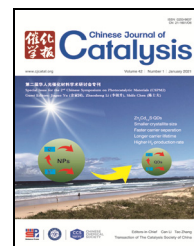




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Special Issue for the 2nd Chinese Symposium on Photocatalytic Materials (CSPM2)

Guest Editors: Jiaguo Yu, Zhaosheng Li, Shifu Chen

Chinese Journal of Catalysis

Graphical Contents

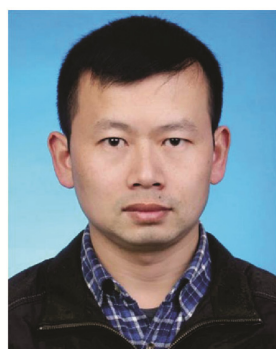
Editorial

Chin. J. Catal., 2021, 42: 1 doi: 10.1016/S1872-2067(20)63664-6

Preface to the Special Issue for the 2nd Chinese Symposium on Photocatalytic Materials (CSPM2)

Jiaguo Yu, Zhaosheng Li, Shifu Chen

Wuhan University of Technology; Nanjing University; Huaibei Normal University



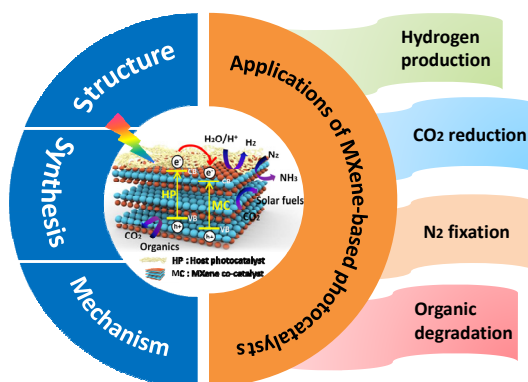
Review

Chin. J. Catal., 2021, 42: 3–14 doi: 10.1016/S1872-2067(20)63630-0

MXenes as noble-metal-alternative co-catalysts in photocatalysis

Kaining Li, Sushu Zhang, Yuhuan Li *, Jiajie Fan, Kangle Lv *

South-Central University for Nationalities; Chongqing Technology and Business University; Zhengzhou University



This mini-review presents recent achievements in research on MXenes as co-photocatalysts in H₂ production, CO₂ reduction, N₂ fixation, and organic degradation. The structures, synthesis, and mechanisms of MXenes as co-photocatalysts are also summarized and discussed.

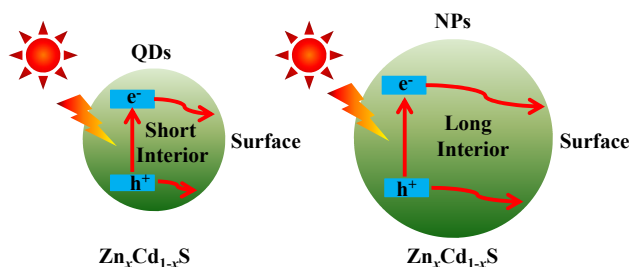
Articles

Chin. J. Catal., 2021, 42: 15–24 doi: 10.1016/S1872-2067(20)63614-2

Zn_xCd_{1-x}S quantum dot with enhanced photocatalytic H₂-production performance

Rongrong Gao, Bei Cheng *, Jiajie Fan, Jiaguo Yu, Wingkei Ho *
Wuhan University of Technology; Zhengzhou University;
The Education University of Hong Kong

The ZCS QD has a relatively small crystallite size, short photogenerated carriers transfer distance from the interior to the surface, and long carrier lifetime, resulting in a significantly enhanced photocatalytic H₂-production rate.

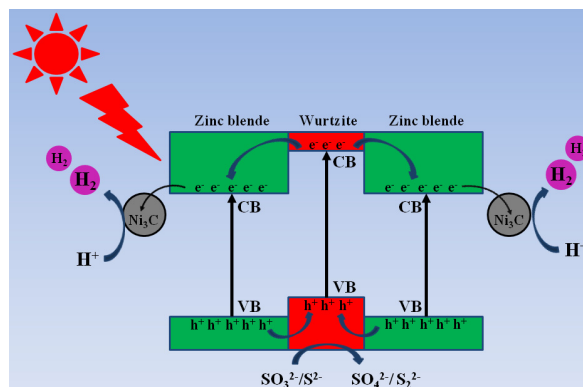


Chin. J. Catal., 2021, 42: 25–36 doi: 10.1016/S1872-2067(20)63600-2

Constructing low-cost Ni₃C/twin-crystal Zn_{0.5}Cd_{0.5}S heterojunction/homojunction nanohybrids for efficient photocatalytic H₂ evolution

Rongchen Shen, Yingna Ding, Shibang Li, Peng Zhang,
Quanjun Xiang, Yun Hau Ng *, Xin Li *
South China Agricultural University; Zhengzhou University;
University of Electronic Science and Technology of China;
City University of Hong Kong

The noble metal-free Ni₃C cocatalysts could significantly enhance the photocatalytic H₂ evolution over the twin nanocrystal Zn_{0.5}Cd_{0.5}S solid solution homojunctions.

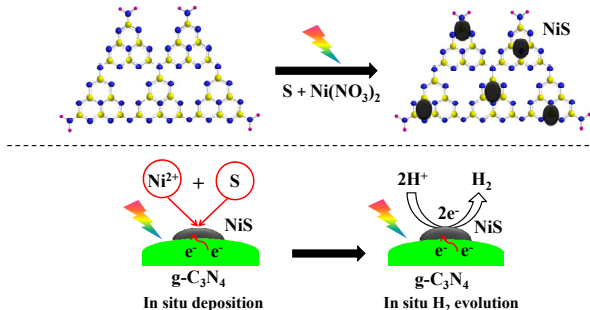


Chin. J. Catal., 2021, 42: 37–45 doi: 10.1016/S1872-2067(20)63633-6

Sulfur-mediated photodeposition synthesis of NiS cocatalyst for boosting H₂-evolution performance of g-C₃N₄ photocatalyst

Min Wang, Jingjing Cheng, Xuefei Wang *, Xuekun Hong, Jiajie Fan,
Huogen Yu *
Wuhan University of Technology; Changshu Institute of Technology;
Zhengzhou University

NiS is deposited on the electron transfer sites of g-C₃N₄ by a sulfur-mediated photodeposition approach and provides active sites to improve the photocatalytic H₂-production of g-C₃N₄.

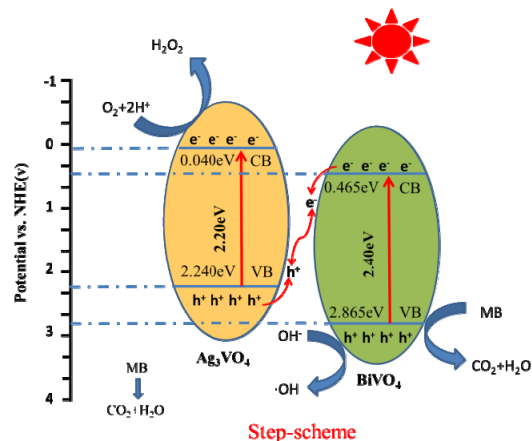


Chin. J. Catal., 2021, 42: 46–55 doi: 10.1016/S1872-2067(20)63560-4

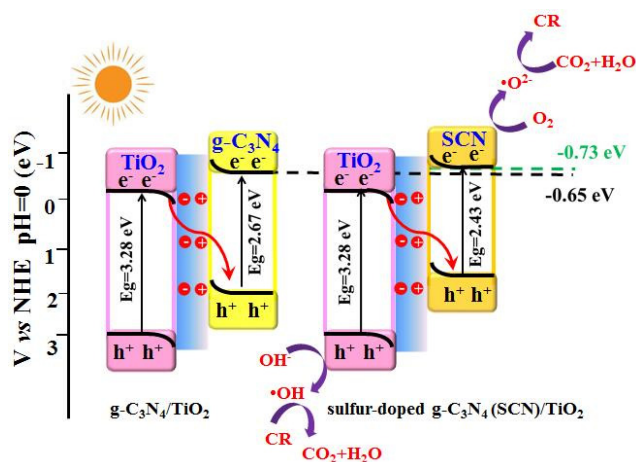
A novel step-scheme BiVO₄/Ag₃VO₄ photocatalyst for enhanced photocatalytic degradation activity under visible light irradiation

Lizhong Liu, Taiping Hu, Kai Dai *, Jinfeng Zhang *, Changhao Liang *
Huaibei Normal University;
Hefei Institute of Physical Science, Chinese Academy of Sciences

A step-scheme BiVO₄/Ag₃VO₄ heterojunction was successfully fabricated using a hydrothermal and chemical deposition process. The formation of the heterojunction improved the photocatalytic activity of the composite by separating electron-hole pairs and improving their transmission efficiency.



Chin. J. Catal., 2021, 42: 56–68 doi: 10.1016/S1872-2067(20)63634-8

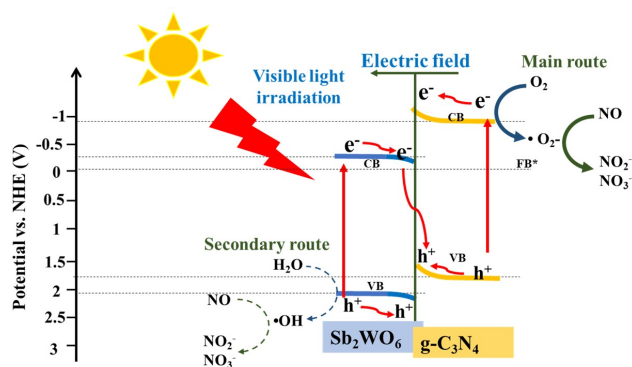
Sulfur-doped g-C₃N₄/TiO₂ S-scheme heterojunction photocatalyst for Congo Red photodegradationJuan Wang, Guohong Wang*, Bei Cheng*, Jiaguo Yu, Jiajie Fan
Hubei Normal University; Wuhan University of Technology; Zhengzhou University

The S-doped g-C₃N₄ (SCN) possesses a stronger reductive performance than pure g-C₃N₄. The S-scheme heterojunction formed by SCN and TiO₂ can improve the separation efficiency of photoinduced electron-hole pairs as well as the photocatalytic activity.

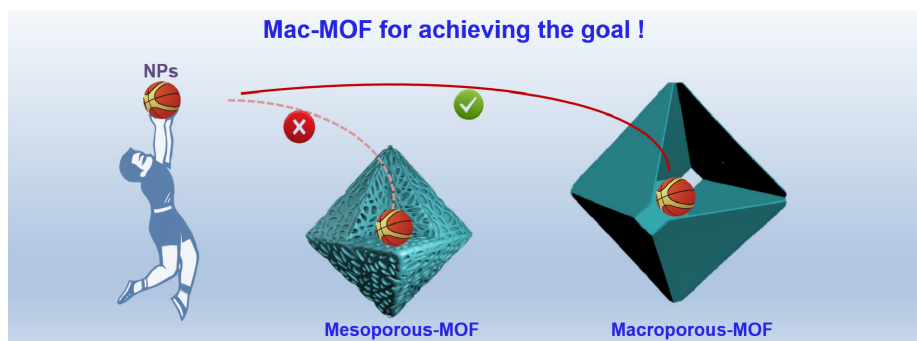
Chin. J. Catal., 2021, 42: 69–77 doi: 10.1016/S1872-2067(20)63631-2

S-scheme Sb₂WO₆/g-C₃N₄ photocatalysts with enhanced visible-light-induced photocatalytic NO oxidation performanceYuyu Ren, Yuan Li, Xiaoyong Wu, Jinlong Wang, Gaoke Zhang*
Wuhan University of Technology

The S-scheme heterojunctions between Sb₂WO₆ and g-C₃N₄ enhanced both the utilization of visible light and the separation of photoinduced electron-hole pairs.



Chin. J. Catal., 2021, 42: 78–86 doi: 10.1016/S1872-2067(20)63661-0

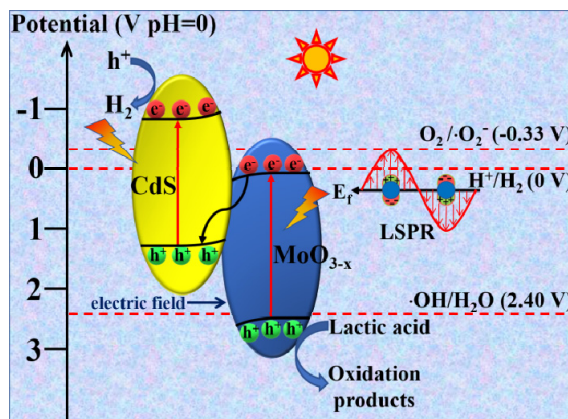
Hierarchically porous S-scheme CdS/UiO-66 photocatalyst for efficient 4-nitroaniline reductionJinxin Wei, Yawen Chen, Hongyang Zhang, Zanyong Zhuang*, Yan Yu*
Fuzhou University

Pore sizes of UiO-66 significantly affected the spatial location of CdS NPs incorporated and macroporous MOFs nanocage highlights its superiority on better advanced catalysts design.

Chin. J. Catal., 2021, 42: 87–96 doi: 10.1016/S1872-2067(20)63595-1

Construction of LSPR-enhanced 0D/2D CdS/MoO_{3-x} S-scheme heterojunctions for visible-light-driven photocatalytic H₂ evolution

Jinjun Peng, Jun Shen, Xiaohui Yu, Hua Tang*, Zulfiqar, Qinqin Liu*
Jiangsu University; Suzhou Vocational Health College

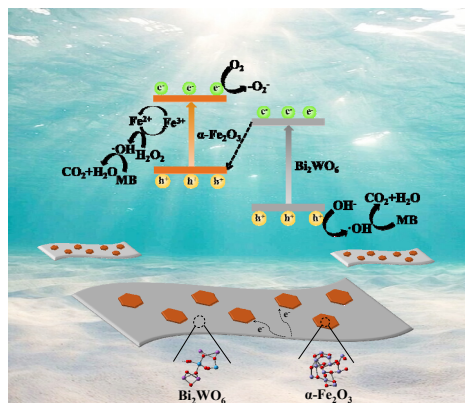


The MoO_{3-x}/CdS heterojunctions exhibit improved photocatalytic H₂ generation activity, which is accredited to an LSPR-enhanced S-scheme charge transfer mechanism.

Chin. J. Catal., 2021, 42: 97–106 doi: 10.1016/S1872-2067(20)63602-6

2D/2D step-scheme α-Fe₂O₃/Bi₂WO₆ photocatalyst with efficient charge transfer for enhanced photo-Fenton catalytic activity

Wenliang Wang, Wenli Zhao, Haochun Zhang, Xincheng Dou, Haifeng Shi*
Jiangnan University

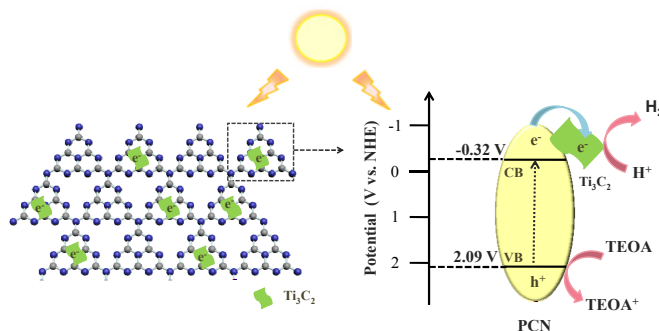


The 2D/2D step-scheme α-Fe₂O₃/Bi₂WO₆ composite with efficient charge transfer, large contact surface and abundant active sites displayed a remarkably enhanced photo-Fenton catalytic activity in the degradation of organic dyes.

Chin. J. Catal., 2021, 42: 107–114 doi: 10.1016/S1872-2067(20)63559-8

In situ construction of protonated g-C₃N₄/Ti₃C₂ MXene Schottky heterojunctions for efficient photocatalytic hydrogen production

Haotian Xu, Rong Xiao, Jingran Huang, Yan Jiang*, Chengxiao Zhao, Xiaofei Yang*
Jiangsu University; Nanjing Forestry University; Harbin Normal University



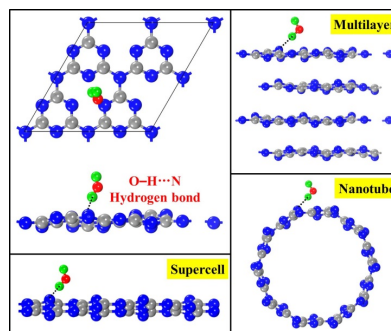
In addition to the protonation of graphitic carbon nitride, conductive 2D MXene was introduced as a co-catalyst to further accelerate electron-hole separation and interfacial charge transport for improved hydrogen production.

Chin. J. Catal., 2021, 42: 115–122 doi: 10.1016/S1872-2067(20)63598-7

H₂O molecule adsorption on s-triazine-based g-C₃N₄

Bicheng Zhu, Liuyang Zhang, Bei Cheng, Yan Yu *, Jianguo Yu *
Wuhan University of Technology;
Fuzhou University;
Zhengzhou University

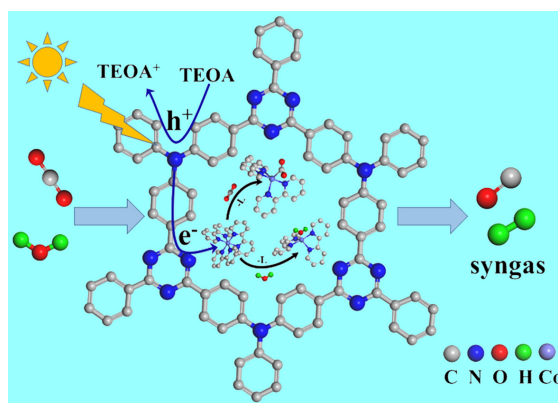
First-principles calculation results disclosed a highly preferential H₂O adsorbed g-C₃N₄ architecture established by intermolecular hydrogen bond. The same geometry structure and electronic property were shared by different g-C₃N₄ substrates, including g-C₃N₄ multilayer, large supercell and nanotube.



Chin. J. Catal., 2021, 42: 123–130 doi: 10.1016/S1872-2067(20)63603-8

Encapsulation of Co single sites in covalent triazine frameworks for photocatalytic production of syngas

Yajun He, Xin Chen, Chi Huang, Liuyi Li *, Chengkai Yang, Yan Yu *
Fuzhou University

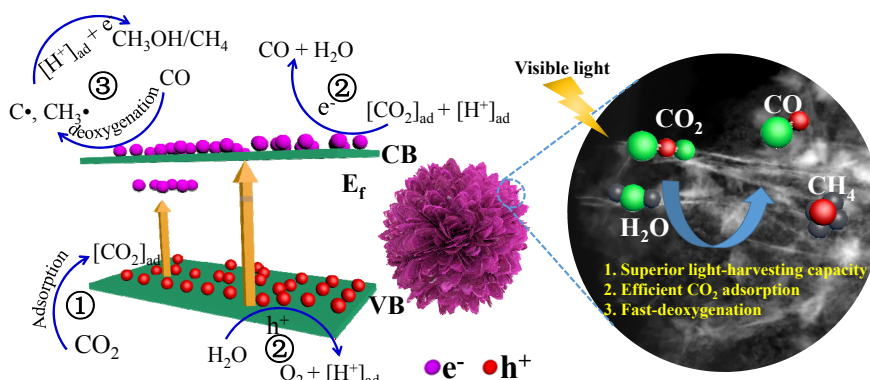


Encapsulation of Co single sites in covalent triazine frameworks with intramolecular heterojunctions boosts the efficiency of photocatalytic syngas production, revealing the promising potential of covalent triazine frameworks for single-site photocatalysis.

Chin. J. Catal., 2021, 42: 131–140 doi: 10.1016/S1872-2067(20)63623-3

Structural engineering of 3D hierarchical Cd_{0.8}Zn_{0.2}S for selective photocatalytic CO₂ reduction

Lei Cheng, Dainan Zhang, Yulong Liao, Jiajie Fan, Quanjun Xiang *
University of Electronic Science and Technology of China; Zhengzhou University



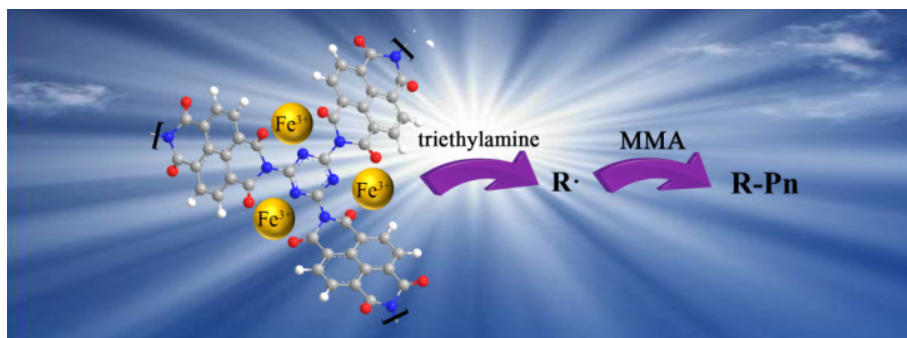
The as-prepared self-assembled Cd_{0.8}Zn_{0.2}S flowers with decorating ultrathin petals through an oil-bath method exhibit highly selective photocatalytic CO₂ reduction under visible-light irradiation.

Chin. J. Catal., 2021, 42: 141–151 doi: 10.1016/S1872-2067(20)63610-5

A novel iron-chelating polyimide network as a visible-light-driven catalyst for photoinduced radical polymerization

Gang Ding, Qin Wang, Fei Liu, Yi Dan *, Long Jiang *

Sichuan University; Southwest University of Science and Technology



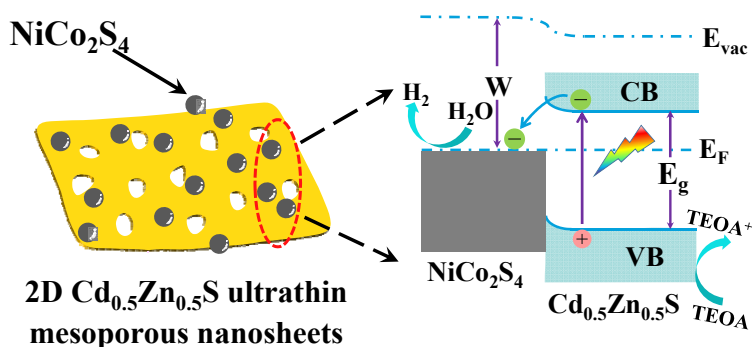
In this study, Fe(III) chelating melamine polyimide network (Fe@MPI) has been successfully synthesized and served as a heterogeneous catalyst for visible light driven radical polymerization of MMA. Fe@MPI can be easily separated from the polymerization solution due to its heterogeneous nature, and reused without losing its photocatalytic performance.

Chin. J. Catal., 2021, 42: 152–163 doi: 10.1016/S1872-2067(20)63593-8

2D mesoporous ultrathin $\text{Cd}_{0.5}\text{Zn}_{0.5}\text{S}$ nanosheet: Fabrication mechanism and application potential for photocatalytic H_2 evolution

Wenhua Xue, Wenxi Chang, Xiaoyun Hu, Jun Fan *, Enzhou Liu *

Northwest University



Efficient photocatalytic H_2 evolution over NiCo_2S_4 nanoparticle-modified 2D $\text{Cd}_{0.5}\text{Zn}_{0.5}\text{S}$ ultrathin mesoporous nanosheets and corresponding charge transfer between interfaces.

Chin. J. Catal., 2021, 42: 164–174 doi: 10.1016/S1872-2067(20)63608-7

Z-scheme N-doped $\text{K}_4\text{Nb}_6\text{O}_{17}$ /g- C_3N_4 heterojunction with superior visible-light-driven photocatalytic activity for organic pollutant removal and hydrogen production

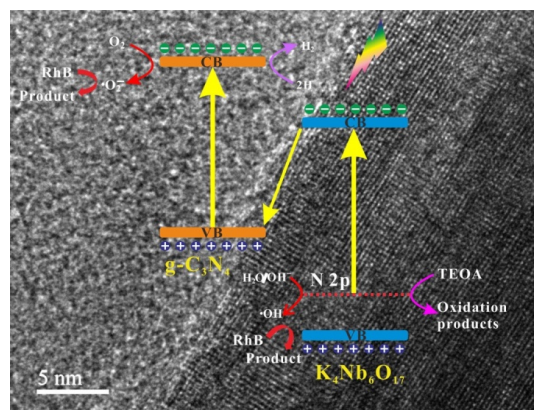
Chao Liu, Yue Feng, Zitong Han, Yao Sun, Xiaoqi Wang,

Qinfang Zhang *, Zhigang Zou *

Nanjing University; Yancheng Institute of Technology;

Jinling Institute of Technology

Z-scheme N-doped $\text{K}_4\text{Nb}_6\text{O}_{17}$ /g- C_3N_4 composite shows improved photocatalytic activities for H_2 generation and RhB degradation due to the synergistic effects of the broadened light harvesting ability by N-doping and the efficient charge separation by heterojunction.

