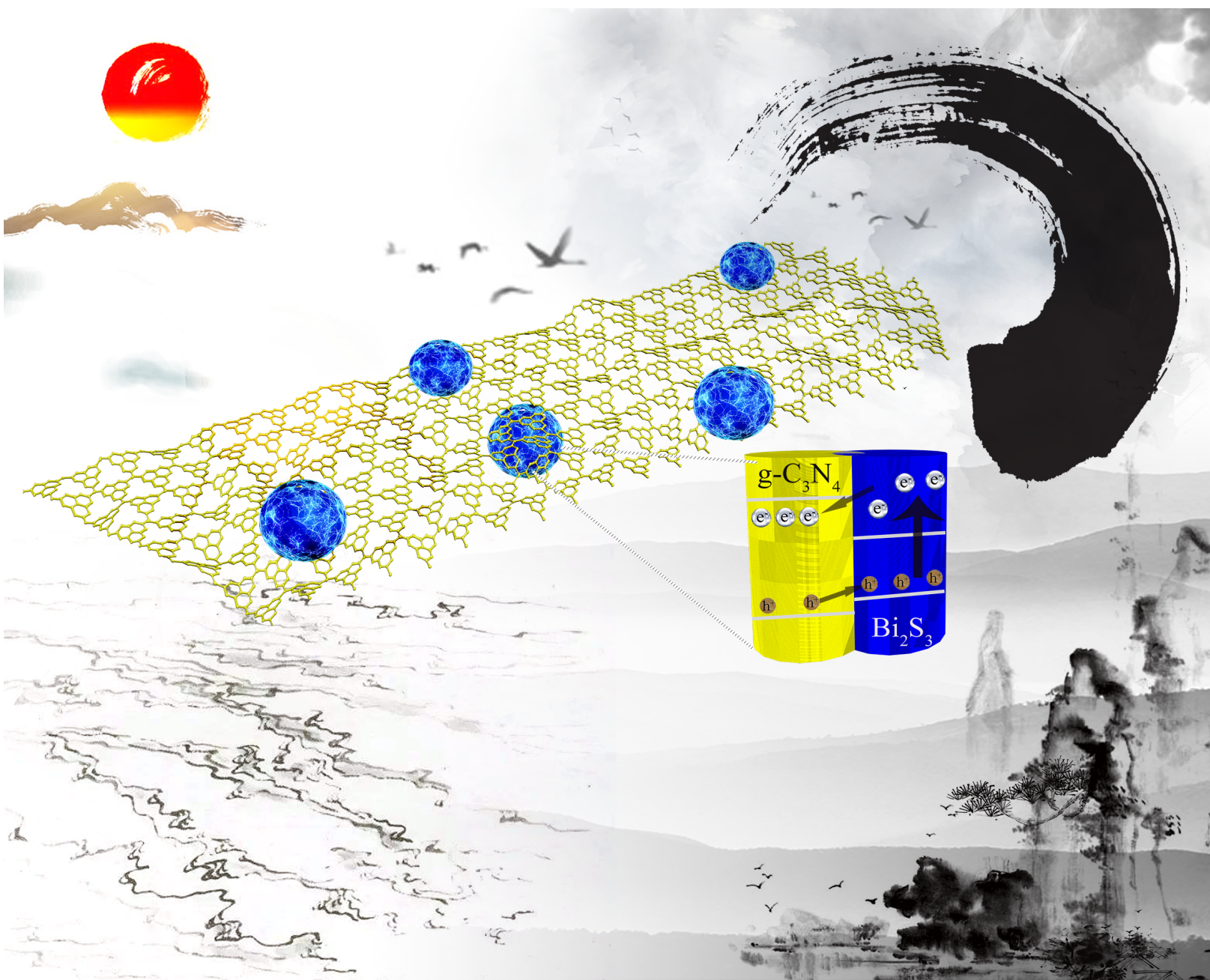




Chinese Journal of Catalysis

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Chinese Journal of Catalysis

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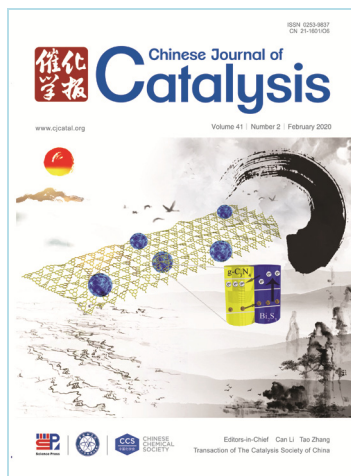
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In This Issue



Cover: Hao and coauthors in their Article on pages 249–258 reported a facile synthesis of bismuth sulfide nanoparticle modified graphitic carbon nitride and the composite materials exhibited excellent photocatalytic performance under simulated sunlight irradiation. The authors employed the photothermal effect, high-energy electron theory and electron paramagnetic resonance spectra to clarify the reaction mechanism.

