SMALL MOLECULE ACTIVATION AND CATALYSIS WITH F-BLOCK ORGANOMETALLICS; (ANY) TWO METALS ARE BETTER THAN ONE

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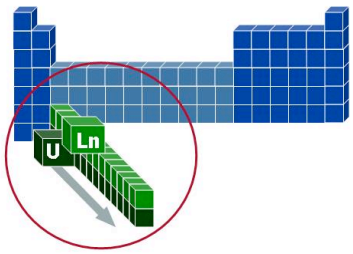
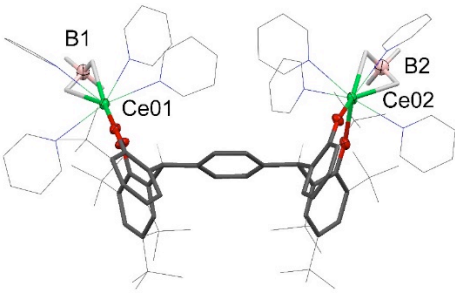
The subtleties of structure and bonding in compounds of the rare earths (Group 3 and the lanthanides) and uranium, the heaviest naturally occurring element, are still poorly-understood. However, their complexes can exhibit high and tuneable Lewis acidity and reduction capability, and rapid ligand exchange reactions. Organometallic compounds of the lanthanides and actinides have shown many interesting small molecule activation reactions, including hydrocarbon C-H bond cleavage. Interest in their activity as catalysts is increasing since the recognition that many rare earths are at least as abundant as iodine, and many are cheap and less toxic than iron. We will show new f-block organometallics that are capable of the reductive activation and functionalisation of CO, CO_2, N_2, and arenes, even using simple bulky ligands that have been previously overlooked. The dominance of single-electron redox reactivity is a potential drawback they share with the 3d metal catalysts. We will present some dinuclear f-block complexes supported by new platform ligands, and their multiple-electron redox chemistry and catalysis.[1]





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