

UCA Department of Chemistry Seminar

February 14, 2014 2 pm Laney 104

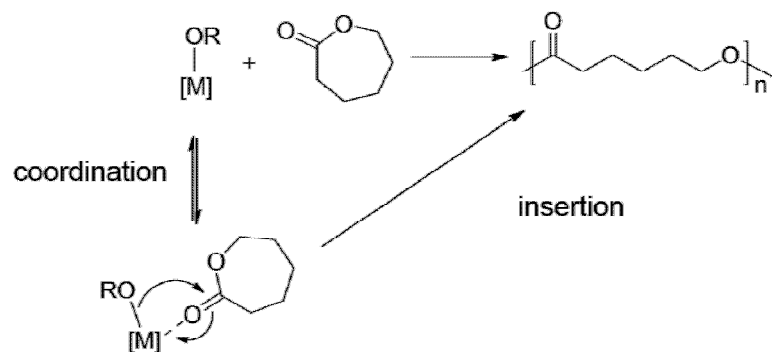
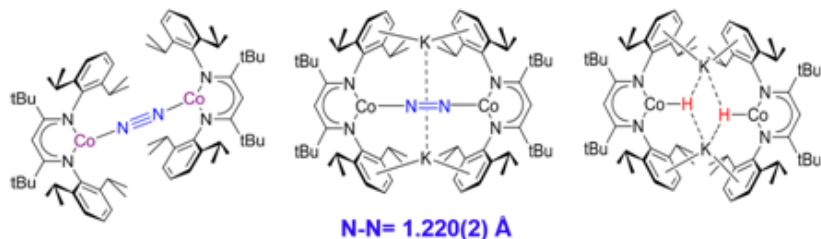
Keying Ding
Middle Tennessee State

Organometallic Approaches to Nitrogen Fixation Chemistry and Mechanism

Elucidation for Cyclic Ester Polymerization

One of the important approach to study nitrogen fixation is to study transition metal N_2 complexes. Using bulky diketiminate ligand, a series of dinitrogen complexes with cobalt were successfully synthesized and characterized. Both low coordination geometry and the existence of alkali metal were found to play important roles in activating dinitrogen molecule. A cobalt hydride complex was successfully isolated and this is the first crystallographically characterized three-coordinate metal hydride species. The cobalt hydride shows interesting reactivity with dinitrogen at ambient condition, providing an alternative way of nitrogen fixation in the absence of strong reducing agent.

The kinetics of polymerization of ϵ -caprolactone (CL) initiated by aluminum alkoxide complexes were studied by NMR spectroscopy. Saturation kinetics were observed using high monomer concentrations, enabling independent determination of the substrate coordination (k_{eq}) and insertion (k_2) events in the ring-opening polymerization process. These data, in conjunction with DFT calculations, provide mechanistic knowledge and insights of general significance for metal alkoxide catalyzed ROP reactions critical for sustainable polymer synthesis. The approach of dissection of what are usually composite propagation rate constants has much promise for future studies of catalysts other than those studied herein



Lunch provided for students with the seminar speaker from
12:00 – 1:15 pm in Laney Hall Rm 105.
Contact P. Desrochers (patrickd@uca.edu) for more information.