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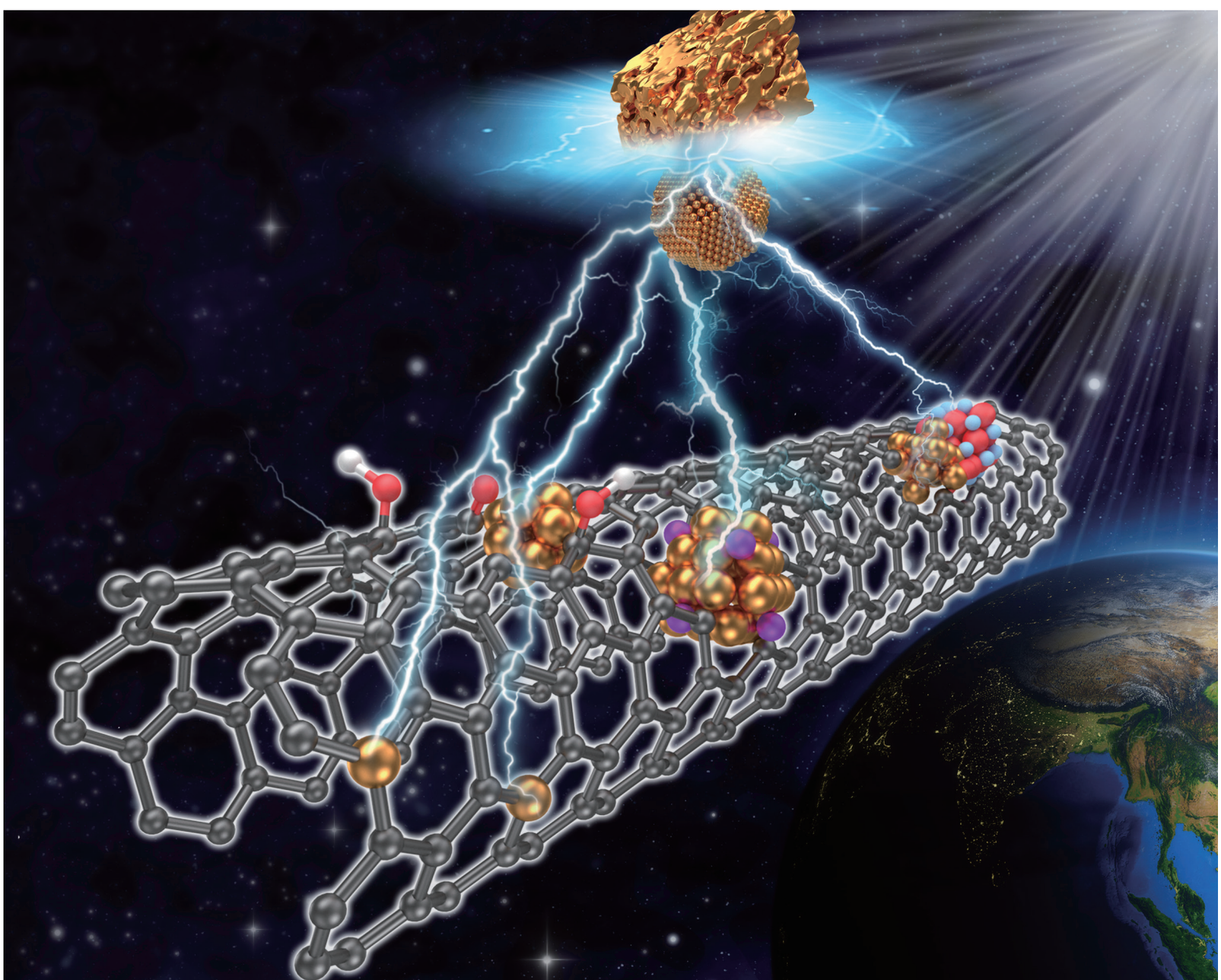

催化学报 CHINESE JOURNAL OF CATALYSIS May 2021 Vol. 42 No. 5 Pages 667–854

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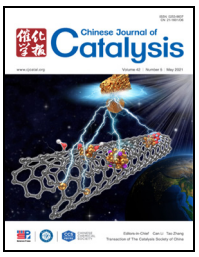