封面: 郝强等报道了一种硫化铋纳米颗粒修饰的类石墨相氮化碳光催化材料的简易合成方法, 该材料在模拟太阳光照射下表现出优异的光催化性能。作者利用光热转换、高能电子理论和电子顺磁共振谱等解释了催化反应的机理。见本期第 249–258 页。

About the Journal

Chinese Journal of Catalysis is an international journal published monthly by Chinese Chemical Society, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, and Elsevier. The journal publishes original, rigorous, and scholarly contributions in the fields of heterogeneous and homogeneous catalysis in English or in both English and Chinese. The scope of the journal includes:

- ◆ New trends in catalysis for applications in energy production, environmental protection, and production of new materials, petroleum chemicals, and fine chemicals;
- ◆ Scientific foundation for the preparation and activation of catalysts of commercial interest or their representative models;
- ◆ Spectroscopic methods for structural characterization, especially methods for in situ characterization;
- ◆ New theoretical methods of potential practical interest and impact in the science and applications of catalysis and catalytic reaction;
- ◆ Relationship between homogeneous and heterogeneous catalysis;
- ◆ Theoretical studies on the structure and reactivity of catalysts.
- ◆ The journal also accepts contributions dealing with photo-catalysis, bio-catalysis, and surface science and chemical kinetics issues related to catalysis.

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- **Reviews** deal with topics of current interest in the areas covered by this journal. Reviews are surveys, with entire, systematic, and important information, of recent progress in important topics of catalysis. Rather than an assemblage of detailed information or a complete literature survey, a critically selected treatment of the material is desired. Unsolved problems and possible developments should also be discussed. Authors should have published articles in the field. Reviews should have more than 80 references.
- **Communications** rapidly report studies with significant innovation and major academic value. They are limited to four Journal pages. After publication, their full-text papers can also be submitted to this or other journals.
- **Articles** are original full-text reports on innovative, systematic and completed research on catalysis.
- **Highlights** describe and comment on very important new results in the original research of a third person with a view to highlight their significance. The results should be presented clearly and concisely without the comprehensive details required for an original article.
- **Perspectives** are short reviews of recent developments in an established or developing topical field. The authors should offer a critical assessment of the trend of the field, rather than a summary of literatures.
- **Viewpoints** describe the results of original research in general in some area, with a view to highlighting the progress, analyzing the major problems, and commenting the possible research target and direction in the future.

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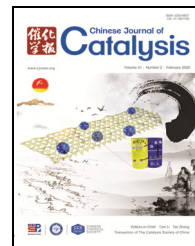
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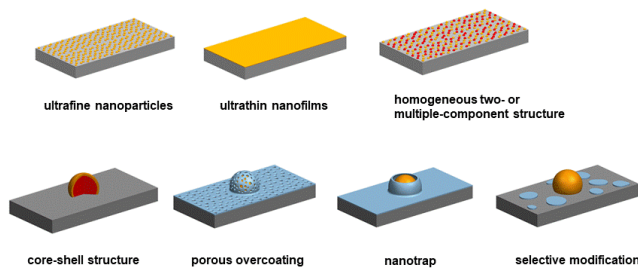
Chin. J. Catal., 2020, 41: 227–241 doi: S1872-2067(19)63440-6

Application of atomic layer deposition in fabricating high-efficiency electrocatalysts

Huimin Yang, Yao Chen, Yong Qin *

Institute of Coal Chemistry, Chinese Academy of Sciences; Northwestern Polytechnical University

ALD strategies for fabricating high-efficiency electrocatalysts



This review summarizes recent developments in atomic layer deposition (ALD) toward the design and synthesis of electrocatalysts, including different ALD strategies for improving the activity and stability of noble metal Pt electrocatalysts, noble bimetallic electrocatalysts, and non-noble metallic electrocatalysts.

