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# Chinese Journal of Catalysis

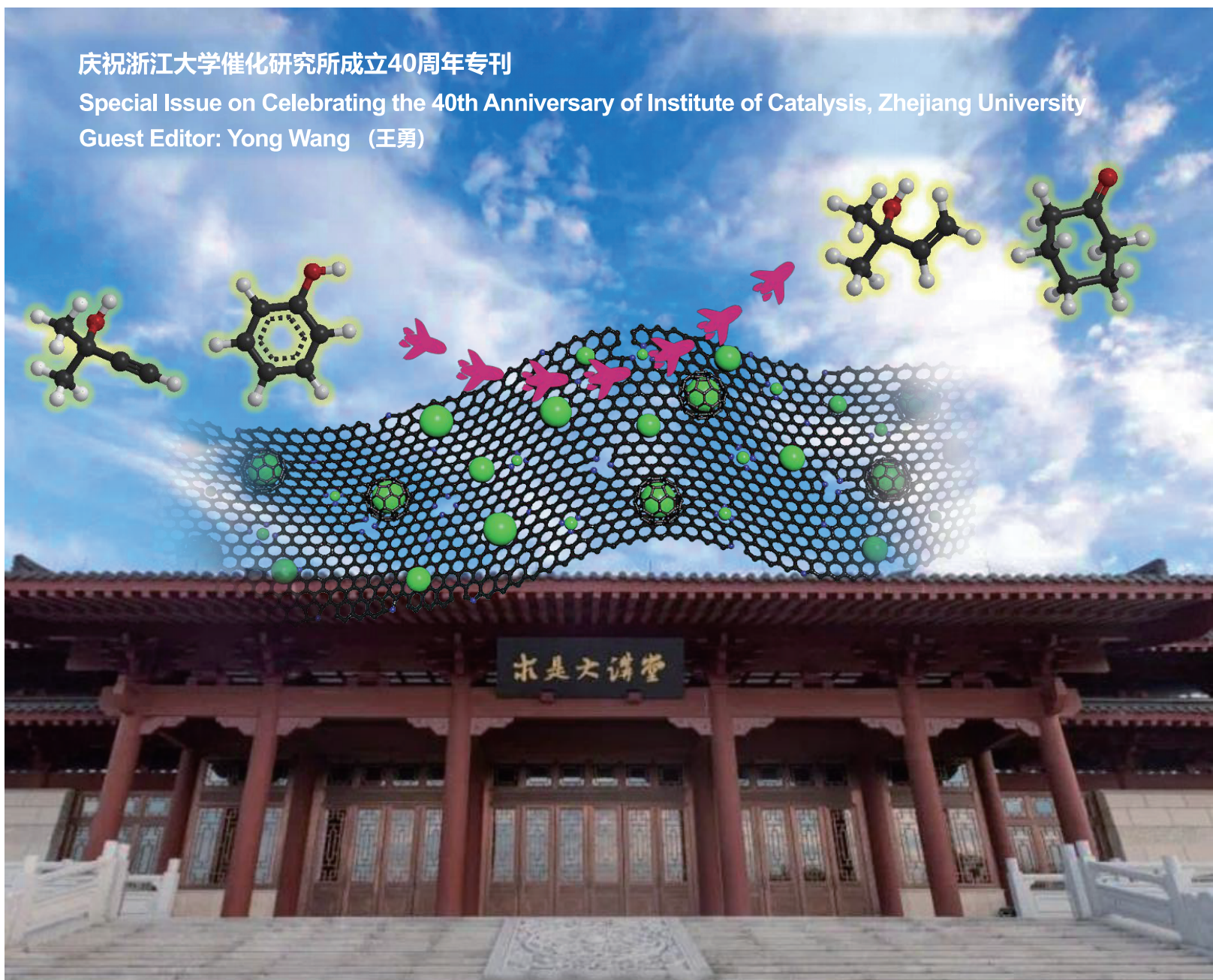
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Special Issue on Celebrating the 40th Anniversary of Institute of Catalysis, Zhejiang University

Guest Editor: Yong Wang (王勇)



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Editors-in-Chief Can Li (李灿) Tao Zhang (张涛)  
Transaction of The Catalysis Society of China





# Chinese Journal of Catalysis

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## In This Issue



**Cover:** Various active centers, including bare nanoparticles, metal or metal oxides encapsulated partly by carbon layers and single-atoms, co-exists on the nitrogen-doped carbon supported metal catalysts. Many transformations can be catalyzed by these catalysts due to the synergy effect between several active sites. They have a great potential for many valuable reactions in industry. This special issue collects 13 papers with 1 perspective, 4 full reviews, 1 communication and 7 original research papers.

