

Steric Control of the Disilene – Silylsilylene Equilibrium

Martin W. Stanford¹, Gary S. Nichol¹ and Michael J. Cowley*¹

¹ School of Chemistry, University of Edinburgh, David Brewster Road, Edinburgh, EH9 3FJ, UK.

E-Mail: michael.cowley@ed.ac.uk

The equilibrium between disilene ($\text{H}_2\text{Si}=\text{SiH}_2$) and silylsilylene ($\text{H}_3\text{Si}-\text{SiH}$) has been studied computationally¹ and at 10 K in an argon matrix² because of its importance as an intermediate in the chemical vapour deposition of silicon for electronics.

This equilibrium has been implicated in the rearrangements of isolable disilenes at ambient and elevated temperatures, but has not directly been observed for isolable molecular disilenes.³ In order to further investigate this process, we sought a facile method for the preparation of substituted disilenes bearing a single hydride substituent that may undergo migration.

Here, we present a synthetic route to asymmetrically-substituted base-coordinated disilenes. By taking advantage of substituents and coordinating bases with a range of steric parameters, we are able to observe and control the rearrangement between disilenes and silylsilylenes. Surprisingly, migration of a trimethylsilyl group is favoured over hydride migration. We will present further details of the equilibrium and the synthesis, structures and reactivity of isolated compounds.

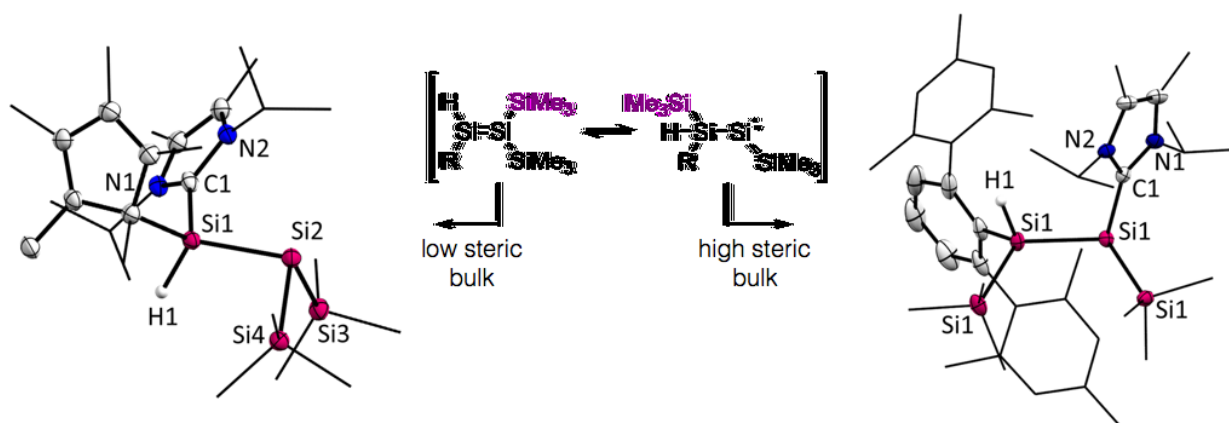


Figure 1. Base-coordinated disilene and silyl-silylene compounds.

[1] G. Dolgonos, *Chem. Phys. Lett.*, 2008, **466**, 11–15.

[2] G. Maier, H. P. Reisenauer and J. Glatthaar, *Chem. – Eur. J.*, 2002, **8**, 4383–4391.

[3] D. Scheschkewitz, Ed., *Functional Molecular Silicon Compounds II: Low Oxidation States*, Springer International Publishing, Cham, 2014, vol. 156.