

Chemistry 501 Seminar

Thursday, January 19, 2012

3:45 p.m. Buehler 415

Seminar webcast

Refreshments served in Buehler 412 at 3:30 p.m.



**New Mexico
State University**
Las Cruces, NM

Dr. Jeremy Smith

Associate Professor

New Mexico State University

Hosted by Dr. David Jenkins

“Nitrogen Atom Transfer from High Valent Iron”

Abstract

The transfer of nitrogen atoms from discrete nitrido complexes is a promising method for the functionalization of organic substrates. The anticipated reactivity of first row transition metal nitrido complexes makes these species of interest for nitrogen atom transfer. Strongly donating tris(carbene)borate ligands allow for the isolation of reactive iron(IV) and iron(V) nitrido complexes containing the $[\text{Fe}\equiv\text{N}]$ unit. Spectroscopic, mechanistic and theoretical investigations have been used to provide detailed insights into their nitrogen atom transfer reactivity. Thus, two-electron nitrogen atom transfer to triarylphosphines involves a dual nature transition state that provides a pathway for rapid nitrogen atom transfer. The nitrido ligands can also be transferred to hydrocarbon substrates, including alkenes to yield iron(II) aziridino complexes. Complete nitrogen atom transfer to certain substrates can also be affected, allowing for the development of nitrogen atom transfer cycles. The complexes are also reactive in single electron nitrogen atom transfer reactions, most notably leading to the formation of ammonia.

Biosketch

Jeremy M. Smith received his Ph.D. at the University of Witwatersrand (Johannesburg, South Africa) under the supervision of Neil Coville. Following postdoctoral research stints with Russ Hughes (Dartmouth College) and Pat Holland (University of Rochester), he started his independent career at New Mexico State University in 2003. He was promoted to Associate Professor with tenure in 2009. He is a Camille Dreyfus Teacher-Scholar and an editor for the journal *Inorganica Chimica Acta*.