Department of Chemistry
College of Science

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Seminar

Monday 23 May 2011

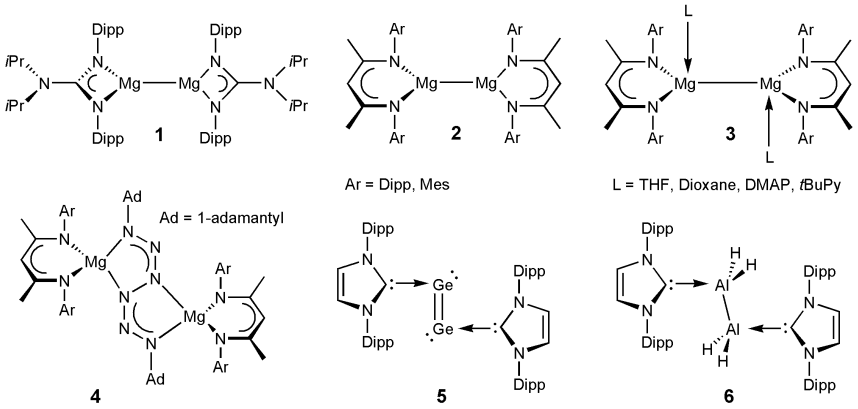
11.00 am - Room 531

Dr Andreas Stasch

ARC Australian Research Fellow, School of Chemistry,
Clayton Campus, Monash University, Melbourne, Australia

The Chemistry of Molecular Magnesium(I) Compounds

The majority of chemical elements are metals and the study of metal-metal bonded species is of fundamental importance. Molecular compounds containing homonuclear element-element bonds are long known in the p- and d-blocks of the periodic table and have formed our understanding of chemical bonding. Very recently, we could show for the s-block, that the reduction of some substituted magnesium(II) iodide precursors, bearing sterically demanding chelating N-ligands, can yield stable molecular magnesium(I) compounds with long Mg–Mg single bonds of *ca.* 2.85 Å, *e.g.* see compounds **1** and **2** (Dipp = 2,6-diisoproplyphenyl, Mes = 2,4,6-trimethylphenyl).[1,2]



1 **2** **3** **4** **5** **6**

These remarkably thermally stable compounds contain a central Mg_2^{2+} core with a high s-character covalent Mg–Mg bond that is coordinated by anionic ligands. Suitable donor molecules form stable adducts of **2** that stretch the Mg–Mg bonds to up to *ca.* 3.20 Å. These magnesium(I) compounds show a unique reactivity and undergo a range of facile reduction reactions of unsaturated organic substrates, *e.g.* forming compound **4**. In addition, these reagents have become invaluable tools in the reduction chemistry of inorganic molecules and organometallic complexes as strong, selective, stoichiometric, hydrocarbon soluble, and safe reducing agents. For example, we were able to isolate unusual donor stabilised digermanium(0) and Al2H4 molecules, **5** and **6**, only when the dimeric magnesium(I) compound **2** as the reducing agent was used. The properties, structures and further chemistry of magnesium(I) compounds such as **1** and **2**, related magnesium(II) hydride complexes, and newly prepared low oxidation state complexes such as **5** and **6** will be presented.

References: [1] S.P. Green, C. Jones, A. Stasch, Science 2007, 318, 1754–1757; [2] For a recent review see: A. Stasch, C. Jones, Dalton Trans. 2011, published online (DOI: 10.1039/c0dt01831g), and references therein.

ALL WELCOME For further information : phone 364 2100