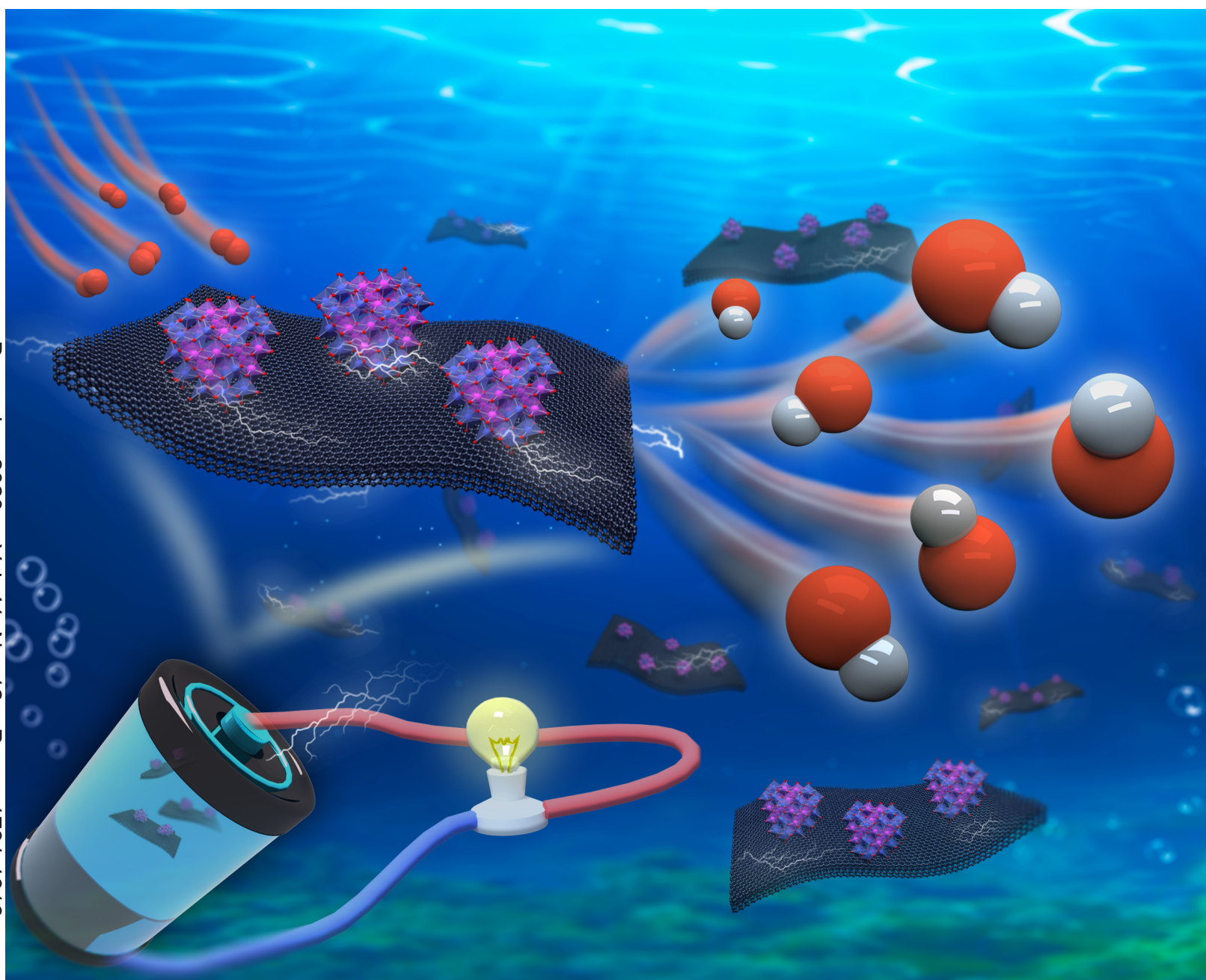




# Chinese Journal of Catalysis

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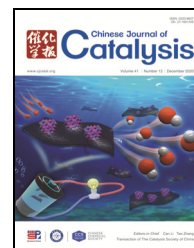
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## Chinese Journal of Catalysis

