J. LI, B. CHENG, X. SHU, Z. XU, C. LI, H. HUO* (XIAMEN UNIVERSITY, P. R. OF CHINA)
Enantioselective Alkylation of α-Amino C(sp^3)–H Bonds via Photoredox and Nickel Catalysis
Nat. Catal. **2024**, DOI: 10.1038/s41929-024-01192-7.

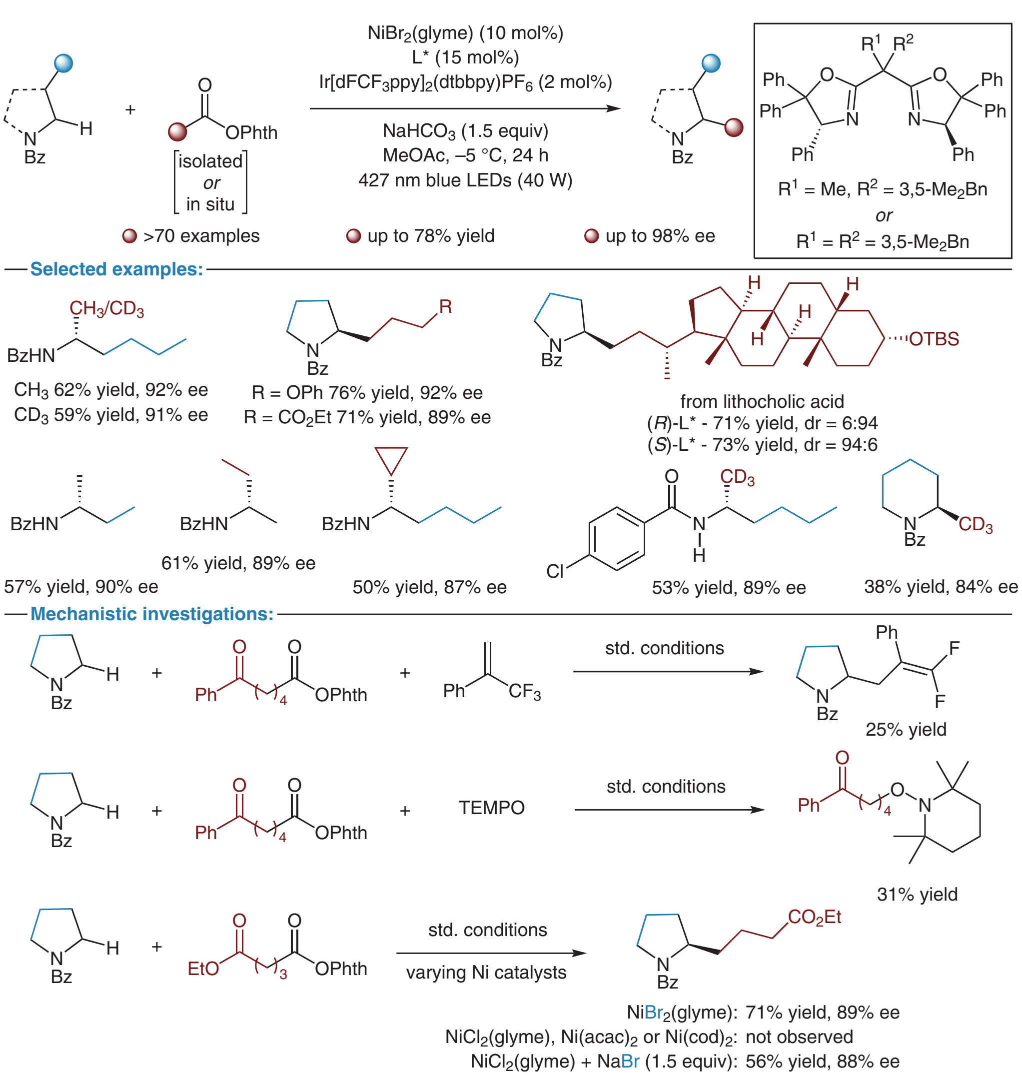
Category

Metals in Synthesis

Key words

nickel catalysis
photoredox catalysis
C–H alkylation
bromide activation

Nickel- and Photocatalytic Enantioselective Alkylation of α-Amino C(sp^3)–H Bonds



Significance: The authors report the nickel and photoredox co-catalyzed enantioselective coupling of α-amino C–H bonds and redox active esters (RAEs). The reaction proceeds via the generation and coupling of two different alkyl radicals. The enantioselectivity of the reaction remained very high even when the groups were of similar steric bulk. The authors also showed the RAEs could be generated in situ resulting in similar yields and ee values.

Comment: The reaction was shown to require bromide as an hydrogen atom transfer (HAT) source. $NiBr_2$ has the benefit of adding the nickel catalyst and the HAT catalyst from the same source. Trapping with radical acceptors suggest that the α-amino radical is formed, and trapping with TEMPO indicates that the alkyl radical from the RAE is also formed. The parallel KIE experiment gave a result of 3.4, indicating the HAT step likely plays a role in the rate-determining step.

SYNFACTS Contributors: Mark Lautens, Andrew G. Durant
Synfacts 2024, 20(09), 0929 Published online: 16.08.2024
DOI: 10.1055/s-0043-1775000; **Reg-No.:** L12124SF

Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany