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Special Issue in Memory of the 80th Birthday of Professor Jingfa Deng

Guest Editors: Kangnian Fan (范康年), Xinhe Bao (包信和), Guoqin Xu (许国勤)

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Guest Editors: Kangnian Fan, Xinhe Bao, Guoqin Xu

Graphical Abstract

Editorials

Chin. J. Catal., 2013, 34: 817–819 doi: 10.1016/S1872-2067(12)60593-2

Preface to Special Issue of *Chinese Journal of Catalysis* in Memory of the 80th Birthday of Professor Jingfa Deng

FAN Kangnian, BAO Xinhe, XU Guoqin (Guest Editors)
Fudan University, China; Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China; National University of Singapore, Singapore



Chin. J. Catal., 2013, 34: 820–827 doi: 10.1016/S1872-2067(12)60594-4

Brief biography of Jingfa Deng

QIAO Minghua, XU Guoqin, FAN Kangnian *
Fudan University, China;
National University of Singapore, Singapore

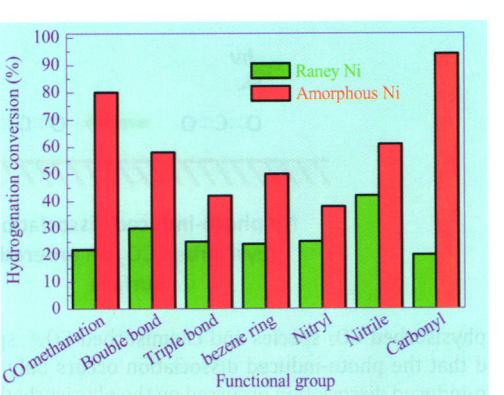
Reviews

Chin. J. Catal., 2013, 34: 828–837 doi: 10.1016/S1872-2067(11)60486-5

Research, development, and application of amorphous nickel alloy catalysts prepared by melt-quenching

ZONG Baoning *, MU Xuhong, ZHANG Xiaoxin, MENG Xiangkun, QIAO Minghua
Research Institute of Petroleum Processing;
Fudan University

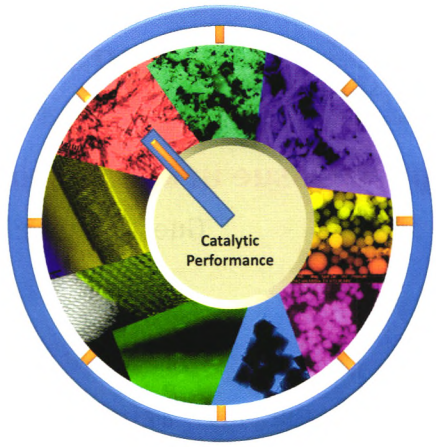
Transforming crystalline Raney Ni into an amorphous structure by the application of a melt-quenching technique can significantly enhance the material's catalysis of hydrogenation reactions.



Chin. J. Catal., 2013, 34: 838–850 doi: 10.1016/S1872-2067(12)60573-7

Tuning the shape of ceria nanomaterials for catalytic applications

TA Na, LIU (Jimmy) Jingyue*, SHEN Wenjie*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China;
Arizona State University, USA



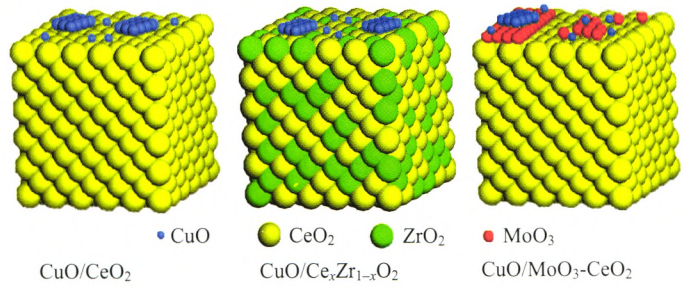
The catalytic performance of CeO_2 materials can be adjusted via tuning their shape at nanometer level by exposing different crystal planes, which influences both reaction pathway and metal-support interaction.

Chin. J. Catal., 2013, 34: 851–864 doi: 10.1016/S1872-2067(12)60592-0

Interactions among supported copper-based catalyst components and their effects on performance: A review

DONG Lin*, YAO Xiaojiang, CHEN Yi
Nanjing University

This review summarizes the relationships among the compositions, structures and properties of the copper-based catalysts CuO/CeO_2, $CuO/Ce_xZr_{1-x}O_2$, and CuO/MoO_3-CeO_2 when applied to model reactions involving the oxidation of CO or the selective catalytic reduction of NO by CO/NH_3.

