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Contents

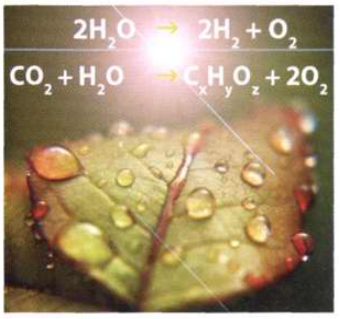
Reviews

Chin. J. Catal., 2011, 32: 879–890 doi: 10.1016/S1872-2067(10)60209-4

Conversion of Solar Energy to Fuels by Inorganic Heterogeneous Systems

Kimfung LI, David MARTIN, Junwang TANG*
University College London, UK

Solar radiation can be used to drive both water photolysis and CO_2 conversion to fuels by mimicking natural photosynthesis. Recent progress on material development and mechanistic understanding is reviewed.

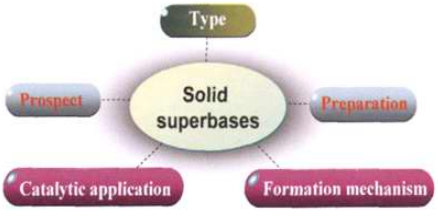


Chin. J. Catal., 2011, 32: 891–898 doi: 10.3724/SP.J.1088.2011.10206

Research Progress on Solid Superbase Catalysts in the Last Decade

WEI Yudan, ZHANG Shuguo, LI Guisheng, YIN Shuangfeng*,
AU Chaktong
Hunan University; Hong Kong Baptist University

The achievements made in the last decade on solid superbase catalysts were reviewed, touching on the types, preparation, and catalytic applications of the superbases, as well as the generation mechanism of basic sites. A direction for further development of solid superbases was also proposed.

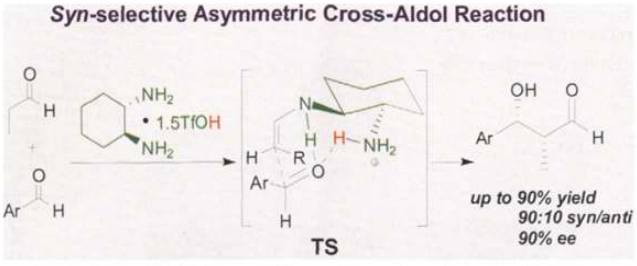


Communication

Chin. J. Catal., 2011, 32: 899–903 doi: 10.1016/S1872-2067(10)60237-9

Chiral Primary Amine Organocatalysts for *Syn*-selective Asymmetric Cross-Aldol Reactions

GAO Qiang, LIU Yan, LU Shengmei, LI Can*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



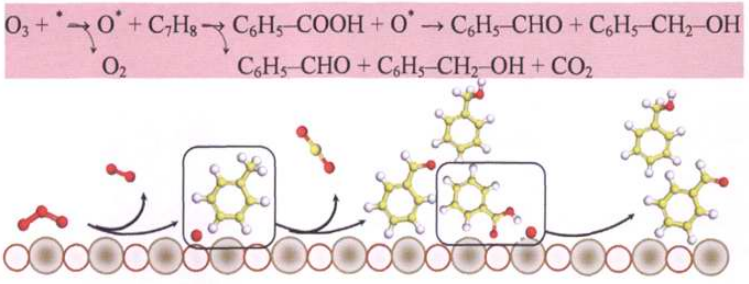
This communication presents easily prepared chiral primary amine organocatalysts for *syn*-selective asymmetric cross-aldol reactions of aldehydes with high yields and selectivities (up to 90% yield, 90:10 *syn*/*anti* ratio, 90% ee).

万方数据

Chin. J. Catal., 2011, 32: 904–916 doi: 10.1016/S1872-2067(10)60216-1

Room Temperature Catalytic Ozonation of Toluene over MnO_2/Al_2O_3

LONG Liping, ZHAO Jianguo, YANG Lixian, FU Mingli, WU Junliang, HUANG Bichun, YE Daiqi*
South China University of Technology

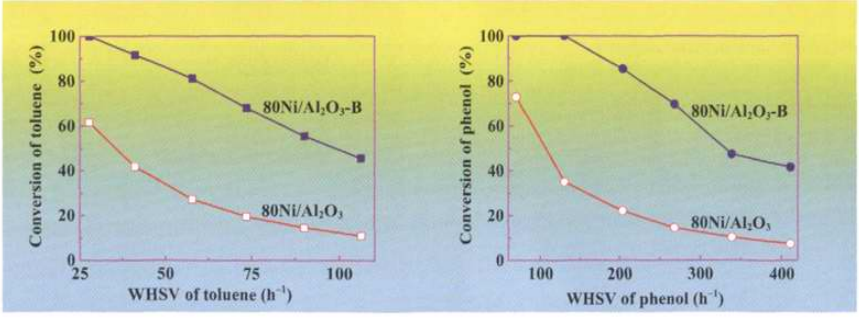


CO_2 and substances containing COO^-, C=O, and C–O groups were produced in a reaction process. A high ozone concentration favors toluene decomposition and the transformation from COO^- to C=O and C–O.

