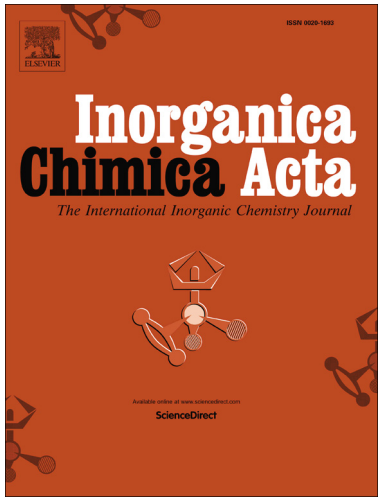

Research paper

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Synthesis and Characterization of Bissilyl Cobalt and Iron Hydrides Bearing Disilazane Ligands via Si-H Bond Activation

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Abstract

The reaction between 2-pyridinetetramethyldisilazane **1** and $CoMe(PMe_3)_4$ led to the formation of the novel bissilyl cobalt(III) hydride $CoH((C_5H_4N)\text{-}N(SiMe_2)_2)(PMe_3)_3$ (**2**) via the cleavage of two Si-H bonds with the elimination of methane. The reaction of phenyltetramethyldisilazane **3** with $CoMe(PMe_3)_4$ could directly provide the hydrido cobalt(III) complex $CoH((C_6H_5)\text{-}N(SiMe_2)_2)(PMe_3)_3$ **4**. Complex **4** is an analogue to complex **2**. This result indicates that a pre-coordination of the nitrogen atom in pyridine to the cobalt center before Si-H bond activation can be excluded in the formation mechanism of **2**. This exclusion is further supported by the *in situ* ^1H NMR spectra of the reaction mixtures between 2-pyridinetetramethyldisilazane **1** with $CoMe(PMe_3)_4$ in C_6D_6 in different reaction times. A new bissilyl iron hydride $FeH((C_5H_4N)\text{-}N(SiMe_2)_2)(PMe_3)_3$ (**5**) was obtained through the reaction of $Fe(PMe_3)_4$ with **1**. Complexes **2**, **4** and **5** with two metal-Si bonds are very stable and did not react with MeI, EtBr , acetylacetone, CO or CO_2. The molecular structures of complexes **2**, **4** and **5** were determined by single crystal X-ray diffraction.

Keywords*:* Si-H bond activation; Silyl iron hydride; Silyl cobalt hydride; Disilazane ligand; Trimethylphosphine

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