Harnessing Alkyl Amine and Alcohol Derivatives in Cross-Coupling Reactions

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Transition metal-catalyzed cross-coupling reactions have revolutionized organic synthesis, particularly the construction of bonds to sp²-hybridized carbons. However, the discovery of analogous reactions of Csp³ electrophiles have lagged behind, despite their potential to deliver a range of important targets, including chiral molecules in high enantiopurity. Towards solving this challenge in organic synthesis, we have developed a range of nickel-catalyzed cross-couplings of alkyl amine and alcohol derivatives. In particular, we have developed stereospecific, nickel-catalyzed cross couplings of benzylic ammonium salts and carboxylates. These reactions utilize starting materials that are readily available in high optical purity; proceed with high levels of stereochemical fidelity; employ air-stable, functional group tolerance coupling partners, such as aryl boronic acids; and display excellent functional group tolerance. We have also developed nickel-catalyzed cross-couplings of alkyl amine derivatives with non-activated alkyl groups (non-benzylic, non-allylic). This exciting new chemistry opens new opportunities for the use of alkyl amines in synthesis, and is particularly useful for late-stage functionalization of alkyl amines. The optimization, scope, and mechanistic studies of these reactions will be presented.

Date: Wed, Oct. 24, 2018
Time: 4:30-5:30 pm
Location: 208 Clark Hall

Students, meet the speaker over coffee and cookies in the Bennett Conference room at 3:30 pm