DEPARTMENT OF CHEMICAL AND BIOMOLECULAR ENGINEERING

CBE.UDEL.EDU

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CHEMICAL ENGINEERING APPROACHES FOR CATALYTIC REDUCTION OF CO_2

KURT WOHL MEMORIAL LECTURE

JINGGUAN CHEN

COLUMBIA UNIVERSITY

Department Chair and Thayer Lindsley Professor of Chemical Engineering

ABSTRACT

Rising atmospheric concentration of CO_2 is forecasted to have potentially disastrous effects on the environment from its role in global warming and ocean acidification. Converting CO_2 into valuable chemicals and fuels is one of the most practical routes for reducing CO_2 emissions while fossil fuels continue to dominate the energy sector. In the past few years our group has investigated the catalytic reduction of CO_2 using a combination of kinetic studies, in situ characterization and density functional theory calculations. In this talk we will present several examples on (1) CO_2 conversion by thermocatalysis, (2) CO_2 reduction by electrocatalysis, and (3) simultaneous upgrading of CO_2 and shale gas. We will use these examples to highlight the importance of using fundamental chemical engineering principles to guide the selection of reaction conditions and catalyst compositions.

BIOGRAPHY

Jingguang Chen is the Department Chair and Thayer Lindsley Professor of Chemical Engineering at Columbia University, with a joint appointment at Brookhaven National Laboratory. After spending several years as a staff scientist at Exxon Corporate Research Laboratories, he started his academic career at the University of Delaware and rose to the rank of the Claire LeClaire Professor of chemical engineering and the Director of the Center for Catalytic Science and Technology. He is the co-author of 23 United States patents and 440 journal publications and he is recognized as a Web of Science Highly Cited Researcher. He is currently the President of the North American Catalysis Society and the lead-PI of the Synchrotron Catalysis Consortium. He received many awards, including the 2015 George Olah Award from the American Chemical Society, the 2017 Robert Burwell Lectureship from the North American Catalysis Society, and the 2020 R.H. Wilhelm Award from the American Institute of Chemical Engineers.

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