Chin. J. Catal., 2011, 32: 917–925 doi: 10.1016/S1872-2067(10)60224-0

Preparation of Highly Loaded and Active Ni/Al_2O_3 Catalysts for the Hydrogenation of Aromatic Rings

HU Shenghua, XUE Mingwei, CHEN Hui, SUN Yinlu, SHEN Jianyi*
Nanjing University



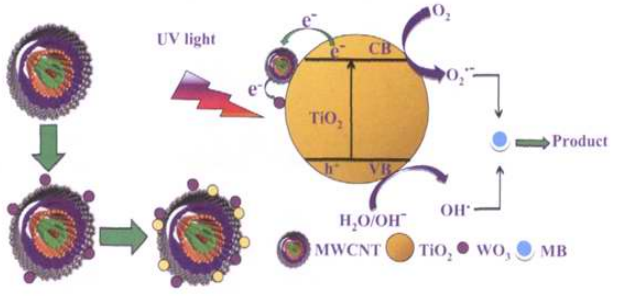
Highly loaded Ni/Al_2O_3 catalysts were prepared by the co-precipitation method. The $80Ni/Al_2O_3$-B treated with *n*-butanol exhibited much higher catalytic activities in hydrogenation of toluene and phenol than the $80Ni/Al_2O_3$.

Chin. J. Catal., 2011, 32: 926–932 doi: 10.1016/S1872-2067(10)60208-2

Fabrication and Characterization of Tailored TiO_2 and WO_3/MWCNT Composites for Methylene Blue Decomposition

ZHU Lei, MENG Zeda, OH Won-Chun*
Hanseo University, Korea

WO_3/MWCNT-TiO_2 composites were fabricated with carbon nanotubes as template. The dispersion and catalytic activity were improved by combining with MWCNT and the WO_3 semiconductor.



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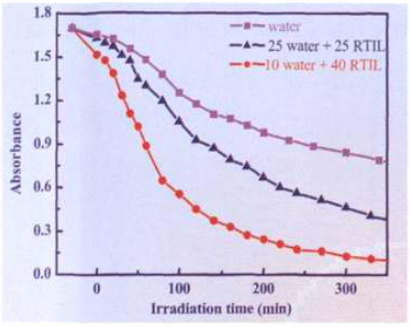
Chin. J. Catal., 2011, 32: 933–938 doi: 10.1016/S1872-2067(10)60217-3

Microwave-Assisted Preparation of CdS Nanoparticles in a Halide-Free Ionic Liquid and Their Photocatalytic Activities

M. ESMAILI, A. HABIBI-YANGJEH*
University of Mohaghegh Ardabili, Iran

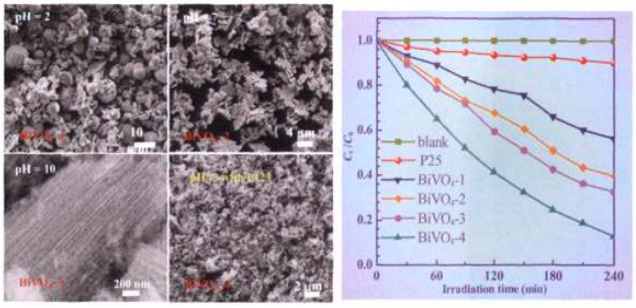
Nanoparticles of CdS prepared in water and aqueous solutions of a halide-free ionic liquid under microwave radiation for 4–6 minutes were compared. Their photocatalytic activities were measured using UV and visible light.



Chin. J. Catal., 2011, 32: 939–949 doi: 10.1016/S1872-2067(10)60215-X

Morphology-Dependent Photocatalytic Performance of Monoclinic $BiVO_4$ for Methyl Orange Degradation under Visible-Light Irradiation

JIANG Haiyan, DAI Hongxing*, MENG Xue, ZHANG Lei, DENG Jiguang, JI Kemeng
Beijing University of Technology

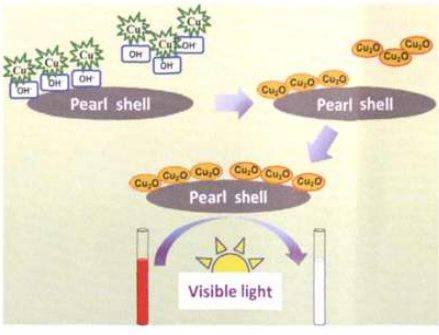


Monoclinic $BiVO_4$ with multiple morphologies were fabricated using the alcoho-hydrothermal strategy. Its excellent visible-light-driven catalytic performance for methyl orange degradation was dependent on the morphology of the monoclinic $BiVO_4$ particles.