Chinese Journal of Catalysis

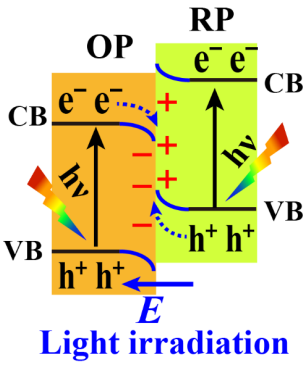
Graphical Contents

Highlight

Chin. J. Catal., 2021, 42: 667–669 doi: 10.1016/S1872-2067(20)63705-6

A new heterojunction in photocatalysis: S-scheme heterojunction

S. Wageh *, Ahmed A. Al-Ghamdi, Rashida Jafer, Xin Li *, Peng Zhang
King Abdulaziz University, Saudi Arabia;
South China Agricultural University, China;
Zhengzhou University, China



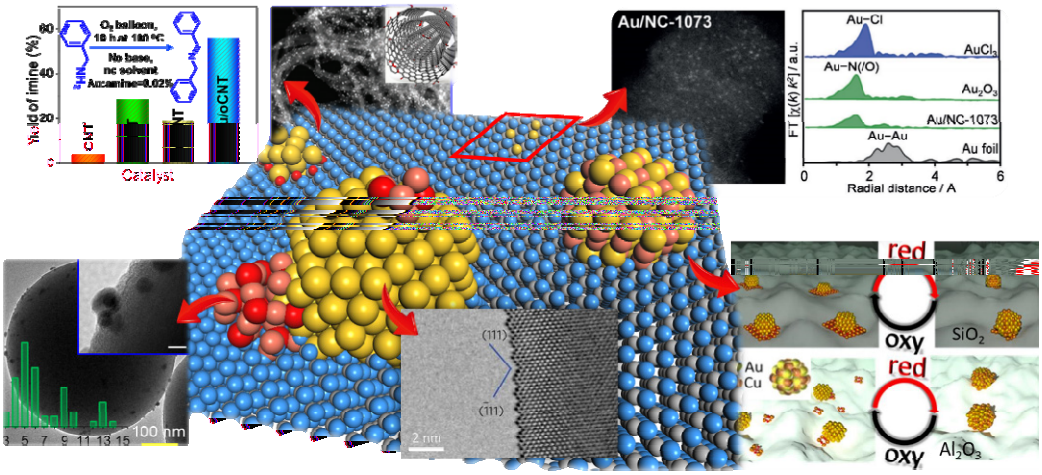
The conceptual innovation, origin, progress, state-of-the-art developments, importance and challenges of S-scheme heterojunctions are briefly discussed in this highlight. It is expected to achieve the precise design and extensive applications of new S-scheme heterojunction photocatalysts.

Reviews

Chin. J. Catal., 2021, 42: 670–693 doi: 10.1016/S1872-2067(20)63743-3

Development of gold catalysts supported by unreducible materials: Design and promotions

Jingjie Luo, Yanan Dong, Corinne Petit, Changhai Liang *
Dalian University of Technology, China; University of Strasbourg, France

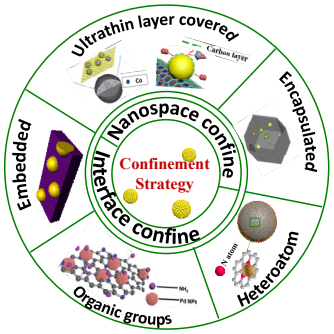


Reports on the use of gold supported by unreducible materials (e.g., C, SiO_2, Al_2O_3, and hydroxyapatite) are systematically reviewed. Currently prevailing modification strategies are summarized from both the aspects of theoretical conceptualization and practical methodology.

Chin. J. Catal., 2021, 42: 694–709 doi: 10.1016/S1872-2067(20)63699-3

Stabilization of heterogeneous hydrogenation catalysts for the aqueous-phase reactions of renewable feedstocks

Xiaoyan Liu, Guojun Lan *, Zhenqing Li, Lihua Qian, Jian Liu, Ying Li *
Zhejiang University of Technology, China;
Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China;
University of Surrey, UK

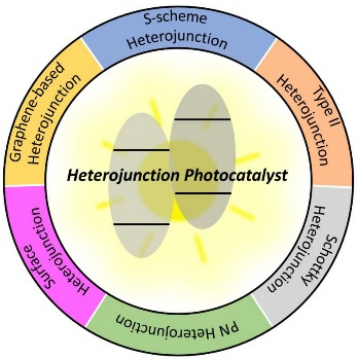


The graphical abstract summarizes the described confinement strategies for improving the stability of metal catalysts (especially MNPs), such as the application of an ultrathin layer covered and encapsulation for the nano-space confinement and embedment, and attachment of organic groups and heteroatoms for the interfacial confinement.

