Glenn T. Seaborg Center Seminar

Hydridoborates From B-Hydrogen Abstraction and Comparisons Between Rare Earth - Transition Metals in Hydroamination

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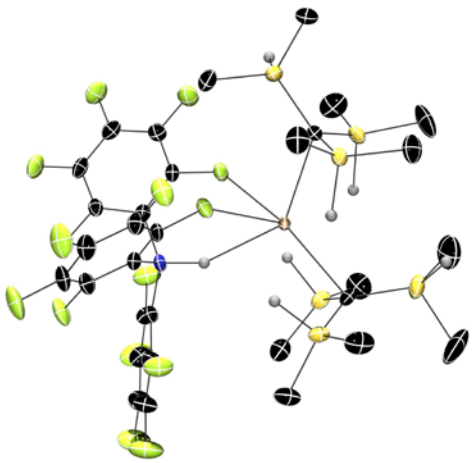
Wednesday Oct 1, 2014
4:00 pm – 5:00 pm
Bldg. 70A, Room 3377

We have synthesized a number of organometallic rare earth compounds containing β-SiH moieties. The series of rare earth elements that support alkyls with β-SiH include Sc, Y, Lu, Yb, Sm, Nd, Pr, Ce, and La. Primarily, we have focused on the tris(dimethylsilyl)methyl ligand $C(SiHMe_2)_3$, its synthetic chemistry with rare earth elements, and its reactivity toward electrophiles and as a precursor for new organometallic compounds. Interestingly, the β-SiH interact with the rare earth center via non-classical 3-center-2-electron interactions which are revealed through NMR and IR spectroscopy and through single crystal X-ray diffraction studies. Furthermore, the β-SiH in these compounds is reactive toward strong electrophiles such as $B(C_6F_5)_3$ or Ph_3C^+, and the overall reaction may be formally described as an intermolecular β-hydrogen elimination because a metal-hydride and unsaturated organic are produced.



We have studied the chemistry of dianionic mixed bis(oxazoline)-cyclopentadienyl borato complexes of yttrium. Optically active derivatives provide high enantioselectivity in aminoalkene cyclization reactions. Interesting, the products have the opposite absolute configuration of products obtained from zirconium-catalyzed reactions using the same ancillary ligand. The kinetic and reaction parameters associated with the stereoselectivity provide a strategy for probing the reaction mechanism, and from this new mechanistic tests have been designed based on ligand design.

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