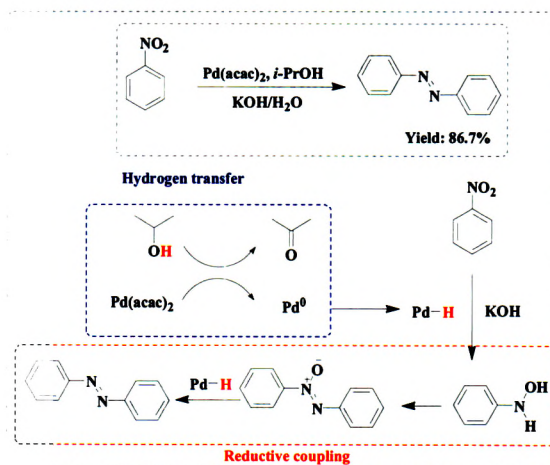
The cubic fluorite solid solution-to-monoclinic Ce_{0.3}Ti_{0.7}O₂ phase transition initially occurs on the outmost surface of a cubic fluorite Ce_{0.7}Ti_{0.3}O₂ solid solution and then grows from the surface to the bulk.

Chin. J. Catal., 2013, 34: 2084–2088 doi: 10.1016/S1872-2067(12)60665-2

Synthesis of in-situ surfactant-free Pd nanoparticle catalysts for the synthesis of aromatic azo compounds and for unsaturated bond hydrogenation by hydrogen transfer

Xin Wang, Jiaqing Wang, Fenqiang Qi, Lei Hu, Xinming Li, Xueqin Cao,
Hongwei Gu*
Soochow University

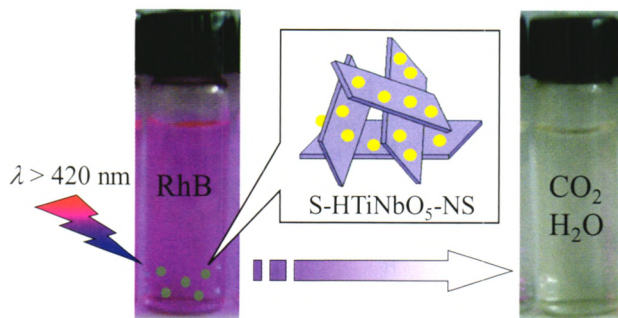
A simple and efficient method to synthesize aromatic azos by hydrogen transfer has been developed. Pd(acac)₂ was selected as a catalyst and isopropyl alcohol was selected as the hydrogen source. This system also works well for the hydrogenation of unsaturated compounds containing a carbonyl group or C=C bond with yields up to ~97%.



Chin. J. Catal., 2013, 34: 2089–2097 doi: 10.1016/S1872-2067(12)60692-5

S-doped HTiNbO₅ nanosheets: A novel efficient visible-light photocatalyst

Lihong Zhang, Chenhui Hu, Liyuan Cheng, Weiping Ding, Wenhua Hou*, Jing Chen*
Nanjing University; Nanjing University of Technology

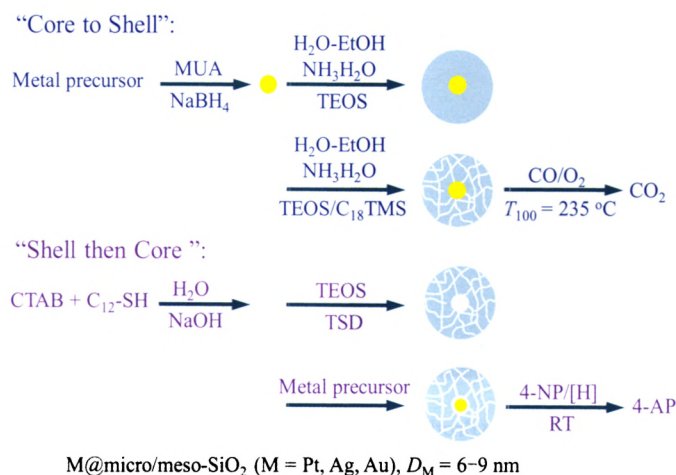


S-doped HTiNbO₅ nanosheets have increased surface area and clear visible-light absorption. These catalysts showed a high visible-light photodegradation rate and a relatively high mineralization degree of 41%, indicating that S doping can effectively improve the photocatalytic activity of nanosheets.

