

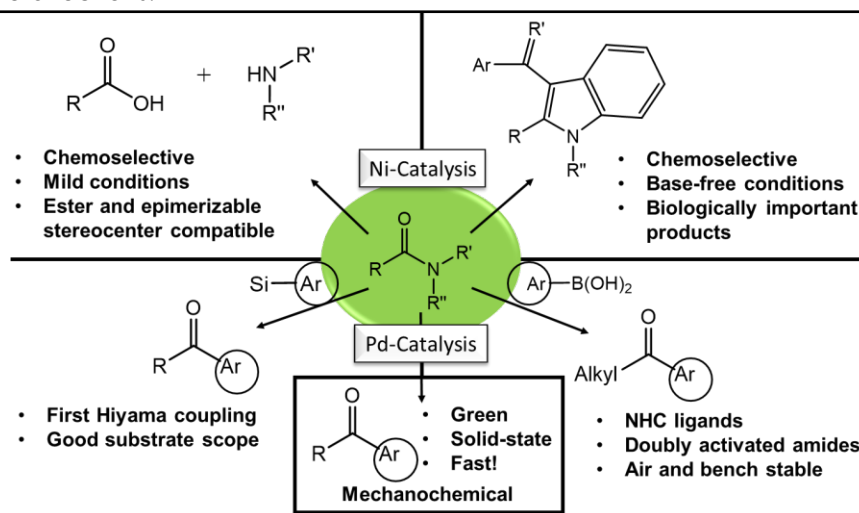


**Recent Advancements in the Employment of Pd/Ni Catalyzed
 C-N Amide Cross-Coupling
 By Garrett Ruesch**



Abstract: The transformational pathways between functional groups are key to the synthesis of highly complex molecules and the means by which important discoveries of novel compounds with ideal properties can be formed. Molecules with high structural complexity prove difficult to synthesize by traditional methods. Functional-to functional group transformations rely on the reactivity of those groups and the reagents added to augment the reactivity of the system. This direct conversion provides a desirable means of achieving chemical diversification. As a general rule, the late-stage functional group transformations in a synthesis are often the most elusive. The last 20 years has shown great advancements in the use of the amide C-N bond for late-stage functionalization. The inherent stability of the amide moiety and its prevalence in biologically relevant molecules makes it ideal for these multi-step syntheses. Specifically, the use of Pd or Ni catalyzed cross-coupling reactions allow for mild activation of the amide C-N bond to form a variety of functional groups including indoles, β -ketoesters, ketones and carboxylic acids.

This presentation highlights recent advances in amide C-N bond cross-coupling interconversion pathways. First, we discuss the contributions of the Garg group with a Ni-catalyzed, mild, one-pot conversion of an amide to a carboxylic acid¹. Next, an examination of work by the Eun Jin Cho group. His Ni catalyzed reductive coupling of amides and alkynes followed by base free transmetalation has provided valuable pathway to biologically important natural products². Then, I will touch on Sunwoo Lee's research. They establish the first reported Pd-catalyzed Hiyama coupling of amides with arylsiloxanes to form ketones with high chemoselectivity³. Finally, the work of Michal Szostak with his Pd-catalyzed, mechanochemical, solid-state Suzuki cross-coupling under mild, green conditions⁴. As well as his extensive study of Pd-(N-heterocyclic carbene)-catalyzed Suzuki cross-coupling of alkyl amides⁵. The steric tuning of the well-defined, air and bench stable catalyst provide a user-friendly synthetic tool as well as a good target for mechanistic studies. Critical catalysis elements and mechanistic studies will be explored throughout this presentation, as well as an outlook on future directions.



Monday, March 7th, 2022 | 3:00 p.m.
Via Zoom