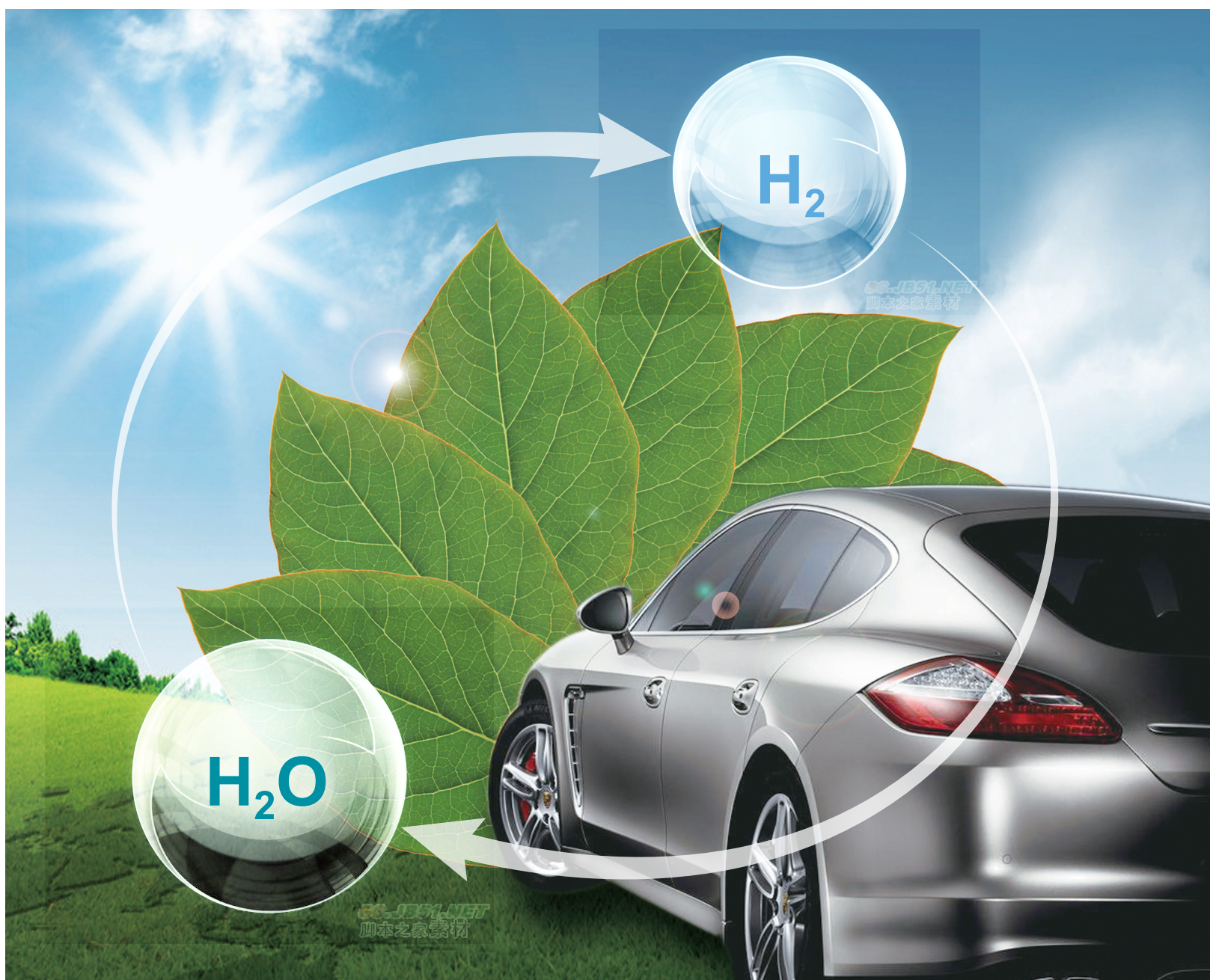




# Chinese Journal of Catalysis

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Volume 38 | Number 1 | January 2017



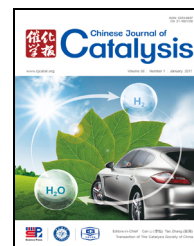
Editors-in-Chief Can Li (李灿) Tao Zhang (张涛)  
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## Chinese Journal of Catalysis