Chin. J. Catal., 2013, 34: 2098–2109 doi: 10.1016/S1872-2067(12)60716-5

Synthesis and catalytic activity of M@SiO₂ (M = Ag, Au, and Pt) nanostructures via “core to shell” and “shell then core” approaches

Shengchao He, Zhaoyang Fei, Lei Li, Bo Sun, Xinzhen Feng, Weijie Ji*
Nanjing University



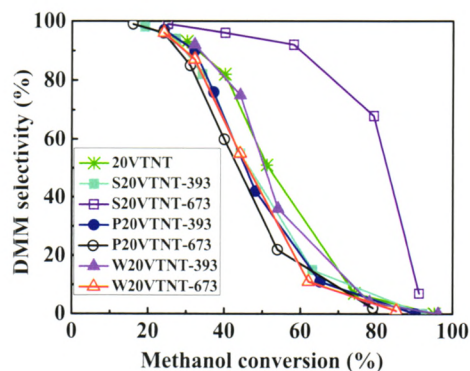
“Core to shell” and “shell then core” approaches were used to prepare 6–9 nm diameter M@SiO₂ (M = Ag, Au and Pt) with tunable shell porosity for catalytic reactions.

Chin. J. Catal., 2013, 34: 2110–2117 doi: 10.1016/S1872-2067(12)60690-1

Effect of acidic promoters on the titania-nanotubes supported V₂O₅ catalysts for the selective oxidation of methanol to dimethoxymethane

Jingxuan Cai, Yuchuan Fu*, Qing Sun, Minhui Jia, Jianyi Shen*
Nanjing University

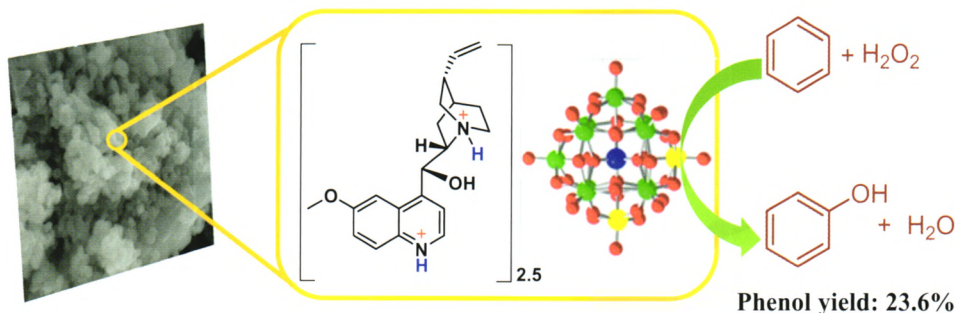
Addition of sulfate groups followed by calcination at 673 K strengthened the surface acidity of V₂O₅/TiO₂ and thus promoted the selectivity to dimethoxymethane at the high methanol conversions, while the addition of phosphoric and phosphotungstic acids in any case or the addition of sulfate groups without a high temperature calcination had the negative effect because they decreased either the surface acidity or redox ability of V₂O₅/TiO₂.



Chin. J. Catal., 2013, 34: 2118–2124 doi: 10.1016/S1872-2067(12)60631-7

Direct hydroxylation of benzene to phenol with hydrogen peroxide catalyzed by a quinine-heteropolyacid hybrid