Chin. J. Catal., 2021, 42: 710–730 doi: 10.1016/S1872-2067(20)63698-1

Advances in designing heterojunction photocatalytic materials

Zongpeng Wang, Zhiping Lin, Shijie Shen, Wenwu Zhong *,
Shaowen Cao *
Taizhou University; Wuhan University of Technology

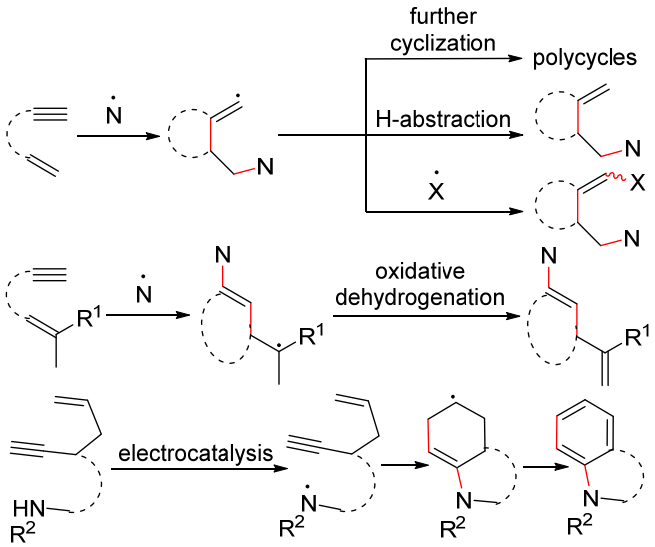


This review systematically presents the working principles of various heterojunctions and summarize the recent innovative strategies for achieving high-performance heterojunction photocatalysts.

Chin. J. Catal., 2021, 42: 731–742 doi: 10.1016/S1872-2067(20)63702-0

***N*-radical enabled cyclization of 1,*n*-enynes**

Wen-Ting Wei *, Qiang Li, Ming-Zhong Zhang , Wei-Min He*
Ningbo University; Liaocheng University; Yangtze Normal University;
Changsha University of Science and Technology



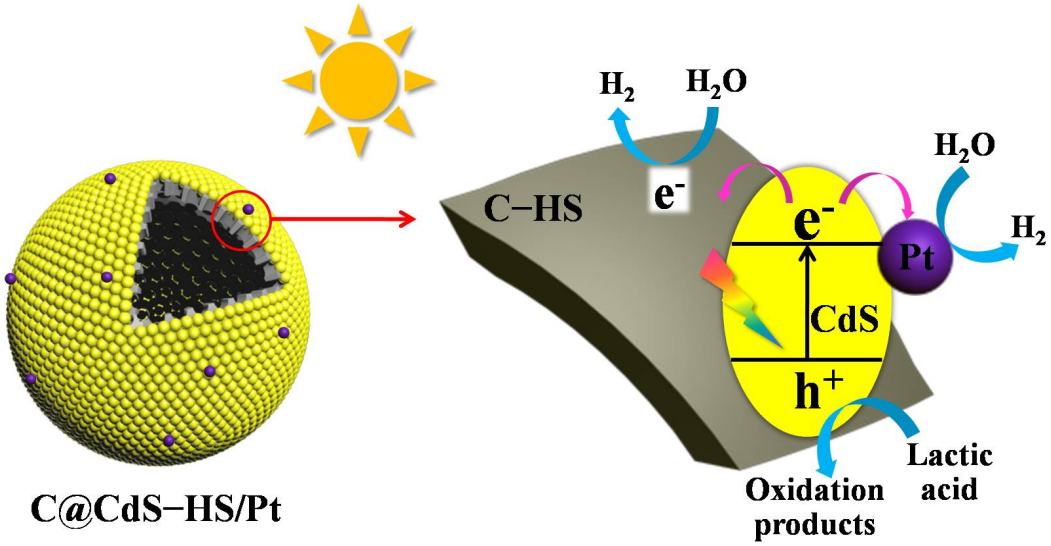
This review summarizes the recent advances in *N*-radical enabled cyclization of 1,*n*-enynes, with emphasis on approaches for the generation of *N*-radicals and their cyclization patterns, associated mechanisms, unmet challenges, and future opportunities.