### Graphical Contents

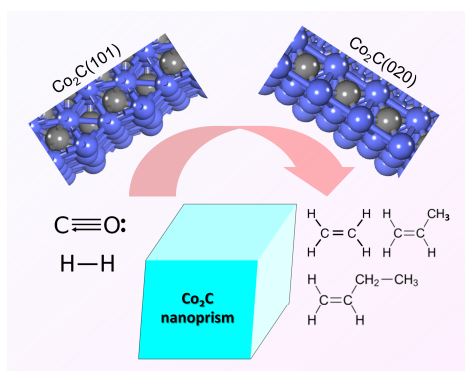
#### Highlights

*Chin. J. Catal.*, 2017, 38: 1–4 doi: 10.1016/S1872-2067(16)62592-5

#### Co<sub>2</sub>C nanoprisms for syngas conversion to lower olefins with high selectivity

Yunjie Ding

Dalian Institute of Chemical Physics, Chinese Academy of Sciences



Co<sub>2</sub>C nanoprisms with the exposed facets of (101) and (020) exhibit strong facet effect for syngas conversion with high selectivity for the production of lower olefins, while generating little methane.

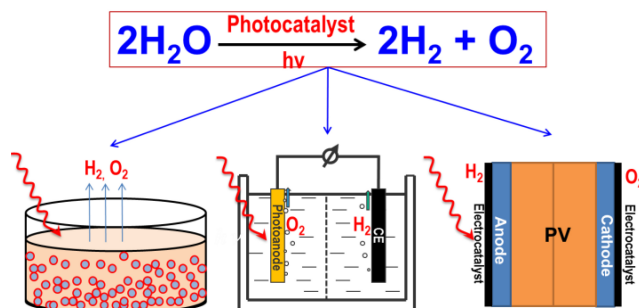
#### MiniReview

*Chin. J. Catal.*, 2017, 38: 5–12 doi: 10.1016/S1872-2067(16)62552-4

#### Latest progress in hydrogen production from solar water splitting via photocatalysis, photoelectrochemical, and photovoltaic-photoelectrochemical solutions

Rengui Li\*

Dalian Institute of Chemical Physics, Chinese Academy of Sciences



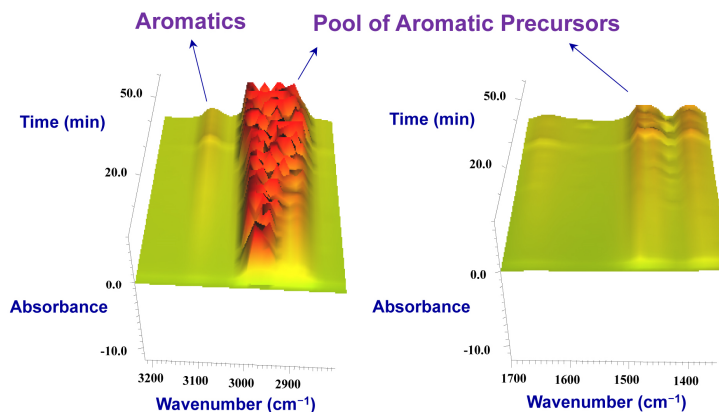
This minireview summarized some latest progress on three major solutions of hydrogen production via solar water splitting in the past 2–3 years.

## Communication

*Chin. J. Catal.*, 2017, 38: 13–19 doi: 10.1016/S1872-2067(17)62751-7

### Construction of an *operando* dual-beam fourier transform infrared spectrometer and its application in the observation of isobutene reactions over nano-sized HZSM-5 zeolite

Jiaxu Liu, Jilei Wang, Wei Zhou, Cuilan Miao, Guang Xiong, Qin Xin, Hongchen Guo\*  
Dalian University of Technology; Dalian Institute of Chemical Physics, Chinese Academy of Sciences



An *operando* dual-beam Fourier transform infrared spectrometer was developed using a facile method, and was successfully used to characterize the dynamic processes in isobutene aromatization over nano-sized HZSM-5 zeolite under real reaction conditions.

