

HOMOGENEOUS COBALT CATALYSED AMIDES TO AMINES HYDROGENATION

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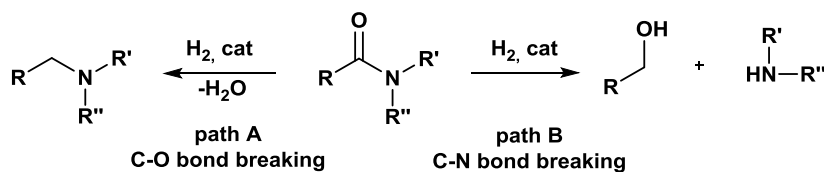
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Amines constitute an important class of compounds with wide application in major industrial fields, such as in agrochemical and pharmaceuticals [1] For the synthesis of structurally complex compounds and natural products containing amine moieties, a route foresees the reduction of the amide to corresponding amine. Unfortunately, amides constitute one of the least reactive derivatives among all classes of carbonyl and traditionally, their reduction is performed using an excess of reducing agents producing stoichiometric amounts of waste-products. [2]

Thus, catalytic hydrogenation using molecular hydrogen is of high interest as it offers an atom-economic and waste-free methodology. [3]

Depending on the type of homogeneous catalyst, the hydrogenation of amides (Scheme 1, path A and B) can follow two distinct pathways: path A, which foresees the C-O bond cleavage to afford the more desired higher amine or, alternatively, the catalyst can promote the C-N bond breaking (path B), that leads to the formation of corresponding alcohol and amine; in the last decade, significant improvements in amide hydrogenation using homogeneous Ir and Ru-based catalysts have been achieved. [4]

In this work, we have developed a three components catalytic system constituted by $\text{Co}(\text{N}(\text{Tf})_2)_2$ as metallic precursor, 1,1,1-tris{bis(4-methoxyphenyl)phosphinomethyl}ethane as ligand and a Lewis acid as external additive, that is able to hydrogenate a wide range of amides; the presence of Lewis acid additive improves yields and selectivity of the higher desired amines.



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