BORON DIRECTED, Ni-CATALYZED REDUCTIVE COUPLING OF UNACTIVATED ALKYL AND ARYL HALIDES WITH INTERNAL ALKENES

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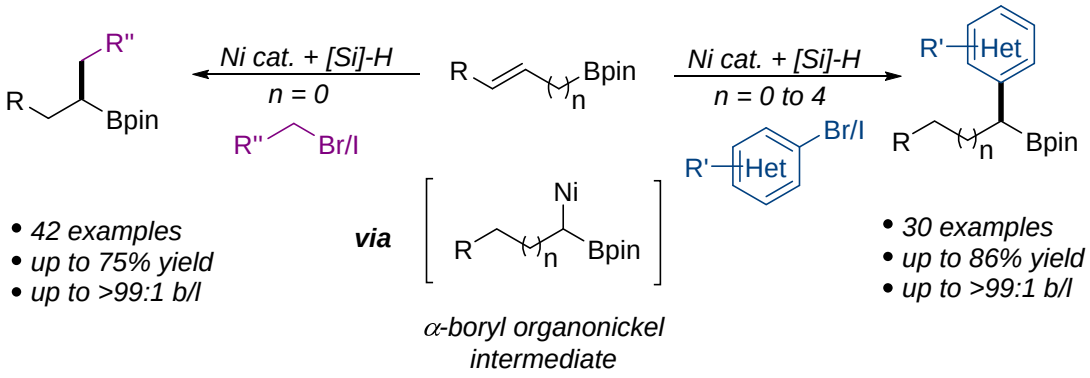
Organic boron compounds have become some of the most versatile synthetic intermediates by virtue of the facile conversion of a boron group to another functional group.[1] Described here is an approach to use a boronate group, Bpin (pin = pinacol), to stabilize α-organonickel species (Scheme 1). These species are generated by nickel hydride[2] addition to internal alkenes, and they subsequently engage in nickel-catalyzed sp^3-sp^3 and sp^3-sp^2 cross-coupling with unactivated alkyl and aryl halides. This strategy leads to highly regio- and chemoselective hydroalkylation and hydroarylation of alkenyl boronic esters and remote C-H arylation of alkenes where the C=C bond is distal to the terminal Bpin group. The reactions are operationally very simple and mild, have broad scope, and are compatible to a large number of functional groups thus constituting a complementary and conceptually different approach to existing borylation techniques of different electrophiles.[3]



Scheme 1: Hydroalkylation and Hydroarlyation of alkenyl Bpin.[4]

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