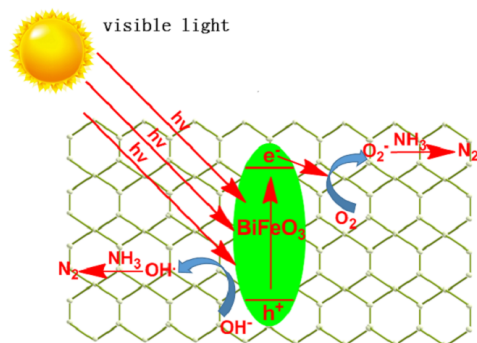
## Articles

*Chin. J. Catal.*, 2017, 38: 20–28 doi: 10.1016/S1872-2067(17)62752-9

### Efficient removal of ammonia with a novel graphene-supported BiFeO<sub>3</sub> as a reusable photocatalyst under visible light

Cong-yang Zou, Shou-qing Liu, Zhemin Shen\*, Yuan Zhang, Ni-shan Jiang, Wen-chao Ji  
Shanghai Jiao Tong University; Suzhou University of Science and Technology

rG-BiFeO<sub>3</sub> showed a 91.20% degradation of 50 mg/L NH<sub>3</sub> under visible light at pH 11 in the absence of hydrogen peroxide. Holes, superoxide anion radical and hydroxyl radical oxidize NH<sub>3</sub> directly to N<sub>2</sub>.

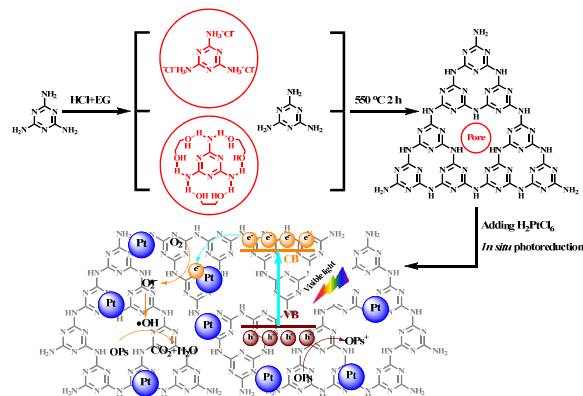


*Chin. J. Catal.*, 2017, 38: 29–38 doi: 10.1016/S1872-2067(16)62589-5

### Fabrication of highly dispersed platinum-deposited porous g-C<sub>3</sub>N<sub>4</sub> by a simple *in situ* photoreduction strategy and their excellent visible light photocatalytic activity toward aqueous 4-fluorophenol degradation

Zhenxing Zeng, Kexin Li\*, Kai Wei, Yuhua Dai\*, Liushui Yan, Huiqin Guo, Xubiao Luo  
Nanchang Hangkong University

A series of highly dispersed platinum-deposited porous g-C<sub>3</sub>N<sub>4</sub> (Pt/pg-C<sub>3</sub>N<sub>4</sub>) were successfully fabricated by a simple *in situ* photoreduction strategy and applied to the degradation and mineralization of aqueous 4-fluorophenol under visible-light irradiation.



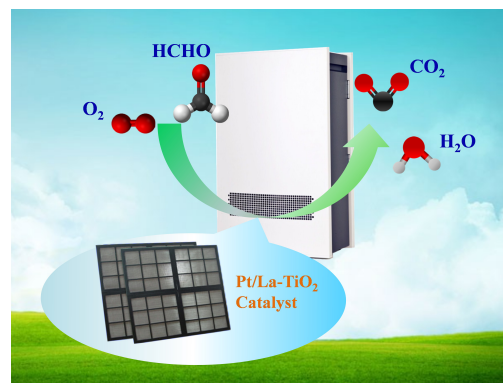


*Chin. J. Catal.*, 2017, 38: 39–47 doi: 10.1016/S1872-2067(16)62532-9

### La-doped Pt/TiO<sub>2</sub> as an efficient catalyst for room temperature oxidation of low concentration HCHO

Honggen Peng\*, Jiawei Ying, Jingyan Zhang, Xianhua Zhang, Cheng Peng, Cheng Rao, Wenming Liu, Ning Zhang, Xiang Wang\*  
Nanchang University; Shanghai Jiao Tong University

