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Editors-in-Chief Can Li Tao Zhang

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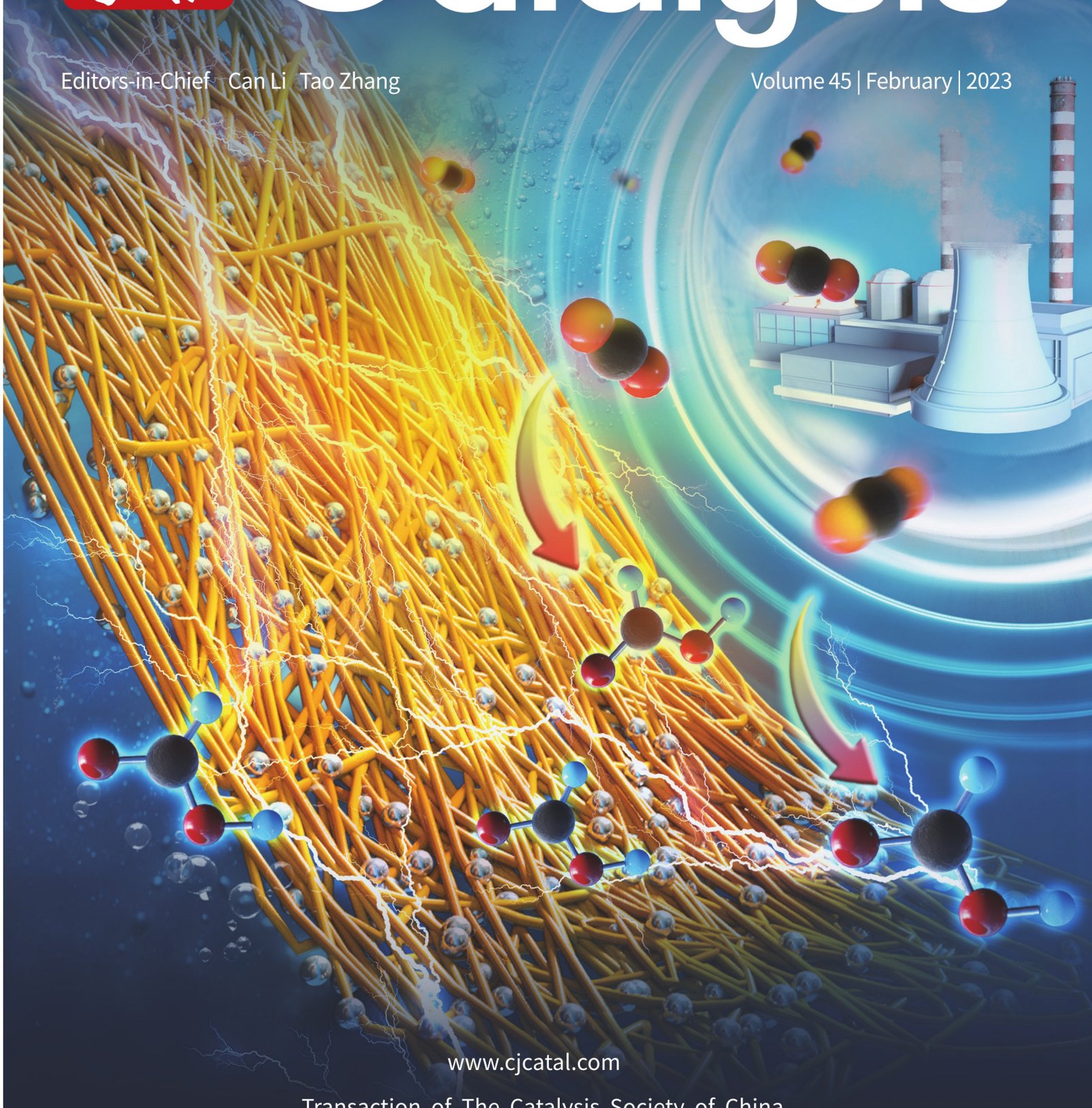

