



Academic Lecture



State Key Laboratory
of Chemical Resource Engineering

Tackling CO₂ Issues by Chemical Conversion and by Reducing CO₂ Emission

报告人: Prof. Jingguang Chen (Columbia University)

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地点: 逸夫会议中心中心会议室



报告简介:

Emission of CO₂, a byproduct from many industrial processes and power plants, has increased with increasing energy demand and growing population. Most of the efforts to chemically reduce CO₂ requires the use of H₂. This is not desirable because at present ~95% of H₂ is generated from hydrocarbon-based feedstock, producing CO₂ as a byproduct. In this talk we will first give a brief summary of CO₂ conversion by H₂, followed by discussing our recent efforts in converting CO₂ by light alkanes, such as ethane, via the oxidative dehydrogenation route to generate ethylene ($C_2H_6 + CO_2 \rightarrow C_2H_4 + CO + H_2O$). Using a combination of kinetic studies, in situ characterization and DFT calculations, we have identified several classes of catalysts that can activate both CO₂ and light alkanes to achieve selective CO₂-assisted oxidative dehydrogenation. We will then discuss how to achieve net-reduction of CO₂ using mass and energy balances in thermocatalysis and electrocatalysis. Finally, we will propose reducing CO₂ emission by alternative pathways for N₂ transformation reactions, which are currently the most CO₂-emitting chemical processes.

报告人简介:

Jingguang Chen is the Thayer Lindsley Professor of chemical engineering at Columbia University, with a joint appointment as senior chemist at Brookhaven National Laboratory. He received his BS degree from Nanjing University and PhD degree from the University of Pittsburgh. He then carried out his Alexander von Humboldt postdoctoral research in KFA-Julich in Germany. After spending several years as a staff scientist at Exxon Corporate Research Laboratories, he started his academic career at the University of Delaware in 1998 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 moved to Columbia University in 2012. He is the co-author of 23 United States patents and 400 journal publications that have been cited over 25,000 times. He is currently the President of the North American Catalysis Society and an Associate Editor of *ACS Catalysis*. 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 2019 R.B. Anderson Award from the Canadian Catalysis Division.

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