Articles

Chin. J. Catal., 2021, 42: 743–752 doi: 10.1016/S1872-2067(20)63695-6

Enhanced photocatalytic H_2 production performance of CdS hollow spheres using C and Pt as bi-cocatalysts

Shipeng Tang, Yang Xia, Jiajie Fan, Bei Cheng, Jiaguo Yu *, Wingkei Ho *
Wuhan University of Technology; Zhengzhou University; The Education University of Hong Kong

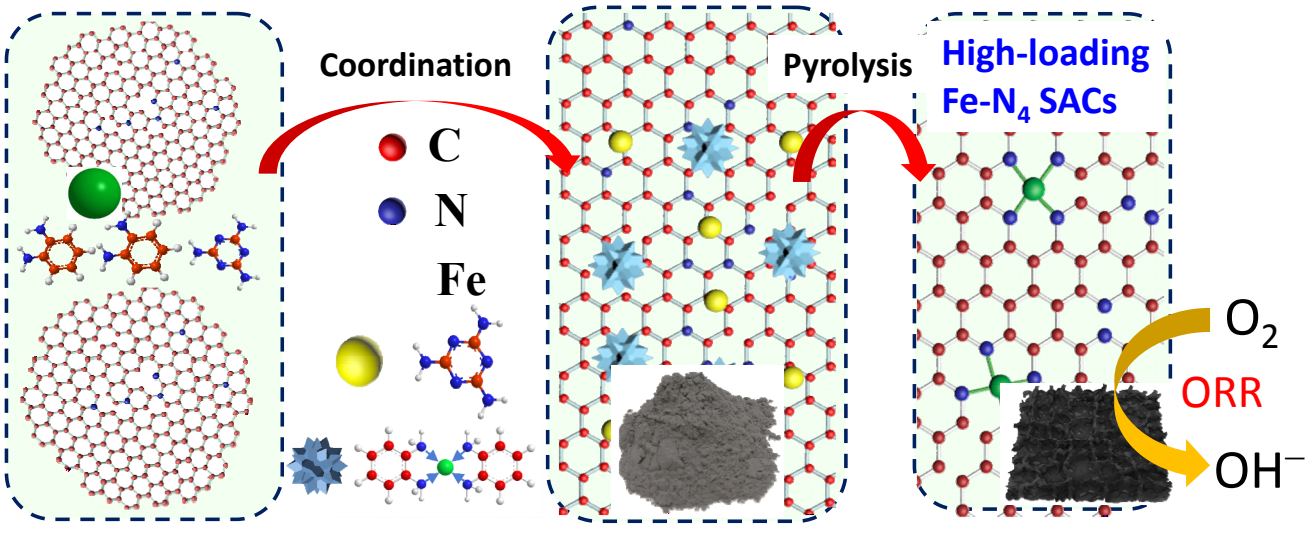


Carbon@CdS composite hollow spheres (C@CdS-HS) are fabricated using carbon hollow spheres (C-HS) as a template, and they show excellent photocatalytic H_2-production activity with C and Pt as bi-cocatalysts.

Chin. J. Catal., 2021, 42: 753–761 doi: 10.1016/S1872-2067(20)63689-0

Fabricating high-loading Fe-N_4 single-atom catalysts for oxygen reduction reaction by carbon-assisted pyrolysis of metal complexes

Jun-Sheng Jiang, He-Lei Wei, Ai-Dong Tan, Rui Si, Wei-De Zhang, Yu-Xiang Yu *
South China University of Technology;
Shanghai Institute of Applied Physics, Chinese Academy of Sciences

