



Profile

1. Reactor Engineering,

research, development and design of various reactor technologies. In particular, the design and industrial application of radial reactors

2. Catalyst Engineering

the research, development and application of various catalysts are carried out through the control of crystal structure and shape of catalyst carrier or active component, as well as the modulation of basic physical properties.

3. Green manufacturing of chemical raw materials

through the development of new reactors and catalysts, process intensification and application of energy-saving and consumption-reducing Technologies, low-cost production of chemical raw materials and green manufacturing are realized.

Research Field

At present, it is mainly engaged in methane catalytic conversion (methane carbon dioxide dry gas reforming to synthesis gas and methane chlorine oxidation to CH_3Cl , CH_3Cl catalytic to ethylene, propylene, etc.) and molecular sieve catalysis (n-alkane isomerization, dimethyl ether to olefin, dimethyl ether homologation, aromatics alkylation, etc.). In the research of preparation and catalysis of multi-stage porous zeolite materials, many kinds of multi-stage porous zeolite materials have been developed and used in catalytic reaction. At present, alkylation of benzene and methanol has been applied in industry.

Research results and selected published papers

- (1) Fan Yang, Jie Zhong, Xiaohui Liu*, Xuedong Zhu* A novel catalytic alkylation process of syngas with benzene over the cerium modified platinum supported on HZSM-5 zeolite, *Applied Energy*, (226):22-30 (2018)
- (2) Yang Ni, Donghai Wang, Yong Jiang, Yanping Gao, Xuedong Zhu*, Haijiao Zhang*, Raspberry-like monodispersity ZnO microspheres for photodegradation of rhodamine B. *Materials Research Bulletin*, (99):37-44 (2018)
- (3) Xing Lanyu, Wei Zhenhao, Wen Zhenhao, Zhu Xuedong*. Catalytic study for methanol aromatization over hierarchical ZSM-5 zeolite synthesized by kaolin [J]. *Petroleum Science & Technology*, (9):1-6 (2017)
- (4) Wei Zhenhao, Zhu Kake, Xing Lanyu, Yang Fan, Li Yunsheng, Xu Yarong, Zhu Xuedong*. Steam-assisted transformation of natural kaolin to hierarchical ZSM-11 using tetrabutylphosphonium hydroxide as structure-directing agent: synthesis, structural characterization and catalytic performance in the methanol-to-aromatics reaction [J]. *RSC Advances*, 7:24015-24021(2017)
- (5) Wei, Zhenhao, Chen, Lifang, Cao, Qingsheng, Wen, Zhenhao, Zhou, Zhuo, Xu, Yarong, Zhu, Xuedong*. Steamed Zn/ZSM-5 catalysts for improved methanol aromatization with high stability, *Fuel Processing technology*, (162),7:66-77(2017)
- (6) Rui Zhang, Zhenchuan Yu, Lei Wang, Qizhe Shen, Xiaoyan Hou, Xuhong Guo, Junwei Wang, Xuedong Zhu*, and Yuan Yao*, Selective Adsorption and Separation of Organic Dyes with Spherical Polyelectrolyte Brushes and Compressed Carbon Dioxide, *Chem. Eur. J.*, 23, 1-9 (2017)
- (7) Zhenhao Wen a, Daqiang Yang a, Fan Yang a, Zhenhao Wei a, Xuedong Zhu*, Methylation of toluene with methanol over HZSM-5: A periodic density functional theory investigation, *Chinese Journal of Catalysis*, 37(11): 1882-1890(2016)
- (8) Yu Miao, Haijiao Zhang*, Shuai Yuan, Zheng Jiao, Xuedong Zhu*, Preparation of flower-like ZnO architectures assembled with nanosheets for enhanced photocatalytic activity, *Journal of Colloid and Interface Science*, (462): 9-18(2016)
- (9) Zhenhao Wen, Tengfei Xia, Minghui Liu, Kake Zhu, Xuedong Zhu*, Methane formation mechanism in methanol to hydrocarbon process: A periodic density functional theory study, *Catalysis Communications*, (75) :45-49(2016)
- (10) Yu Cang, Rui Zhang, Dingye Fang, Xuhong Guo & Xuedong Zhu, Fabrication and characterization of bifunctional spherical polyelectrolyte brushes, *Designed Monomers and Polymers*, 19 (2): 145-154 (2016)
- (11) Zhenhao Wen, Daqiang Yang, Xuan He, Yunsheng Li, Xuedong Zhu*, Methylation of benzene with methanol over HZSM-11 and HZSM-5: A density functional theory study, *Journal of Molecular Catalysis. A, Chemical*, 9: 351-357 (2016)
- (12) Haijiao Zhang*, Minxia Ying, Renmei Gao, Le Hu, Zheng Jiao and Xuedong Zhu*, Carbon-mediated fabrication of core-shell structured $\text{SnO}_2@ \text{TiO}_2$ nanocomposites with excellent photocatalytic performance, *RSC Adv*, (5):58439-58448 (2015)
- (13) Zhenhao Wei, Tengfei Xia, Minghui Liu, Qingsheng Cao, Yarong Xu, Kake Zhu, Xuedong Zhu*, Alkaline modification of ZSM-5 catalysts for methanol aromatization: The effect of the alkaline concentration, *Front. Chem. Sci. Eng.* 9(4): 450-460 (2015)
- (14) Wang, Donghai, Zhang, Haijiao, Guo, Jingxin, Xu, Huijuan, Zhu, Xuedong(*), Jiao, Zheng, Template-free fabrication of rattle-type TiO_2 hollow microspheres with superior photocatalytic performance, *RSC Advances*, 4(70): 37311-37319 (2015)