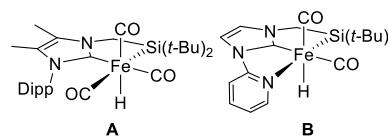


## Synthesis and Properties of Iron Complexes Bearing SiCN-Type Pincer Ligands

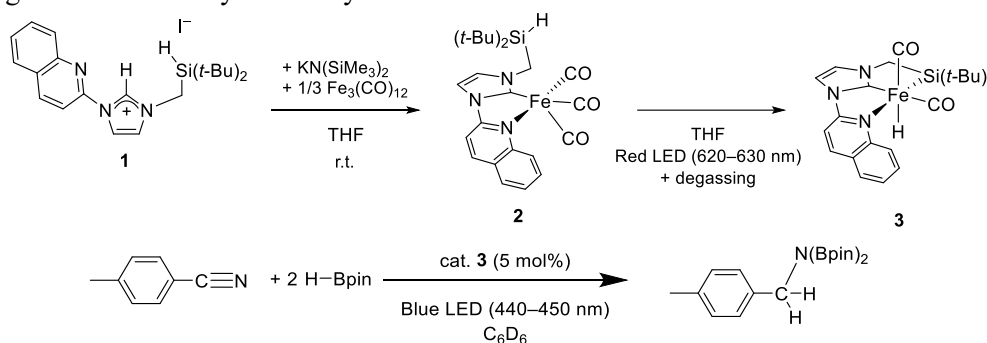
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**Keywords:** Iron Catalyst; Silyl Ligand; N-Heterocyclic Carbene; Pincer Complex; Hydroboration

Replacing traditional noble metal catalysts with iron catalysts has attracted attention from a standpoint of sustainability.<sup>[1]</sup> We have recently developed iron catalyst **A** bearing a strongly  $\sigma$ -donating silyl-NHC chelate ligand, which promotes double hydroboration of nitriles under UV irradiation.<sup>[2]</sup> Moreover, our recent study revealed that related silyl-NHC-pyridine pincer complex **B** acts as a catalyst for the same reaction under visible-light irradiation by blue LED.<sup>[3]</sup> In this work, to explore more efficient visible-light driven catalysts, we designed and synthesized an analogous pincer complex by extending the  $\pi$  conjugation of the pyridine unit of **B** to a quinoline unit.



The reaction of imidazolium salt **1** with  $\text{Fe}_3(\text{CO})_{12}$  in the presence of  $\text{KN}(\text{SiMe}_3)_2$  afforded NHC-quinoline chelate iron complex **2** in 49% yield (Scheme 1). Complex **2** was then converted to silyl-NHC-quinoline pincer complex **3** in 78% yield upon irradiation with red LED and repeated degassing. The UV-visible spectrum of complex **3** showed an absorption band in the visible light region of ca. 450–500 nm, which is red-shifted from that of complex **B** by ca. 50 nm. Furthermore, we investigated the catalytic activity of complex **3** for the double hydroboration of *p*-tolunitrile with pinacolborane (HBpin) under irradiation by blue LED (440–450 nm) at room temperature, which gave *N,N*-bis(boryl)amine in 47% NMR yield. Exploration of substrate scope of hydroboration catalyzed by **3** and **B**, and mechanistic investigation are currently underway.



**Scheme 1.** Synthesis and catalysis of a silyl-NHC-quinoline pincer-ligated iron complex

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