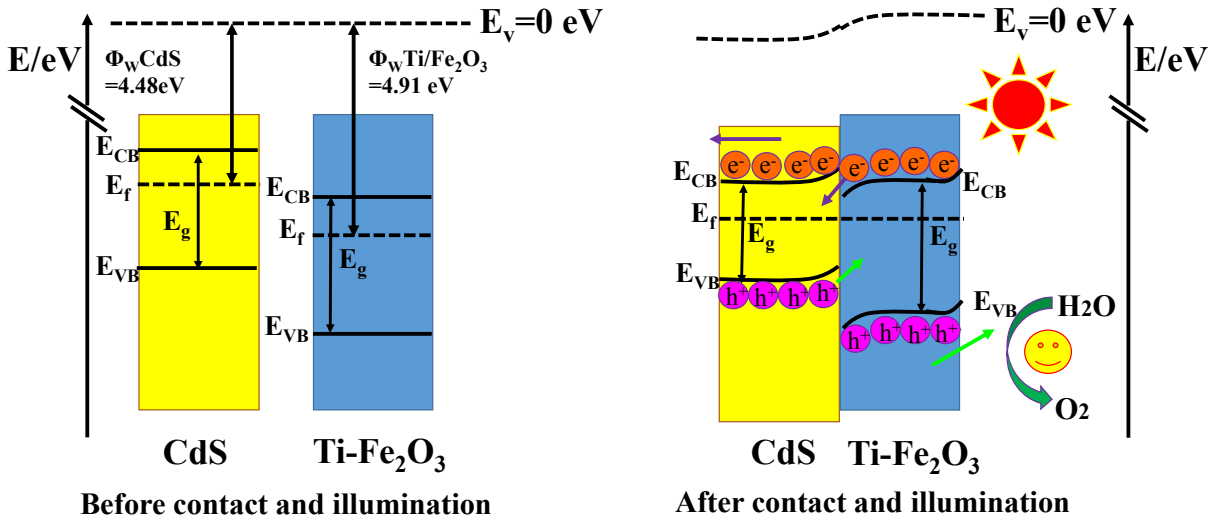


A high-loading Fe-N_4 single-atom catalyst with 7.5 wt% Fe loading was prepared by carbon-assisted pyrolysis of Fe complexes. The optimized 250Fe-SA/NPC-800 catalyst exhibited onset and half-wave ORR potentials of 0.97 and 0.85 V, respectively.

Chin. J. Catal., 2021, 42: 762–771 doi: 10.1016/S1872-2067(20)63700-7

An effective CdS/Ti-Fe_2O_3 heterojunction photoanode: analyzing Z-scheme charge-transfer mechanism for enhanced photoelectrochemical water-oxidation activity

Yinyin Li, Qiannan Wu, Qijing Bu, Kai Zhang, Yanhong Lin, Dejun Wang, Xiaoxin Zou, Tengfeng Xie *
Jilin University

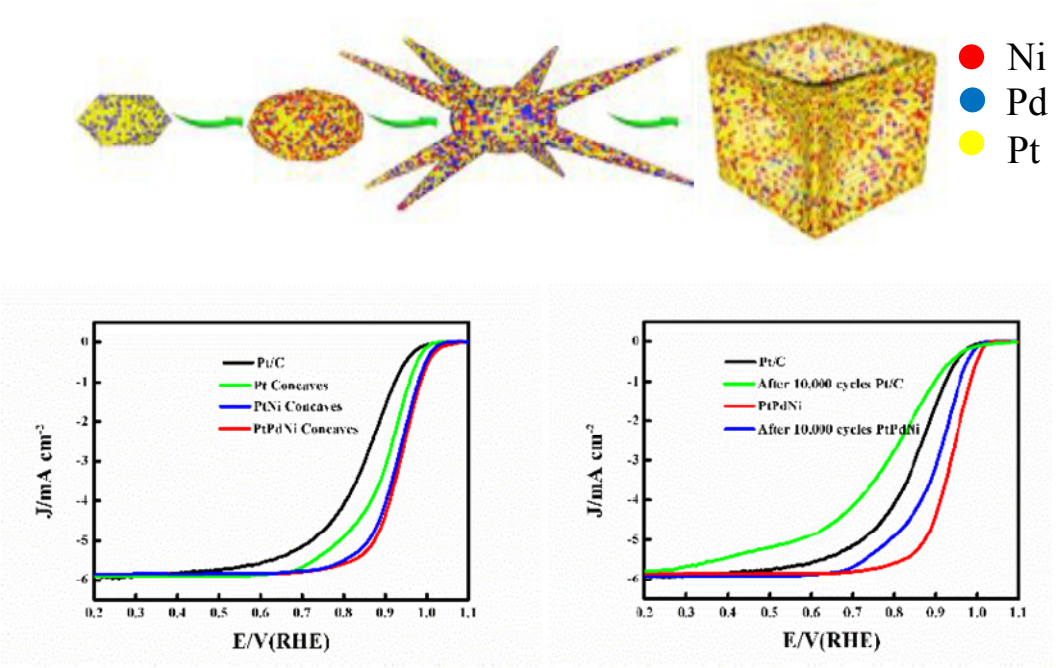


As Ti-Fe_2O_3 and CdS make contact to form the Z-scheme heterojunction, the electrons of Ti-Fe_2O_3 recombine with the holes of CdS at the internal electric field, leading to more holes transferring to the Ti-Fe_2O_3 surface.

