James Blakemore

Assistant Professor, Chemistry
University of Kansas

James Blakemore is an Assistant Professor in the Department of Chemistry at the University of Kansas. James was raised in Kansas, and studied chemistry with Francis D'Souza at Wichita State University, graduating in 2007. James then moved to Yale University, completing his Ph.D. in Chemistry in 2012 as a student of Gary Brudvig and Robert Crabtree. Upon completing his Ph.D., James did postdoctoral work at Caltech with Harry Gray as a Fellow of the NSF CCI Solar Fuels Program and the Resnick Sustainability Institute. At KU, James is studying the mechanism of action of inorganic and organometallic catalysts for conversion of renewable energy into useful fuels and chemicals. A portion of this work, funded by the US NSF SusChEM Program, is examining new catalysts and media for conversion of carbon dioxide in collaboration with Profs. Kevin Leonard and Bala Subramaniam**.**

Chemical and Electrochemical Studies of Fuel Generation by Molecular Electrocatalysts

Abstract

The development of efficient electrocatalysts for the production of fuels and useful chemicals from renewable feedstocks is challenging in part due to the difficulty of obtaining mechanistic information. Additionally, electrocatalysts often operate under corrosive and highly reducing conditions that make mechanstic studies difficult. We are working on understanding how catalysts operate under these challenging conditions.

In one project, we have recently shown that the electrochemical quartz crystal microbalance can distinguish homogeneous and heterogeneous proton-reduction catalysis by providing real-time electrode mass information during polarization (Chem. Commun., 2017, 53, 7286). Information gained from these studies is contributing to development of improved catalysts and reaction conditions.

In a second project, we are exploring the coordination chemistry and catalytic behavior of certain pentamethylcyclopentadienyl ([Cp*]–) complexes of rhodium (ChemSusChem, 2017, in press; Inorg. Chem., 2017, 56, 10824). These complexes serve as catalysts for hydrogen generation from acidic solutions, and form unusual intermediates en route to H2 production that bear an unusual Cp*H ligand. The mechanistic studies underway now are revealing new information about the surprising non-innocent behavior of the [Cp*] ligand, and suggest exciting new opportunities in catalyst design.

Thursday, October 12th, 2017 | 11:00 – 11:50AM

2 Eaton Hall (Spahr Auditorium)