**封面:** 氮掺杂炭负载型纳米催化剂中活性位点种类丰富,且各位点之间存在很强的协同作用,可高效催化多种底物的选择性加氢反应,具有广泛的应用前景. 本期庆祝浙江大学催化研究所成立40周年催化专刊共收集13篇文章,包括1篇视角、4篇综述、1篇快讯和7篇论文.

## 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.

### Types of Contributions

- **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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2017 SCI Impact Factor: **3.525**  
2017 SCI 5-Year Impact Factor: 2.736

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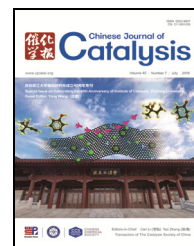
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## Special Issue on Celebrating the 40th Anniversary of Institute of Catalysis, Zhejiang University

Guest Editor: Yong Wang

### Chinese Journal of Catalysis

### Graphical Contents

#### Editorial

*Chin. J. Catal.*, 2019, 40: 969–970 doi: S1872-2067(19)63394-2

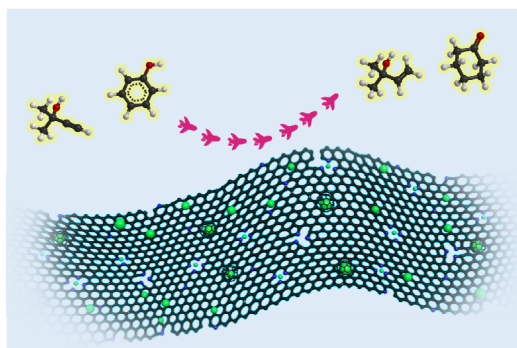
#### Preface to Special Issue on Celebrating the 40th Anniversary of Institute of Catalysis, Zhejiang University

Yong Wang  
*Zhejiang University*

#### Perspective

*Chin. J. Catal.*, 2019, 40: 971–979 doi: S1872-2067(19)63353-X

#### Rational design of hydrogenation catalysts using nitrogen-doped porous carbon

Yuzhuo Chen, Zhe Wang, Shanjun Mao, Yong Wang\*  
*Zhejiang University*

This perspective discusses the microstructure of N-doped carbon, the fabrication of various N-doped carbon materials, and the application of N-doped carbon-based metal catalysts in different hydrogenation reactions. The image shows the structure of N-doped carbon and its application in hydrogenation.

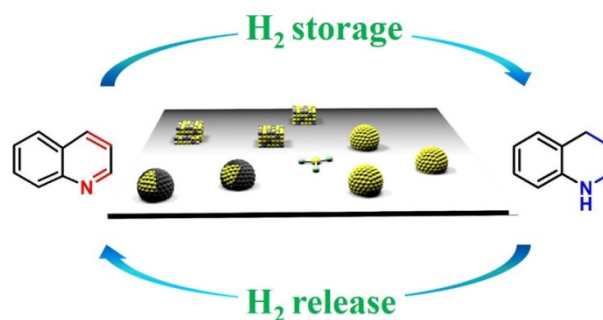
## Reviews

*Chin. J. Catal.*, 2019, 40: 980–1002 doi: S1872-2067(19)63336-X

### Recent advances in heterogeneous catalytic hydrogenation and dehydrogenation of N-heterocycles

Zhongzhe Wei, Fangjun Shao, Jianguo Wang\*  
Zhejiang University of Technology

An overview summarizes the recent progress on the heterogeneous catalytic hydrogenation and reverse dehydrogenation of N-heterocycles spanning from noble metal catalysts to earth-abundant catalysts, and discusses their overall fabrication strategies and microstructure-reactivity relationships.

