Efficient C-H Functionalization of Alkyl Amines with Alkenes Catalyzed by Tantalum Complexes

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The catalyzed α-C–H functionalization of amines with alkenes, also known as hydroaminoalkylation,1 has recently emerged as a powerful method for the synthesis of nitrogen containing blocks. This 100% atom-efficient transformation is highly attractive since readily available olefin feedstocks can be converted in a single step into functionalized amine containing materials applicable in pharmaceutical and agrochemical industries. Catalyst design plays a very important role since it can directly affect the rate and the regioselectivity of the reaction affording either α-(*linear*) or β-(*branched*) alkylated products. Despite advances in the field,2 the current state of the art for this reaction still requires high reaction times (> 20 h), high temperatures (> 100 °C) and excess of the alkene substrate (1.5 eq). Herein, we show that catalytic systems based on tantalum complexes supported by ureate type *N,O*-chelating ligands (formed *in situ* or isolated) can afford high yields of β-alkylated derivatives in as little as 15 min using stoichiometric amounts of amine and alkene substrates.3 These highly tunable ligands can be easily modified to allow challenging substrates, such as internal alkenes or alkyl amine, to be employed in this reaction. Mechanistic investigations *via* kinetic monitoring experiments will also be presented.



Figure 1. C-H functionalization of amines with alkenes *via* hydroaminoalkylation catalysis.

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