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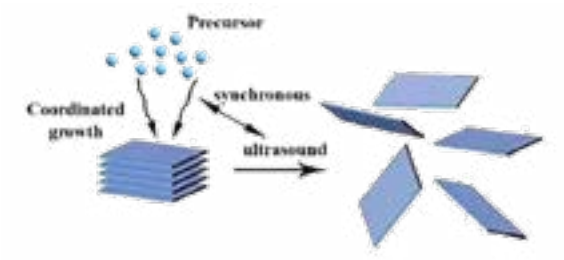
Nano-architectured design of MOFs-based catalysts

As a kind of newly emerged functional inorganic-organic hybrid material, Metal-organic frameworks (MOFs) have attracted increasing attention due to their tunable open metal centers, functional organic linkers, and active guest species in their pores. MOFs offer a new window for fine tuning various structure–property relationships to design MOFs-based catalysts with desirable performance. Recently, in order to obtain catalysts with excellent catalytic performance, good selectivity, high cyclic stability and convenient recyclability, we prepared a series of novel catalysts by designing and tailoring the composition and structure of MOFs, including immobilizing active guest species in the pores of MOFs, modifying the functional groups using a post-synthetic strategy, integrating MOFs with other functional materials or preparing 2D ultrathin MOFs, etc. These MOFs-based catalysts showed high efficiency for catalyzing the aerobic oxidation of alcohols and benzylic C–H bonds, oxygen evolution reaction (OER), etc. Meanwhile, the design concept and structure control of these novel MOFs-based catalysts are also highlighted.



Recent Publications

1. Y. Luan, Y. Qi, H. Y. Gao, N. N. Zheng, G. Wang (2014) Synthesis of an amino-functionalized metal–organic framework at a nanoscale level for gold nanoparticle deposition and catalysis, J. Mater. Chem. A 2: 20588-20596.
2. Z. Y.Wu, X. B. Huang, H. Y. Zheng, P. Wang, G. T. Hai, W. J. Dong, G. Wang (2018) Aromatic heterocycle-grafted NH2-MIL-125 (Ti) via conjugated linker with enhanced photocatalytic activity for selective oxidation of alcohols under visible light, Appl. Catal B-Environ. 224: 479-487.
3. S. Fan, W. J. Dong, X. B. Huang, H. Y. Gao, J. J. Wang, Z. K. Jin, J. Tang, G. Wang (2017) In Situ-Induced Synthesis of Magnetic Cu-CuFe2O4@HKUST-1 Heterostructures with Enhanced Catalytic Performance for Selective Aerobic Benzylic C–H Oxidation, ACS Catal. 7: 243-249.

4. G. T. Hai, X. L. Jia, K. Y. Zhang, X. Liu, Z.Y. Wu, Ge Wang (2018) High-performance oxygen evolution catalyst using two-dimensional ultrathin metal-organic frameworks nanosheets, Nano Energy 44: 345-352.
5. Y. Luan, M. Yang, Q. Q. Ma, Y. Qi, H. Y. Gao, Z. Y. Wu, G. Wang (2016) Introduction of an organic acid phase changing material into metal–organic frameworks and the study of its thermal properties, J. Mater. Chem. A 4: 7641-7649.

Biography

Ge Wang received her PhD in Chemistry from the Michigan Technological University in 2002. Currently she is a professor and PhD supervisor in the School of Material Science and Engineering at the University of Science and Technology Beijing. In 2012, she became a special chair professor endowed by the Chang Jiang Scholars Program of the Ministry of Education. Her research interests focus on creating complex materials structures with nanoscale precision using physical or chemical approaches, and studying the functionalities in energy, catalysis, biomedicine and environment applications, etc.

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