Hydroboration of Bis(trimethylsilylethynyl)silanes with 9-Borabicyclo[3.3.1]nonane. A New Route to 1-Sila-3-cyclopentenes and to a 1-Sila-2,4-cyclopentadiene

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The hydroboration of bis(trimethylsilylethynyl)silanes $Me(R)Si(C{\equiv}C{-}SiMe_3)_2$ **1a** (R = Me) and **1b** (R = H) with 9-borabicyclo[3.3.1]nonane (9-BBN) does not give products related to the usual *cis*-1,2-hydroboration of one or both C≡C bonds. Instead, the major products obtained from **1a** are the two isomers of 2,5-bis(trimethylsilyl)-2,5-bis[9-(9-borabicyclo[3.3.1]-nonyl)]-1-sila-3-cyclopentene **2a** and **2a′** (silolenes), and from the reaction of **1b** with 9-BBN solely the silolene **2b** can be isolated. The silolenes **2a** and **2b** were studied by X-ray structural analysis. The reaction of **1a** with 9-BBN in a 1:1 molar ratio gave a mixture of products, consisting of the silolenes **2a** and **2a′**, some unidentified material, and 2,5-bis(trimethylsilyl)-3-[9-(9-borabicyclo[3.3.1]nonyl)]-1-sila-2,4-cyclopentadiene **3a**. The silole **3a** was then prepared in pure state by the reaction of **1a** with 9-isobutyl-9-borabicyclo[3.3.1]nonane in boiling toluene, where the borane decomposes slowly into isobutene and 9-BBN which is trapped by **1a**. The proposed structures of the heterocycles **2** and **3** in solution follow from a consistent set of NMR data (^{1}H, ^{11}B, ^{13}C, ^{29}Si NMR).

Key words: Alkynes, Silole, Hydroboration, Isomerisation, NMR