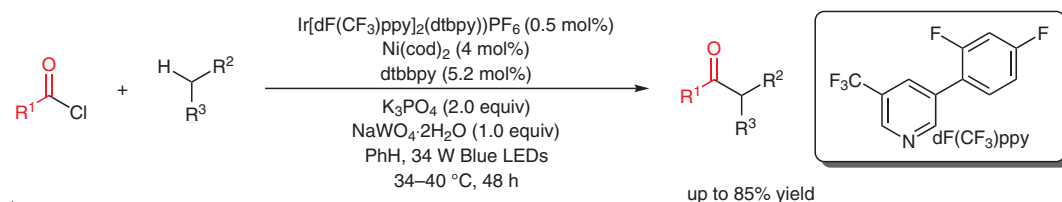


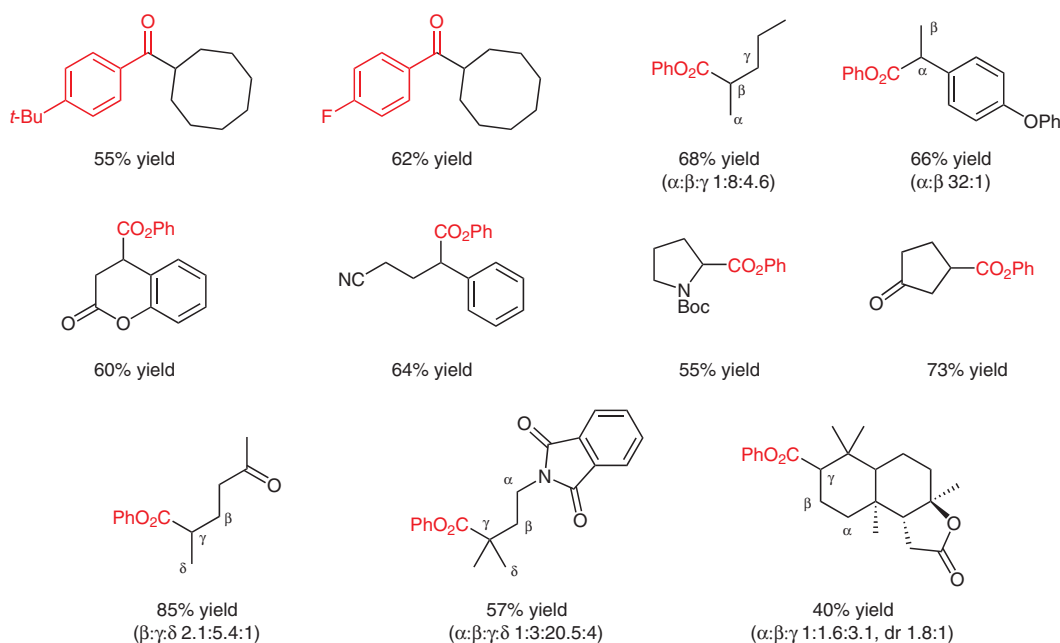
C–C Bond Formation Using Nickel-Photoredox Catalysis



R¹ = OAr, Ar, Cy

R², R³ = various substituted alkyl or aryl moieties

Selected examples:



Significance: The authors developed a nickel-photoredox-catalyzed C(sp³)-H functionalization of a variety of unactivated alkyl or benzyl compounds using chloroformate derivatives. Mild coupling conditions allow the tolerance of several functional groups, leading to the corresponding carbonyl compounds in good yields.

Comment: From a mechanistic point of view, the authors hypothesized a catalytic cycle, which starts with an oxidative addition of chloroformate to a nickel(0) species. A SET forms a nickel(III) intermediate, which undergoes subsequent photoelimination, leading to a chlorine radical. Following H-abstraction results in a carbon-centered radical. Addition of the nickel(II) complex and subsequent reductive elimination affords the carbonyl compound.