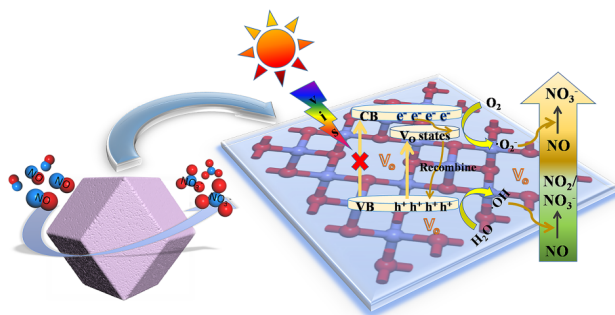


Chin. J. Catal., 2021, 42: 175–183 doi: 10.1016/S1872-2067(20)63592-6

Enhanced photocatalytic NO removal and toxic NO₂ production inhibition over ZIF-8-derived ZnO nanoparticles with controllable amount of oxygen vacancies

Pengfei Zhu *, Xiaohu Yin, Xinhua Gao, Guohui Dong, Jingkun Xu, Chuanyi Wang *

Shaanxi University of Science and Technology; Ningxia University; Jiangxi Science & Technology Normal University



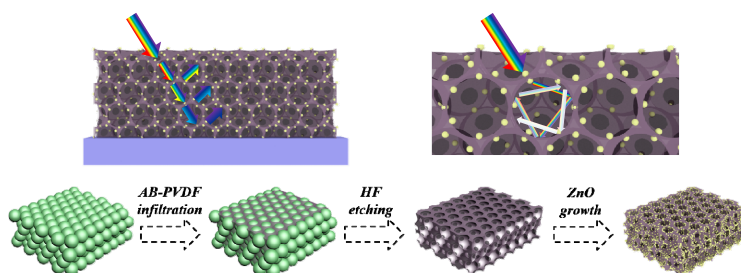
ZIF-8 was used as precursor for two-step calcination synthesis of ZnO nanoparticles with controlled OVs, which were used to effectively remove NO under visible light irradiation.

Chin. J. Catal., 2021, 42: 184–192 doi: 10.1016/S1872-2067(20)63588-4

Design of a ZnO/Poly(vinylidene fluoride) inverse opal film for photon localization-assisted full solar spectrum photocatalysis

Yukai Chen, Yu Wang, Jiaojiao Fang, Baoying Dai, Jiahui Kou *, Chunhua Lu *, Yuanjin Zhao *

Nanjing Tech University; Southeast University



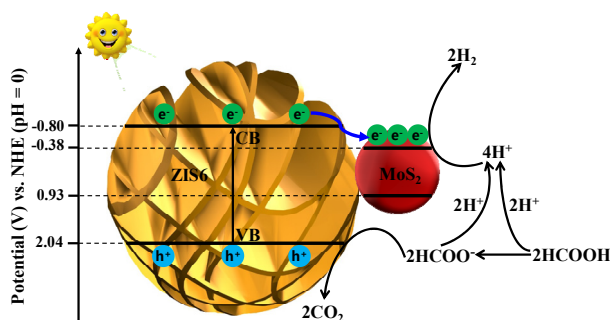
ZnO/PVDF inverse opal film was prepared to reach photothermal synergetic catalysis in the microreactor. By utilizing photon localization effect and slow light effect, the photocatalytic performance was greatly enhanced.

Chin. J. Catal., 2021, 42: 193–204 doi: 10.1016/S1872-2067(20)63584-7

MoS₂/Zn₃In₂S₆ composite photocatalysts for enhancement of visible light-driven hydrogen production from formic acid

Sujuan Zhang, Shixiang Duan, Gaoli Chen, Sugang Meng, Xiuzhen Zheng, You Fan, Xianliang Fu, Shifu Chen *

Huaibei Normal University



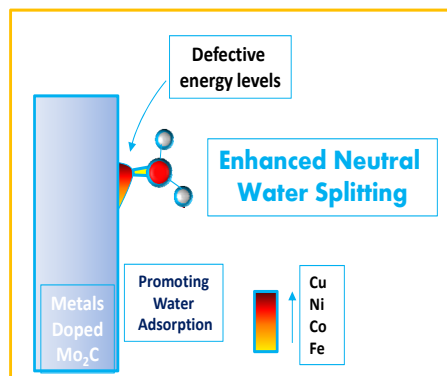
A novel MoS₂/Zn₃In₂S₆ (MoS₂/ZIS6) heterojunction photocatalyst was constructed with matching energy band potentials; it exhibited excellent performance in the excitation and transfer of photogenerated carriers and consequently, in visible-light-driven hydrogen production from formic acid.