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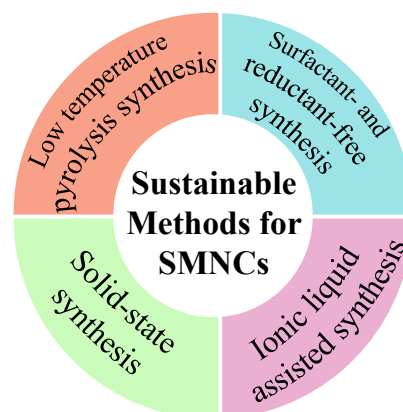
#### Review

*Chin. J. Catal.*, 2020, 41: 1791–1811 doi: 10.1016/S1872-2067(20)63652-X

##### Sustainable synthesis of supported metal nanocatalysts for electrochemical hydrogen evolution

Qian Chen, Yao Nie, Mei Ming, Guangyin Fan \*, Yun Zhang \*,  
Jin-Song Hu  
*Sichuan Normal University; Chongqing Normal University;  
Institute of Chemistry, Chinese Academy of Sciences*

A brief summary and perspective regarding the sustainable synthesis of supported metal nanocatalysts and their representative applications for electrochemical hydrogen evolution is provided.

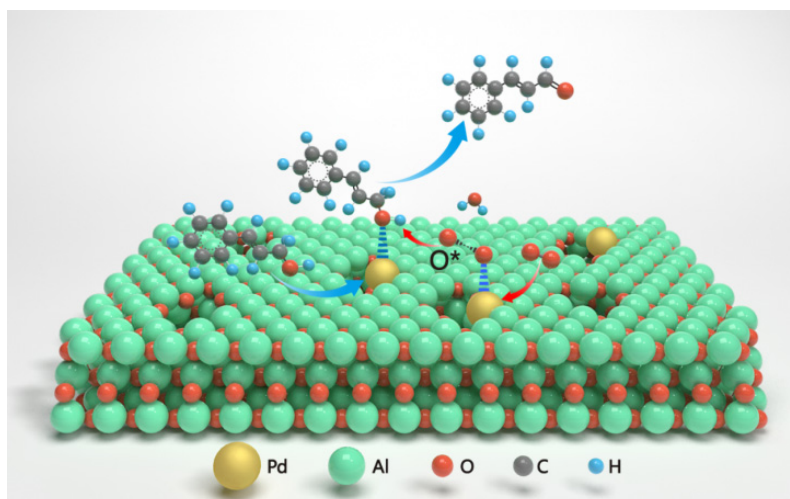


#### Communication

*Chin. J. Catal.*, 2020, 41: 1812–1817 doi: 10.1016/S1872-2067(20)63651-8

##### A palladium single-atom catalyst toward efficient activation of molecular oxygen for cinnamyl alcohol oxidation

Qinghao Shang, Nanfang Tang \*, Haifeng Qi, Shuai Chen, Guoliang Xu, Chuntian Wu, Xiaoli Pan, Xiaodong Wang, Yu Cong \*  
*Dalian Institute of Chemical Physics, Chinese Academy of Sciences; University of Chinese Academy of Sciences*



