The Intermolecular 1,2-Alkylborylation of Unactivated Olefins through Copper(I)-Catalyzed Radical Relay Reaction

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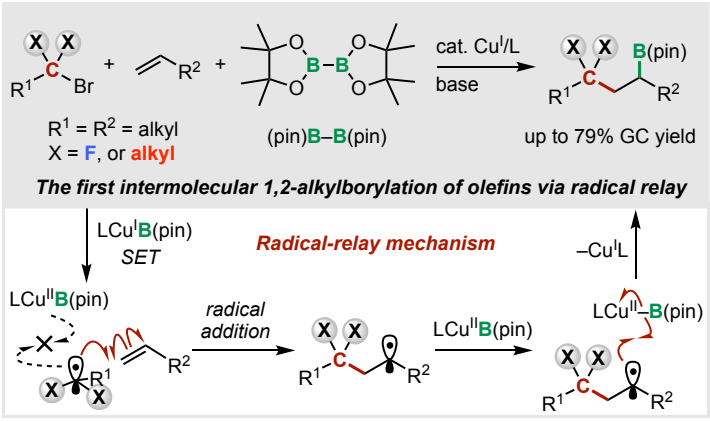
Keywords: Radical Relay; Copper(I) Catalysis; 1,2-Carboborylation; Fluorine-Containing Compounds

The transition-metal-catalyzed radical-relay strategy for intermolecular 1,2-carbofunctionalization of widely available unactivated olefins is one of the most useful protocols for rapid construction of complex carbon-based structures with a catalytic amount of a radical-generating reagent.[1] One of the main advantages of this protocol is that it tolerates electronically or sterically demanding alkyl electrophiles that cannot be used in catalytic 1,2-carbofunctionalization reactions that involve S_N2-type nucleophilic substitutions. In this context, the intermolecular 1,2-carboborylation of olefins via a radical relay, a transformation that involves the simultaneous installation of a C–C bond and a transformable C–B bond, would undoubtedly be highly attractive. Despite the significant progress that has been made in radical-relay chemistry, the intermolecular 1,2-carboborylation of olefins via a radical relay remains elusive so far.

Herein, we report the first example of an intermolecular 1,2-alkylborylation of unactivated olefins via a radical-relay strategy. The key to the success of this protocol is the use of electronically or sterically demanding alkyl electrophiles such as α,α-difluoro alkyl bromides or tertiary alkyl bromides to suppress undesired boryl-substitution reactions. Notably, the products of these reactions are difficult to access via any other hitherto reported carboborylation strategies.[2]



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