



Prof. Ye Wang

State Key Laboratory of Physical Chemistry of
Solid Surfaces, Collaborative Innovation Center
of Chemistry for Energy Materials
Xiamen University, China

New Route in C1 Chemistry: Controlling Selectivity

May 3 | Bldg. 101
Thur 11:00 | Seminar Room on the 1st floor

Abstract: C1 chemistry has attracted much recent attention because of the society need to utilize non-petroleum carbon resources (natural or shale gas, coal, biomass and CO₂) to replace oil. Catalytic conversion of syngas (CO/H₂) into liquid fuels and chemicals is the core of C1 chemistry and Fischer-Tropsch (FT) synthesis is the classic syngas-conversion route. However, the product selectivity of FT synthesis is uncontrollable. Based on the concept of reaction coupling, we have developed new route for direct conversion of syngas beyond FT synthesis. Here, I present our work on developing bifunctional catalysts for direct conversion of syngas into lower olefins and aromatics by integrating CO activation and selective C-C coupling. The selectivity of C₂-C₄ olefins or aromatics reaches 70-80% by designing bifunctional catalysts composed of Zn-doped ZrO₂ solid solution nanoparticles and zeolites with CHA (SAPO-34 and SSZ-13) or MFI (ZSM-5) topology. The key controlling factors and reaction mechanism will be discussed.

Reference:

- [1] M. M. T. Galvis, J. H. Bitter, K. P. de Jong, *et al.*, *Science* 335, 835 (2012)
- [2] L. Zhong, F. Yu, Y. Sun, *et al.*, *Nature* 538, 84 (2016)
- [3] J. Kang, K. Cheng, Y. Wang, *et al.*, *Angew. Chem. Int. Ed.* 50, 5200 (2011)
- [4] X. Peng, K. Cheng, Y. Wang, *et al.*, *Angew. Chem. Int. Ed.* 54, 4554 (2015)
- [5] F. Jiao, J. Li, X. Bao, *et al.*, *Science* 351, 1065 (2016)
- [6] K. Cheng, B. Gu, Y. Wang, *et al.*, *Angew. Chem. Int. Ed.* 55, 4725 (2016)
- [7] K. Cheng, W. Zhou, Y. Wang, *et al.*, *Chem* 3, 334 (2017)

Ye Wang is a Professor of Xiamen University and serves as the director of State Key Laboratory of Physical Chemistry of Solid Surfaces. His group works on catalysis for C1 and sustainable chemistry, including: (1) Activation and selective conversion of C1 molecules (CO, CO₂, methane, CH₃OH); (2) Valorization of lignin, cellulose and related bio-based molecules; (3) C-H activation chemistry; (4) C-C coupling and C-C/C-O cleavage chemistry. He is the author and co-author of around 200 papers. He is Associate Editor of ACS Catalysis. He obtained National Science Fund for Distinguished Young Scholars and Chinese Catalysis Society Award for Young Scientist.

You are cordially invited to attend!

Special Guest Seminar