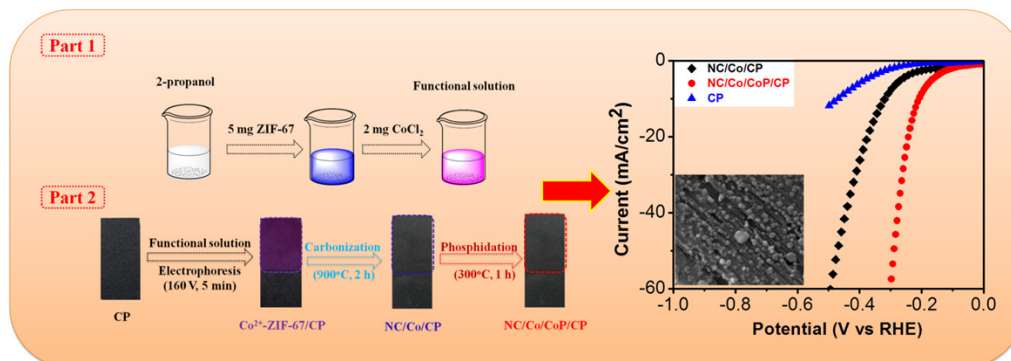
Communication

Chin. J. Catal., 2020, 41: 242–248 doi: S1872-2067(19)63410-8

In situ assembly of metal-organic framework-derived N-doped carbon/Co/CoP catalysts on carbon paper for water splitting in alkaline electrolytes

Meiyu Cong, Deshuai Sun, Linlin Zhang, Xin Ding *

Qingdao University



An MOF-derived NC/Co/CoP/CP electrode was obtained by electrophoretic deposition and post-processing reactions. The binder-free electrode showed favorable catalytic activity in both HER and OER processes.

Articles

Chin. J. Catal., 2020, 41: 249–258 doi: S1872-2067(19)63450-9

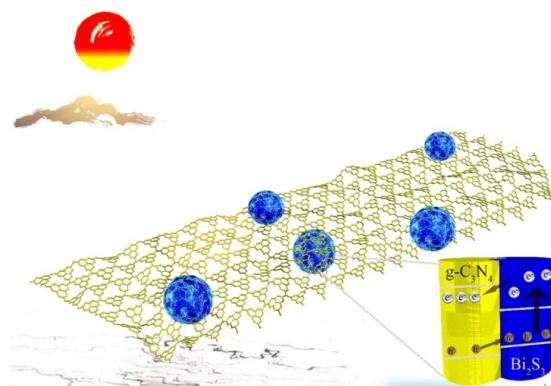
Accelerated separation of photogenerated charge carriers and enhanced photocatalytic performance of g-C₃N₄ by Bi₂S₃ nanoparticles

Qiang Hao, Ci'an Xie, Yongming Huang, Daimei Chen*, Yiwen Liu, Wei Wei, Bing-Jie Ni*

China University of Geosciences Beijing, China;

University of Technology Sydney (UTS), Australia

Accelerated separation of photogenerated charge carriers and enhanced photocatalytic performance of g-C₃N₄ by Bi₂S₃ nanoparticles.



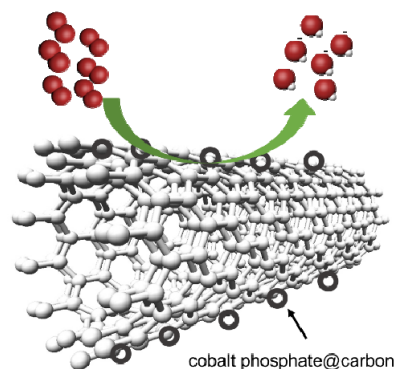
Chin. J. Catal., 2020, 41: 259–267 doi: S1872-2067(19)63455-8

Phosphonate-derived nitrogen-doped cobalt phosphate/carbon nanotube hybrids as highly active oxygen reduction reaction electrocatalysts

Hui Zhao, Chen-Chen Weng, Jin-Tao Ren, Li Ge, Yu-Ping Liu, Zhong-Yong Yuan*

Nankai University; Liaocheng University

Phosphonate-derived nitrogen-doped cobalt phosphate/carbon nanotube hybrids were synthesized by a facile hydrothermal treatment followed by high temperature calcination under inert atmosphere, exhibiting superior catalytic activity towards ORR in alkaline media.

