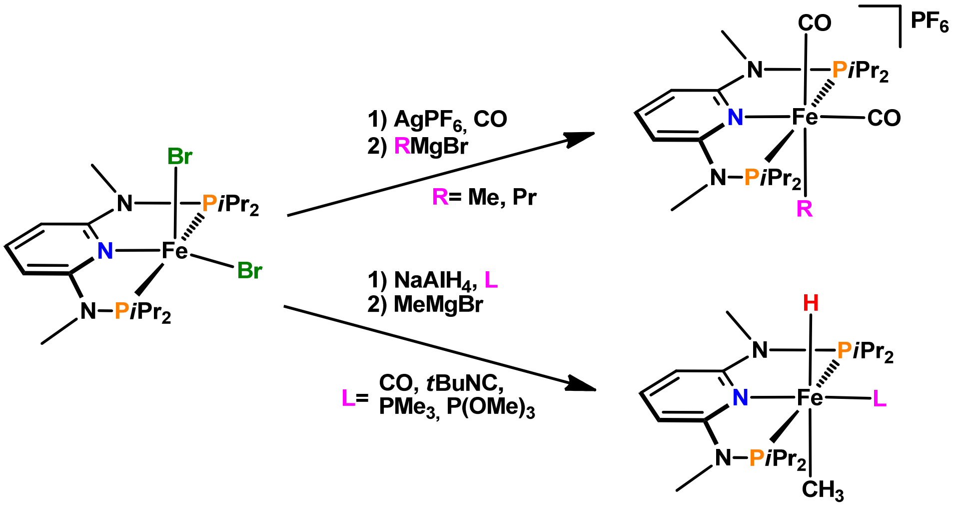
SYNTHESIS AND CHARACTERIZATION OF NEW IRON ALKYL PNP PINCER COMPLEXES

Florian Thurnher, Karl Kirchner*

Institute of Applied Synthetic Chemistry, Vienna University of Technology,
Vienna, Austria

Iron PNP pincer complexes have been successfully employed as catalysts for hydrofunctionalization and hydrogenation reactions. However, the main flaw of these highly active catalysts is their low air and moisture stability [1]. To circumvent this, it was the goal to synthesize new, more stable iron pre-catalysts based on carbonyl ligand. As previously demonstrated for manganese, stable alkyl carbonyl complexes could be obtained that undergo migratory insertion and form highly active Mn(I) hydride catalysts, followed by rapid hydrogenolysis [2].



Scheme 1. Overview of the obtained new alkyl and hydrido alkyl complexes

Herein the synthesis and characterization of new complexes starting from the previously published Fe[(PNP^{Me}-*i*Pr)Br$_2$] [3] are reported (Scheme 1), as well as the applicability of these as catalysts. The dicarbonyl propyl and methyl complexes in particular were examined for their catalytic properties and compared with one another. Furthermore, the potential of the dicarbonyl methyl complex to undergo migratory insertion by forming the acyl complex was investigated.

Also, the synthesis of new hydrido methyl complexes was achieved, which were probed for the activation of CO$_2$ to form formate complexes through insertion into the hydrido-iron bond. Therefore, these complexes could be promising catalysts for small molecule activation forming formic acid from H$_2$ or a proton donor and CO$_2$ [4].

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