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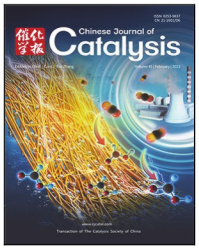


Chinese Journal of Catalysis

Graphical Contents

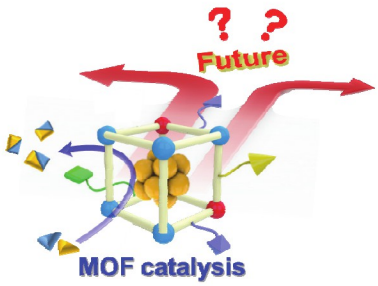
Comment

Chin. J. Catal., 2023, 45: 1–5 doi: 10.1016/S1872-2067(22)64193-7

Metal-organic frameworks for catalysis: Fundamentals and future prospects

Long Jiao *, Hai-Long Jiang *
University of Science and Technology of China

This comment introduces the fundamentals on the design of MOF-based catalysts along with the specific advantages of MOFs for catalysis. Moreover, the potential limitations and further prospects on MOF catalysis are briefly discussed.



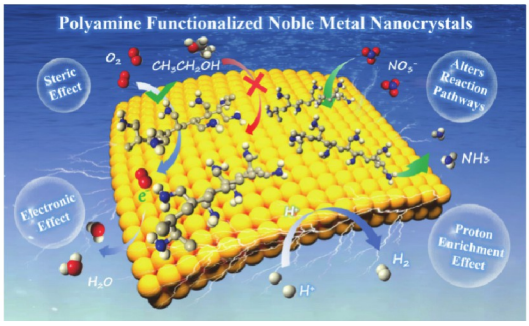
Accounts

Chin. J. Catal., 2023, 45: 6–16 doi: 10.1016/S1872-2067(22)64186-X

Chemical functionalized noble metal nanocrystals for electrocatalysis

Qi Xue, Zhe Wang, Yu Ding, Fumin Li *, Yu Chen *
Shaanxi Normal University;
Xi'an University of Architecture and Technology;
Huazhong University of Science and Technology

Chemical functionalization changes the electronic structure, geometric structure and electrode/electrolyte interface structure of noble metal catalysts to improve their catalytic activity and selectivity through electronic effect, steric effect and proton enrichment effect.

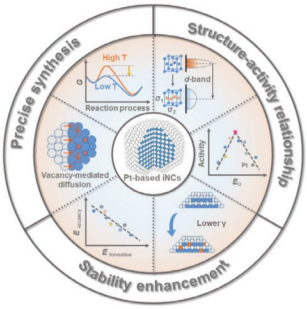


Chin. J. Catal., 2023, 45: 17–26 doi: 10.1016/S1872-2067(22)64165-2

Design principle and synthetic approach of intermetallic Pt-M alloy oxygen reduction catalysts for fuel cells

Xuan Liu, Jiashun Liang, Qing Li *
Huazhong University of Science and Technology

This account summarizes the recent advance on synthetic methodology, structure-activity relationship, and stability regulation strategies of Pt-based intermetallic catalysts for oxygen reduction reaction in fuel cells.