Chin. J. Catal., 2021, 42: 772–780 doi: 10.1016/S1872-2067(20)63703-2

High-quality and deeply excavated PtPdNi nanocubes as efficient catalysts toward oxygen reduction reaction

Yanjie Li, Rifeng Wu, Yang Liu, Ying Wen, Pei Kang Shen *
Guangxi University

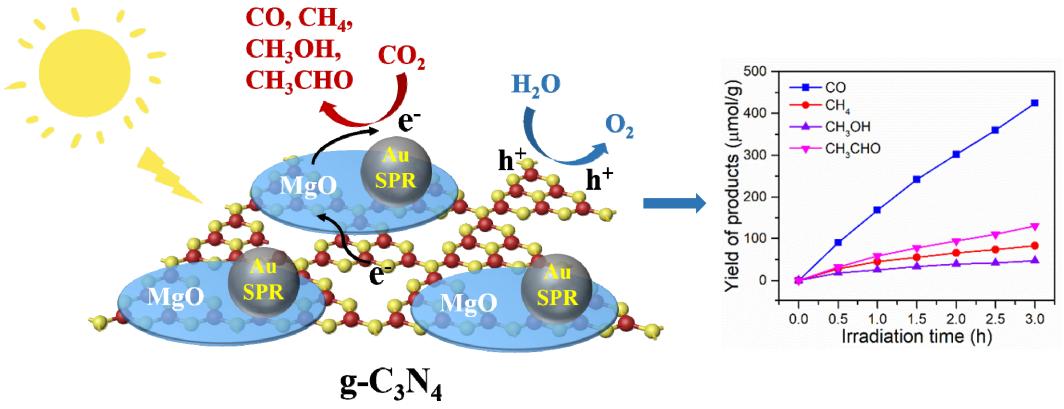


High-quality and deeply excavated PtPdNi nanocubes have been synthesized and show excellent catalytic activity for oxygen reduction reaction.

Chin. J. Catal., 2021, 42: 781–794 doi: 10.1016/S1872-2067(20)63690-7

MgO and Au nanoparticle Co-modified g-C_3N_4 photocatalysts for enhanced photoreduction of CO_2 with H_2O

Naixu Li, Meiyou Huang, Jiancheng Zhou *, Maochang Liu *, Dengwei Jing *
Southeast University; Xi'an Jiaotong University; Institute of Chemical Industry of Forest Products, Chinese Academy of Forestry; Suzhou Academy of Xi'an Jiaotong University

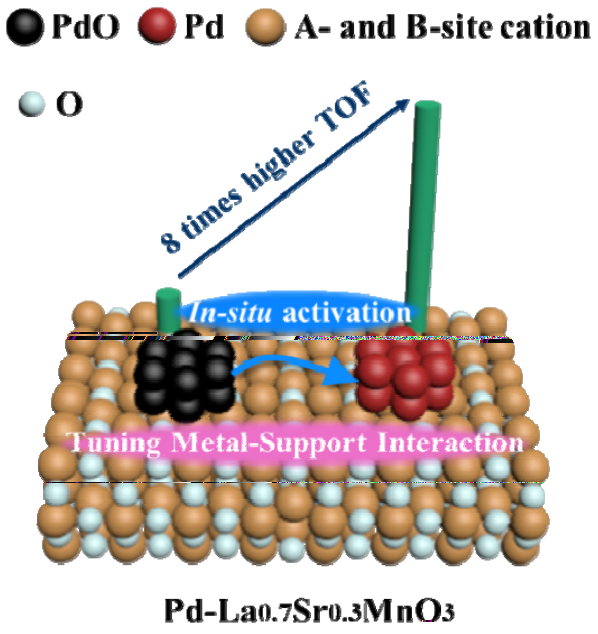


A series of MgO and Au co-modified g-C_3N_4 photocatalysts were prepared via a facile route, which exhibited a remarkably high activity for the photocatalytic reduction of CO_2 to CO, CH_4, CH_3OH, and CH_3CHO.