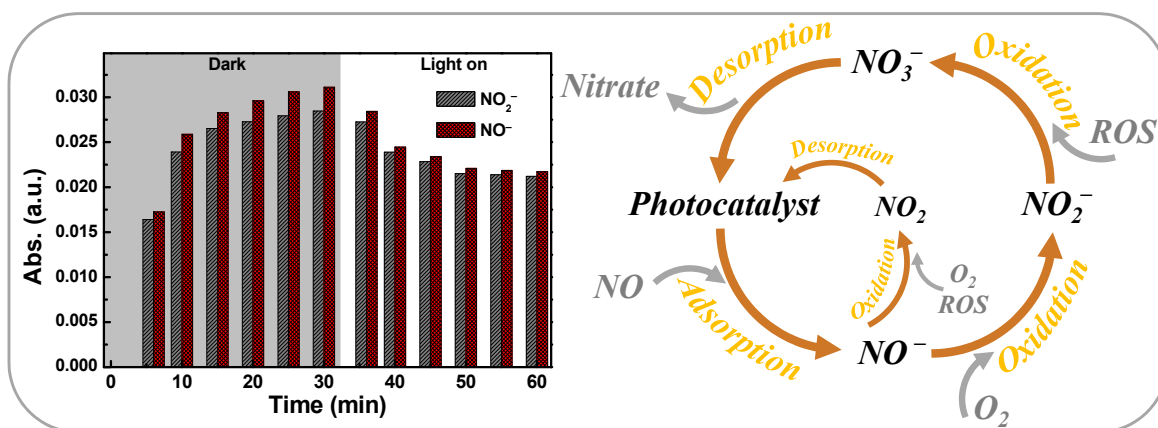


Chin. J. Catal., 2020, 41: 268–275 doi: S1872-2067(19)63460-1

Facile construction of Bi₂Mo₃O₁₂@Bi₂O₂CO₃ heterojunctions for enhanced photocatalytic efficiency toward NO removal and study of the conversion process

Wangchen Huo, Tong Cao, Weina Xu, Ziyang Guo, Xiaoying Liu, Hong-Chang Yao, Yuxin Zhang*, Fan Dong*

Chongqing University; University of Electronic Science and Technology of China; Chongqing Technology and Business University; Zhengzhou University



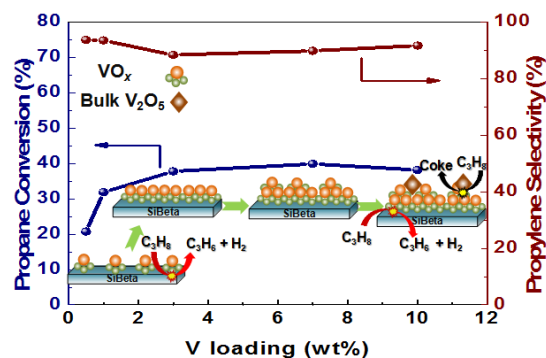
The in situ DRIFTS was applied to intuitively and dynamically investigate the NO oxidation process over the surface of BMO@BOC heterojunction. And the NO⁻ and NO₂⁻ could be oxidized by ROS to form the nitrate.

Chin. J. Catal., 2020, 41: 276–285 doi: S1872-2067(19)63444-3

Nature of active phase of VO_x catalysts supported on SiBeta for direct dehydrogenation of propane to propylene

Chong Chen, Minglei Sun, Zhongpan Hu, Yuping Liu,
Shoumin Zhang, Zhong-Yong Yuan*
Nankai University

The acidic sites of VO_x catalyst supported on SiBeta zeolite are the catalytically active phase, derived from the interaction sites, which shows high activity and great reusability in direct dehydrogenation of propane to propylene.

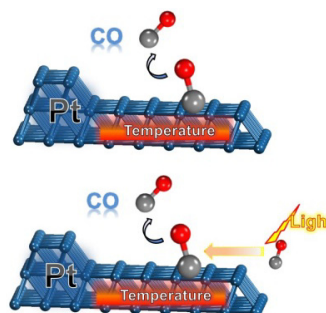


Chin. J. Catal., 2020, 41: 286–293 doi: S1872-2067(19)63445-5

Visible light-enhanced photothermal CO_2 hydrogenation over Pt/ Al_2O_3 catalyst

Ziyan Zhao, Dmitry E. Doronkin*, Yinghao Ye,
Jan-Dierk Grunwaldt, Zeai Huang, Ying Zhou*
Southwest Petroleum University, China;
Karlsruhe Institute of Technology, Germany

Light illumination and temperature affected CO coverage during CO_2 hydrogenation in different ways, offering a new pathway for improving the thermal catalysis.