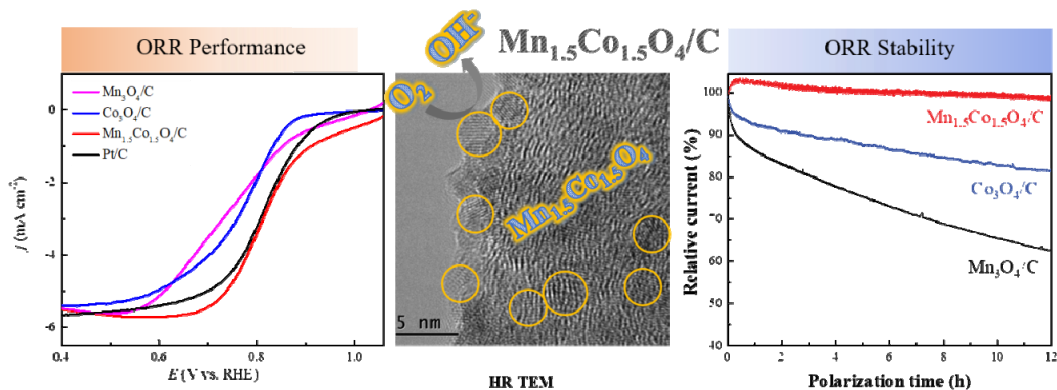
Allylic alcohols were adsorbed on Pd atoms and produced partially dehydrogenated intermediates, whereas active oxygen species behaving chemically like singlet- $O_2$  were generated on the interaction of  $O_2$  with  $Pd_1/Al_2O_3$ . Then the two active species reacted and formed the desired alkenyl aldehyde.

## Articles

*Chin. J. Catal.*, 2020, 41: 1818–1825 doi: 10.1016/S1872-2067(20)63624-5

### Low-temperature synthesis of ultrasmall spinel $\text{Mn}_x\text{Co}_{3-x}\text{O}_4$ nanoparticles for efficient oxygen reduction

Chengxiang Shi, Sana Ullah, Ke Li, Wei Wang, Rongrong Zhang, Lun Pan, Xiangwen Zhang\*, Ji-Jun Zou\*  
Tianjin University



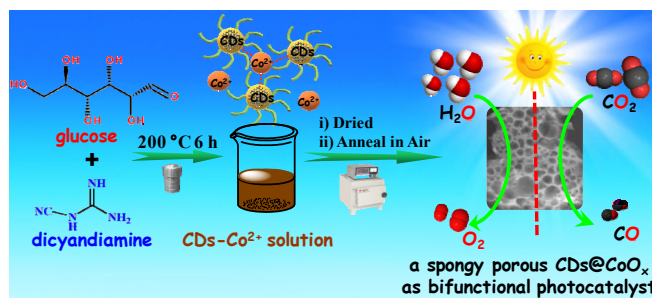
Supported ultrasmall spinel manganese-cobalt oxide nanoparticles prepared at low temperature (60 °C) exhibit excellent ORR activity and stability compared with single metal oxide (both  $\text{Mn}_3\text{O}_4/\text{C}$  and  $\text{Co}_3\text{O}_4/\text{C}$ ).

*Chin. J. Catal.*, 2020, 41: 1826–1836 doi: 10.1016/S1872-2067(20)63646-4

### Amorphous $\text{CoO}_x$ coupled carbon dots as a spongy porous bifunctional catalyst for efficient photocatalytic water oxidation and $\text{CO}_2$ reduction

WanJun Sun, Xiangyu Meng, Chunjiang Xu, Junyi Yang,  
Xiangming Liang, Yinjuan Dong, Congzhao Dong, Yong Ding\*  
Lanzhou University;  
Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences

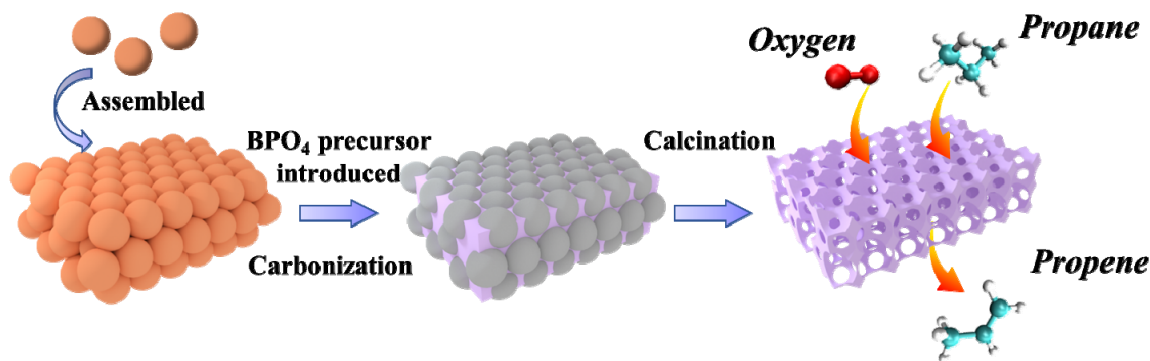
A spongy porous catalyst  $\text{CDs}@\text{CoO}_x\text{-300}$  was used as an efficient and stable bifunctional photocatalyst for water oxidation and  $\text{CO}_2$ -to-CO conversion, in which the boosted photocatalytic behavior is attributed to the synergistic effect between  $\text{CoO}_x$  and CDs.



*Chin. J. Catal.*, 2020, 41: 1837–1845 doi: 10.1016/S1872-2067(20)63654-3

### Ordered macroporous boron phosphate crystals as metal-free catalysts for the oxidative dehydrogenation of propane

Wen-Duo Lu, Xin-Qian Gao, Quan-Gao Wang, Wen-Cui Li, Zhen-Chao Zhao, Dong-Qi Wang, An-Hui Lu\*  
Dalian University of Technology; Institute of High Energy Physics, Chinese Academy of Sciences



Ordered, macroporous, and metal-free  $\text{BPO}_4$  materials with an interconnected robust framework have been prepared by hydrothermal-assisted synthesis. This material can be used as a stable and selective catalyst for the ODH of propane to propene with high productivity.

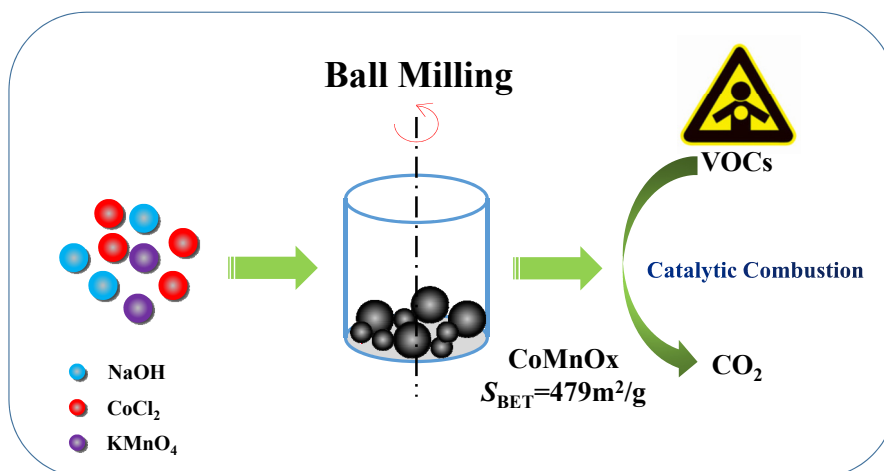


*Chin. J. Catal.*, 2020, 41: 1846–1854 doi: 10.1016/S1872-2067(20)63635-X

### Mechanochemical redox-based synthesis of highly porous $\text{Co}_x\text{Mn}_{1-x}\text{O}_y$ catalysts for total oxidation

Jiafeng Bao, Hao Chen, Shize Yang, Pengfei Zhang \*

Shanghai Jiao Tong University, China; University of Tennessee, USA; Brookhaven National Laboratory, USA