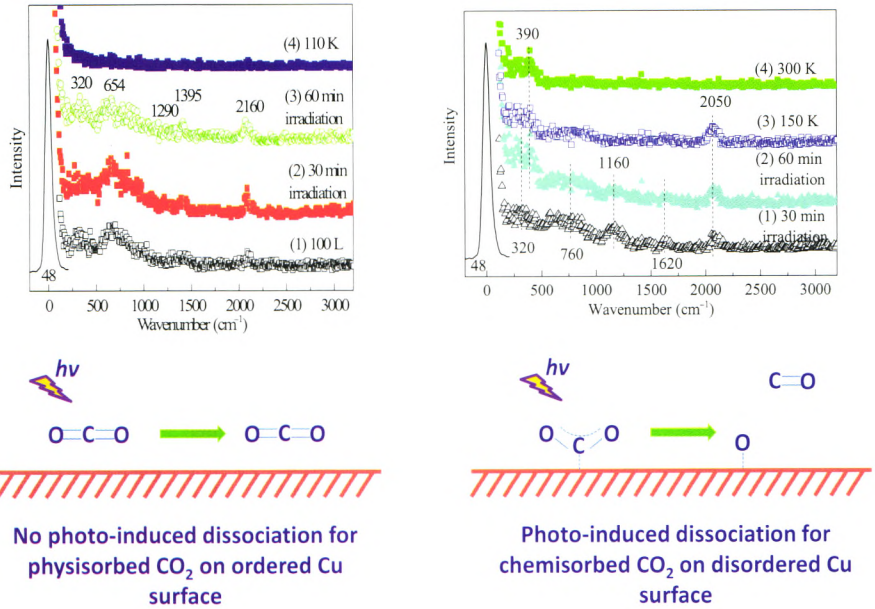


Communications

Chin. J. Catal., 2013, 34: 865–870 doi: 10.1016/S1872-2067(12)60538-5

Effect of photon irradiation on the adsorption of CO_2 on polycrystalline Cu

WANG Shuai, XU Guoqin*
Xinjiang Normal University, China;
National University of Singapore, Singapore

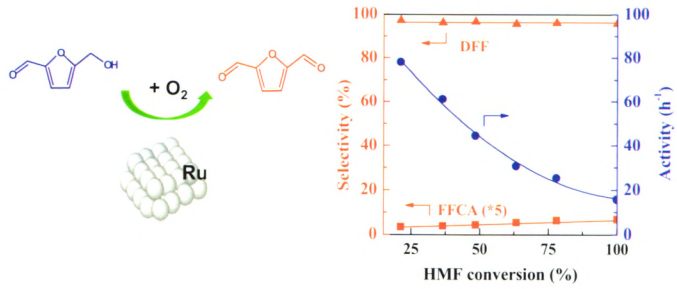


The physisorbed CO_2 species and chemisorbed $CO_2^{\delta-}$ species are routinely isolated on the ordered and disordered Cu surfaces. It was found that the photo-induced dissociation occurs only on the chemisorbed species by the 193 nm laser irradiation; while there is no photo-induced dissociation occurred on the physisorbed species.

Chin. J. Catal., 2013, 34: 871–875 doi: 10.1016/S1872-2067(12)60551-8

Activated carbon-supported ruthenium as an efficient catalyst for selective aerobic oxidation of 5-hydroxymethylfurfural to 2,5-diformylfuran

NIE Junfang, XIE Jiahan, LIU Haichao*
Peking University



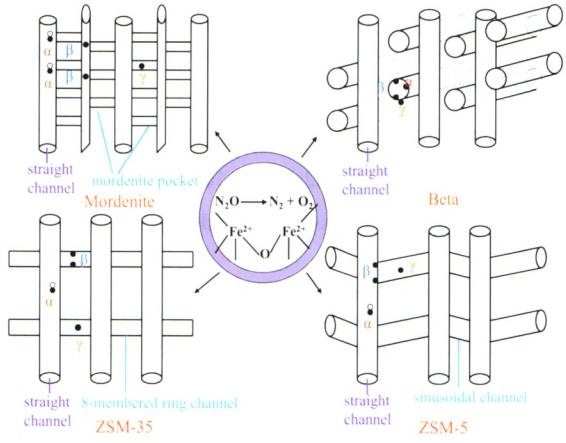
Ru/C is an effective and recyclable catalyst in the aerobic oxidation of 5-hydroxymethylfurfural (HMF) to 2,5-diformylfuran (DFF), affording a high DFF yield of 95.8% in toluene.

