Valorizing carbon dioxide value via C-C bond forming reactions

Abstract: Two strategies for reducing the concentration of CO_2 in the atmosphere are sequestration, where carbon dioxide is captured and stored either by chemical/biochemical conversion or by injection into underground geological formations, and chemical utilization, where CO_2 is used as a C_1 source in the synthesis of fuels or commodity chemicals. While the synthesis of commodity chemicals from CO_2 cannot match the scale required to significantly impact the effects of anthropogenic CO_2 emission, it can create intrinsic economic value from CO_2 waste. In this presentation we will discuss our recent efforts to develop iron and ruthenium complexes which couple CO_2 with light olefins to create valuable organic carboxylates. These will include a discussion of the organometallic catalytic intermediates, mechanistic obstacles to catalyst development and our latest experimental advances.