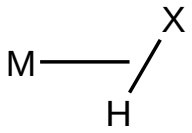
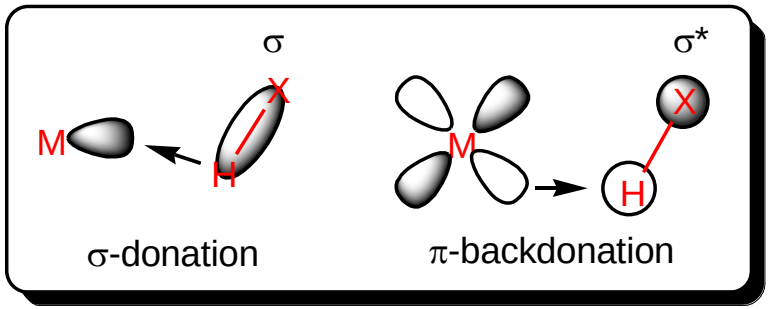
σ-Complexes

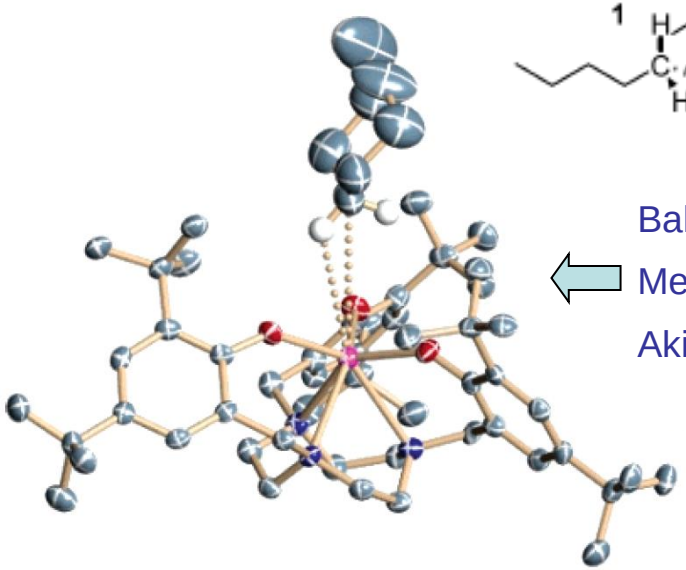
Typical Ligands (σ-complexes)

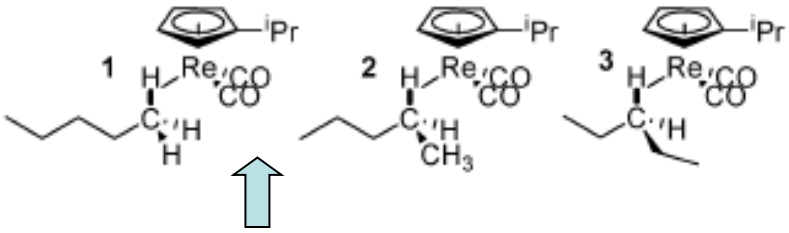


X = Si, Sn, B, P, C



- Mostly π-backdonation to lobe of σ*-orbital on H atom
- H generally much closer to M due to small atomic radius and lack of lone pairs or substituents
- σ-Interactions weaken the H–X bond so can activate H–X towards reactivity