Chin. J. Catal., 2011, 32: 950–956 doi: 10.1016/S1872-2067(10)60231-8

Preparation of Nano-Cu_2O/Pearl Shell Composites for Treating Organic Dyes

ZOU Xiaolan, YU Yanqing, LI Chaofeng, ZHU Xiaobin*
Institute of Oceanology, Chinese Academy of Sciences



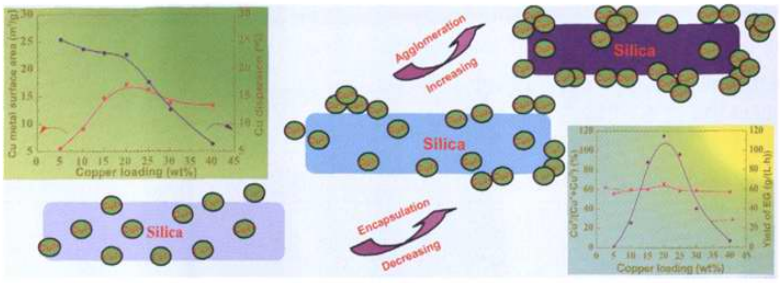
Nano Cu_2O were prepared and loaded onto pearl shells carriers by hydrolysis. These composites were formed in two processes, and can catalyze the decolorization of organic dyes under visible light irradiation.

万方数据

Chin. J. Catal., 2011, 32: 957–969 doi: 10.1016/S1872-2067(10)60223-9

Cu/SiO_2 Catalysts Prepared by the Sol-Gel Method for the Hydrogenation of Dimethyl Oxalate to Ethylene Glycol

LIN Ling, PAN Pengbin, ZHOU Zhangfeng, LI Zhaoji, YANG Jinxia, SUN Minling, YAO Yuangen*
Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences

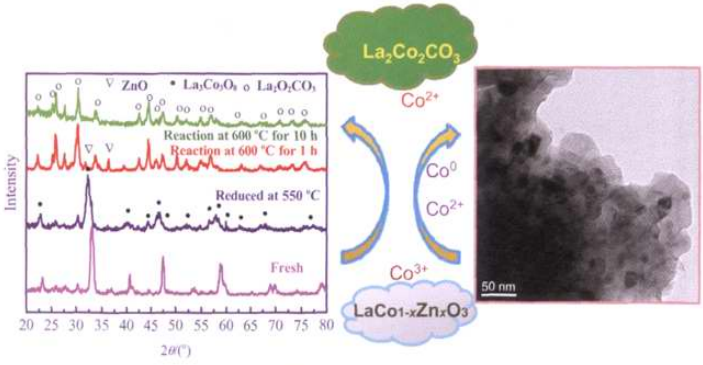


Upon an increase in copper loading in Cu/SiO_2 catalysts, under the same conditions, encapsulation decreases and agglomeration increases, which affects the performance of these catalysts.

Chin. J. Catal., 2011, 32: 970–977 doi: 10.1016/S1872-2067(10)60218-5

Steam Reforming of Ethanol over Zn Doped $LaCoO_3$ Perovskite Nanocatalysts

MA Fei, CHU Wei*, HUANG Lihong, YU Xiaopeng, WU Yongyong
Sichuan University

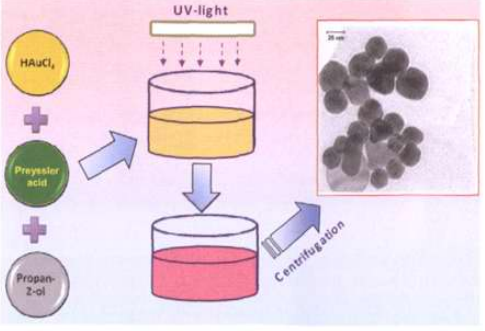


The high dispersion of CoO and the interaction between Co^{2+} and Co^0 leads to high activity for $LaCo_{1-x}Zn_xO_3$, and the presence of $La_2O_2CO_3$ can retard carbon deposition, which enhances its methane reforming property.