Articles

Chin. J. Catal., 2013, 34: 876–888 doi: 10.1016/S1872-2067(12)60555-5

Catalytic performance of different types of iron zeolites in N_2O decomposition

WANG Junying, XIA Haian, JU Xiaohua, FAN Fengtao, FENG Zhaochi, LI Can*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences; Graduate University of Chinese Academy of Sciences

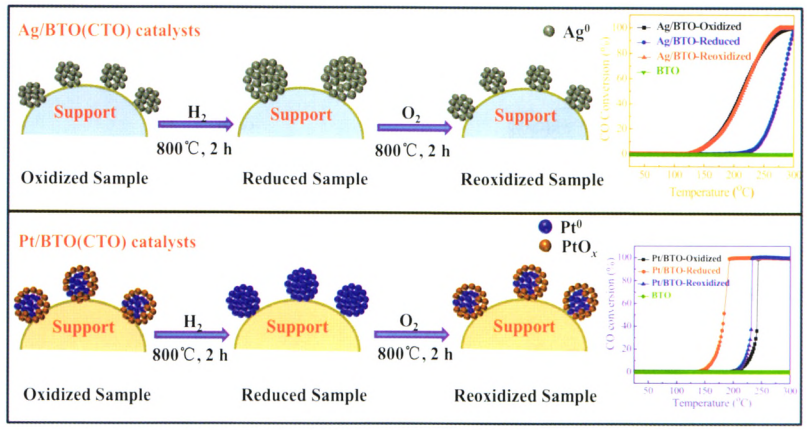


The influence of zeolite frameworks on the catalytic properties of Fe/zeolites in N_2O decomposition was investigated using a combination of UV-Vis diffuse reflectance, in-situ FT-IR, and in-situ visible Raman spectroscopic techniques with a transient response method.

Chin. J. Catal., 2013, 34: 889–897 doi: 10.1016/S1872-2067(12)60581-6

Dynamic structural changes of perovskite-supported metal catalysts during cyclic redox treatments and effect on catalytic CO oxidation

GAO Kang, Wei Mingming, QU Zhenping*, FU Qiang*, BAO Xinhe
Dalian University of Technology; Dalian Institute of Chemical Physics, Chinese Academy of Sciences



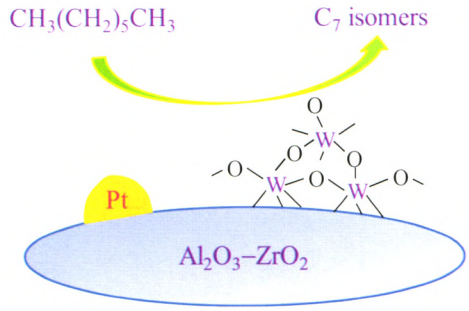
Perovskite-supported Ag and Pt catalysts show reversible structural changes and oxidation catalysis performance during cyclic oxidation and reduction treatments. Supported Ag catalysts show better performance after oxidation treatment, whereas supported Pt catalysts have enhanced activity after reduction treatment.

Chin. J. Catal., 2013, 34: 898–905 doi: 10.1016/S1872-2067(12)60540-3

Influence of preparative method on Al_2O_3-doped Pt/WO_3-ZrO_2 catalyst for *n*-heptane isomerization

SHANG Shuning, XU Xin, XIE Pengfei, YUE Yinghong, HUA Weiming*, GAO Zi*
Fudan University

An Al_2O_3-doped Pt/WO_3/ZrO_2 catalyst prepared using a constant pH method exhibited significantly higher activity in *n*-heptane hydroisomerization than did the corresponding catalyst prepared using a variable pH method. This was because more Brönsted acid sites were generated on the former catalyst in the presence of H_2.

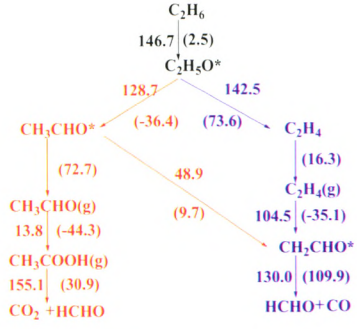


Chin. J. Catal., 2013, 34: 906–910 doi: 10.1016/S1872-2067(11)60523-8

Periodic DFT study of the deep oxidation in the oxidative dehydrogenation of ethane over V_2O_5 (001)

DAI Guoliang, LI Zhenhua, WANG Wenning, LIU Jing, FAN Kangnian*
Fudan University;
Huazhong University of Science and Technology

In ethane ODH over V_2O_5 (001), acetaldehyde formation is the main side reaction, and it can be further easily oxidized to acetic acid. CO_x mainly comes from the oxidation of acetaldehyde.