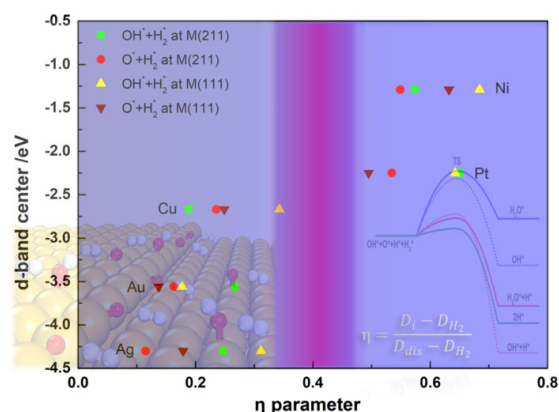


Chin. J. Catal., 2020, 41: 294–301 doi: S1872-2067(19)63434-0

General trends in Horiuti-Polanyi mechanism vs non-Horiuti-Polanyi mechanism for water formation on transition metal surfaces

Xitong Sun, Jianfu Chen*, P. Hu*
East China University of Science and Technology, China;
Queen's University Belfast, UK

A thorough investigation of the Horiuti-Polanyi (HP) mechanism and the non-HP mechanism for hydroxyl/oxygen hydrogenation catalyzed by transition metals has been carried out through first-principles calculations, and the descriptor η was defined to understand the different mechanisms.

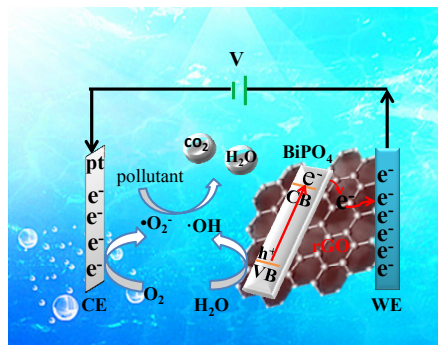


Chin. J. Catal., 2020, 41: 302–311 doi: S1872-2067(19)63520-5

Preparation of BiPO_4 /graphene photoelectrode and its photoelectrocatalytic performance

Zetian He, Sen Liu, Yi Zhong, Daimei Chen*, Hao Ding*,
Jiao Wang, Gaoxiang Du, Guang Yang, Qiang Hao
China University of Geosciences, China; Beijing Polytechnic College,
China; University of Technology Sydney, Australia

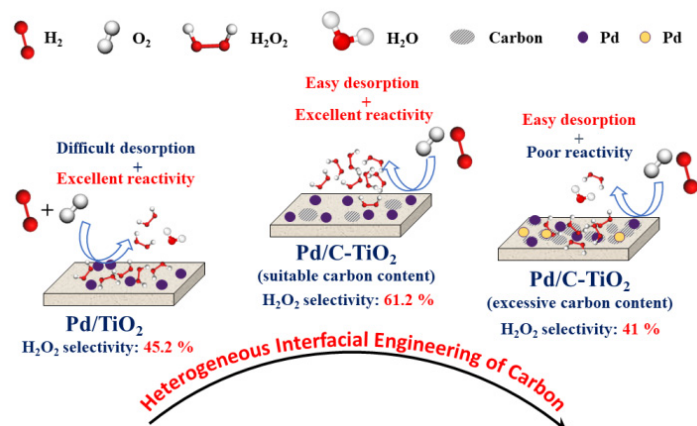
A BiPO_4 /rGO/FTO composite photoelectrode was prepared by a simple two-step electrodeposition method. The BiPO_4 /rGO/FTO composite photoelectrode exhibits the higher PEC activity than BiPO_4 /FTO photoelectrode and it has good stability.



