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Harnessing Electron-Donor-Acceptor Complexes to Enable Photo-Induced Transformations

ABSTRACT:

Generating new carbon–carbon (C−C) and carbon–heteroatom (C–Z) bonds under reactions conditions that are ever more environmentally friendly and mild remains a priority in organic synthesis. Of particular importance to the pharmaceutical and agrochemical industries, the functionalization of aromatic rings and functionalization of C–H bond heavily relies on the use of rare transition-metals such as Pd, Pt, Rh, and Ir. Current estimates indicate that these metals may become very scarce long before petroleum. The development of strategies that are transition-metal-free and orthogonal to these current approaches is significant as it addresses an unmet need. Our research group has recently developed a series of photo-induced reactions that generate radicals efficiently and regioselectively without the need for transition-metal catalysts. In detail, we use visible-light in presence of benign and affordable additives to induce selective activation of carbon–halogen bonds for C–Z bond formation and C–H bond functionalizations via electron-donor-acceptor (EDA) complexes.

BIO:

Seb grew up in Venezuela, Mexico, and France. While pursuing a Master's Degree in chemical engineering from the National Engineering Graduate School of Chemistry (ENSCM) in Montpellier, France, he started a Ph.D. program at the University of Louisville with Michael H. Nantz in 2008. Together, they expanded the role of the oximation reaction by developing new aminooxy containing reagents for applications in synthesis and quantitative high throughput GC-MS analysis. After graduating in 2013, Seb became a postdoctoral associate at Duke University working with Jennifer L. Roizen. There, he developed new Suzuki-Miyaura cross-coupling methodologies for the selective functionalization of *ortho*-halopyridines. In August 2016, Seb started his independent career at IUPUI as an assistant professor in the Department of Chemistry and Chemical Biology.