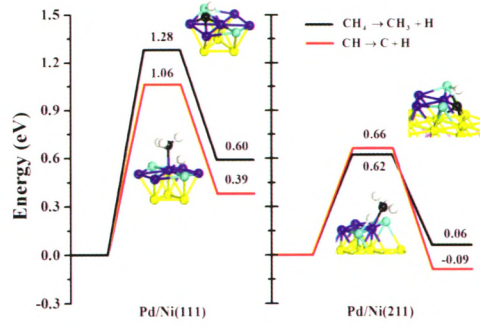


Chin. J. Catal., 2013, 34: 911–922 doi: 10.1016/S1872-2067(12)60565-8

Theoretical study on the dissociative adsorption of CH_4 on Pd-doped Ni surfaces

ZHAO Yonghui, LI Shenggang*, SUN Yuhan
Shanghai Advanced Research Institute, Chinese Academy of Sciences;
Institute of Coal Chemistry, Chinese Academy of Sciences

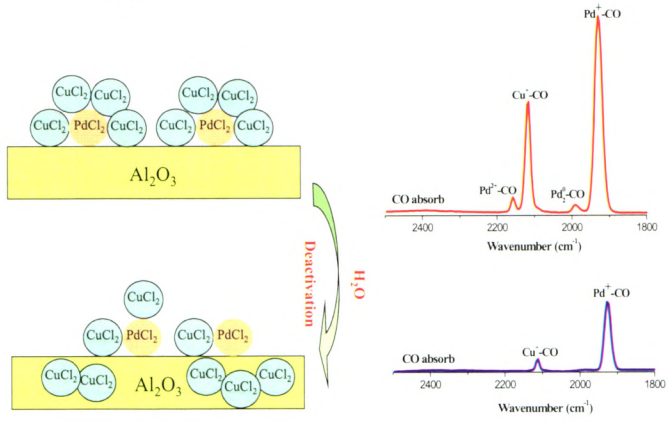
Periodic density functional theory calculations show that CH_4 and CH dissociate predominately on the Pd/Ni(211) step surface rather than the closely packed Pd/Ni(111) surface. For the most active Ni(211) surface, Pd-doping causes CH dissociation to have a higher activation barrier than CH_4 dissociation, which changes the rate limiting step, and helps reduce carbon deposition.



Chin. J. Catal., 2013, 34: 923–931 doi: 10.1016/S1872-2067(12)60556-7

Deactivation mechanism of $PdCl_2$-$CuCl_2$/Al_2O_3 catalyst for CO oxidation at low temperatures

FENG Yafen, WANG Li, ZHANG Yanhui, GUO Yun*, GUO Yanglong, LU Guanzhong
East China University of Science and Technology

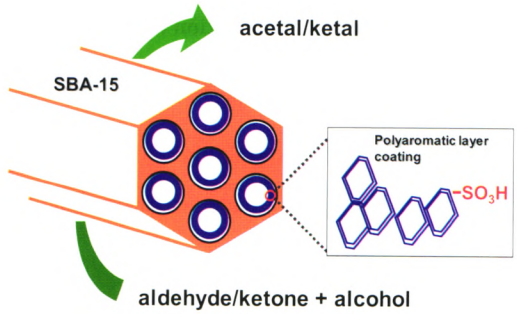


The transfer of Cu species to the internal pores of the support in the presence of water weakens the Pd and Cu species interactions, which causes catalyst deactivation.

Chin. J. Catal., 2013, 34: 932–941 doi: 10.1016/S1872-2067(12)60591-9

Carbon-coated mesoporous silica functionalized with sulfonic acid groups and its application to acetalization

FANG Lin, ZHANG Kun*, CHEN Lu, WU Peng*
East China Normal University

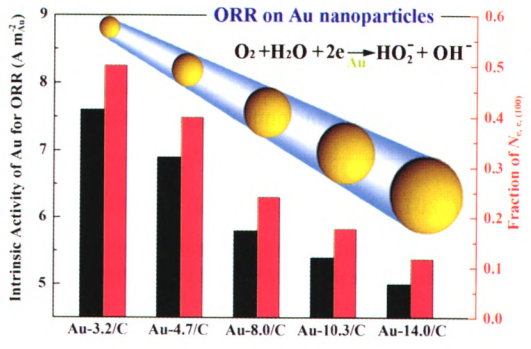


Polycyclic carbon-coated SBA-15 serves as a stable solid acid catalyst after sulfonation, and is efficient during acetalization of aldehydes/ketones with alcohol because of its high surface area and abundant Brönsted acid sites.

