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Sustainable one-pot multicatalysis for the synthesis of pharmaceutical active compounds

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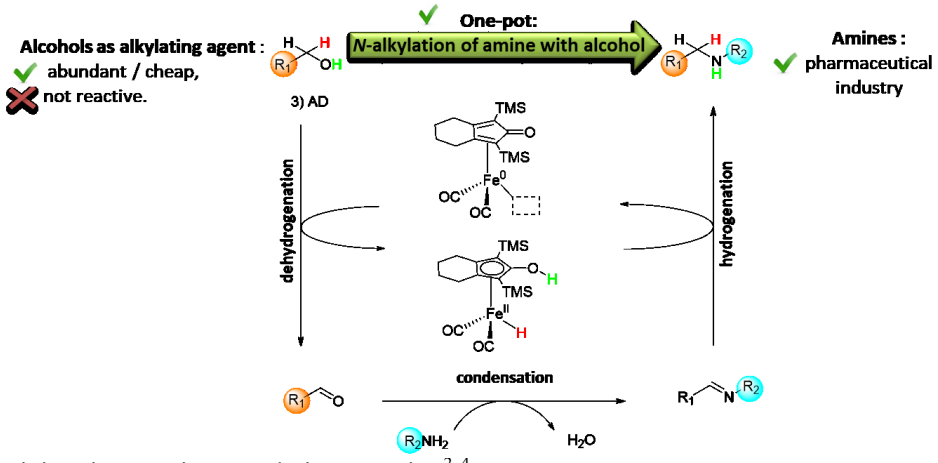
The direct catalytic high atom economy and sustainable *N*-alkylation of amine with alcohol through borrowing hydrogen catalysis is considered as one of the most promising methods to access sustainably valuable pharmaceutical ingredients containing amine groups from readily available stable alcohols. For decades, this field has endured dominance of late and mostly noble metal based homogeneous and heterogeneous catalysts. Recently, the development of efficient molecular catalysts based on non-precious, non-toxic and earth abundant metal such as iron encompassed growing interest.[1] Among these catalysts, (cyclopentadienone)iron carbonyl complexes (**[LFe(CO)$_3$]**) hold a special place due to their easy synthesis from simple and cheap materials, their air and water stability and to the metal-ligand



cooperation giving rise to unique catalytic properties.[2–4]

Here, we address their catalytic mechanisms investigation in order to improve their efficiency for synthetic processes described in the literature and to extend their use to novel multi-catalytic reactions currently uneasy in single step reactions.[5] Our methodology in this field relies on clear structure-properties correlations and mechanism determination of molecular catalysts in order to optimize catalysts structures, solve crucial challenges in the field of BH reactions, and promote catalysts recyclability.

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