Cation-Responsive Pincer-Crown Ether Complexes for Tunable Catalysis

Research involves around transformations relevant to global energy concerns, including the storage of solar energy in chemical fuels, proton-coupled electron transfer reactions, and hydrocarbon transformations. Website: http://www.chem.unc.edu/people/faculty/miller/

Abstract
Catalyst performance is often regulated by substrate binding to a transition metal center, but control over substrate binding remains elusive. We are harnessing interactions between molecular catalysts and their environment to control organometallic catalysis. Incorporating a crown ether macrocycle into a robust pincer ligand enables the donor properties of such “pincer-crown ether” ligands to be tuned through cation-macrocycle interactions. Mechanistic studies of the dynamic interactions between catalysts, cations, and substrates provide an emerging picture of how cations can tune ligand substitution, oxidative addition, and migratory insertion in catalysis.