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Yanhong Dong, Yaomin Shi, Yizheng Geng, Tingting Zheng, Xiaoyan Li, Hongjian Sun, Olaf Fuhr, Dieter Fenske

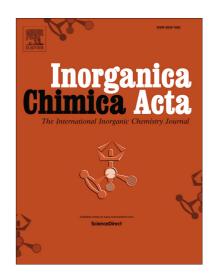
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ACCEPTED MANUSCRIPT

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

Yanhong Dong, a, Yaomin Shi, a, Yizheng Geng, a Tingting Zheng, a, Xiaoyan Li, a Hongjian Sun*, a Olaf Fuhr, a Dieter Fenske

Abstract

The reaction between 2-pyridinetetramethyldisilazane 1 and CoMe(PMe₃)₄ led to the formation of the novel bissilyl cobalt(III) hydride $CoH((C_5H_4N)-N(SiMe_2)_2)(PMe_3)_3$ (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 $CoH((C_6H_5)-N(SiMe_2)_2)(PMe_3)_3$ 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 $FeH((C_5H_4N)-N(SiMe_2)_2)(PMe_3)_3$ (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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