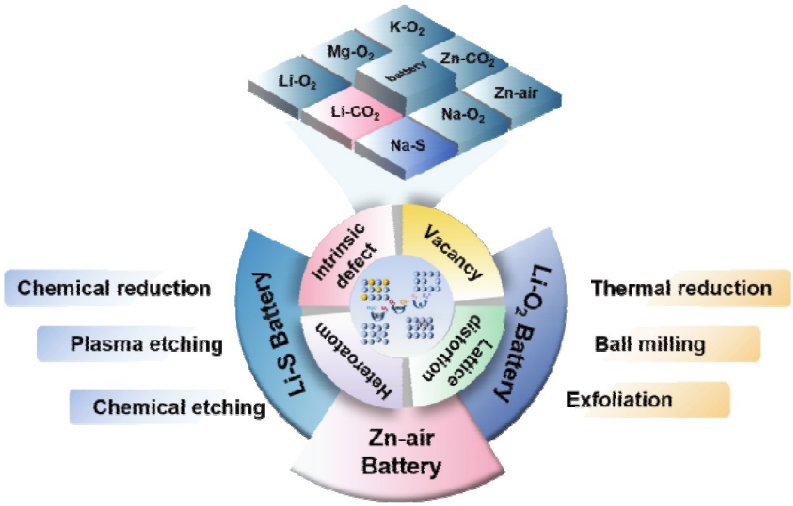


Review

Chin. J. Catal., 2023, 45: 27–87 doi: 10.1016/S1872-2067(22)64168-8

Defect engineering of electrocatalysts for metal-based battery

Xiaoni Liu, Xiaobin Liu*, Caixia Li*, Bo Yang, Lei Wang*
Qingdao University of Science and Technology



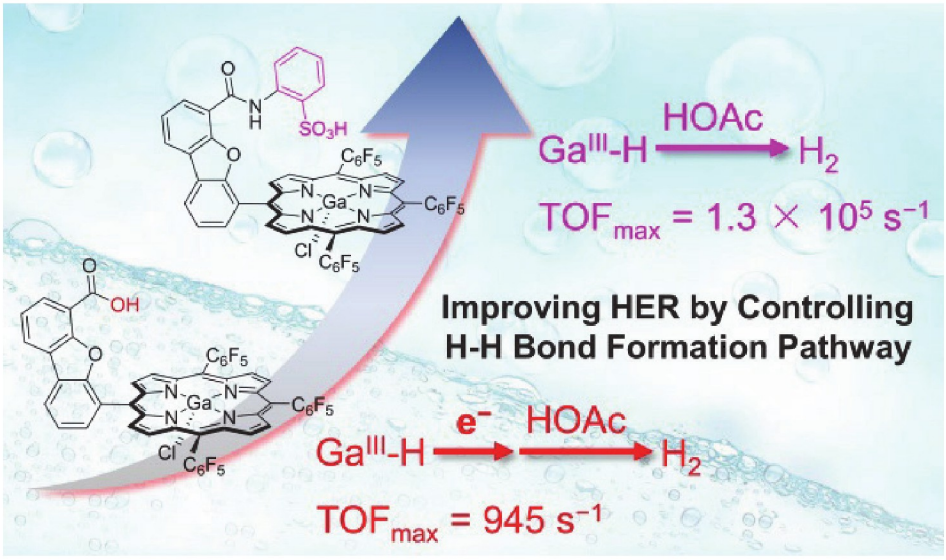
This review takes electrocatalysis as the starting point and battery catalysis as the foothold, and puts forward insights on the application, development and prospect of energy storage technology in the future.

Communication

Chin. J. Catal., 2023, 45: 88–94 doi: 10.1016/S1872-2067(22)64183-4

Promoting hydrogen evolution reaction with a sulfonic proton relay

Ni Wang, Xue-Peng Zhang, Jinxiu Han, Haitao Lei, Qingxin Zhang, Hang Zhang *, Wei Zhang, Ulf-Peter Apfel, Rui Cao *
Shaanxi Normal University, China;
Ruhr-University Bochum, Germany;
Fraunhofer UMSICHT, Germany



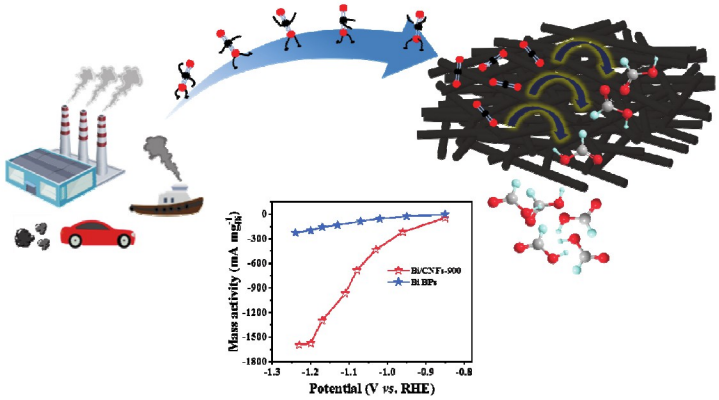
A Ga porphyrin bearing a second-sphere sulfonic group displays extraordinary activity for electrocatalytic hydrogen evolution reaction. The sulfonic group plays critical roles in facilitating proton transfer and lowering the H–H bond formation barrier.

