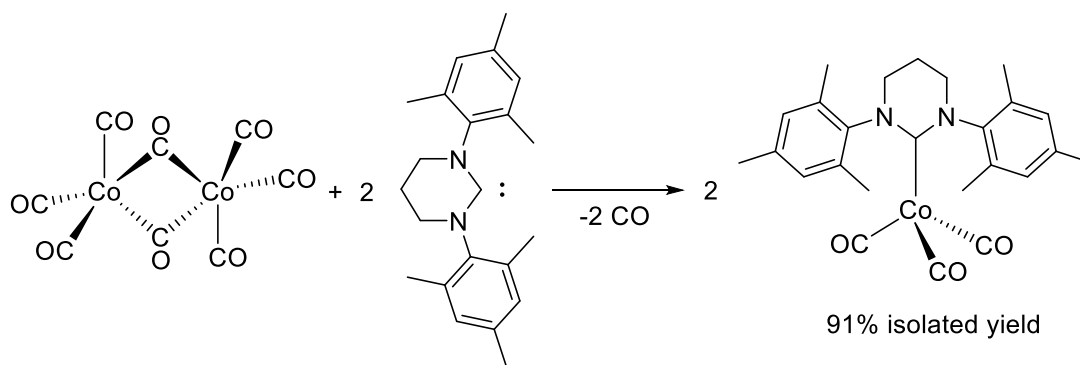


## Isolation of Mononuclear [Co(ligand)(CO)<sub>3</sub>] Metalloradicals and Its H<sub>2</sub> Activation Mechanism

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**Keywords:** Cobalt; NHC; Metalloradical; H<sub>2</sub> activation; Hydroformylation.

The dimeric cobalt (0) complexes [Co(ligand)(CO)<sub>3</sub>]<sub>2</sub> (ligand = CO or PR<sub>3</sub>) have been known as one of the most useful organometallic catalysts in industry since 1940s. Nowadays, long-chain alcohols are produced using [Co(PR<sub>3</sub>)(CO)<sub>3</sub>]<sub>2</sub>-catalyzed hydroformylation of long-chain olefins.<sup>1</sup> [Co(ligand)(CO)<sub>3</sub>]<sub>2</sub> is known to exist in equilibrium with a monomeric 17-electron metalloradical complex, [Co(ligand)(CO)<sub>3</sub>], based on spectroscopic studies.<sup>2</sup> The termolecular reaction between two molecules of this metalloradical species and H<sub>2</sub> is proposed as a pathway to generate a key catalytic intermediate [HCo(ligand)(CO)<sub>3</sub>].<sup>2,3</sup> However, synthesis and isolation of the monomeric [Co(ligand)(CO)<sub>3</sub>] is unknown, and because of that its reactivity towards H<sub>2</sub> have not been clarified. In this talk, I will present the first synthesis and isolation of the monomeric [Co(ligand)(CO)<sub>3</sub>] complexes using N-heterocyclic carbene (NHC) ligands, as well as its H<sub>2</sub> activation mechanism.<sup>4</sup>



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