Chin. J. Catal., 2013, 34: 942–948 doi: 10.1016/S1872-2067(12)60546-4

Nano-size effect of Au catalyst for electrochemical reduction of oxygen in alkaline electrolyte

ZHANG Gui-Rong, XU Bo-Qing*
Tsinghua University

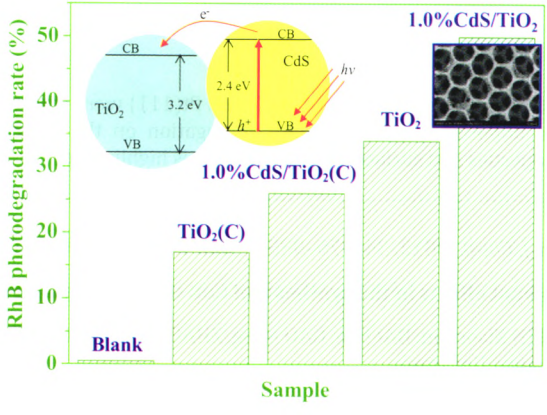


This work provides a clear demonstration of the structure-sensitive nature of Au for oxgen reduction reaction (ORR) in alkaline electrolyte using a series of nearly monodisperse Au nanoparticles, with their particle sizes varied in the range of 3 to 14 nm using PVP as the only stabilizer.

Chin. J. Catal., 2013, 34: 949–955 doi: 10.1016/S1872-2067(12)60560-9

Preparation and visible light catalytic activity of three-dimensional ordered macroporous CdS/TiO_2 films

CHEN Xiaofang, ZHANG Jia, HUO Yuning*, LI Hexing*
Shanghai Normal University

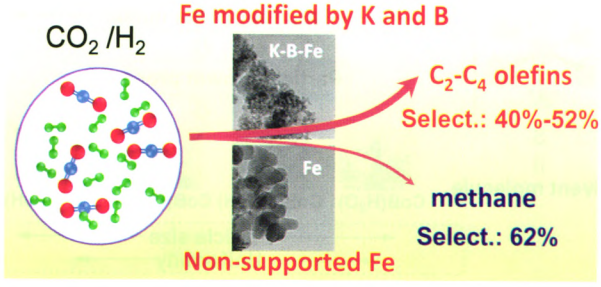


Three-dimensional ordered macroporous CdS/TiO_2 films prepared by the sol-gel method with a colloidal crystal template and S^{2-} ion exchange exhibited improved visible light photocatalytic activity due to improved light utilization and CdS photosensitization.

Chin. J. Catal., 2013, 34: 956–963 doi: 10.1016/S1872-2067(12)60559-2

Hydrogenation of carbon dioxide to light olefins over non-supported iron catalyst

YOU Zhenya, DENG Weiping, ZHANG Qinghong, WANG Ye*
Xiamen University

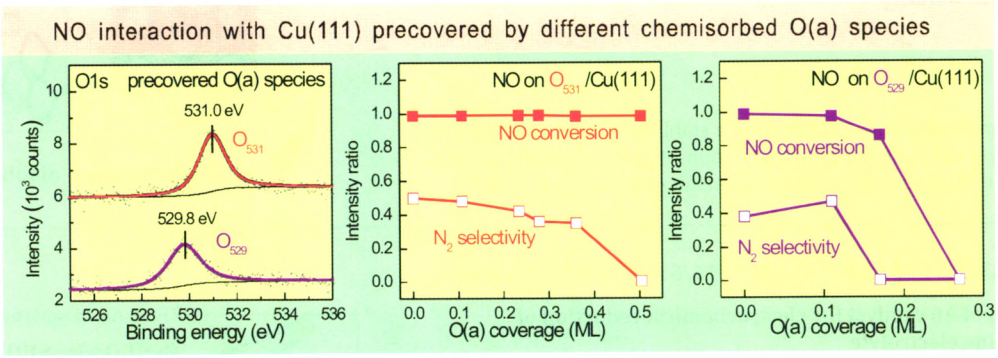


The modification of a non-supported Fe catalyst by alkali metal ions, particularly K^+, in combination with a small amount of B, significantly enhanced the hydrogenation of CO_2 to light olefins.

Chin. J. Catal., 2013, 34: 964–972 doi: 10.1016/S1872-2067(12)60585-3

XPS and TPD study of NO interaction with Cu(111): Role of different oxygen species

CHEN Bohao, MA Yunsheng*, DING Liangbing, XU Lingshun, WU Zongfang, YUAN Qing, HUANG Weixin*
University of Science and Technology of China

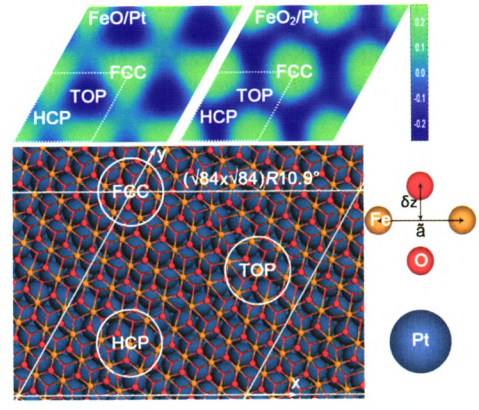


The adsorption and reaction behavior of NO on Cu(111) largely depends on the type of precovered oxygen species, which were prepared by varying NO exposure and annealing temperature.