Chin. J. Catal., 2011, 32: 978–982 doi: 10.1016/S1872-2067(10)60221-5

Photocatalytic Synthesis of Gold Nanoparticles Using Preyssler Acid and Their Photocatalytic Activity

Ali AYATI, Ali AHMADPOUR*, Fatemeh F. BAMOHARRAM, Majid M. HERAVI, Hamed RASHIDI
Ferdowsi University of Mashhad, Iran
Islamic Azad University, Mashhad Branch, Iran
Azzahra University, Iran



Gold nanoparticles were synthesized using Preyssler acid as reducing agent and stabilizer. The photocatalytic activity of the prepared nanoparticles was investigated by methyl orange degradation.

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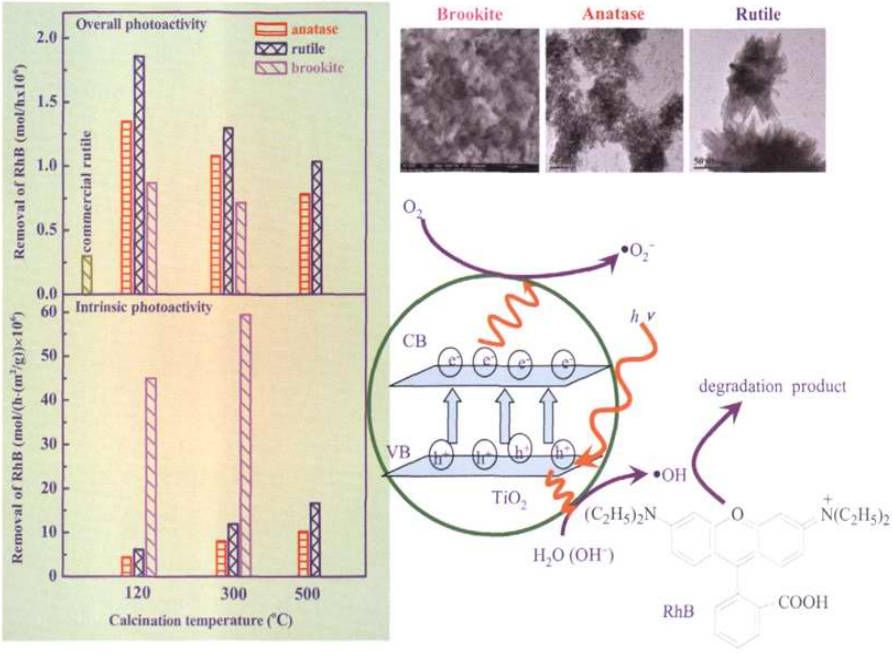
Chin. J. Catal., 2011, 32: 983–991 doi: 10.1016/S1872-2067(10)60222-7

Photocatalytic Degradation of Rhodamine B on Anatase, Rutile, and Brookite TiO_2

ZHANG Jing*, YAN Song, FU Lu, WANG Fei, YUAN Mengqiong, LUO Genxiang, XU Qian, WANG Xiang, LI Can
Liaoning Shihua University
Dalian Institute of Chemical Physics, Chinese Academy of Sciences

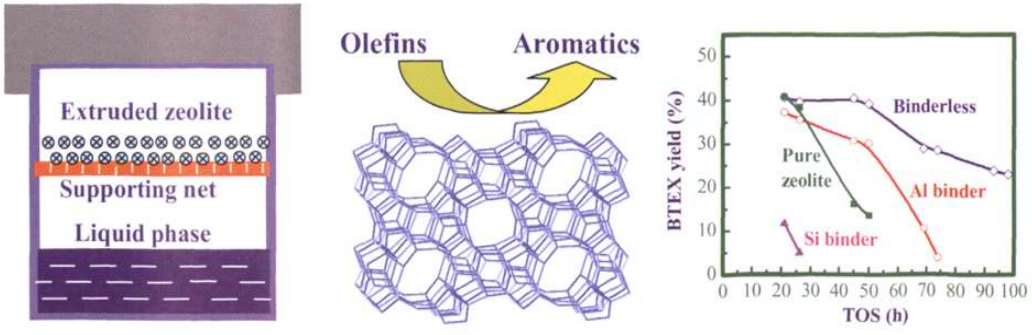


Rutile showed a higher photocatalytic activity than anatase with the same particle size and surface area, while brookite showed the highest areal photoactivity.

Chin. J. Catal., 2011, 32: 992–996 doi: 10.3724/SP.J.1088.2011.10107

Aromatization of Mixed C_4 Hydrocarbons over the Binderless Zn/ZSM-5 Catalyst

LI Yuning*, REN Liping, LI Yanan, JIN Zhaosheng, TENG Jiawei, YANG Weimin
Shanghai Research Institute of Petrochemical Technology, SINOPEC



The dispersion of zinc species was optimized over the binderless Zn/ZSM-5 catalyst, and this benefited the transformation of mixed C_4 hydrocarbons into aromatics.

