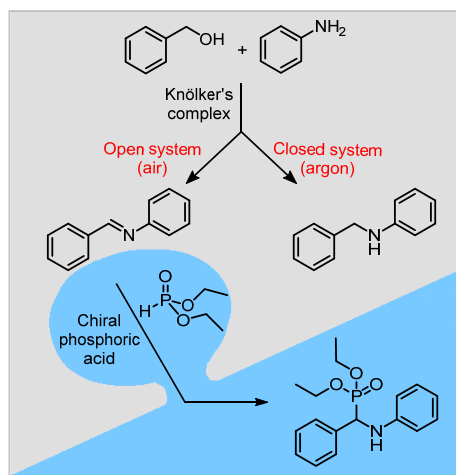


SWITCHABLE BASE METAL CATALYZED HYDROGEN BORROWING PROCESSES

Natalie Hofmann, Kai C. Hultsch*

Institute of Chemical Catalysis, Faculty of Chemistry, University of Vienna, Austria

Carbon-heteroatom containing molecules are indispensable substructures of synthetically valuable compounds ranging from agrochemicals and pharmaceuticals to fine chemicals. Therefore, their easy and atom-efficient synthesis starting from simple, commercially available precursors plays a significant role in modern synthetic chemistry [1]. The hydrogen borrowing strategy provides promising opportunities as it is an atom-efficient method for a variety of transformations of alcohols, in particular the formation of new carbon-carbon or carbon-nitrogen bonds [2]. In order to broaden the applicability of this method we are investigating suitable cascade reactions. We investigated, among others, the selective N-alkylation of anilines with benzylic alcohols catalyzed by a nitrile-ligated variant of Knölker's complex [3]. While a hydrogen borrowing process is observed in a closed system under inert conditions, a dehydrogenative condensation occurs in an open system in air. The latter leads to a selective formation of reactive imines, which can be further functionalized. Hence, we report the one-pot three-component condensation of enantioenriched α -alkylamino phosphonates by a sequential iron-promoted dehydrogenative condensation followed by a hydrophosphonylation-step promoted by chiral BINOL-based phosphoric acids [4].



[1] R. A. Sheldon, I. W. C. E. Arends, U. Hanefeld, *Green Chemistry and Catalysis*, Wiley-VCH, Weinheim, 2007.

[2] For reviews on this topic see: a) T. Irrgang, R. Kempe, *Chem. Rev.* **2019**, *119*, 2524–2549; b) A. Corma, J. Navas, M. J. Sabater, *Chem. Rev.* **2018**, *118*, 1410–1459.

[3] H.-J. Knölker, H. Goesmann, R. Klauss, *Angew. Chem. Int. Ed.* **1999**, *38*, 702–705.

[4] N. Hofmann, K. C. Hultsch, *Eur. J. Org. Chem.* **2019**, DOI: 10.1002/ejoc.201900209.