Chin. J. Catal., 2020, 41: 312–321 doi: S1872-2067(19)63412-1

Heterogeneous interfacial engineering of Pd/TiO₂ with controllable carbon content for improved direct synthesis efficiency of H₂O₂

Wei Yan, Rui Sun, Meng Li, Licheng Li *, Zhuhong Yang, Zelin Hua, Xiaohua Lu, Chang Liu *
Nanjing Tech University; Nanjing Forestry University



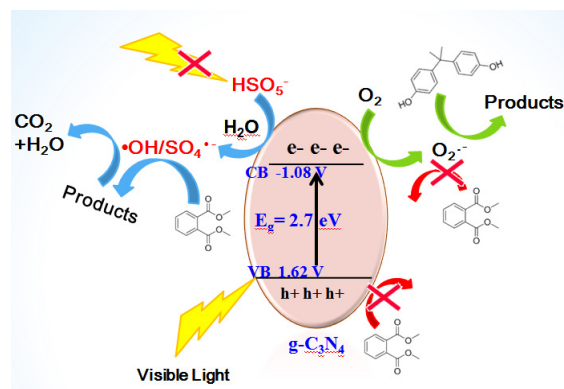
Heterogeneous interfacial engineering of carbon could maintain the interaction of Pd nanoparticles with TiO₂ and simultaneously accelerate the H₂O₂ desorption, which improves the H₂O₂ direct synthesis performance of catalyst.

Chin. J. Catal., 2020, 41: 322–332 doi: S1872-2067(19)63447-9

Mechanistic studies on peroxymonosulfate activation by g-C₃N₄ under visible light for enhanced oxidation of light-inert dimethyl phthalate

Lijie Xu, Lanyue Qi, Yang Sun, Han Gong, Yiliang Chen, Chun Pei, Lu Gan *
Nanjing Forestry University; South China Agricultural University; Shenzhen University

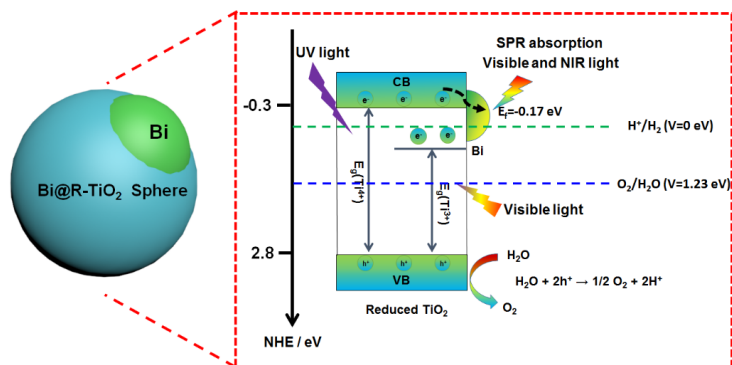
Synergistic effects were obtained by combining g-C₃N₄ with PMS under visible light. The dominant radicals were converted from •O₂⁻ to SO₄^{•-} and •OH. Increase of g-C₃N₄ dosage was more productive than increase of PMS.



Chin. J. Catal., 2020, 41: 333–340 doi: S1872-2067(19)63428-5

Noble metal-like behavior of plasmonic Bi particles deposited on reduced TiO₂ microspheres for efficient full solar spectrum photocatalytic oxygen evolution

Hang Zhao, Zhangqian Liang, Xiang Liu, Pengyuan Qiu, Hongzhi Cui *, Jian Tian *
Shandong University of Science and Technology



The novel plasmonic Bi metal *in situ* deposited in reduced TiO₂ microspheres are fabricated via a bimetallic MOF-derived synthesized strategy, which exhibit the excellent full solar spectrum photocatalytic oxygen evolution activity (4728.709 μmol h⁻¹ g⁻¹).

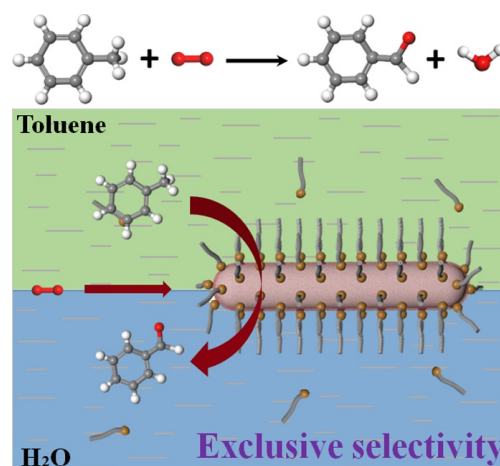
Chin. J. Catal., 2020, 41: 341–349 doi: S1872-2067(19)63417-0

Exclusively catalytic oxidation of toluene to benzaldehyde in an O/W emulsion stabilized by hexadecylphosphate acid terminated mixed-oxide nanoparticles

Changshun Deng, Mengxia Xu, Zhen Dong, Lei Li, Jinyue Yang, Xuefeng Guo, Luming Peng, Nianhua Xue, Yan Zhu, Weiping Ding*

Nanjing University; Luoyang R&D Center of Technology, Sinopec Engineering (Group) Co., Ltd.