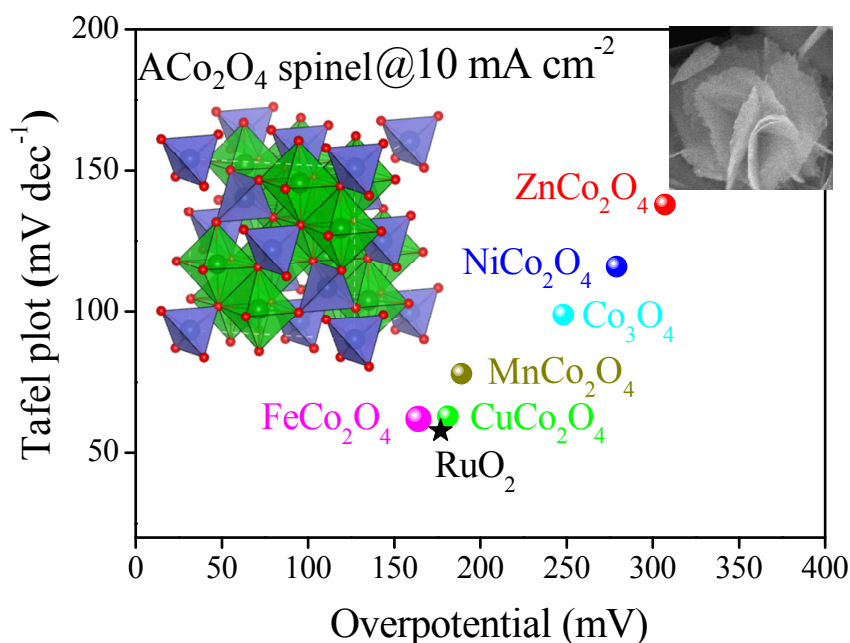
A mechanochemical redox reaction ( $\text{MnO}_4^- + 3\text{Co}^{2+} + 5\text{OH}^- = \text{MnO}_2 + 3\text{CoOOH} + \text{H}_2\text{O}$ ) was introduced to obtain a  $\text{Co}_x\text{Mn}_{1-x}\text{O}_y$  catalyst with a high specific surface area. The synthesized  $\text{Co}_x\text{Mn}_{1-x}\text{O}_y$  catalyst exhibited good performance in the catalytic combustion reaction of VOCs.

*Chin. J. Catal.*, 2020, 41: 1855–1863 doi: 10.1016/S1872-2067(20)63638-5

### Highly efficient mixed-metal spinel cobaltite electrocatalysts for the oxygen evolution reaction

Leiming Tao, Penghu Guo, Weiling Zhu, Tianle Li, Xiantai Zhou, Yongqing Fu, Changlin Yu \*, Hongbing Ji \*

Guangdong University of Petrochemical Technology, China; Huazhong University of Science and Technology, China; Northumbria University, UK; Sun Yat-sen University, China



Cation substitution of spinel cobaltites is a promising strategy for optimizing the electrochemical performance for water splitting. The  $\text{FeCo}_2\text{O}_4$  has an overpotential of 164 mV at a current density of  $10 \text{ mA cm}^{-2}$  in alkaline media. The underlying mechanisms have been clarified by cation substitution with different numbers of d-electrons between 5 and 10. The crystal field of spinel  $\text{ACo}_2\text{O}_4$  is identified as the key factor in dictating the OER performance of these spinel cobaltites.

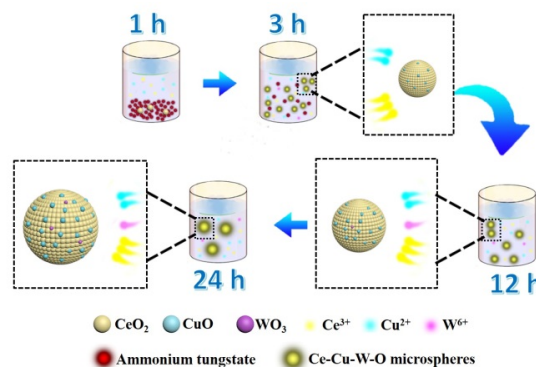


*Chin. J. Catal.*, 2020, 41: 1864–1872 doi: 10.1016/S1872-2067(20)63653-1

### Novel synthetic route to Ce-Cu-W-O microspheres for efficient catalytic oxidation of vinyl chloride emissions

Xiaoshan Feng, Yingbin Zheng, Daifeng Lin, Enhui Wu,  
Yongjin Luo \*, Yufeng You, Hun Xue, Qingrong Qian, Qinghua Chen \*  
*Fujian Normal University; Fuqing Branch of Fujian Normal University*

