

# WISE

WATERLOO INSTITUTE  
FOR SUSTAINABLE ENERGY



## LECTURE SERIES

FREE ADMISSION | OPEN TO THE PUBLIC

BUILDINGS | CARBON CAPTURE AND STORAGE | FUEL CELLS | NUCLEAR | POLICY | PLANNING  
RENEWABLES | SMART GRID | STORAGE | SUSTAINABLE MOBILITY | SUSTAINABILITY ANALYSES

PRESENTED BY THE WATERLOO INSTITUTE  
FOR SUSTAINABLE ENERGY

Friday, June 12, 2015

1:30 - 2:30 pm

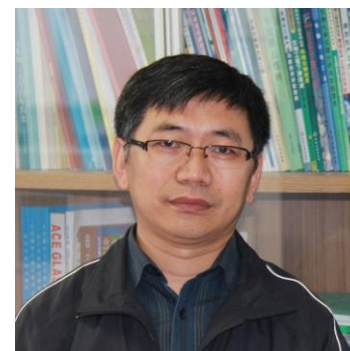
DC 1302

## Synthesis of Coal-based Clean Fuels and Chemicals

**Professor Zhong Li**, Deputy Director, Key Lab of Coal  
Science & Technology, Institute of Coal Chemical  
Engineering, Taiyuan University of Technology

With the rapidly growing demand for energy supply and consistent pressure on greenhouse gases, China is likely to use coal as a basic resource for producing synthetic cleaner fuels and other chemicals. Resulted from a combined coal gasification, gas conditioning and gas cleaning, syngas becomes an important intermediate which can be further processed to make cleaner fuels such as methane gas, gasoline, diesel, or methanol. Methanol, as valuable feedstock, can be used to manufacture a number of chemicals including olefin, ethylene glycol, aromatic hydrocarbon, dimethyl carbonate, and dimethyl ester, etc. Notably all of these reactions are largely depended on the efficiency of the catalysts which are expected to provide good selectivity and stability in the industry scale. In our lab, we target at these issues through both experimental and analytic approaches. As an example, copper based catalysts have been systematically investigated for developing methanol synthesis from syngas and to convert into dimethyl carbonate.

### Biography



Professor Zhong Li is the vice director of the Key Lab of Coal Science and Technology, Taiyuan University of Technology. He received his PhD in Chemical Engineering and Technology, MSc in Organic Chemical Engineering, and BSc in Polymer Chemical Engineering, all from Taiyuan University of Technology. He was a visiting scholar in the Department of Chemistry of the University of Exeter, UK, from Nov. 1997 to Nov. 1998, and in the EMS Energy Institute of the Pennsylvania State University, USA, from Nov. 2010 to Feb. 2011. He was promoted to the rank of full professor in Sept. 2002, and was named as the Leader of Science and Technology in Shanxi Province in 2012. He received the Scientific and Technical Academy Award of Shanxi Province in 2008.

Dr. Li's research has been focused on the synthesis of clean fuels, material and chemicals from coal. He investigates, to name a few examples, the chemistry of syngas, H<sub>2</sub>, CO and CO<sub>2</sub>, green synthesis of chemicals and environmentally friend catalysts, utilization of CO<sub>2</sub>, synthesis of methanol and methane from syngas, carbonate and hydrocarbons from methanol, etc. His research involves both fundamental studies and industry applications. He has published more than 100 papers in international and national journals such as Applied Catalysis A and B, Fuel, Fuel Process Technology, Applied Surface Science, Catalysis Communications, etc. And he holds more than 20 Chinese patents. He also published two books entitled "Coal Based Alcohol Ether Fuel" and "Methanol and Its Derivates".

1. G. Zhang, et al., Influence of the surface oxygenated groups of activated carbon on preparation of a nano Cu/AC catalyst and heterogeneous catalysis in the oxidative carbonylation of methanol, Applied Catalysis B: Environmental, 2015, 179: 95-105.
2. J. Ren, et al, Methanation of carbon dioxide over Ni-M-ZrO<sub>2</sub> (M Fe, Co, Cu) catalysts, Fuel Processing Technology, 2015, 137: 204-211.
3. J. Li, et al, First-principles investigation on Cu/ZnO catalyst precursor: energetic, structural and electronic properties of Zn-doped Cu<sub>2</sub>(OH)<sub>2</sub>CO<sub>3</sub>, Computational Materials Science, 2015, 96: 1-9.

For more information, please view web:  
[www.tyut.edu.cn/li/](http://www.tyut.edu.cn/li/).