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Functional Carbon Materials from Petroleum Heavy Oil

June 25, 2018 | Bldg. 101
Mon. 14:00 | Seminar Room on the 1st floor

Abstract: As a by-product in the oil refining process, heavy oil including petroleum coke and pitch have a high content of carbon and low content of ash, and are rich in 'benzene rings' or aromatic domains, such that preparation of high quality carbon materials from them is possible. Here I report our recent work on the preparation of porous carbon, carbon quantum dots (CQDs), and graphene materials, from heavy oil. The obtained porous carbon can act as a solid acid catalyst for biomass conversion, the as-made CQDs show good possibilities for detecting Cu^{2+} in water and also for photocatalysis, and the graphene materials exhibit superior electrochemical performance for ORR, supercapacitors, and LIBs. In order to improve the poor electron transfer inside CQDs, various strategies including Cu-N or Cu-Zn doping and different acid oxidation were invented. The modified CQDs show superior catalysis of 1,4-DHP. Our work offer simple pathways to produce high quality carbon materials from heavy oil.

Reference:

- [1] Xiaodong Shao, Mingbo Wu, et al. *Journal of Catalysis*, 2016, 344: 236–241.
- [2] Wenting Wu, Mingbo Wu, et al. *Angew. Chem. Int. Ed.*, 2015, 54(22):6540-6544.
- [3] Mingbo Wu, Yue Wang, et al. *Carbon*, 2014, 78:480-489.
- [4] Lei Pan, Mingbo Wu, et al. 3D self-assembly synthesis of hierarchical porous carbon from petroleum asphalt for supercapacitors. *Carbon*, 2018, 134:345–353.

Dr. Mingbo Wu is a Full Professor, awardee of 10000 Talent Project, Taishan Distinguished Scholar, Director of the Heavy Oil Based New Carbon Materials Lab, and Vice director of the State Key Laboratory of Heavy Oil Processing. His research interests have been focused on the development of new methodologies for synthesis of functional carbon materials, and their uses in catalysis, energy conversion/storage, and environmental protection. He has received a number of awards, including the First Class Award for achievements in technological invention from the China Petroleum and Chemical Industry Foundation, Runners-up Award for achievements in technological invention from the Education Ministry of China, Youth Science and Technology Award from Shandong Province, and the Young Teacher's Award from the Education Ministry of China. He has co-authored over 130 papers in peer-reviewed journals.

You are cordially invited to attend!

Special Guest Seminar