# Synthesis of a Kinetically Stabilized 2,2-Dihydrosilene

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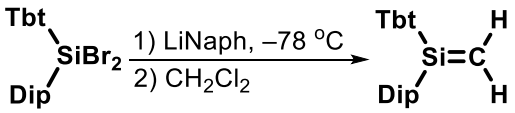
**Keywords**: *Silene; Dilithiosilanes; Reduction; Highly Reactive Species*

Since the successful isolation of stable silene $(Me_3Si)_2$**Si=C**$(OSiMe_3)$(1-Ad) (1-Ad = 1-adamantyl) in 1981 by Brook and co-workers[1], several main group-chemists were prompted to synthesize and isolate a variety of silenes by taking advantage of kinetic stabilization by using appropriate bulky substituents as steric protection groups. These **Si=C** doubly bonded compounds are largely difficult to isolate due to their poor 3p(Si)-2p(C) orbital overlap and their tendency to undergo facile oligomerization. Therefore, it is only imperative to discover suitable methodologies to properly synthesize, isolate, and characterize these elusive molecules.

In this work, a sterically demanding 2,2-dihydrosilene bearing 2,4,6-tris[bis-(trimethylsilyl)methyl]phenyl (Tbt) and 2,6-diisopropylphenyl (Dip) groups was synthesized by exhaustive reduction of the corresponding dibromosilane, Tbt(Dip)$SiBr_2$, with lithium naphthalenide at –78 °C followed by addition of $CH_2Cl_2$.[2,3] $^1$H-NMR signals of the dihydrosilene observed at 4.55 (dd, 1H, $^2J_{H\text{-}H}$ = 9.8 Hz) and 4.77 (dd, 1H, $^2J_{H\text{-}H}$ = 9.8 Hz) were assigned to the two geminal protons attached to the methylene carbon. This was established with the aid of HSQC in which a carbon atom ($CH_2$; 95.3 ppm) is directly bonded to two non-chemically equivalent protons. Moreover, a sharp resonance at 90.5 ppm in $^{29}$Si-NMR was observed as the three-coordinate silicon atom of a silene[4]. Although establishing the purity remains a challenge due to inseparable by-product, we succeeded in the identification of the dihydrosilene by X-ray crystallographic analysis. In terms of its stability, the observed silene was found to be stable in solution at room temperature for a long period of time. The experimental data obtained in this study were further complemented with extensive DFT calculations.

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