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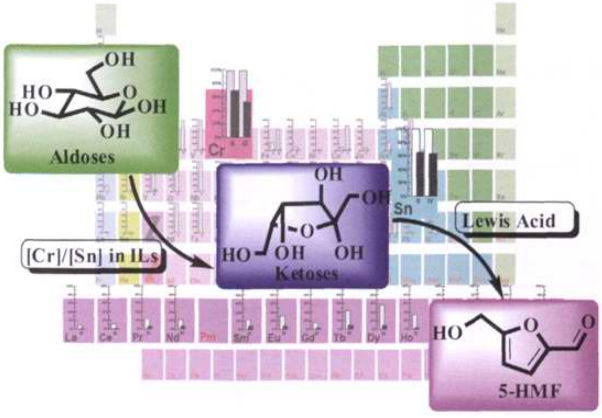
Chin. J. Catal., 2011, 32: 997–1002 doi: 10.3724/SP.J.1088.2011.01258

Dehydration of Glucose and Fructose into 5-Hydroxymethylfurfural Catalyzed by Lewis Acid in Ionic Liquids

TIAN Yukui, DENG Jin, PAN Tao, GUO Qingxiang, FU Yao*
University of Science and Technology of China



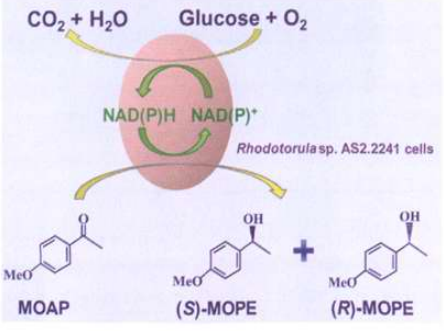
A systematic study on the conversion of glucose and fructose to 5-hydroxymethylfurfural (5-HMF) in an integrated ionic liquid and Lewis acid system has been presented, and further optimization was conducted in the research.

Chin. J. Catal., 2011, 32: 1003–1010 doi: 10.3724/SP.J.1088.2011.10112

Asymmetric Biosynthesis of (*S*)-1-(4-Methoxyphenyl)ethanol in Various Reaction Systems

WANG Wei, ZONG Minhua*, LOU Wenyong
ZhongKai University of Agriculture and Engineering
South China University of Technology

Ionic liquids could improve the efficiency of the biocatalytic enantioselective reduction of MOAP to MOPE to different extents. The catalytic performance of the biocatalyst depended not only on the types of the anions and cations in the ionic liquids but also on their combination.

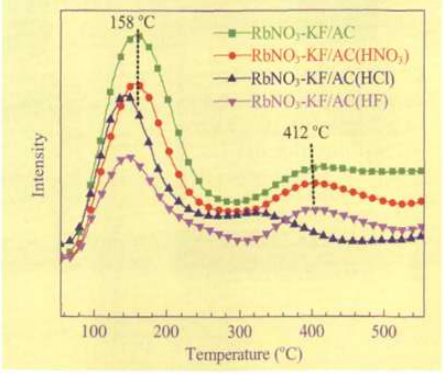


Chin. J. Catal., 2011, 32: 1011–1016 doi: 10.3724/SP.J.1088.2011.01235

Effects of Acid Treatment of Activated Carbon on Catalytic Performance of $RbNO_3$-KF/AC Catalyst for C_2F_5I Gas-Phase Synthesis

MAO Aiqin, WANG Hua, TAN Linghua, LIN Xiangyang, PAN Renming*
Nanjing University of Science and Technology
Anhui University of Technology

The dispersion and catalytic activity of $RbNO_3$-KF/AC catalyst samples depend on the oxygen-containing surface groups and moderate basic sites from AC, but no unambiguous correlation has been found between the dispersion and basicity of the catalyst.

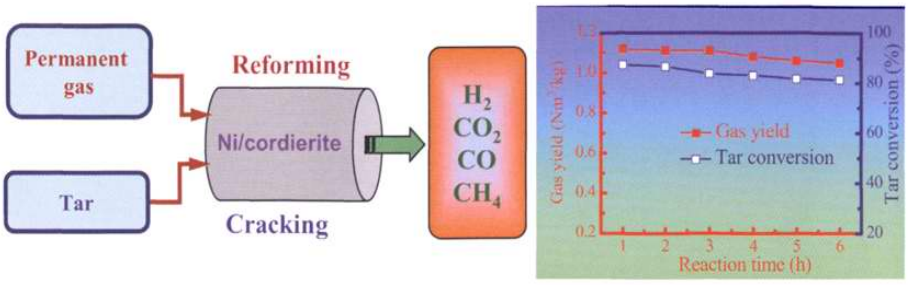


万方数据

Chin. J. Catal., 2011, 32: 1017–1021 doi: 10.3724/SP.J.1088.2011.10139

Synthesis Gas from Pyrolysis of Cedar Sawdust as Biomass Materials: Characterization and Catalytic Performance of Nickel-Based Monolithic Catalyst