Pingping Zhao, Yu Zhou, Yangqing Liu, Jun Wang*
Nanjing University of Technology

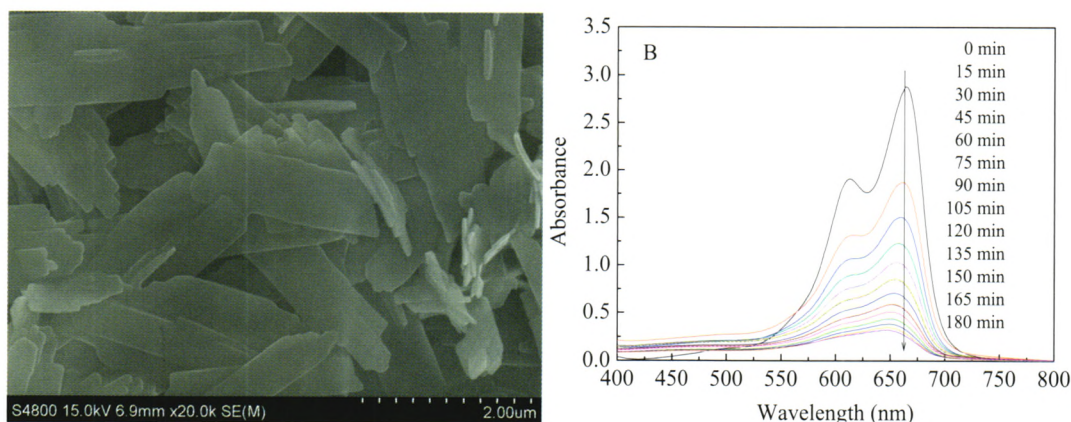


A quinine-modified phosphovanadomolybdate hybrid is developed as a heterogeneous catalyst for hydroxylation of benzene. The redox properties of the heteropolyanion are improved by quinine, accounting for its excellent catalytic performance.

Chin. J. Catal., 2013, 34: 2125–2129 doi: 10.1016/S1872-2067(12)60717-7

Degradation of methylene blue with H₂O₂ over a cupric oxide nanosheet catalyst

Maiyong Zhu, Dehai Meng, Chengjiao Wang, Jian Di, Guowang Diao*
Yangzhou University; Jiangsu University



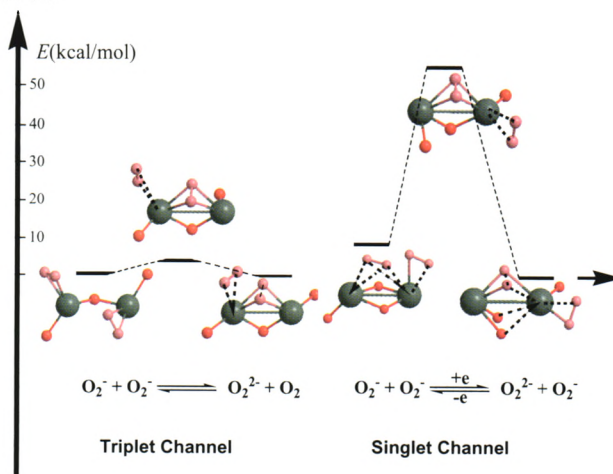
Cupric oxide (CuO) nanosheets were prepared by a hydrothermal method. The degradation of methylene blue using H₂O₂ as the oxidant over the CuO nanosheets was investigated.

Chin. J. Catal., 2013, 34: 2130–2137 doi: 10.1016/S1872-2067(12)60694-9

Pathways between superoxide and peroxide species on small La-O clusters

Wensheng Xia*, Da Zhang, Weizheng Weng, Huilin Wan*
Xiamen University

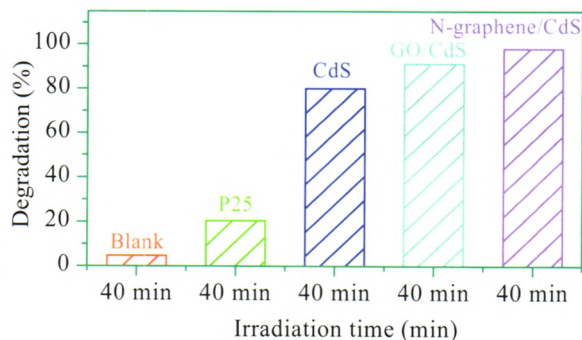
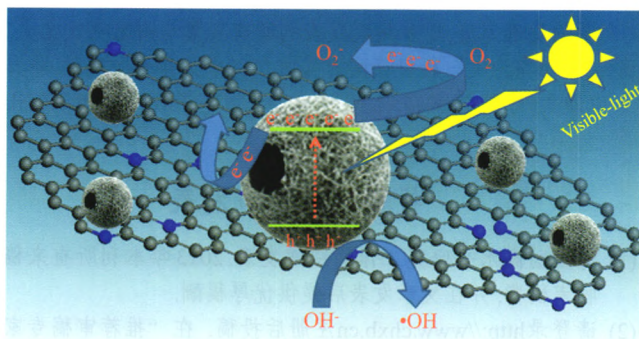
Superoxide species over La-O clusters are in rapid exchange with peroxide species in the triplet channel while superoxide and peroxide species are both relatively stable in the singlet channel.