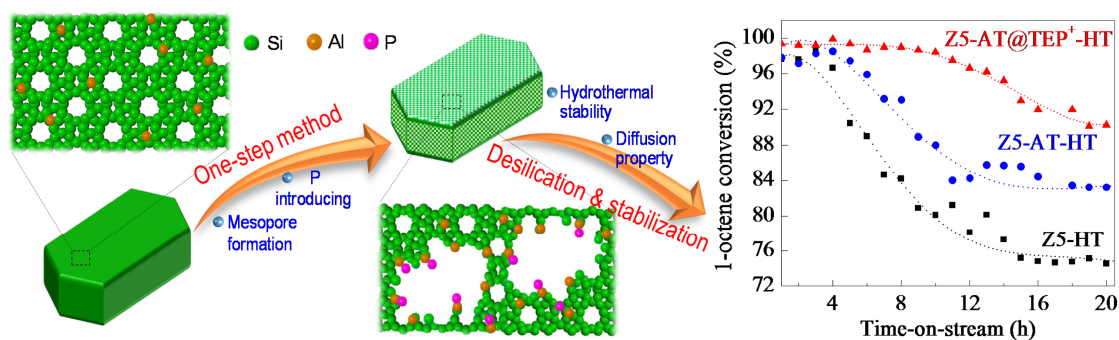
La-doped TiO<sub>2</sub> was used to support Pt and the catalyst displayed superior catalytic performance in the removal of low concentration HCHO at room temperature.



*Chin. J. Catal.*, 2017, 38: 48–57 doi: 10.1016/S1872-2067(16)62549-4

### One-step post-synthesis treatment for preparing hydrothermally stable hierarchically porous ZSM-5

Jian Ding, Teng Xue, Haihong Wu\*, Mingyuan He  
East China Normal University

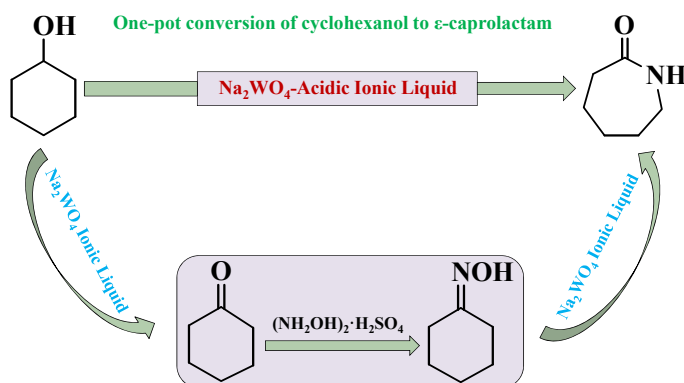


Hierarchically porous ZSM-5 with high hydrothermal stability was obtained by a one-step post-synthesis treatment involving simultaneous controlled desilication and phosphorous modification. The prepared catalyst displayed prolonged catalytic activity and stability toward hydrocarbon cracking.

*Chin. J. Catal.*, 2017, 38: 58–64 doi: 10.1016/S1872-2067(16)62563-9

### One-pot conversion of cyclohexanol to $\epsilon$ -caprolactam using a multifunctional Na<sub>2</sub>WO<sub>4</sub>-acidic ionic liquid catalytic system

Hefang Wang, Liyuan Jia, Rongbin Hu, Meidan Gao, Yanji Wang\*  
Hebei University of Technology



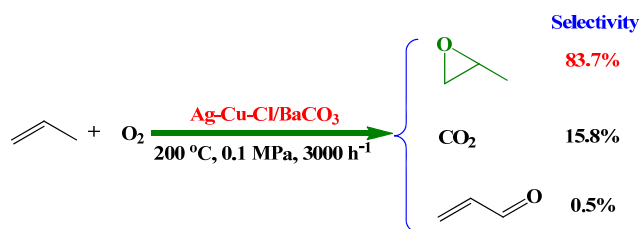
Na<sub>2</sub>WO<sub>4</sub>-acidic ionic liquid was used as a simple, ecofriendly, recyclable and efficient catalytic system in the one-pot synthesis of  $\epsilon$ -caprolactam from cyclohexanol, hydrogen peroxide, and hydroxylamine.



*Chin. J. Catal.*, 2017, 38: 65–72 doi: 10.1016/S1872-2067(16)62539-1

### Gas-phase epoxidation of propylene by molecular oxygen over Ag-Cu-Cl/BaCO<sub>3</sub> catalyst: Effects of Cu and Cl loadings

Qing Zhang, Yanglong Guo\*, Wangcheng Zhan, Yun Guo, Li Wang, Yunsong Wang, Guanzhong Lu\*  
East China University of Science and Technology