Articles

Chin. J. Catal., 2023, 45: 95–106 doi: 10.1016/S1872-2067(22)64177-9

Boosting electrocatalytic CO_2 reduction to formate *via* carbon nanofiber encapsulated bismuth nanoparticles with ultrahigh mass activity

Yan Kong, Xingxing Jiang, Xuan Li, Jianju Sun, Qi Hu, Xiaoyan Chai, Hengpan Yang *, Chuanxin He *
University of Science and Technology of China; Shenzhen University

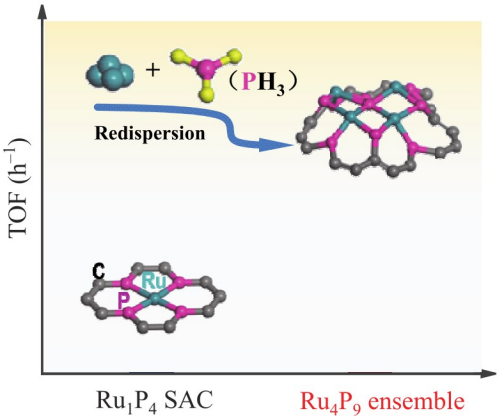


A carbon nanofiber encapsulated bismuth nanoparticles catalyst demonstrates excellent electrocatalytic performance on CO_2 reduction toward formate with a high Faraday efficiency (94.5%), ultrahigh mass activity (–1.6 A mg$_{Bi}^{-1}$), and outstanding production rate (4403.3 μmol h^{-1} cm^{-2}).

Chin. J. Catal., 2023, 45: 107–119 doi: 10.1016/S1872-2067(22)64172-X

Facile fabrication of atomically dispersed Ru-P-Ru ensembles for efficient hydrogenations beyond isolated single atoms

Chao Nie, Xiangdong Long, Qi Liu, Jia Wang, Fei Zhan, Zelun Zhao, Jiong Li, Yongjie Xi *, Fuwei Li *
Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences;
University of Chinese Academy of Sciences;
Shanghai Advanced Research Institute, Chinese Academy of Sciences

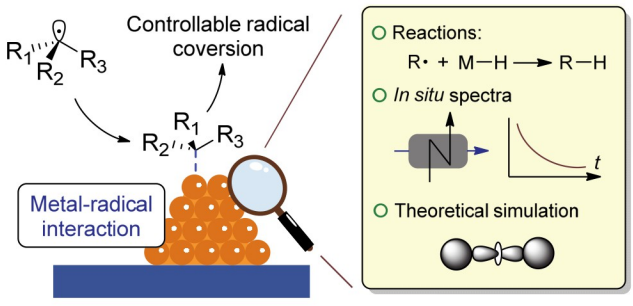


Through a facile impregnation-redispersion strategy, we have successfully fabricated a novel phosphorus bridged ruthenium ensemble (Ru-P-Ru) catalyst, which displayed much higher catalytic activities than Ru SAC in diverse selective hydrogenations of C=O, C=C, and C=N bonds with good recyclability.

Chin. J. Catal., 2023, 45: 120–131 doi: 10.1016/S1872-2067(22)64181-0

Controlling the reactions of free radicals with metal-radical interaction

Zhipeng Huang, Yang Yang, Junju Mu, Genheng Li, Jianyu Han, Puning Ren, Jian Zhang, Nengchao Luo, Ke-Li Han, Feng Wang *
Dalian Institute of Chemical Physics, Chinese Academy of Sciences;
University of Chinese Academy of Sciences;
Dalian University of Technology

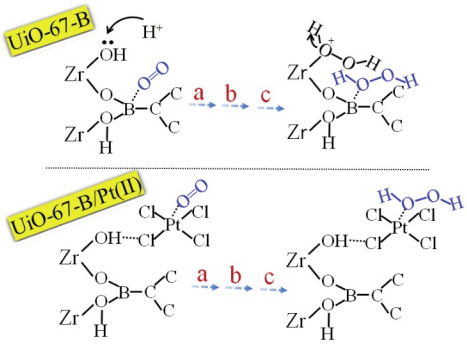


Supported Pd nanoparticles can stabilize extraneous free radicals and manipulate their subsequent conversion *via* the strong metal-radical interaction, which has been detailedly elucidated by photocatalytic reactions, *in situ* transient absorption spectroscopy, and theoretical simulation.