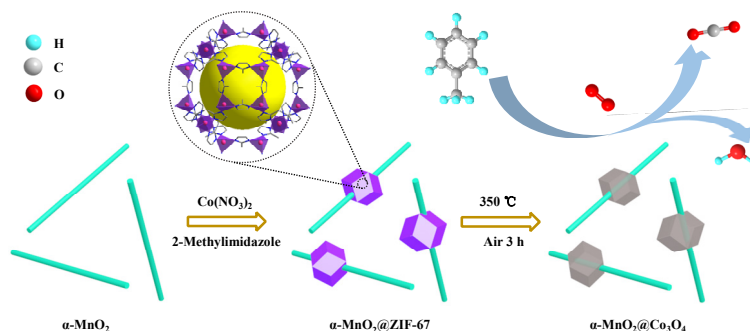
The solubility of ammonium tungstate in the hydrothermal condition was utilized to synthesize uniform microspheres of Ce-Cu-W-O oxides with both enhanced acidity and reducibility, which show excellent performance in the catalytic oxidation of vinyl chloride.



*Chin. J. Catal.*, 2020, 41: 1873–1883 doi: 10.1016/S1872-2067(20)63641-5

### Enhancing catalytic toluene oxidation over MnO<sub>2</sub>@Co<sub>3</sub>O<sub>4</sub> by constructing a coupled interface

Quanming Ren, Shengpeng Mo, Jie Fan, Zhentao Feng, Mingyuan Zhang, Peirong Chen, Jiajian Gao, Mingli Fu, Limin Chen, Junliang Wu,  
Daiqi Ye \*  
*South China University of Technology (SCUT), China; Nanyang Technological University, Singapore*

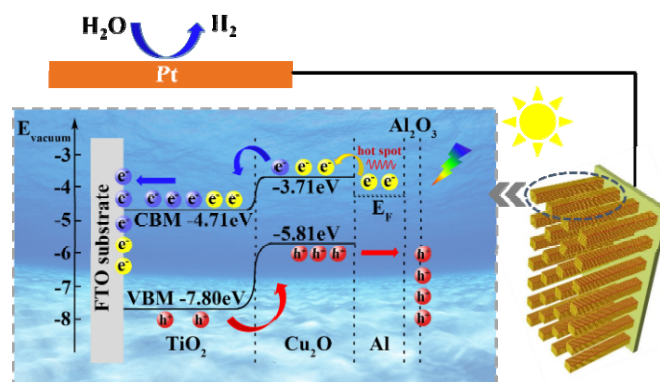


The resultant  $\alpha$ -MnO<sub>2</sub>@Co<sub>3</sub>O<sub>4</sub> catalyst with a coupled interface shows better catalytic activity than the pure  $\alpha$ -MnO<sub>2</sub>, which is ascribed to the increased number of surface-adsorbed oxygen species, which accelerate the oxygen mobility and enhance the redox pairs of Mn<sup>4+</sup>/Mn<sup>3+</sup> and Co<sup>2+</sup>/Co<sup>3+</sup>.

