Metal borohydrides as catalysts for (hydro)silylation reactions

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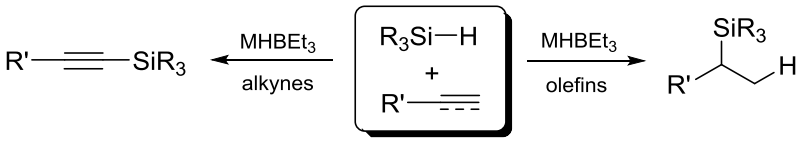
The hydrosilylation of alkenes is believed to be one of the most straightforward and efficient catalytic processes in organosilicon chemistry, important from both academic and industrial point of view.[1] Since its first description in 1947 by Sommer, considerable attention and effort has been given towards broadening the scope of the reaction involving the addition of Si-H unit to C-C multiple bonds and discovering new catalytic systems.[2]

In the communication we prove that simple metal borohydrides ($MHBEt_3$), which are commonly used as reducing agents for in-situ reduction of other hydrometallation precatalysts (e.g. Co(II), Fe(II), Ni(II) complexes), can be used as a single, highly selective and commercially available alternative for transition metal-based hydrosilylation catalysts. We report catalytic activity of selected metal borohydrides in the hydrosilylation of resonance-stabilized olefins and dehydrogenative silylation of aromatic and aliphatic alkynes with aromatic hydrosilanes and hydrosiloxanes (Scheme 1).[3] Mechanistic view of these reactions based on both literature and stoichiometric experiments using NMR methods is discussed.



Scheme 1. Metal triethylborohydrides as catalysts of Markovnikov hydrosilylation of olefins vs. dehydrogenative silylation of alkynes.

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