LU Min, LÜ Pengmei*, YUAN Zhenhong, LI Huiwen, XU Jingliang
Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences

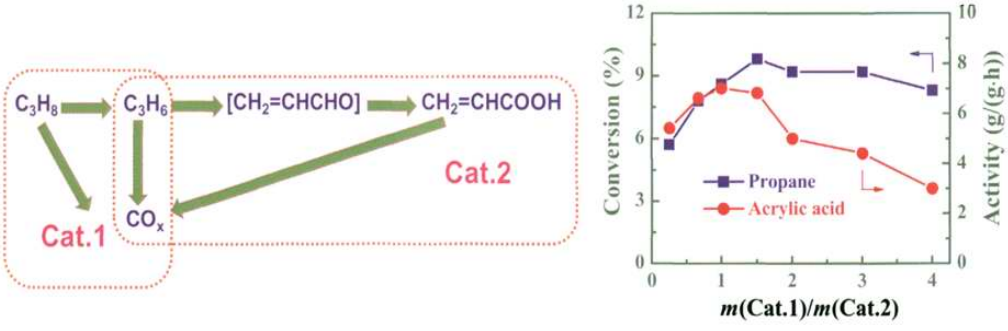


A Ni-based catalyst supported on acid treated cordierite exhibits relatively stable activity for the tar cracking and gas reforming under high tar concentration conditions.

Chin. J. Catal., 2011, 32: 1022–1026 doi: 10.3724/SP.J.1088.2011.10136

Propane Selective Oxidation to Acrylic Acid over Combined Catalysts

FANG Wen, GE Qingjie*, YU Jiafeng, XU Hengyong*
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



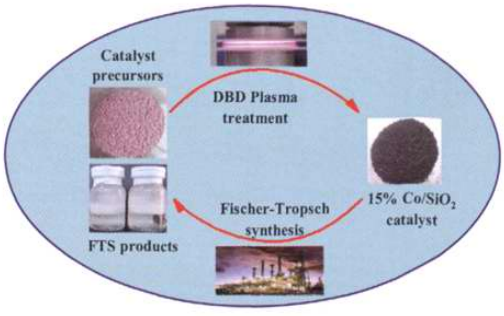
A novel approach for the selective oxidation of propane to acrylic acid based on the use of two layers of combined catalysts in a single reactor is presented. The effects of reaction conditions were investigated.

Chin. J. Catal., 2011, 32: 1027–1034 doi: 10.3724/SP.J.1088.2011.10116

Preparation and Characterization of Co-Based Catalyst via Dielectric-Barrier Discharge Plasma Decomposition for Fischer-Tropsch Synthesis

HUANG Chengdu, BAI Suli, LÜ Jing, LI Zhenhua*
Tianjin University

Cobalt precursors were decomposed directly by dielectric barrier discharge (DBD) plasma without requiring a thermal calcination process. The Co/SiO_2 catalyst treated by DBD plasma had good performance for Fischer-Tropsch synthesis.



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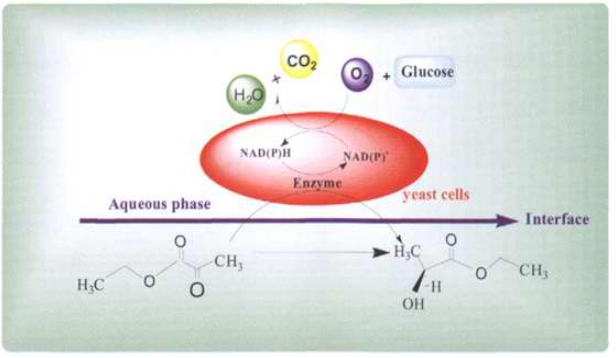
Chin. J. Catal., 2011, 32: 1035–1039 doi: 10.3724/SP.J.1088.2011.01236

Asymmetric Reduction of Ethyl Pyruvate Catalyzed by Yeast Resting Cells to (*S*)-Ethyl Lactate

WANG Dan, ZHANG Qiang, LI Wang, QI Nanchang, GUO Chunxiao, YANG Zhirong, ZHANG Jie*
Sichuan University
Chengdu Medical College



