**Lewis Base Stabilized Dichlorosilylene**

Please complete these guiding questions to the journal article *Angew. Chem. Int. Ed. Engl.* **2009**, *48*, 5683-5686. DOI: [10.1002/anie.200901766](https://doi.org/10.1002/anie.200901766)

This literature discussion celebrates Dr. Herbert Roesky for being the recipient of the Frederic Stanley Kipping Award in Silicon Chemistry 2024 from the American Chemical Society. The award citation reads: “*For the preparation of unique compounds with low-valent silicon from commodities without using metals as reducing agents*.”

1. b) Draw the Lewis structures of SiCl4 and silylene SiCl2. Using Valence Bond Theory, indicate the hybridization at each Si center. Draw the two orbitals for Si in SiCl2 not involved in bonding with the Cl atoms.

b) Assign the oxidation state for Si in each of these compounds.

2. What is the motivation for studying silylenes as stated by the authors?

3. The award citations mentions the importance of not using metals as reducing agents in the synthesis of silylenes. What metal reducing agents are mentioned by the authors in this article? What are the hazards associated with this metal according to the SDS?

4. In Schemes 1, the structure of compound **1** is drawn with an arrow between the carbene carbon in the NHC ligand L1 and the Si of silylene SiCl2. Describe what this notation conveys in terms of the interaction between the carbene lone pair and the orbitals of silylene.

5. a) List the techniques used to characterize compound **1**.

b) Consult this [website on 29Si NMR](https://chem.ch.huji.ac.il/nmr/techniques/1d/row3/si.html). Record the natural abundance of this nucleus, its spin, and the range of chemical shifts observed.

6. The second half of the article discusses the structure of compound **1** using data from single-crystal X-ray diffraction and computational methods.

a) What geometry does compound **1** have according to X-ray diffraction? Is this consistent with the geometry predicted using VSEPR theory?

b) The authors used computational methods to study the electronic structure and geometry of NHC-coordinated SiCl2 (compound **1**) and non-coordinated SiCl2. What was the presumed hybridization of non-coordinated SiCl2 according to Valence Bond Theory (VBT) and is this consistent with what would be predicted using the principles of VBT?

7. Why did the authors cite reference 24?