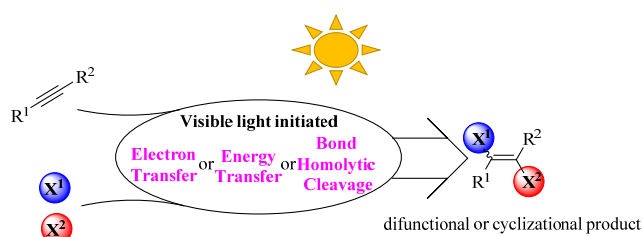


*Chin. J. Catal.*, 2019, 40: 1003–1019 doi: S1872-2067(19)63278-X

### Visible light promoted difunctionalization reactions of alkynes

Xiang Ren, Zhan Lu\*  
Zhejiang University

Visible light promoted difunctionalization and cyclization of alkynes are discussed. The strategy has succeeded in the construction of C–C, C–O, C–P, C–N, C–S, C–Se, and C–Br bonds, as well as several valuable chemical skeletons under mild conditions.

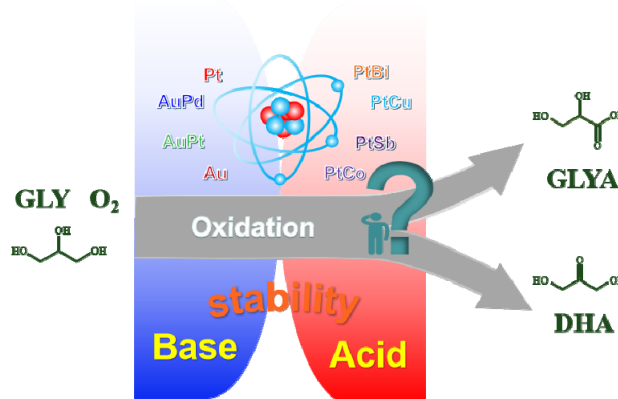


*Chin. J. Catal.*, 2019, 40: 1020–1034 doi: S1872-2067(19)63301-2

### Selective oxidation of glycerol in a base-free aqueous solution: A short review

Lihua Yang, Xuwen Li, Ping Chen, Zhaoyin Hou\*  
Zhejiang University

Recent progresses in the selective oxidation of glycerol with molecular oxygen were reviewed, and the performance of monometallic Au, Pt and Pd, bimetallic Au–Pt, Au–Pd, Pt–Bi, Pt–Sb, Pt–Cu, Pt–Co catalysts were compared and discussed.

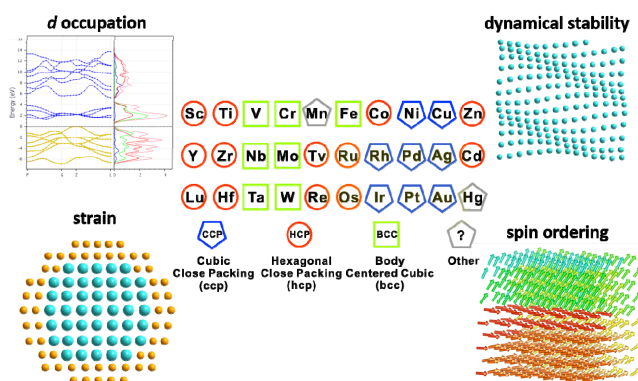


*Chin. J. Catal.*, 2019, 40: 1035–1056 doi: S1872-2067(19)63385-1

### Crystal phase regulation in noble metal nanocrystals

Qiaoli Chen, Tianchun Cheng, Hongya Fu, Yihan Zhu\*  
Zhejiang University of Technology

Crystal phase engineering of noble metal nanocrystals leads to intriguing performances in catalysis and energy conversion. This review provides the basic principles, design rationale, synthetic approaches, and structural characterizations related to the topic of “regulations in crystal phase engineering.”



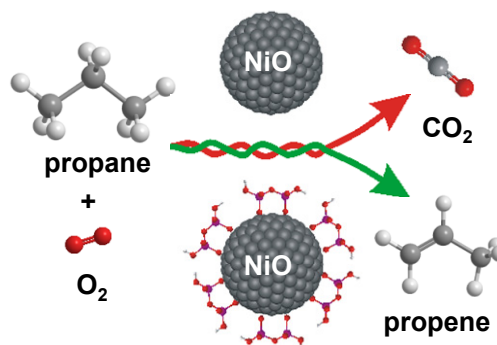


## Communication

*Chin. J. Catal.*, 2019, 40: 1057–1062 doi: 10.1016/S1872-2067(18)63199-7

### Tuning catalytic selectivity of propane oxidative dehydrogenation via surface polymeric phosphate modification on nickel oxide nanoparticles