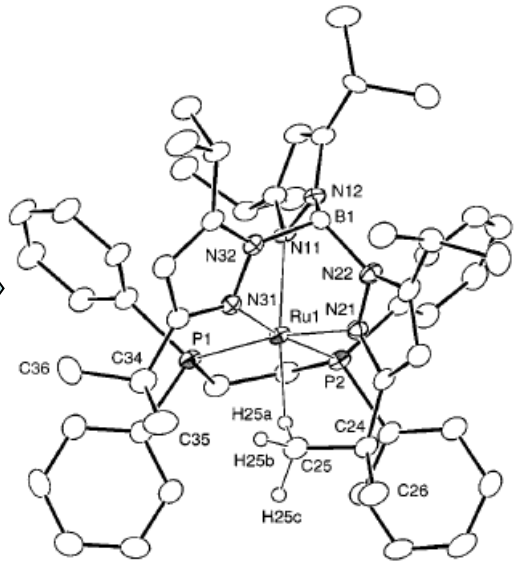




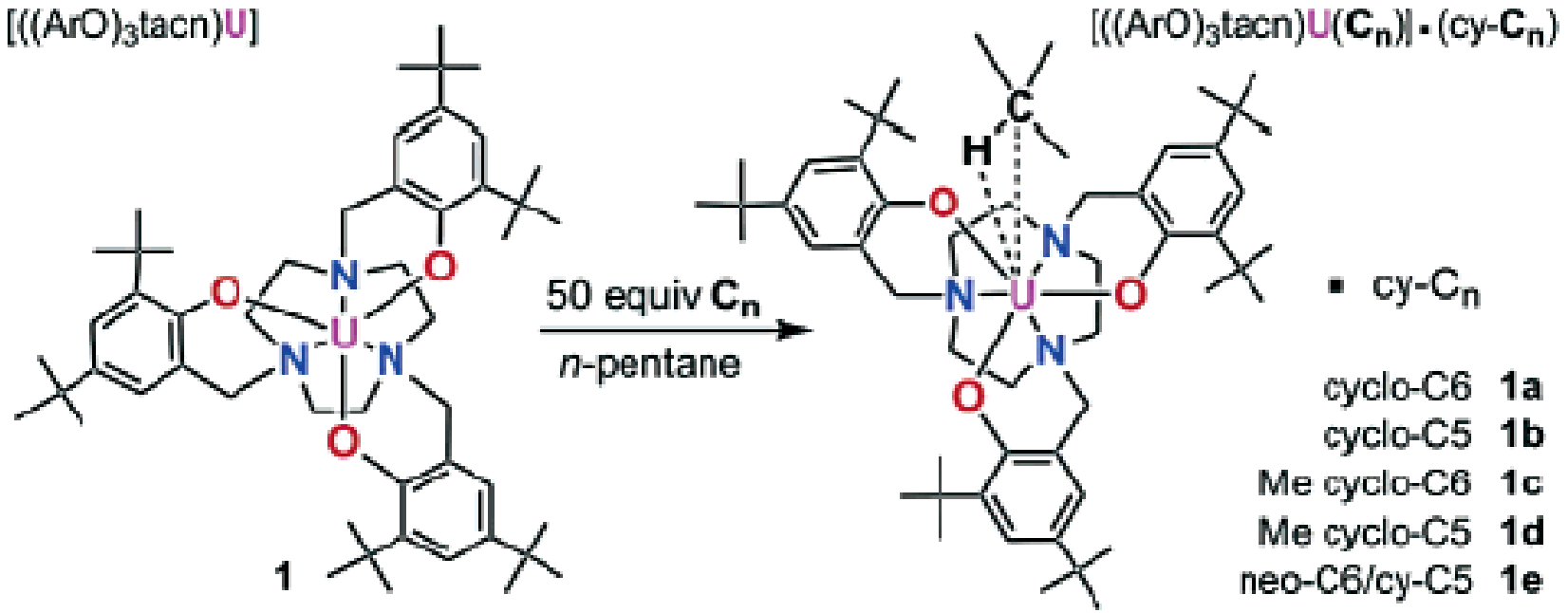
Ball, *JACS*, **2005**, 4134.

Meyer, *JACS*, **2003**, 15734.

Akita, *Organometallics*, **1999**, 2571.



Crystallographically Characterized Alkane σ-Complex



- K. Meyer *et al.*, *J. Am. Chem. Soc.*, **2003**, *125*, 15734.

Crystallographically Characterized Alkane σ-Complex

- K. Meyer *et al.*, *J. Am. Chem. Soc.*, **2003**, *125*, 15734.