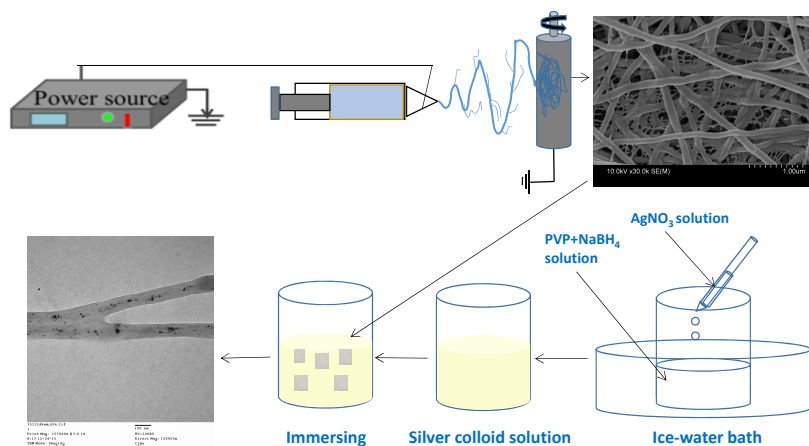


The appropriate loadings of Cu and Cl of Ag-Cu-Cl/BaCO<sub>3</sub> catalyst are important to the balance between molecular and atomic oxygen species, which benefits the epoxidation of propylene by molecular oxygen.

*Chin. J. Catal.*, 2017, 38: 73–82 doi: 10.1016/S1872-2067(16)62545-7

### Fabrication and catalytic behavior of hierarchically-structured nylon6 nanofiber membrane decorated with silver nanoparticles

Huihui Zhao, Weimin Kang\*, Xiaomin Ma, Nanping Deng, Zongjie Li, Bowen Cheng\*  
Tianjin Polytechnic University



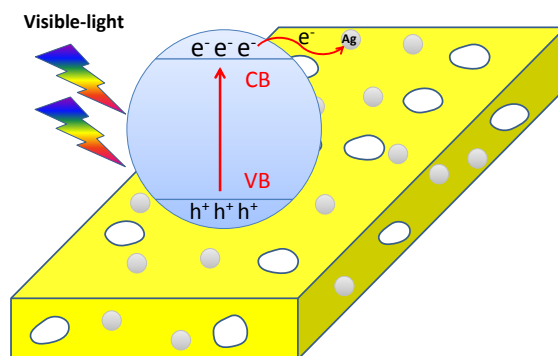
A hierarchically-structured Ag/nylon 6 (PA6) nanofiber membrane with thick fibers which acted as supports and thin fibers which provide high specific surface area was fabricated via electrospinning and impregnation method. The special structure endows the membrane high specific surface area and that contribute to the loading and dispersion of Ag NPs. Compared with normal Ag/PA6 nanofiber membrane (Ag/PA6 NM), the HS-Ag/PA6 NM with higher specific surface area exhibits improved degradation rate of methylene blue (MB) from 81.77% to 98.13% within 2 h.

*Chin. J. Catal.*, 2017, 38: 83–91 doi: 10.1016/S1872-2067(16)62575-5

### Ag-loaded mesoporous Pb<sub>3</sub>Nb<sub>2</sub>O<sub>8</sub> photocatalysts with enhanced activity under visible-light irradiation

Xiaopeng Han, Jianan Lü, Li Tian, Lingru Kong, Xuemei Lu, Yong Mei, Jiwei Wang\*, Xiaoxing Fan\*  
Liaoning University

Ag-loaded mesoporous Pb<sub>3</sub>Nb<sub>2</sub>O<sub>8</sub> photocatalysts are synthesized by Ag photodeposition on the as-obtained mesoporous Pb<sub>3</sub>Nb<sub>2</sub>O<sub>8</sub> by the evaporation-induced self-assembly (EISA) method. The photocatalysts show outstanding performance in the photodegradation of organic pollutants compared with Pb<sub>3</sub>Nb<sub>2</sub>O<sub>8</sub>

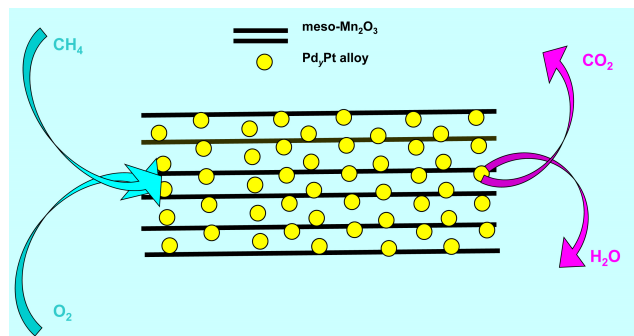


*Chin. J. Catal.*, 2017, 38: 92–105 doi: 10.1016/S1872-2067(16)62567-6

### Catalytic performance enhancement by alloying Pd with Pt on ordered mesoporous manganese oxide for methane combustion