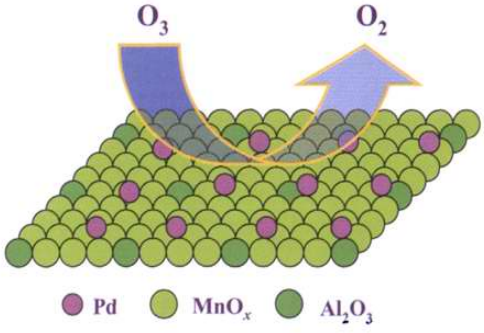
With oxidation-reduction enzyme in the resting cells of yeast BYT18-6 as a catalyst, the asymmetric reduction of ethyl pyruvate to (*S*)-ethyl lactate in an aqueous phase was presented. Coenzyme NAD(P)H consumed in the conversion reaction can be regenerated through the metabolism of such energy substance as glucose.

Chin. J. Catal., 2011, 32: 1040–1045 doi: 10.3724/SP.J.1088.2011.10145

Ground-Level Ozone Decomposition over Pd-MnO_x/Al_2O_3 Catalyst Prepared by Urea Hydrolysis

PAN Hao, ZHOU Lina, ZHU Yi, PENG Na, GONG Maochu, CHEN Yaoqiang*
Sichuan University

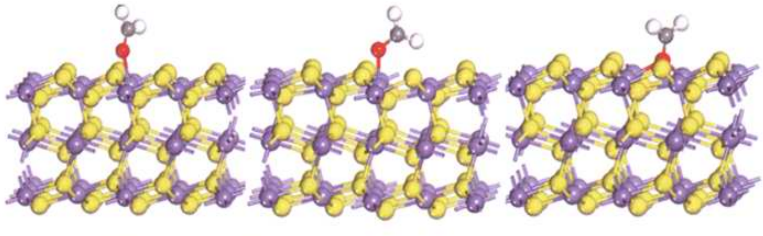
The Pd-MnO_x/Al_2O_3 catalyst prepared by urea hydrolysis method exhibited good catalytic activity at low temperature, and the ground-level ozone could be completely decomposed at only 24 °C.



Chin. J. Catal., 2011, 32: 1046–1050 doi: 10.3724/SP.J.1088.2011.01251

Theoretical Study of the Adsorption of Formaldehyde on Perfect and S-Deficient FeS_2(100) Surfaces

DU Yudong, GUO Xin, CHEN Wenkai*, LI Yi, ZHANG Yongfan
Fuzhou Universiy



Several different sites on FeS_2(100) perfect and S-deficient surface were chosen to study the adsorption of formaldehyde. After adsorption, the electrons transferred from the substrate to formaldehyde, and the bond of C=O was elongated and weakened.

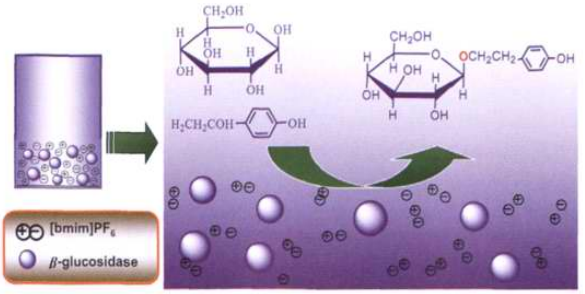
万方数据

Chin. J. Catal., 2011, 32: 1051–1055 doi: 10.3724/SP.J.1088.2011.01211

Biocatalytic Synthesis of Salidroside by β-Glucosidase in Ionic Liquids

WANG Mengliang*, GUO Chunxia
Shanxi University

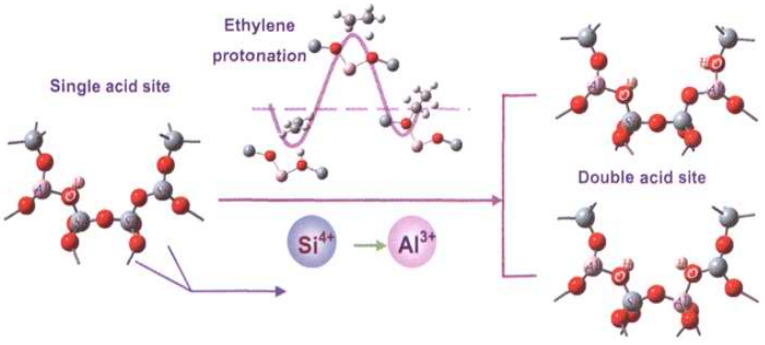
Salidroside was synthesized from tyrosol and D-glucose by β-glucosidase in ionic liquid [bmim]PF_6. The relationship between the product yield and reaction conditions was studied.