Chin. J. Catal., 2021, 42: 205–216 doi: 10.1016/S1872-2067(20)63589-6

Metal-doped Mo₂C (metal = Fe, Co, Ni, Cu) as catalysts on TiO₂ for photocatalytic hydrogen evolution in neutral solution

Jing Liu, Gary Hodes, Junqing Yan*, Shengzhong (Frank) Liu*
Shaanxi Normal University, China;
Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China;
Weizmann Institute of Science, Israel

Metals (Fe, Co, Ni and Cu) doped Mo₂C samples are reported to promote the water adsorption performance, and then boost the neutral HER activity for working as the co-catalysts of TiO₂.



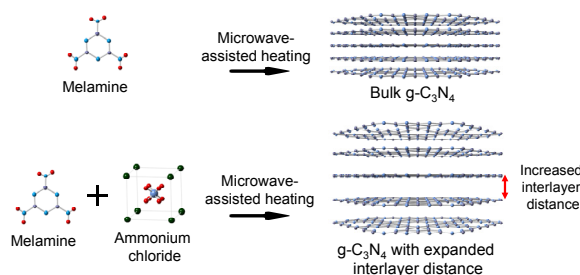
Chin. J. Catal., 2021, 42: 217–224 doi: 10.1016/S1872-2067(20)63611-7

Engineering graphitic carbon nitride with expanded interlayer distance for boosting photocatalytic hydrogen evolution

Qiushi Yang, Shaonian Hu, Yaxuan Yao, Xiangang Lin, Haiwei Du*, Yupeng Yuan*

Anhui University; National Institute of Metrology;

Expanding interlayer distance of graphitic carbon nitride via ammonia gas escape derived by cofiring melamine and ammonium chloride for enhanced photocatalytic hydrogen production activity.



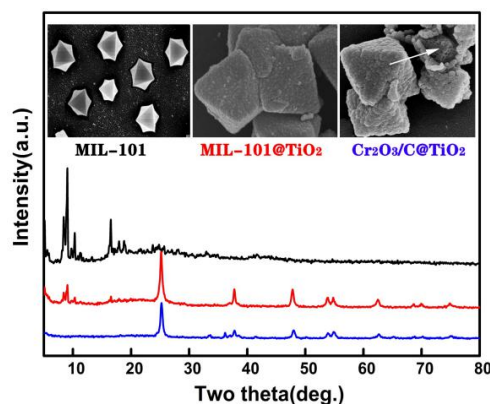
Chin. J. Catal., 2021, 42: 225–234 doi: 10.1016/S1872-2067(20)63615-4

Synthesis of core-shell nanostructured Cr₂O₃/C@TiO₂ for photocatalytic hydrogen production

Yang Chen, Guobing Mao, Yawen Tang, Heng Wu, Gang Wang, Li Zhang*, Qi Liu*

Anhui Polytechnic University; Nankai University

Cr₂O₃/C@TiO₂ nanocomposites were fabricated via the calcination of core-shell MIL-101@TiO₂, where MIL-101, which presented high surface area, was used as the template, Cr, and C source. The photocatalytic performance of the obtained Cr₂O₃/C@TiO₂ nanocomposites for the H₂ production reaction was significantly higher than that of pristine TiO₂.



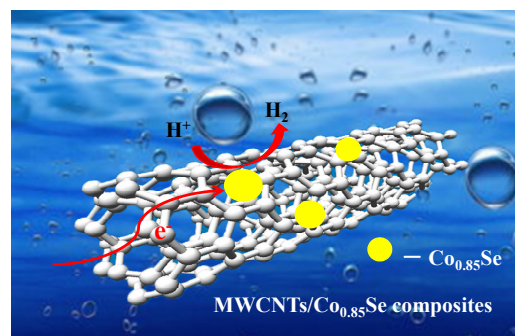
Chin. J. Catal., 2021, 42: 235–243 doi: 10.1016/S1872-2067(20)63632-4

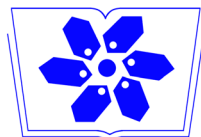
Co_{0.85}Se magnetic nanoparticles supported on carbon nanotubes as catalyst for hydrogen evolution reaction

Xiaohui Sun, Nuzahat Habibul, Hong Du*

Xinjiang Normal University

Co_{0.85}Se magnetic nanoparticles supported on carbon nanotube enhanced the performance of electrocatalytic hydrogen production, which possesses excellent activity than that of pure Co_{0.85}Se nanoparticle.





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第二届华人光催化材料学术研讨会专刊

客座主编: 余家国, 李朝升, 陈士夫

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