Kaimin Du, Mengjia Hao, Zhinian Li, Wei Hong, Juanjuan Liu, Liping Xiao, Shihui Zou \*, Hisayoshi Kobayashi \*, Jie Fan \*  
*Zhejiang University, China;*  
*Hangzhou Dianzi University, China;*  
*Kyoto Institute of Technology, Japan*



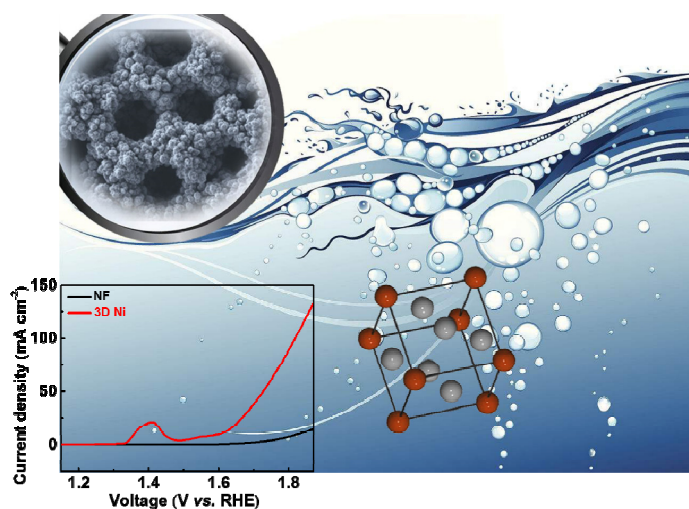
Polymeric phosphate is demonstrated as an efficient and stable ligand to tune the selectivity of propane oxidative dehydrogenation. Beneficial from the weakened affinity of propene, NiO modified with polymeric phosphate shows a selectivity 2–3 times higher than NiO towards the production of propene.

## Articles

*Chin. J. Catal.*, 2019, 40: 1063–1069 doi: 10.1016/S1872-2067(18)63194-8

### Rational construction of cross-linked porous nickel arrays for efficient oxygen evolution reaction

Kaili Zhang, Shengjue Deng, Yu Zhong, Yadong Wang, Jianbo Wu, Xiuli Wang, Xinhui Xia \*, Jiangping Tu  
*Zhejiang University, China; Nanyang Polytechnic, Singapore; Taizhou University, China*



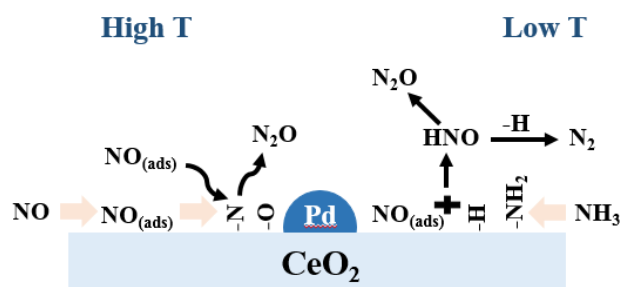
Free-standing 3D nickel arrays with cross-linked highly porous structure are prepared by a versatile one-step electrodeposition method and show superior electrocatalytic performance and remarkable long-term durability.

*Chin. J. Catal.*, 2019, 40: 1070–1077 doi: S1872-2067(19)63328-0

### Mechanistic insight into N<sub>2</sub>O formation during NO reduction by NH<sub>3</sub> over Pd/CeO<sub>2</sub> catalyst in the absence of O<sub>2</sub>

Liping Sheng †, Zhaoxia Ma †, Shiyuan Chen, Jinze Lou, Chengye Li, Songda Li, Ze Zhang, Yong Wang \*, Hangsheng Yang \*  
*Zhejiang University*

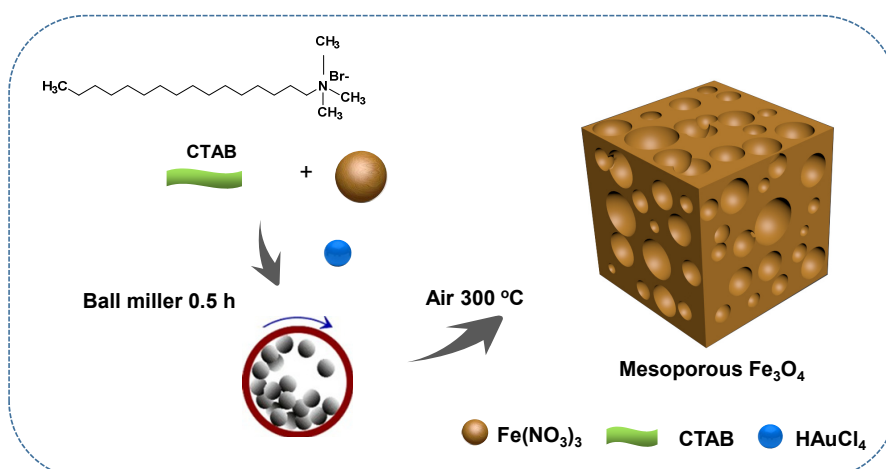
N<sub>2</sub>O formation at low temperatures is through the reaction of two HON intermediates. However, at high temperatures, direct dissociation of NO into N• and O• takes place, and the combination of N• and NO<sub>(ads)</sub> is the route for N<sub>2</sub>O generation.