Chin. J. Catal., 2013, 34: 973–978 doi: 10.1016/S1872-2067(12)60580-4

A first-principles study of the structure, electronic properties, and oxygen binding of FeO/Pt(111) and FeO_2/Pt(111)

SUN Dapeng, LI Weixue*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences

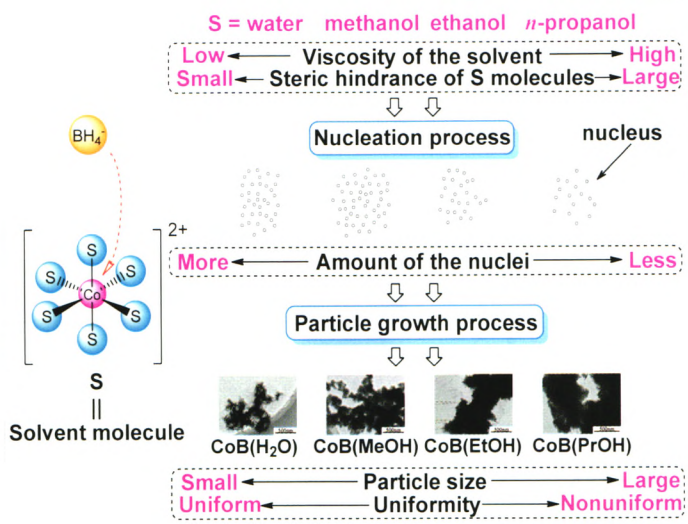


Ultrathin oxide films of iron oxides on Pt(111) were studied by DFT, and the importance of the surface corrugation on the relevant electronic properties and surface oxygen activities is highlighted.

Chin. J. Catal., 2013, 34: 979–985 doi: 10.1016/S1872-2067(12)60577-4

Solvent effects in the synthesis of CoB catalysts on hydrogen generation from hydrolysis of sodium borohydride

SHEN Xiaochen, DAI Min, GAO Ming, ZHAO Bin*, DING Weiping
Nanjing University

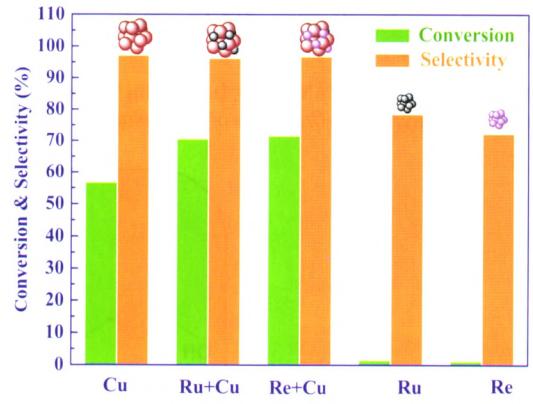


Solvent effects in the synthesis of non-crystalline CoB catalysts on the structures, morphologies, and catalytic properties were studied. A possible mechanism was proposed.

Chin. J. Catal., 2013, 34: 986–992 doi: 10.1016/S1872-2067(11)60505-6

Trivalent metal ions M^{3+} in $M_{0.02}Cu_{0.4}Mg_{5.6}Al_{1.98}(OH)_{16}CO_3$ layered double hydroxide as catalyst precursors for the hydrogenolysis of glycerol

XIA Shuixin, ZHENG Liping, NIE Renfeng, CHEN Ping, LOU Hui, HOU Zhaoyin *
Zhejiang University

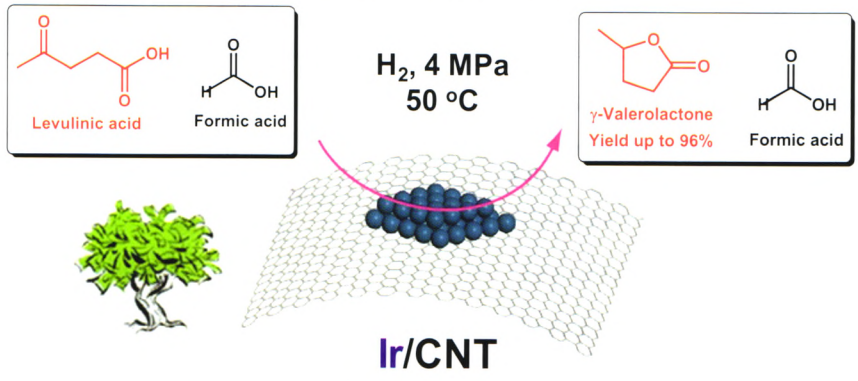


Trivalent metal ions M^{3+} in $M_{0.02}Cu_{0.4}Mg_{5.6}Al_{1.98}(OH)_{16}CO_3$ (M = Ru, Re) layered double hydroxides (LDHs) derived M-Cu/solid base catalysts show excellent performance for the hydrogenolysis of biomass- derived glycerol under mild conditions.