Chin. J. Catal., 2023, 45: 132–140 doi: 10.1016/S1872-2067(22)64163-9

Enhanced photocatalytic H_2O_2 production over Pt(II) deposited boron containing metal-organic framework *via* suppressing the simultaneous decomposition

Yujie Li, Yuanyuan Liu *, Zeyan Wang, Peng Wang, Zhaoke Zheng, Hefeng Cheng, Ying Dai, Baibiao Huang *
Shandong University

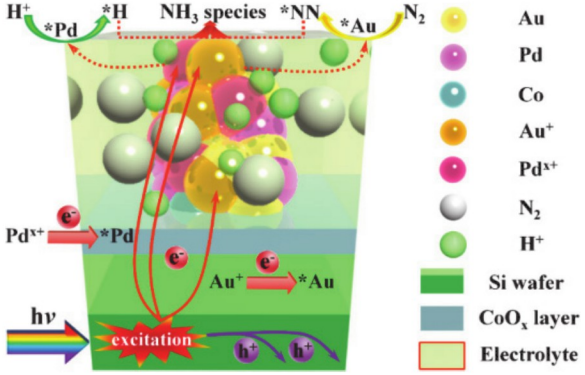


The introduction of Pt(II) plays an important role not only in promoting the H_2O_2 formation but also in inhibiting the H_2O_2 decomposition by coordination of chlorine in $[PtCl_4]^{2-}$ with the hydrogen at Zr-OH in UiO-67-B.

Chin. J. Catal., 2023, 45: 141–151 doi: 10.1016/S1872-2067(22)64178-0

Deciphering the synergy between electron localization and alloying for photoelectrochemical nitrogen reduction to ammonia

Jianyun Zheng *, Yanhong Lyu, Aibin Huang, Bernt Johannessen, Xun Cao *, San Ping Jiang *, Shuangyin Wang *
Hunan University, China; Hunan First Normal University, China; Shanghai Institute of Ceramics, Chinese Academy of Sciences, China; Australian Synchrotron, Australia; Curtin University, Australia

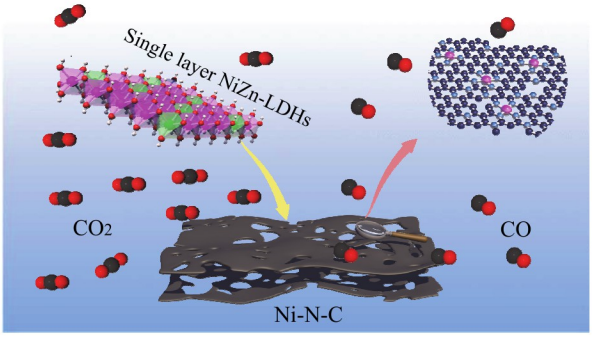


The synergy of electron localization and alloying can facilitate the N_2-to-NH_3 fixation by neighboring reduction sites to synchronously produce and couple the $*N_2$ and *H active species. This work provides an insight on the design of efficient and robust photocathodes for photoelectrochemical nitrogen fixation.

