ENANTIOSELECTIVE NICKEL-CATALYZED AMINATION OF 2-SUBSTITUTED 1,3-DIENES

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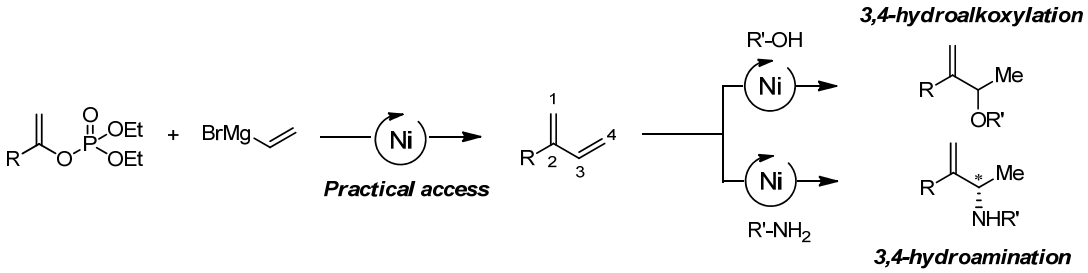
Conjugated 1,3-dienes are a particularly versatile platform in the context of selective functionalization, and have been widely used as building blocks for organic synthesis as well as in polymerization processes. However, selective functionalization of 1,3-dienes is particularly challenging due to the numerous coordination and insertion modes conceivable for a transition metal catalyst.[1] In recent years, efforts toward the development of selective catalytic transformations have been mainly focused on *linear* 1,3-dienes (*i.e*. 1-substituted 1,3-dienes),[2] while the limited synthetic availability of *branched* 1,3-dienes (*i.e.* 2-substituted 1,3-dienes) has severely hampered their use in the development of selective transformations.[3] Within this context, our laboratory recently reported a general Ni-catalyzed protocol which streamlines access to 2-substituted 1,3-dienes from readily available materials.[4]



Herein we describe our results in the selective nickel-catalyzed hydrofunctionalization of this underexplored class of conjugated olefins. Using a (P,N) Phox ligand, 2-substituted 1,3-dienes could be hydroalkoxylated by simple alcohols in a high-yielding and highly regioselective manner, providing a straightforward access to synthetically relevant allylic ethers.[5] Based on thorough mechanistic studies, an enantioselective version of this reaction could be implemented using primary amines and a chiral (P,P) ligand. High yields, regioselectivities and enantiomeric excesses were obtained for a wide variety of substrates.[6]

Overall, we will disclose two catalytic strategies that solve critical challenges arising from the use of conjugated dienes, both in terms of *reactivity* (mono- *vs.* di-functionalization, parasitic reduction, competing isomerization) and *selectivity* (chemoselectivity, regioselectivity, enantioselectivity).

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[6] Tran, G.; Shao, W.; Mazet, C. *Manuscript in preparation*