Chin. J. Catal., 2013, 34: 993–1001 doi: 10.1016/S1872-2067(11)60522-6

Catalytic conversion of biomass-derived levulinic acid into γ-valerolactone using iridium nanoparticles supported on carbon nanotubes

DU Xianlong, LIU Yongmei, WANG Jianqiang, CAO Yong *, FAN Kangnian
Fudan University; Shanghai Institute of Applied Physics, Chinese Academy of Sciences

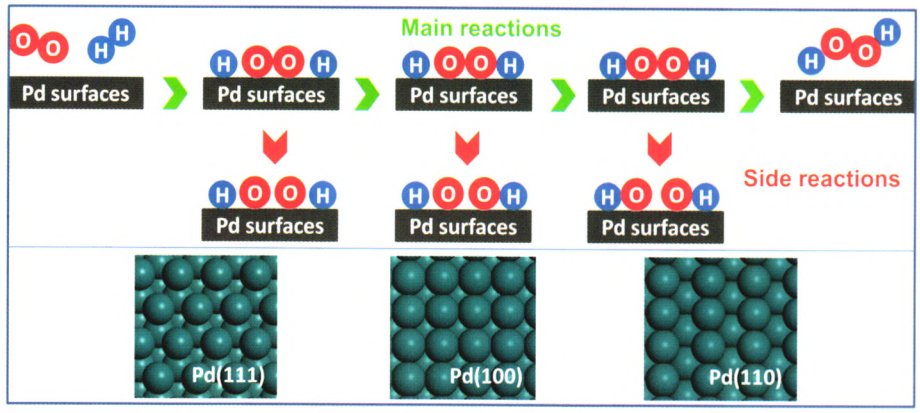


Iridium nanoparticles supported on carbon nanotubes have been used as a highly efficient catalyst for the hydrogenation of biomass-derived levulinic acid to γ-valerolactone (GVL) in the presence of formic acid. The GVL was obtained in an excellent yield of 96% at an operating temperature of 50 °C.

Chin. J. Catal., 2013, 34: 1002–1012 doi: 10.1016/S1872-2067(12)60537-3

Density functional theory study of direct synthesis of H_2O_2 from H_2 and O_2 on Pd(111), Pd(100), and Pd(110) surfaces

TIAN Pengfei, OUYANG Like, XU Xinchao, XU Jing, HAN Yi-Fan *
East China University of Science and Technology

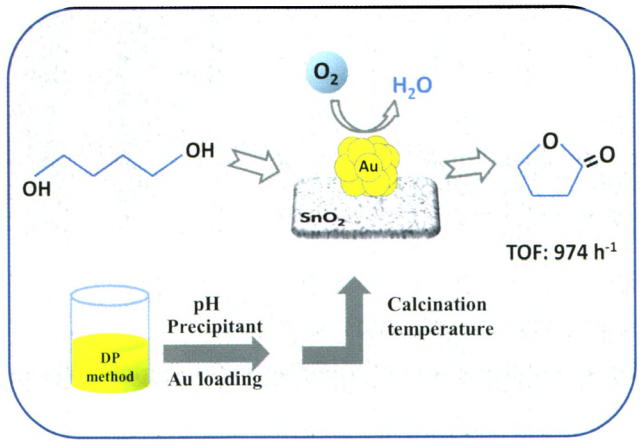


It is described that the direct synthesis of H_2O_2 from H_2 and O_2 on Pd(111), Pd(100), and Pd(110) surfaces using density functional theory calculations. Pd(111) exhibits the highest selectivity for H_2O_2 among the three surfaces.

Chin. J. Catal., 2013, 34: 1013–1019 doi: 10.1016/S1872-2067(12)60534-8

Preparation and application of highly efficient Au/SnO_2 catalyst in the oxidative lactonization of 1,4-butanediol to γ-butyrolactone

LI Xian, ZHENG Jiamin, YANG Xinli, DAI Weilin *, FAN Kangnian
Fudan University; Henan University of Technology



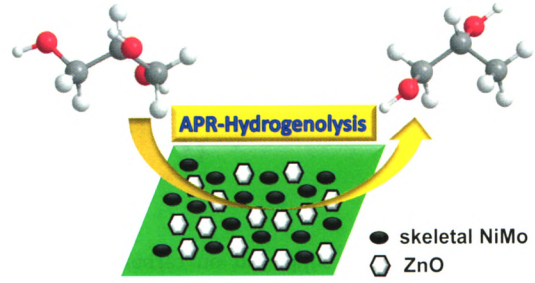
Gold catalysts supported on tin dioxide prepared by deposition-precipitation exhibit high catalytic activity in the oxidative lactonization of 1,4-butanediol.

