ISGC 2019
May 13rd - 17th

N°419 / OC
TOPIC(s) : Homogenous, heterogenous and biocatalysis

Hydrogenation Reactions Catalyzed by Bidentate Manganese (I) Complexes

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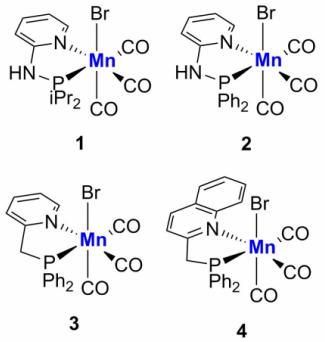
PURPOSE OF THE ABSTRACT

Hydrogenation with molecular dihydrogen is a clean, atom-economic and efficient reaction that has drawn a huge interest for more than a century from the Nobel Prize of Sabatier in 1912 for heterogeneous hydrogenation to the one of Noyori and Knowles in 2001 for asymmetric hydrogenation.[1]

Manganese, being the third most abundant transition metals after iron and titanium, has recently emerged as suitable transition metal for the design of efficient hydrogenation catalysts.[2] Lately, we have shown that Mn(I) complexes bearing readily available phosphino-pyridinyl PN bidentate ligands can achieve a very high efficiency in the hydrogenation of carbonyl compounds and aldimines, through reductive amination.[3]

The complex Mn(CO)3Br(PN) 2 showed good performances for the hydrogenation of carbonyl derivatives under mild conditions.[3a] Then, a one-pot two-step procedure was developed for the alkylation of amines via reductive amination of aldehydes using molecular dihydrogen as a reductant in the presence of 2 mol% of 2 under 50 bar of hydrogen.[3b] Excellent yields were obtained for a large combination of aldehydes and amines including aliphatic aldehydes and amino-alcohols.

FIGURES



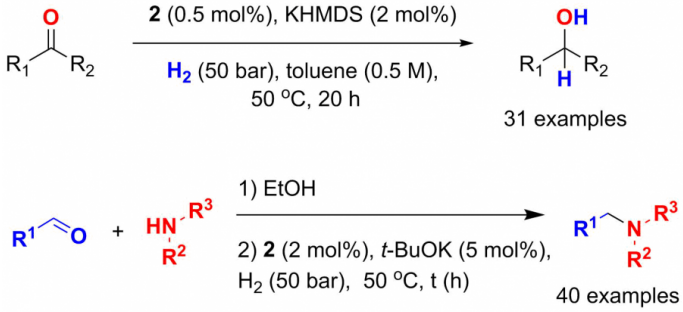


FIGURE 1
Mn(I) phosphino-pyridinyl complexes

FIGURE 2
Hydrogenation reactions catalyzed by bidentate manganese (I) complexes

KEYWORDS
Hydrogenation | Manganese | Carbonyl derivatives | Reductive amination

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