Chin. J. Catal., 2021, 42: 795–807 doi: 10.1016/S1872-2067(20)63694-4

Promoting NO_x reduction via *in situ* activation of perovskite supported Pd catalysts under alternating lean-burn/fuel-rich operating atmospheres

Dongyue Zhao, Yuexi Yang, Zhongnan Gao, Mengxin Yin, Ye Tian, Jing Zhang, Zheng Jiang, Xiaobo Yu, Xingang Li *
Tianjin University; Institute of High Energy Physics, Chinese Academy of Sciences; Shanghai Institute of Applied Physics, Chinese Academy of Sciences; Jilin Institute of Chemical Technology

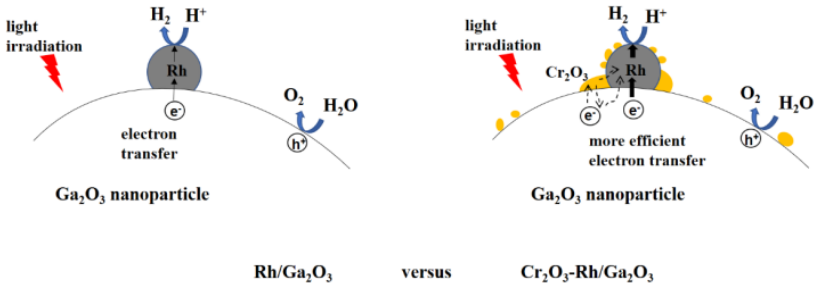


A perovskite-supported Pd catalyst was *in situ* activated to generate Pd^0 species under dynamic alternating oxidizing/reducing atmospheric conditions via tuning the metal-support interactions. The De-NO_x activity of the generated Pd^0 species was eight fold higher than that of the Pd^{2+} species.

Chin. J. Catal., 2021, 42: 808–816 doi: 10.1016/S1872-2067(20)63688-9

Time-resolved infrared spectroscopic investigation of Ga_2O_3 photocatalysts loaded with Cr_2O_3-Rh cocatalysts for photocatalytic water splitting

Qian Ding, Tao Chen, Zheng Li, Zhaochi Feng, Xiuli Wang *
Dalian Institute of Chemical Physics, Chinese Academy of Sciences; University of Chinese Academy of Sciences; Dalian Ocean University

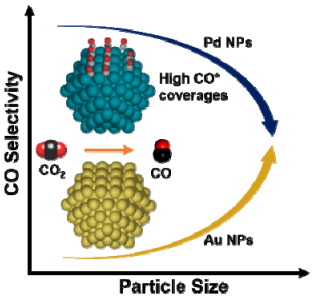


The working mechanisms of Cr_2O_3-Rh cocatalysts are proposed for photocatalytic water splitting on Ga_2O_3-based photocatalysts. Co-loading of Cr_2O_3 efficiently promotes electron transfer from Ga_2O_3 to Rh, which considerably enhances the photocatalytic H_2 evolution.

Chin. J. Catal., 2021, 42: 817–823 doi: 10.1016/S1872-2067(20)63692-0

Reveal the nature of particle size effect for CO_2 reduction over Pd and Au

Piaoping Yang, Lulu Li, Zhi-Jian Zhao *, Jinlong Gong
Tianjin University;
Joint School of National University of Singapore and Tianjin University

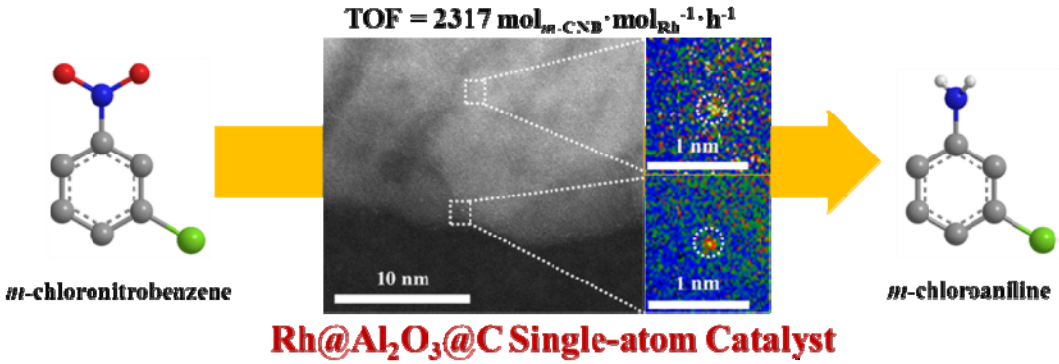


The realistic nanoparticle models and coverage effects play critical roles in understanding the properties of active sites on Au and Pd nanoparticles and revealing the size effect on the selectivity of CO_2 reduction to CO.

