

Fe-catalyzed intramolecular C-H amination reactions

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The direct C-H activation remains to be one of the most challenging transformations in the field of organometallic catalysis.^[1] Apart from oxidative procedures the activation of diazocompounds or azides represents an interesting alternative. Whereas in the former processes significant amounts of a stoichiometric oxidant are commonly employed, N₂ is formed as the sole by-product in the latter processes. A variety of transition metal catalyzed processes for the activation of organic diazocompounds have been published, however the corresponding electrophilic azide activation as part of a C-H amination is mainly limited to noble metal catalysts.^[2] The nucleophilic activation of azides by electron-rich Fe-complexes opens new possibilities in the field of catalysis and complements existing procedures.

Herein we describe an operationally simple Fe-catalyzed intramolecular C-H amination reaction of arylazides to the functionalized carbazole^[3], indole^[3] and indoline^[4] derivatives using Bu₄N[Fe(CO)₃(NO)] (TBA[Fe]) as catalyst. Broad functional group tolerance and low catalyst loadings are characteristics of this catalytic procedure. The question of plausible reaction mechanisms for the TBA[Fe]-catalyzed C-H-amination of sp²- and sp³-hybridized C-H-bonds could be answered by means of different isotope labeling and control experiments.

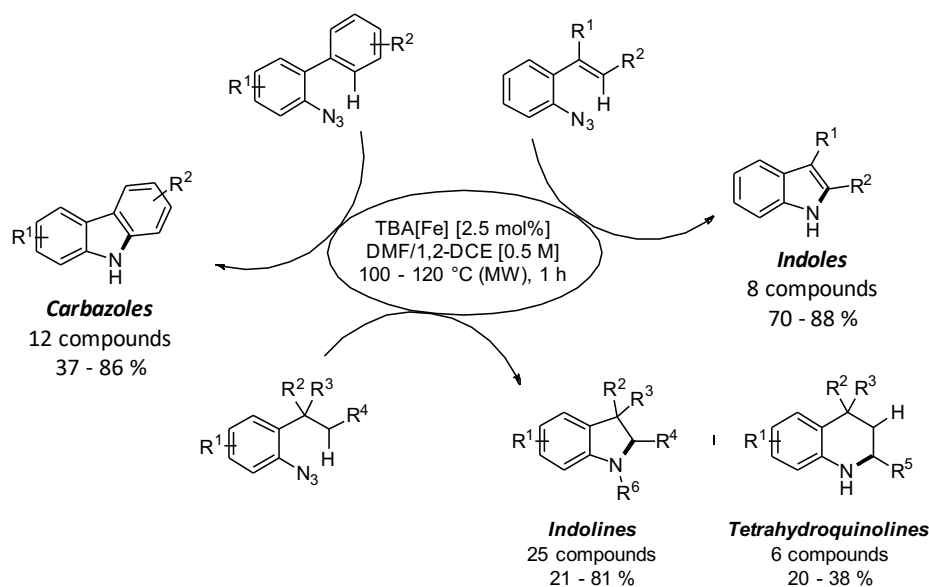


Fig. 1: Schematic illustration of the developed TBA[Fe]-catalyzed C-H-amination reactions.

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[3] I. Alt, B. Plietker, *Angew. Chem. Int. Ed.*, **2016**, *55*, 1519-1522.

[4] I. T. Alt, C. Guttroff, B. Plietker, *Angew. Chem. Int. Ed.*, **2017**, *56*, 10582-10586.