*Chin. J. Catal.*, 2019, 40: 1078–1084 doi: S1872-2067(19)63288-2

### Solid-state CTAB-assisted synthesis of mesoporous Fe<sub>3</sub>O<sub>4</sub> and Au@Fe<sub>3</sub>O<sub>4</sub> by mechanochemistry

Jiahua Zhao, Yuan Shu, Pengfei Zhang\*  
Shanghai Jiao Tong University



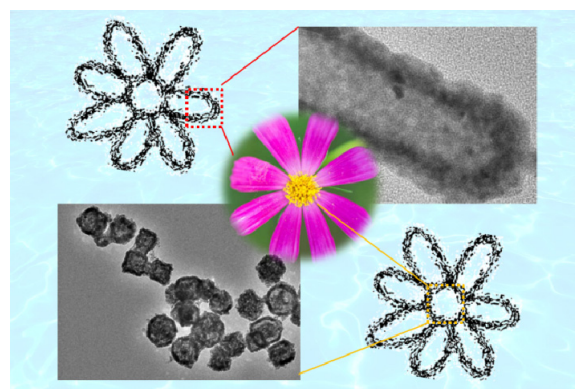
Structurally adjustable mesoporous Fe<sub>3</sub>O<sub>4</sub> and Au@Fe<sub>3</sub>O<sub>4</sub> were rapidly fabricated via mechanochemistry. Meso-Fe<sub>3</sub>O<sub>4</sub> showed excellent catalytic performance for the CO catalytic oxidation reaction, and the Au nanoparticles were highly dispersed.

*Chin. J. Catal.*, 2019, 40: 1085–1092 doi: S1872-2067(19)63299-7

### Cobalt phosphide nanocage@ferric-zinc mixed-metal phosphide nanotube hierarchical nanocomposites for enhanced overall water splitting

Xiaowei Hu, Yongheng Yin, Wei Liu, Xingwang Zhang\*, Hongxiu Zhang\*  
Linyi University; Zhejiang University

A novel hierarchical porous nanocomposite of a cobalt phosphide nanocage@ferric-zinc mixed-metal phosphide nanotube composite has been successfully fabricated using a self-assembly approach. The material shows enhanced catalytic activity for the hydrogen evolution reaction and oxygen evolution reaction compared to the bulk counterpart.

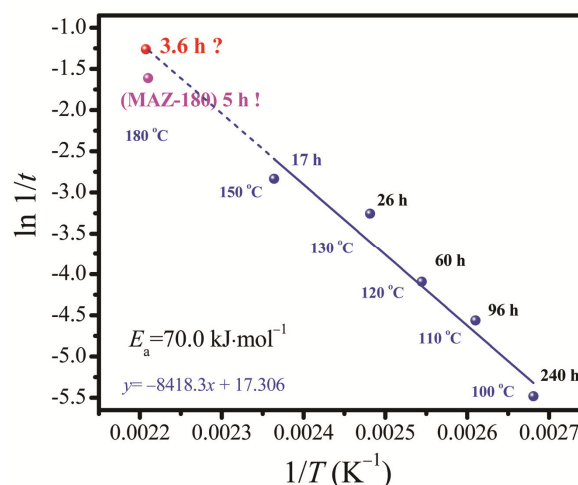


*Chin. J. Catal.*, 2019, 40: 1093–1099 doi: S1872-2067(19)63280-8

### Design of fast crystallization of nanosized zeolite omega crystals at higher temperatures

Fen Zhang, Ling Zhang, Zhichao Yang, Shichao Han, Qiuyan Zhu, Liang Wang, Chenguang Liu, Xiangju Meng\*, Feng-Shou Xiao\*  
Zhejiang University; China University of Petroleum (East China)

Design of fast crystallization of nanosized zeolite omega crystals based on the relationship between crystallization time and temperature according to the Arrhenius equation.