Chin. J. Catal., 2011, 32: 1056–1062 doi: 10.3724/SP.J.1088.2011.10110

Density Functional Theory Study of Ethylene Protonation on HZSM-5 Zeolite with Neighboring Brönsted Acid Sites

REN Jue, ZHOU Danhong*, LI Jinghong, CAO Liang, XING Shuangying
Liaoning Normal University

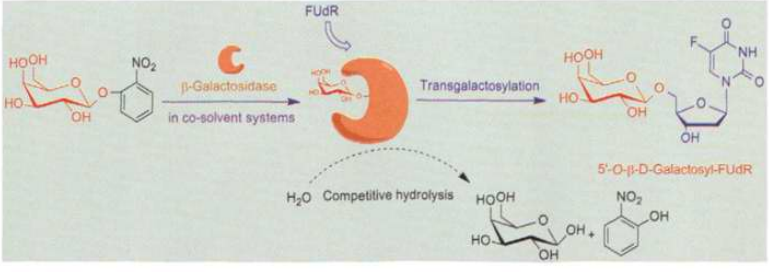


The effect of different acid sites and neighboring acid sites on ethylene protonation over HZSM-5 zeolite was investigated by the density functional theory with B3LYP/6-31G(d,p) method.

Chin. J. Catal., 2011, 32: 1063–1068 doi: 10.3724/SP.J.1088.2011.01150

Regioselective Galactosylation of Floxuridine Catalyzed by β-Galactosidase from Bovine Liver in Co-solvent Systems

YE Min, LIU Qiuping, LI Ning*, ZONG Minhua*
South China University of Technology
Dalian Institute of Chemical Physics, Chinese Academy of Sciences



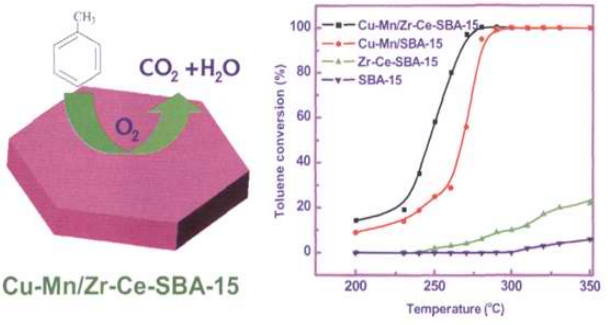
The activity and stability of β-galactosidase from bovine liver were studied for regioselective galactosylation of floxuridine (FUdR) in organic solvent-containing systems. The enzyme performance depended on the dielectric constants of organic solvents.

万方数据

Chin. J. Catal., 2011, 32: 1069–1075 doi: 10.3724/SP.J.1088.2011.10122

Preparation of Cu-Mn/Zr-Ce-SBA-15 Catalyst with Short Mesochannels and Its Catalytic Performance for Toluene Combustion

YUAN Jinfang, LI Jiansheng*, WANG Fang, SUN Xiuyun, SHEN Jinyou, HAN Weiqing, WANG Lianjun*
Nanjing University of Science and Technology; Henan University

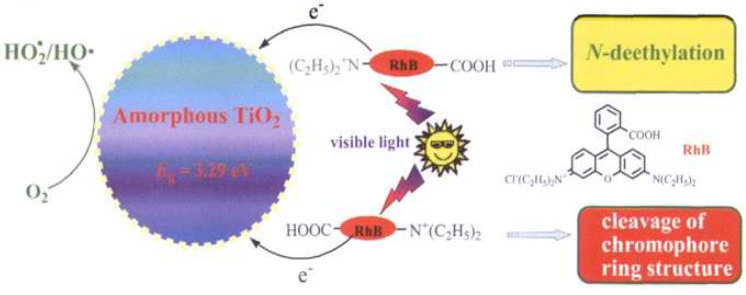


The short channeled Cu-Mn/Zr-Ce-SBA-15 catalyst possesses higher catalytic activity for toluene combustion than the Cu-Mn/SBA-15 catalyst.

Chin. J. Catal., 2011, 32: 1076–1082 doi: 10.3724/SP.J.1088.2011.10336

Photo-sensitized Degradation of Dye Pollutants on Amorphous TiO_2 under Visible Light Irradiation

WANG Qi*, ZHAO Jincai, CONG Yanqing, ZHANG Yi
Zhejiang Gongshang University; Institute of Chemistry, Chinese Academy of Sciences



Rapid photo-sensitized degradation of rhodamine B (RhB) was achieved on the one-step synthesized amorphous TiO_2. Both *N*-deethylation and cleavage of chromophore ring structure were observed because of different anchoring groups.

万方数据