Chin. J. Catal., 2021, 42: 824–834 doi: 10.1016/S1872-2067(20)63697-X

MIL-53 (Al) derived single-atom Rh catalyst for the selective hydrogenation of *m*-chloronitrobenzene into *m*-chloroaniline

Weiyin Wang, Lu Lin, Haifeng Qi, Wenxiu Cao, Zhi Li, Shaohua Chen, Xiaoxuan Zou, Tiehong Chen, Nanfang Tang, Weiyu Song, Aiqin Wang, Wenhao Luo
Xiangtan University; Dalian Institute of Chemical Physics, Chinese Academy of Sciences; University of Chinese Academy of Sciences; Jishou University; China University of Petroleum; Nankai University

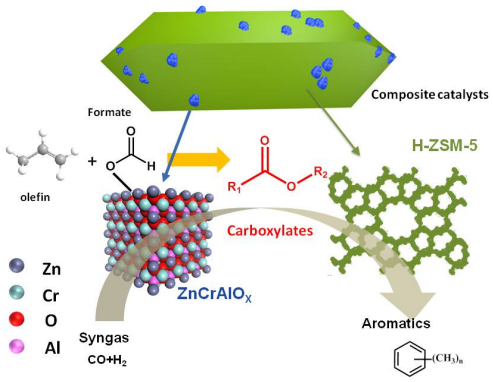


The $Rh@Al_2O_3@C$ SAC, fabricated by utilizing a metal-organic framework of MIL-53 (Al), shows an excellent, sustained chemoselectivity for the hydrogenation of *m*-chloronitrobenzene.

Chin. J. Catal., 2021, 42: 835–843 doi: 10.1016/S1872-2067(20)63691-9

The carboxylates formed on oxides promoting the aromatization in syngas conversion over composite catalysts

Zhiyang Chen, Youming Ni, Fuli Wen, Ziqiao Zhou, Wenliang Zhu *, Zhongmin Liu *
Dalian Institute of Chemical Physics, Chinese Academy of Sciences; University of Chinese Academy of Sciences

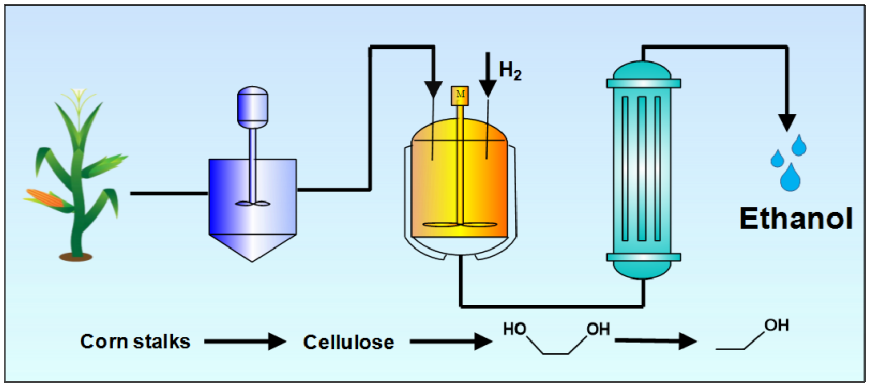


A novel mechanistic route for the formation of aromatics in STA reactions is proposed. The critical intermediates, carboxylates, are proven to be formed by the reaction between formate species and olefins over $ZnCrAlO_x$. Carboxylates are also shown to essentially promote aromatization in the conversion of syngas over a $ZnCrAlO_x$&H-ZSM-5 composite catalyst.

Chin. J. Catal., 2021, 42: 844–854 doi: 10.1016/S1872-2067(20)63709-3

Production of bio-ethanol by consecutive hydrogenolysis of corn-stalk cellulose

Dawang Chu, Yingying Xin, Chen Zhao *
East China Normal University



A consecutive aqueous hydrogenolysis process to convert corn-stalk cellulose into a relatively high concentration of bio-ethanol (6.1 wt%) without humin formation has been developed.

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