

Benzylic C(sp³)-H Phosphonylation via Dual Photo and Copper Catalysis

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The selective functionalization of C(sp³)-H bonds has emerged as a powerful strategy in modern synthetic chemistry to achieve molecular diversity and complexity from simple precursors^[1-2]. Among these approaches, hydrogen atom transfer stands out as an efficient method for C(sp³)-H functionalization, enabling the smooth generation of open-shell alkyl radical intermediates from native C(sp³)-H bonds, which readily undergo subsequent transformations^[3-4]. In this study, we present a novel approach to benzylic C(sp³)-H phosphonylation using dual photo and copper catalysis^[5]. This method directly introduces phosphorus-containing groups into benzylic positions under mild conditions, yielding valuable phosphonylated compounds. The process is operationally simple, features high step economy, and takes place under mild reaction conditions, which enables good functional group tolerance. Mechanistic studies indicate that the reaction proceeds via intermolecular hydrogen atom abstraction and operates by a radical pathway.

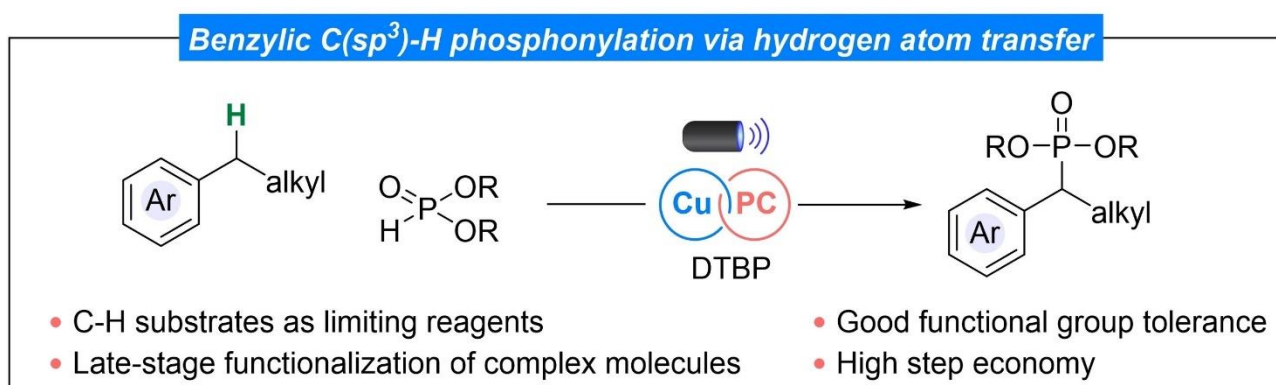


Figure 1. Benzylic C(sp³)-H phosphonylation via hydrogen atom transfer.

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