Chin. J. Catal., 2013, 34: 2138–2145 doi: 10.1016/S1872-2067(12)60641-X

Nitrogen-doped graphene/CdS hollow spheres nanocomposite with enhanced photocatalytic performance

Qian Mi, Daiquan Chen, Juncheng Hu*, Zhengxi Huang*, Jinlin Li*
South-Central University for Nationalities

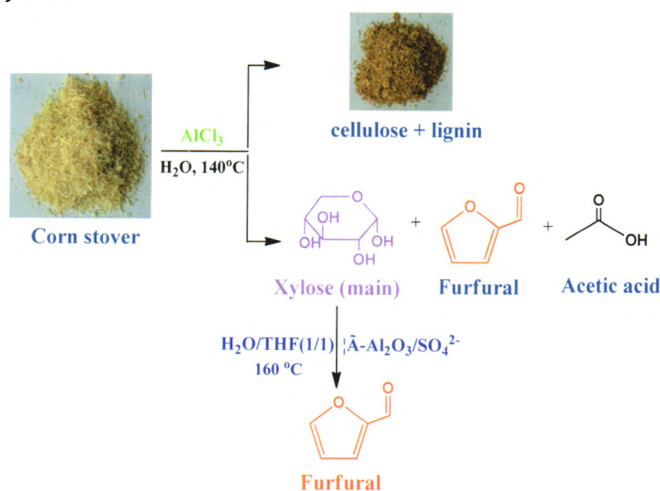


A nitrogen-doped graphene/CdS hollow sphere nanocomposite (HSN) was synthesized by a simple, template-free one-pot method. The N-graphene acted as an electron transfer channel to reduce the recombination of photogenerated electron-holes, which led to dramatically enhanced photoactivity and stability.

Chin. J. Catal., 2013, 34: 2146–2152 doi: 10.1016/S1872-2067(12)60718-9

AlCl₃ catalyzed conversion of hemicellulose in corn stover

Jian Yi, Ting He, Zhicheng Jiang, Jianmei Li*, Changwei Hu*
Sichuan University

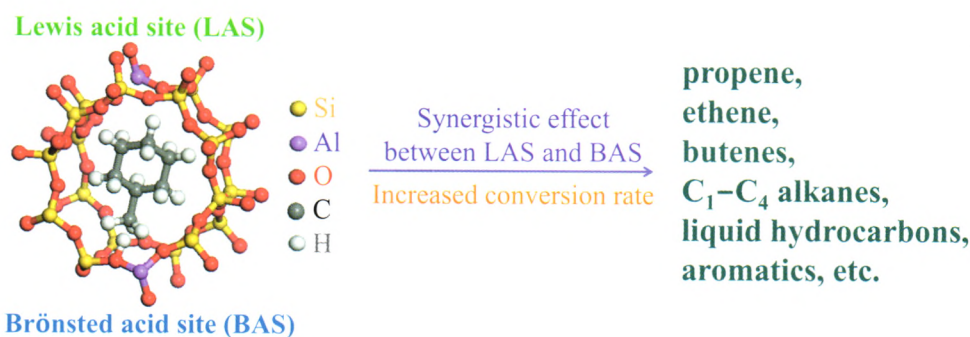


The selective conversion of the hemicellulose in corn stover was achieved using AlCl₃ as the catalyst under hydrothermal conditions. γ -Al₂O₃/SO₄²⁻ efficiently catalyzed the formation of furfural in a H₂O/THF system used for the further reaction of the filtrate.

Chin. J. Catal., 2013, 34: 2153–2159 doi: 10.1016/S1872-2067(12)60721-9

Synergism between the Lewis and Brönsted acid sites on HZSM-5 zeolites in the conversion of methylcyclohexane

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A synergistic effect between Lewis and Brönsted acid sites in steamed HZSM-5 zeolites accelerated the conversion and cracking rate of methylcyclohexane conversion.