

Cross-dehydrogenative silylation of non-aromatic C–H bonds by an Earth-abundant metal catalyst

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A cross-dehydrogenative C–H bond functionalization of non-aromatic systems employing readily available and inexpensive Earth-abundant metal catalysts is described. The method allows for the direct coupling of a C(sp)–H bond and silane Si–H bond to furnish the corresponding C–Si bond in a single step. The catalysis is scalable and proceeds under mild conditions, in the absence of hydrogen acceptors or other additives, and liberates dihydrogen as the byproduct. The scope of the method is broad, enabling the direct silylation of aromatic and aliphatic acetylenes in the presence of a wide array of crucial functional groups such as electron rich and electron deficient aromatic heterocycles, π -conjugated systems, various heteroatoms, alkyl- and aryl halides, alcohols and amines, strained rings, and organometallic scaffolds. Substrate classes that are challenging to activate by classical stoichiometric deprotonations or with state-of-the-art transition metal catalysis strategies are functionalized in good yields. Applications to pharmaceuticals and materials science, multi-component couplings, and directing group chemistries highlight the broad utility and remarkable scope of this catalytic C–H functionalization method across multiple disciplines.