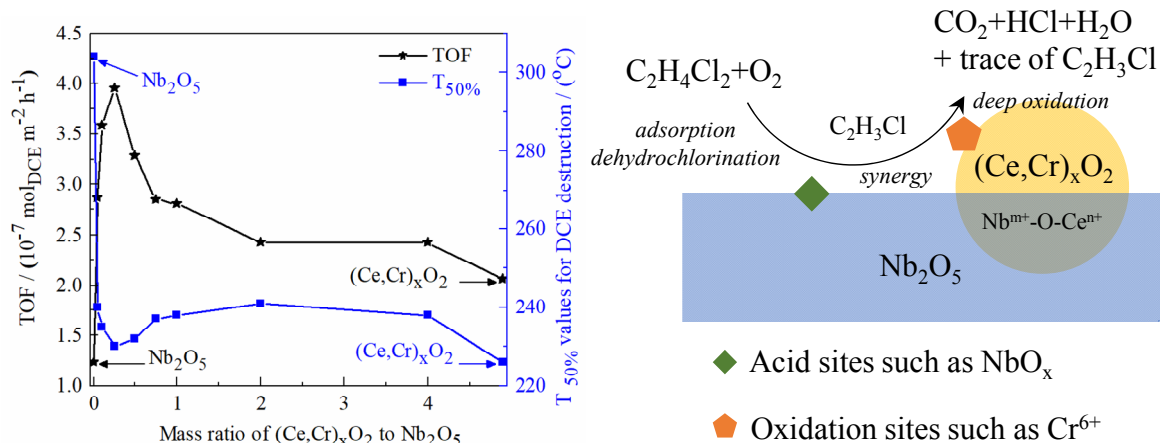


Chin. J. Catal., 2019, 40: 1100–1108 doi: 10.1016/S1872-2067(18)63203-6

**Elimination of 1,2-dichloroethane over (Ce,Cr)<sub>x</sub>O<sub>2</sub>/Nb<sub>2</sub>O<sub>5</sub> catalysts: Synergistic performance between oxidizing ability and acidity**

Jie Wan, Peng Yang, Xiaolin Guo, Renxian Zhou \*

Zhejiang University; Changzhou Qingda Cross Strait Science &amp; Technology Development Co., LTD



A synergistic effect between  $(\text{Ce,Cr})_x\text{O}_2$  and  $\text{Nb}_2\text{O}_5$  improves the intrinsic catalytic activity for 1,2-dichloroethane (DCE) elimination, as the acid sites of  $\text{Nb}_2\text{O}_5$  promote DCE adsorption and dehydrochlorination, while the oxidation sites of  $(\text{Ce,Cr})_x\text{O}_2$  facilitate the deep oxidation of the intermediate  $\text{C}_2\text{H}_3\text{Cl}$ .

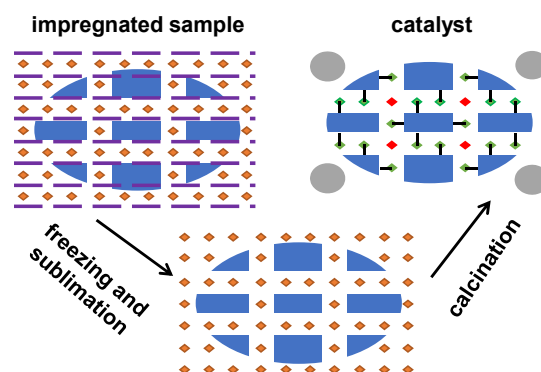
Chin. J. Catal., 2019, 40: 1109–1115 doi: 10.1016/S1872-2067(18)63198-5

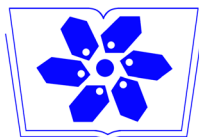
**Preparation of highly dispersed iron species over ZSM-5 with enhanced metal-support interaction through freeze-drying impregnation**

Lisong Fan, Dang-guo Cheng \*, Fengqiu Chen, Xiaoli Zhan

Zhejiang University

For preparation of supported metal catalysts through impregnation, freeze drying provides a general way to tune the metal-support interactions and the metal size.





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## 庆祝浙江大学催化研究所成立40周年专刊

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