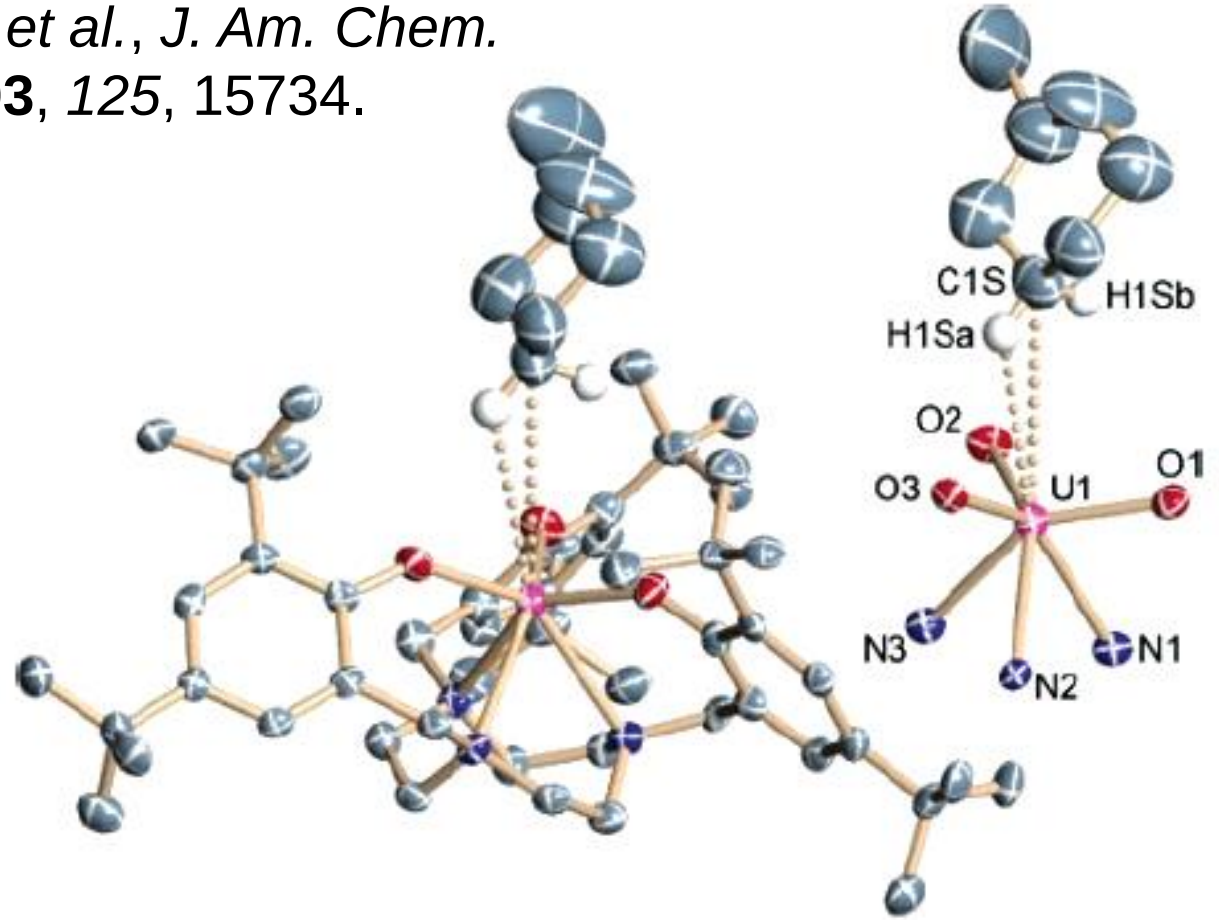


Figure 1. Solid-state molecular structure of [((ArO)$_3$tacn)U(^{Me}cy-C6)]·(^{Me}cy-C6) (**1c**), with dotted lines emphasizing the η^2-H,C mode. Hydrogen atoms and cocrystallized solvent molecule are omitted for clarity; thermal ellipsoids at 50% probability.