Peng Xu, Zhixing Wu, Jiguang Deng, Yuxi Liu, Shaohua Xie, Guangsheng Guo\*, Hongxing Dai\*  
Beijing University of Technology

Alloying Pd with Pt enhanced the catalytic performance in methane combustion. 1.41(Pd<sub>5.1</sub>Pt)/meso-Mn<sub>2</sub>O<sub>3</sub> showed the highest activity because of its large surface area, high O<sub>ads</sub> concentration, good low-temperature reducibility, and strong Pd-Pt alloy and Mn<sub>2</sub>O<sub>3</sub> interactions.

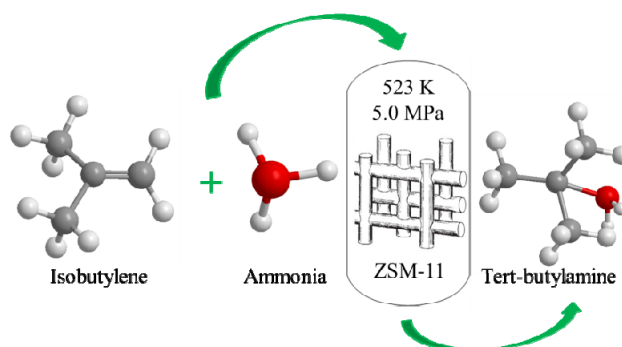


*Chin. J. Catal.*, 2017, 38: 106–114 doi: 10.1016/S1872-2067(16)62550-0

### Thermodynamic study of direct amination of isobutylene to tert-butylamine

Shangyao Gao, Xiangxue Zhu\*, Xiujie Li, Yuzhong Wang, Ye Zhang, Sujuan Xie, Jie An, Fucun Chen, Shenglin Liu, Longya Xu\*  
Dalian Institute of Chemical Physics, Chinese Academy of Sciences

Thermodynamic calculation of the direct amination of isobutylene to tert-butylamine, an atomically economic and green chemical process, provide guidance for developing a highly efficient catalyst and reaction condition optimization.

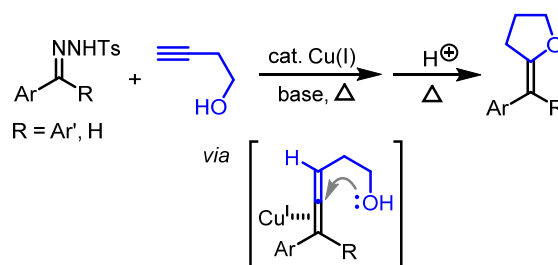


*Chin. J. Catal.*, 2017, 38: 115–122 doi: 10.1016/S1872-2067(16)62565-2

### Cu(I)-catalyzed cascade reaction of *N*-tosylhydrazones with 3-butyne-1-ol: A new synthesis of tetrahydrofurans

Mohammad Lokman Hossain, Kang Wang, Fei Ye, Yan Zhang, Jianbo Wang\*  
Peking University; State Key Laboratory of Organometallic Chemistry, Chinese Academy of Sciences

A simple and efficient method has been developed for the synthesis of tetrahydrofurans. This method is based on the Cu(I)-catalyzed cascade coupling/cyclization reaction of *N*-tosylhydrazones with 3-butyne-1-ol, and involves a Cu(I) carbene migratory insertion as one of its key steps.

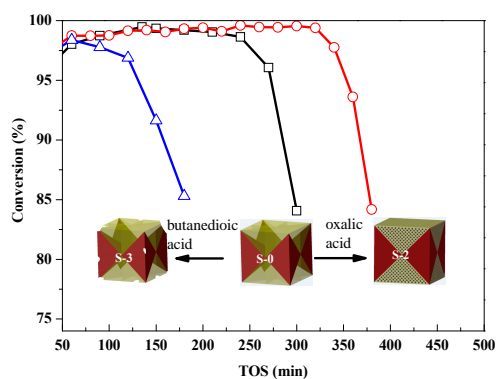


*Chin. J. Catal.*, 2017, 38: 123–130 doi: 10.1016/S1872-2067(16)62557-3

### Enhanced MTO performance over acid treated hierarchical SAPO-34

Shu Ren, Guojuan Liu, Xian Wu, Xinqing Chen, Minghong Wu, Gaofeng Zeng, Ziyu Liu\*, Yuhua Sun\*  
Shanghai University; Shanghai Advanced Research Institute

