

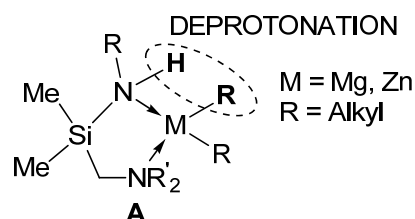
## Deprotonation Reactions – How do they occur? A Venture into the Chemistry of Silazanes and Organometallics

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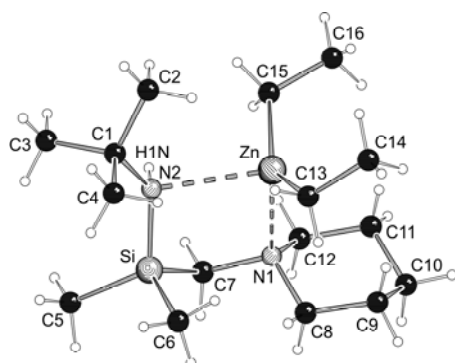
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Metal silylamides and metal silanolates are of great scientific interest due to their potential as alkylation reagents in preparative synthesis or precursors in materials chemistry for silicon-based ceramic materials.<sup>[1]</sup>

Our first aim was to clarify the deprotonation ability of a metallic reagent, specifically lithium, magnesium and zinc alkyls. The well known kinetic hindrance of the deprotonation of many



**Fig. 1.** General scheme of ligand



**Fig. 2.** Crystal structure of a reactive intermediate (adduct of ligand and diethyl zinc before the deprotonation has occurred)

silazane compounds can be bypassed via the precoordination of the metal alkyl. Therefore a ligand of the general form A was designed. Based on the polarity of the organometallic reagent, the deprotonation reaction proceeds with differing activation energy and reaction rates. Consequently, we have been able to isolate various compounds including the precoordinated metal alkyl and various deprotonation products. The structures of these are strongly dependent on the sterical demand of the ligand. To quantify the specific reactivity of the metal alkyl and to understand the structure of the deprotonation products activation energies for the deprotonations and reaction enthalpies were calculated using quantum mechanical methods.

Secondly we observed a substitution reaction of a siloxane with trimethyl aluminium. This unexpected reaction has been clarified by structural investigations and quantum mechanical calculations.

Literature:

[1] (a) B. Conway, E. Hevia, A. R. Kennedy, R. Mulvey, S. Weatherstone, *Dalton Trans.* **2005**, 8, 1532; (b) E. Kroke, Y.-L. Li, C. Konetschny, E. Lecomte, C. Fasel, R. Riedel, *Mater. Sci. Eng.* **2000**, 26, 97.