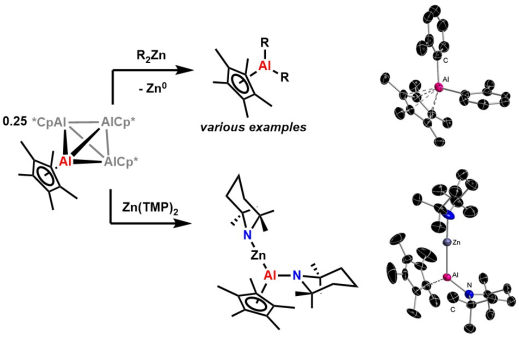
Redox-Transmetalation and Associated Bimetallics Based on an Al/Zn System

F. Dankert*[1], E. Hevia[1]*

[1]University of Bern, Department of Chemistry and Biochemistry, Freiestrasse 3, 3012 Bern,
SWITZERLAND

In the last decade, the chemistry of low-valent aluminum has significantly aroused the interest of many different groups around the globe.[1] As the chemistry of group13 low-valents has evolved, it was also put into context of bimetallics. So does the deft combination of aluminyl precursor and metallic partner yield various combinations of compounds which contain a metal-metal bond. The unsupportive nature of these bonds facilitates unique reactivity. A recent breakthrough is for instance the nucleophilic behaviour of beryllium across an [Al]-[Be] bond.[2] To establish such metal-metal bonds, however, usually requires large, bulky ligands to kinetically stabilize these systems.



In our group, we are currently interested in downsizing ligand bulk which would e.g., be promising for the formation of main-group oligomers and multiple bond activations. Therefore, we currently investigate the reactivity of $[AlCp^*]_4$ towards various small organometallics and homoleptic complexes of small molecules. Here, we demonstrate the reactivity towards diorgano-zinc compounds (=ZnR_2) as well as $ZnTMP_2$. In case of ZnR_2 we could observe the selective transfer of “AlCp*” forming $AlCp^*R_2$ *via* reductive transmetalation. The use of bis amide $ZnTMP_2$, however, gives rise to the formation of a compound with an exceptionally short, rarely[3] observed Al-Zn bond of 239.2(3) pm. We are currently having a look into the reactivity of such simpler systems.

[1] see e.g. *Chem. Sci.*, **2020**, *11*, 6942-6956, *Chem. Commun.*, **2023**, *59*, 503-519; *ChemCatChem*, **2018**, *10*, 4213-4228. [2] *JACS*, **2023**, 145, 8, 4408–4413. [3] *ACIE*, **2021,** *60(41)*, 22301-22306.; *Chem. Sci.,* **2018**, *9,* 2348–2356; *Chem. Commun.* **2022**, *58*, 10091–10094; *Inorg. Chem.* **2018**, *9,* 2348–2356.