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Arylation of Hydrocarbons Enabled by Organosilicon Reagents and Weakly Coordinating Anions

Silylium Ion Catalyzed C–H Arylation of Hydrocarbons

Significance: The Nelson group reports a silylium ion catalyzed arylation of C(sp²)–H and C(sp³)–H bonds. By employing 2–5 mol% of precatalyst A in the presence of a trialkylsilane initiator, various aliphatic and aromatic hydrocarbons were arylated with variously functionalized trimethylsilyl fluorobenzenes.

Comment: Previously, catalytic reactions involving highly reactive phenyl cation equivalents were limited to intramolecular transformations. The authors describe the formation of a β-silicon-stabilized phenyl cation (equivalent) II, which is proposed to subsequently undergo intermolecular insertion into the C–H bond of a hydrocarbon present in large excess. Desilylation of the resulting Wheland intermediate furnishes the product and regenerates the catalytically active species I.

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