f-block complexes for multiple electron reductive activation; two metals are better than one

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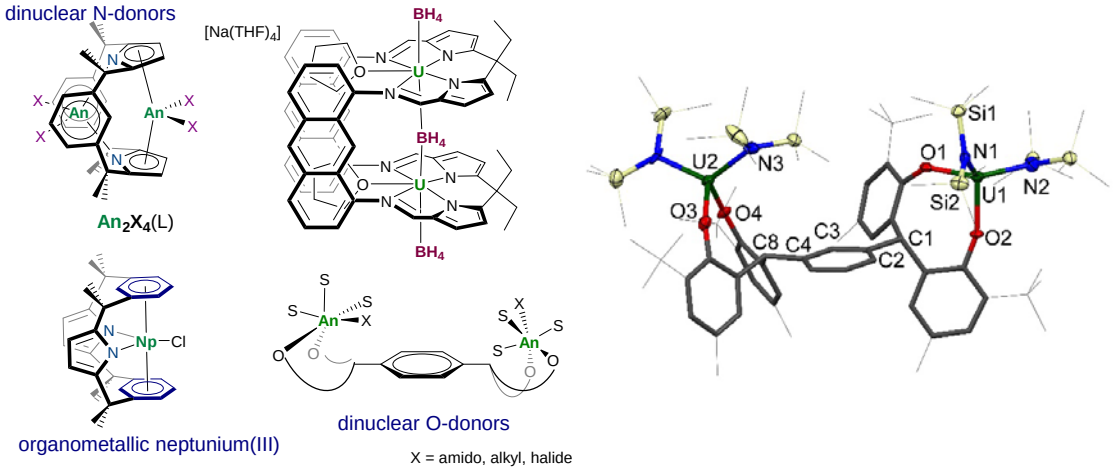
The activation of small, traditionally inert molecules by metal complexes contributes to our fundamental understanding of metal-ligand bonding and can open up new areas of catalysis. We recently reported the first molecules that combine two strongly reducing U^{III} or Np^{III} centres in the same molecule, using pyrrole-based macrocycles. Here, we will present new 4f- and 5f-metal complexes of these, and their binding and reductive activation of small molecules. We will compare their reactivity and present new alternative O-donor systems that can support two-metal-based small molecule reactivity and homogeneous catalysis.



References

1. Review: P. L. Arnold, M. S. Dutkiewicz, O. Walter, *Chem. Rev.*, 2017, *117*, 11460.
2. Review: P. L. Arnold, Z. R. Turner, *Nature Rev. Chem.*, 2017, **1**.
3. M. S. Dutkiewicz, J. H. Farnaby, C. Apostolidis, E. Colineau, O. Walter, N. Magnani, M. G. Gardiner, J. B. Love, N. Kaltsoyannis, R. Caciuffo, P. L. Arnold *Nature Chem.* **2016**, *8*, 797.
4. J. A. L. Wells, M. L. Seymour, M. Suvova and P. L. Arnold, *Dalton Trans.*, **2016**, *45*, 16026.
5. J. A. Hlina, J. R. Pankhurst, N. Kaltsoyannis, P. L. Arnold. *J. Am. Chem. Soc.* **2016**, *138*, 3333.
6. P. L. Arnold, C. J. Stevens, J. H. Farnaby, M. G. Gardiner, G. S. Nichol, J. B. Love, *J. Am. Chem. Soc.* **2014**, *136*, 10218.
7. P. L. Arnold, J. H. Farnaby, R. C. White, N. Kaltsoyannis, M. G. Gardiner, J. B. Love, *Chem. Sci.* **2014** , *5*, 756.
8. P. L. Arnold, S. M. Mansell, D. McKay, and L. Maron, *Nature Chem.*, **2012**, *4*, 668.