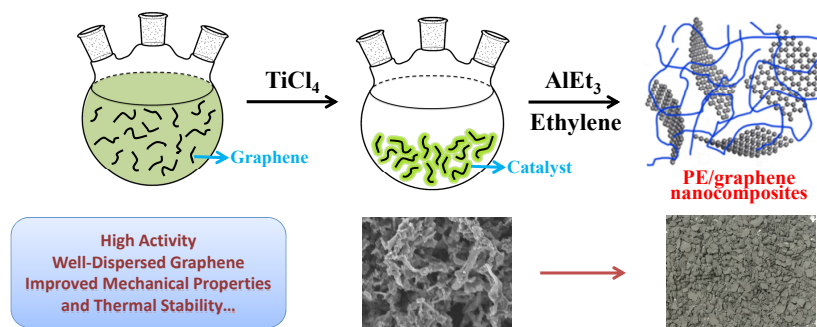
Hierarchical SAPO-34 crystals with butterfly-shaped faces were synthesized by acid etching, which increased the catalyst lifetime and light olefin yield in the MTO reaction.



*Chin. J. Catal.*, 2017, 38: 131–137 doi: 10.1016/S1872-2067(16)62559-7

### Preparation of graphene/MgCl<sub>2</sub>-supported Ti-based Ziegler-Natta catalysts by the coagglomeration method and their application in ethylene polymerization

Hexin Zhang, Jae-Hyeong Park, Young-Kwon Moon, Eun-Bin Ko, Dong-ho Lee, Yanming Hu, Xuequan Zhang\*, Keun-Byoung Yoon\*  
*Kyungpook National University, Korea; Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China*



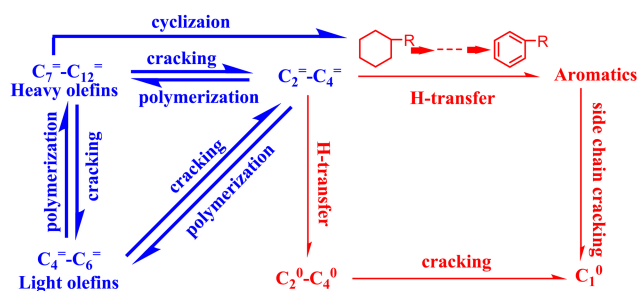
A facile coagglomeration method for preparing graphene/MgCl<sub>2</sub>-supported Ziegler-Natta catalyst was reported. After in-situ ethylene polymerization, the resultant polyethylene/graphene nanocomposites exhibited enhanced thermal stability and mechanical properties than neat polyethylene.

*Chin. J. Catal.*, 2017, 38: 138–145 doi: 10.1016/S1872-2067(16)62579-2

### Enhancing hydrothermal stability of nano-sized HZSM-5 zeolite by phosphorus modification for olefin catalytic cracking of full-range FCC gasoline

Yun Zhao, Jiaxu Liu, Guang Xiong, Hongchen Guo\*  
*Dalian University of Technology*

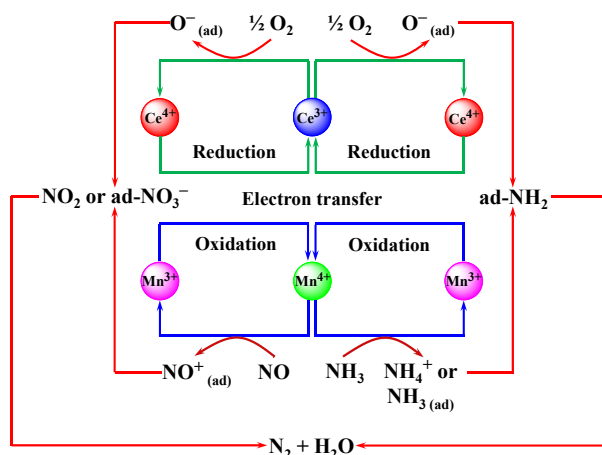
Phosphorus modification of nano-sized HZSM-5 zeolite by trimethyl phosphate impregnation was employed to enhance hydrothermal stability of the zeolites, which exhibited excellent catalytic performance for the olefin catalytic cracking of full-range fluid catalytic cracking gasoline.



*Chin. J. Catal.*, 2017, 38: 146–159 doi: 10.1016/S1872-2067(16)62572-X

### Influence of preparation methods on the physicochemical properties and catalytic performance of MnO<sub>x</sub>-CeO<sub>2</sub> catalysts for NH<sub>3</sub>-SCR at low temperature

Xiaojiang Yao\*, Kaili Ma, Weixin Zou, Shenggui He, Jibin An, Fumo Yang\*, Lin Dong\*  
*Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences; Nanjing University; Institute of Chemistry, Chinese Academy of Sciences; Chongqing University of Arts and Sciences; Institute of Urban Environment, Chinese Academy of Sciences*



Electron interaction between MnO<sub>x</sub> and CeO<sub>2</sub> is influenced by the preparation methods, which can improve the physicochemical properties of MnO<sub>x</sub>-CeO<sub>2</sub> catalysts, and promote the adsorption/activation of reactant molecules to result in excellent catalytic performance.



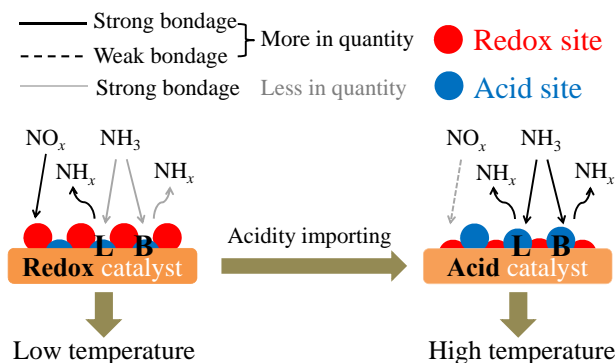
*Chin. J. Catal.*, 2017, 38: 160–167 doi: 10.1016/S1872-2067(16)62581-0

### Influence of sulfation on CeO<sub>2</sub>-ZrO<sub>2</sub> catalysts for NO reduction with NH<sub>3</sub>

He Zhang, Yonggang Zou\*, Yue Peng\*

Changchun University of Science and Technology, China;  
Georgia Institute of Technology, United States

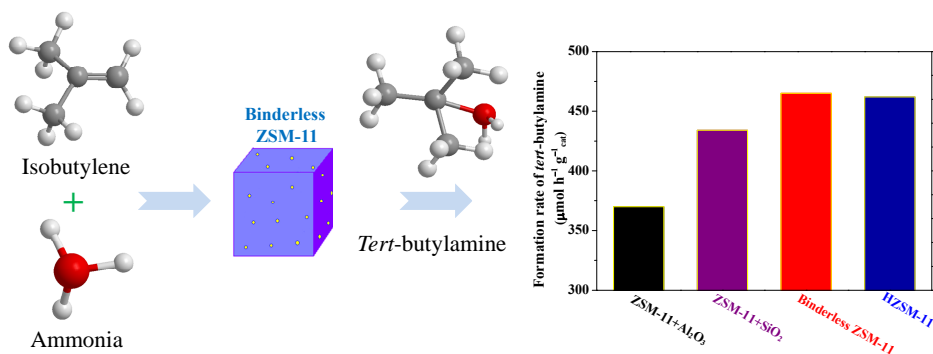
At low temperature the redox property of catalysts presents more contributions to activity than surface acidity. At high temperature, however, the surface acidity especially the strong Brønsted acid sites mainly determines SCR activity.



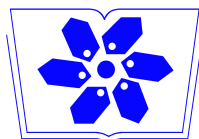
*Chin. J. Catal.*, 2017, 38: 168–175 doi: 10.1016/S1872-2067(17)62756-6

### A shaped binderless ZSM-11 zeolite catalyst for direct amination of isobutene to *tert*-butylamine

Wanshuo Zhang, Shangyao Gao, Sujuan Xie, Hui Liu, Xiangxue Zhu, Yongchen Shang\*, Shenglin Liu\*, Longya Xu, Ye Zhang  
Harbin Normal University; Dalian Institute of Chemical Physics, Chinese Academy of Sciences; University of Chinese Academy of Sciences;  
Sinochem Quanzhou Petrochemical Co., Ltd; PetroChina Fushun Petrochemical Company



A shaped binderless ZSM-11 catalyst was prepared by the dry-gel conversion technique and showed superior performance in isobutene amination reaction.



中国科学院科学出版基金资助出版



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