Chin. J. Catal., 2013, 34: 1020–1026 doi: 10.1016/S1872-2067(12)60543-9

Physically mixed ZnO and skeletal NiMo for one-pot reforming-hydrogenolysis of glycerol to 1,2-propanediol

HU Jiye, LIU Xiaoyu, FAN Yiqiu, XIE Songhai, PEI Yan, QIAO Minghua *, FAN Kangnian, ZHANG Xiaoxin, ZONG Baoning *
Fudan University; Research Institute of Petroleum Processing

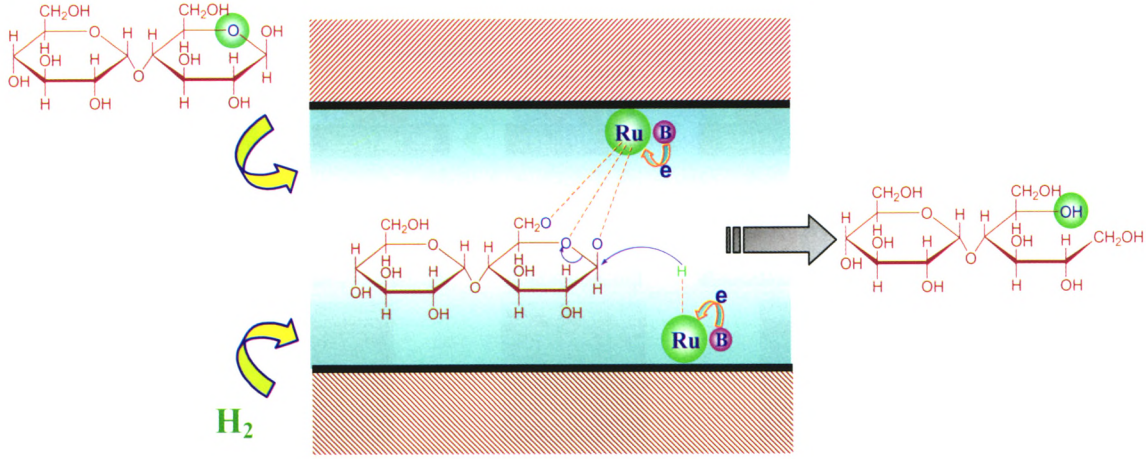
Physically mixing ZnO with skeletal $Ni_{40}Mo_{10}$ gave an excellent catalyst for the hydrogenolysis of glycerol to 1,2-PDO under an inert atmosphere, which was due to CO_2-enhancement of the Lewis acidity of ZnO by CO_2 generated from the reforming of glycerol.



Chin. J. Catal., 2013, 34: 1027–1032 doi: 10.1016/S1872-2067(12)60526-9

Synthesis of Ru-B amorphous alloy supported on SBA-15 with excellent catalytic efficiency in maltose hydrogenation

WANG Yi, XU Liang, XU Lei, LI Hexing, LI Hui *
Shanghai Normal University



Highly dispersed and stable Ru-B amorphous alloy was prepared by using $(NH_4)_2RuCl_6$ as ruthenium sources, which was a potential alternative to the traditional Raney Ni catalyst in maltitol production process.

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- 提供精确程序升温技术进行催化剂表征 ,如金属分散度、活性金属表面积、活性颗粒尺寸和催化材料表面活性等
- 能进行全自动脉冲化学吸附和程序升温还原（TPR）、程序升温脱附（TPD）、程序升温氧化（TPO）和程序升温反应（TPRx）以及 BET 表面积评价
- 配套专用接口，可连接质谱、气相、红外等设备
- 蒸汽发生器选件可进行惰性载气中液体蒸汽包括有机蒸汽（例如吡啶、苯）的吸附
- CryoCooler II 选件可满足低至 -120℃的分析温度

HPVA- II 超高压容量法气体吸附仪

- 超高压，压力可达 200bar,
- 四个分析站，四个独立的脱气站，可同时测试 4 个样品
- 宽温度范围：从 -196℃到 500℃
- 软件升级：增加自由空间管理、基线校准、压力显示等功能
- 增加传感器类型，满足不同用户的需要，仪器适用范围更广

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