



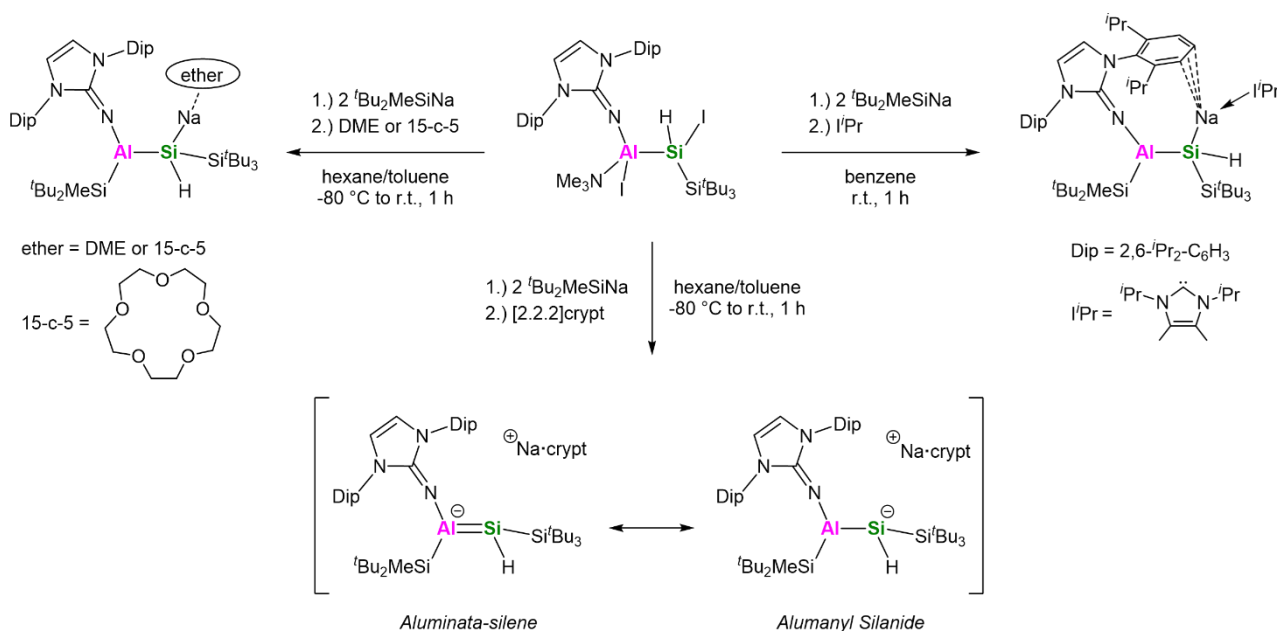
Alumanyl Silanides: An Insight into Silicon-Aluminium Multiple Bonding

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Since the discovery of disilenes, multiple bonded silicon compounds have garnered excitement in the scientific community based on their extraordinary properties, such as reactivity mimicking that of transition metals.^{[1][2]} Nevertheless, silicon group 13 metalloids with multiple bond character have proven to be difficult synthetic targets, owing to the highly polarized and inherently weak nature of the Si=E (E = B, Al, Ga) bond.^[3] Here we present the synthesis and isolation of alumanyl silanides featuring an anionic Al–Si core, stabilized by bulky silyl and *N*-heterocyclic imine (NHI) ligands and a Si–Na interaction.^[4] Crystallographic and spectroscopic analyses, alongside density functional theory calculations, reveal partial double bond character for the Al–Si core. Considering bonding analysis and ongoing reactivity studies, the alumanyl silanides can be described via two major resonance structures. One is characterized by a Si–Na intimate ion pair and predominant silanide-type reactivity. The other, distinguished by no Si–Na interaction, shows aluminata-silene ($\bar{\text{Al}}=\text{Si}$) character. Sequestration of the cation using [2.2.2]cryptand supports the latter resonance structure.



References

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- [3] A. Agarwal, S. K. Bose, *Chem Asian J.* **2020**, 15, 3784–3806.
- [4] M. Ludwig, D. Franz, A. Espinosa, M. Bolte, F. Hanusch, S. Inoue, *Nat. Chem.*, *in press*.