Chin. J. Catal., 2023, 45: 152–161 doi: 10.1016/S1872-2067(22)64188-3

Atomically dispersed Ni-N-C catalyst derived from NiZn layered double hydroxides for efficient electrochemical CO_2 reduction

Ping Zhang, Hao Chen *, Lin Chen, Ying Xiong, Ziqi Sun, Haoyu Yang, Yingke Fu, Yaping Zhang, Ting Liao *, Fei Li *
Southwest University of Science and Technology, China; Queensland University of Technology, Australia; Dalian University of Technology, China

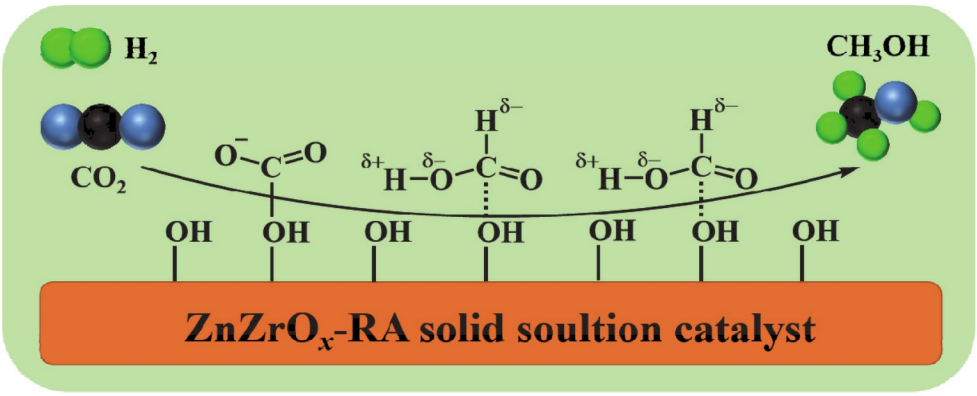


A single-layer NiZn layered double hydroxides sacrifice-assisted strategy is developed to fabricate single-Ni atoms anchored on ultrathin two-dimensional porous carbon catalyst for CO_2 electroreduction.

Chin. J. Catal., 2023, 45: 162–173 doi: 10.1016/S1872-2067(22)64176-7

The role of surface hydroxyls on $ZnZrO_x$ solid solution catalyst in CO_2 hydrogenation to methanol

Feng Sha, Shan Tang, Chizhou Tang, Zhendong Feng, Jijie Wang *, Can Li *
Dalian Institute of Chemical Physics, Chinese Academy of Sciences; Nankai University;University of Chinese Academy of Sciences

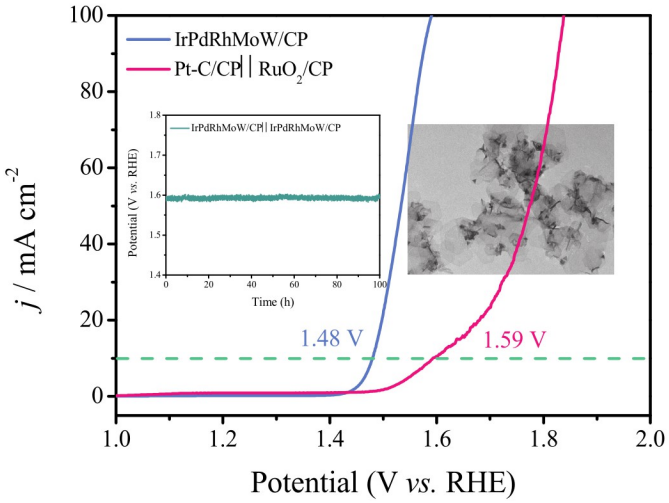


Higher methanol selectivity and CO_2 conversion over $ZnZrO_x$-RA catalyst with more surface hydroxyls was obtained. The surface hydroxyls enhanced the adsorption and activation of H_2 and CO_2, and improved the generation and stability of HCOO* species.

Chin. J. Catal., 2023, 45: 174–183 doi: 10.1016/S1872-2067(22)64166-4

High-entropy alloy metallene for highly efficient overall water splitting in acidic media

Dan Zhang, Yue Shi, Xilei Chen, Jianping Lai *, Bolong Huang *, Lei Wang *
Qingdao University of Science and Technology; the Hong Kong Polytechnic University



IrPdRhMoW HEA metallene with rich amorphous and crystalline structures as an efficient bifunctional electrocatalyst for water splitting under acidic conditions was successfully prepared for the first time.

Chinese Journal of Catalysis
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目 次

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