*Chin. J. Catal.*, 2020, 41: 1884–1893 doi: 10.1016/S1872-2067(20)63637-3

### Decorating non-noble metal plasmonic Al on a TiO<sub>2</sub>/Cu<sub>2</sub>O photoanode to boost performance in photoelectrochemical water splitting

Shaoce Zhang, Zhifeng Liu \*, Weiguo Yan, Zhengang Guo, Mengnan Ruan  
*Tianjin Chengjian University*

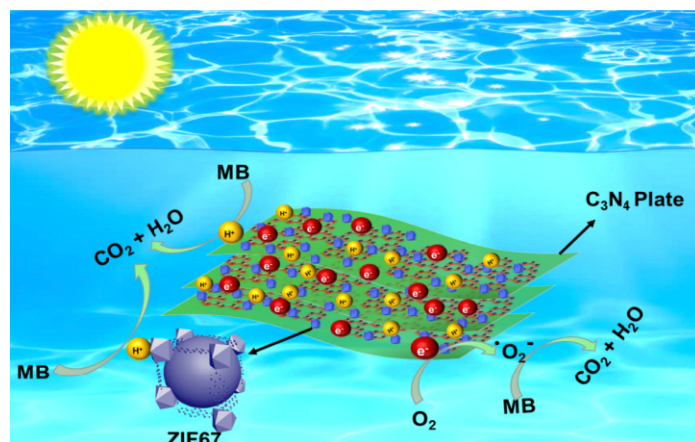


Under light stimulation, TiO<sub>2</sub>/Cu<sub>2</sub>O heterojunctions and the surface plasmon resonance effect of the non-noble metal Al synergistically promote carrier separation and transfer, thus leading to enhanced performance in photoelectrochemical water splitting.

*Chin. J. Catal.*, 2020, 41: 1894–1905 doi: 10.1016/S1872-2067(20)63620-8

### Investigation of surface processes in electrocatalysis by scanning tunneling microscopy

Peidong Su, Junke Zhang, Ke Xiao, Shen Zhao, Ridha Djellabi, Xuewei Li, Bo Yang\*, Xu Zhao\*  
*Shenzhen University, China; Research Center for Eco-Environmental Sciences, CAS, China; Jackson State University, USA*

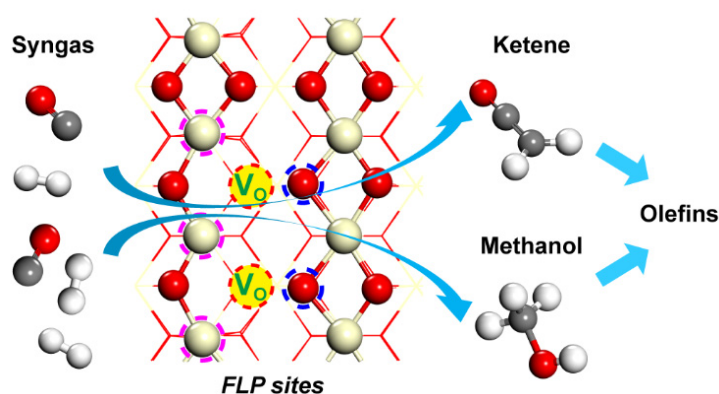


Uniformly distributed single layer ZIF67-derived  $C_3N_4$  was used to the efficient photocatalytic degradation of methylene blue (MB) under visible light. Results indicated that photo-induced holes ( $h^+$ ) and superoxide radicals ( $O_2^{\cdot-}$ ) were responsible for MB degradation.

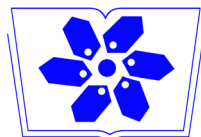
*Chin. J. Catal.*, 2020, 41: 1906–1915 doi: 10.1016/S1872-2067(20)63627-0

### Role of surface frustrated Lewis pairs on reduced $CeO_2(110)$ in direct conversion of syngas

Zheng-Qing Huang, Teng-Hao Li, Bolun Yang, Chun-Ran Chang\*  
*Xi'an Jiaotong University*



The frustrated Lewis pairs constructed via oxygen vacancies of metal oxides play a key role in activating syngas ( $H_2$  and  $CO$ ) and forming key intermediates (ketene and methanol).



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