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Eco-compatible catalysts for the preparation of amines via H-transfer reactions

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PURPOSE OF THE ABSTRACT

The development of efficient and eco-compatible catalytic systems enabling the preparation of organic compounds is of great concern. This presentation more particularly deals with the preparation of amines using H-transfer processes. Indeed, amines are highly important building blocks due to their omnipresence in natural products, pharmaceuticals or agrochemicals.

Two approaches will be presented: the first one (i) concerns the heterogenization of a molecular catalyst onto a nanometric support enabling its recycling and the second one (ii) consists in designing catalysts involving abundant and benign metals.

(i) The first example describes the use of graphene-coated magnetic nanoparticles (MNPs)[1] as supports for a ruthenium catalyst able to promote the transfer hydrogenation of nitroarenes. The originality of this system lies in the non-covalent attachment of the pyrene-tagged ruthenium complex to the graphene surface of MNPs. In the reaction conditions, the pre-catalyst is shown to be released from the support and to act in homogeneous conditions which gives rise high activity.[2] At the end of the reaction, the interactions between the catalyst and the MNPs are restored and the Ru complex recovered with a simple magnet. The reported catalyst can be reused to quantitatively produce anilines over several cycles.

(ii) The second example describes catalysts based on alkaline earth elements (Ae = Mg, Ca, Sr, Ba) for the hydrosilylation of imines which constitutes an attractive synthetic strategy towards amines.[3] Due to their abundance and low toxicity, Ae have attracted much attention over the last decade and were shown to catalyze a wide range of reactions.[4] In this communication, a simple, readily available and moisture stable calcium salt able to catalyse the aldimines hydrosilylation under mild conditions, is presented.[5]

FIGURES

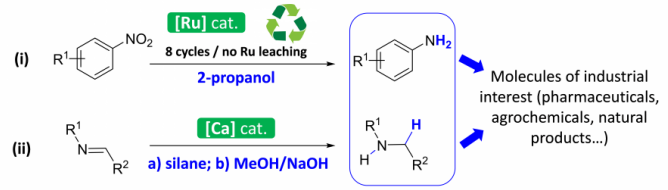

FIGURE 1

Figure

Preparation of amines via two approaches: (i) by using a recyclable Ru nanocatalyst; (ii) by using a calcium-based molecular catalyst

FIGURE 2

KEYWORDS

Recyclable nanocatalyst | Ruthenium | Calcium | Transfer hydrogenation

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