A hexadecylphosphate acid-functionalized $(\text{Fe}_2\text{O}_3\text{-MO}_x)/\text{Al}_2\text{O}_3$ nanorods as the catalyst was used for the oxidation of toluene to benzaldehyde in toluene/water biphasic system under mild conditions. Both the doped iron oxide and the surface adsorbed hexadecylphosphate molecules were essential to provide the excellent catalytic performance for high toluene conversion and the exclusive selectivity to benzaldehyde.



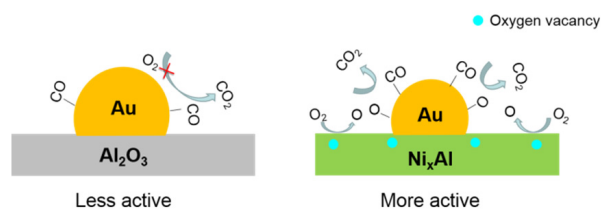
Chin. J. Catal., 2020, 41: 350–356 doi: S1872-2067(19)63439-X

Promotion effects of nickel-doped Al_2O_3 -nanosheet-supported Au catalysts for CO oxidation

Rao Lu, Lei He, Yang Wang, Xin-Qian Gao, Wen-Cui Li*

Dalian University of Technology

The Ni-doped Al_2O_3 -supported Au catalyst exhibited excellent performance for CO oxidation because of its small Au NPs, strong CO adsorption, and O_2 activation properties.



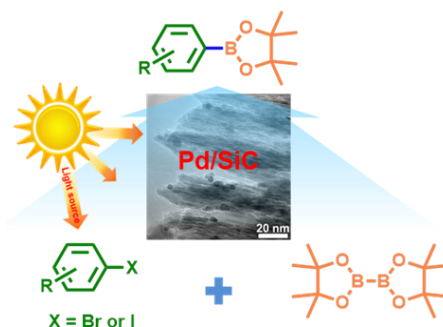
Chin. J. Catal., 2020, 41: 357–363 doi: S1872-2067(19)63449-2

Photocatalytic C–X borylation of aryl halides by hierarchical SiC nanowire-supported Pd nanoparticles

Zhi-Feng Jiao, Ji-Xiao Zhao, Xiao-Ning Guo*, Xiang-Yun Guo*

Institute of Coal Chemistry, Chinese Academy of Sciences, China;
Julius-Maximilians-Universität Würzburg, Germany;
Changzhou University, China;
University of Chinese Academy of Sciences, China

Hierarchical SiC nanowire-supported Pd nanoparticles showed high photocatalytic activity for the C–X (X = Br, I) borylation of aryl halides at 30 °C, due to the rapid transfer of photogenerated electrons from SiC to Pd through their Mott-Schottky contact.



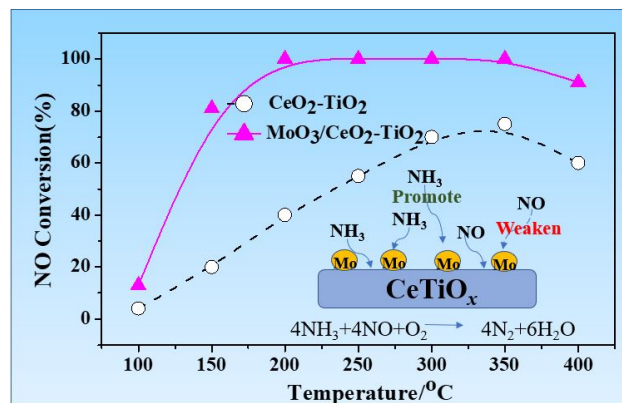
Chin. J. Catal., 2020, 41: 364–373 doi: S1872-2067(19)63437-6

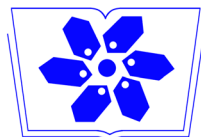
Enhanced low-temperature NH_3 -SCR performance of CeTiO_x catalyst via surface Mo modification

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Mo surface modification improves the low-temperature NH_3 -SCR activity and SO_2 -poisoning resistance of the CeTiO_x catalyst because the acid site number is significantly increased and the adsorption of nitrate species is weakened.





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