Illuminating science of photochemistry: The formation of disubstituted aniline derivatives via photoinitiation

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N-cyclopropylanilines and n-cyclobutylanilines are highly useful building blocks for synthesizing lipophilic amines. Dr. Nan Zheng and his team have created a novel method which photocatalytically disubstitutes strained cyclopropyl and cyclobutyl anilines. However, it suffers from problems regarding the limited scope of the nucleophile because it competitively quenches the excited photocatalyst. Here I explore the possibility of eliminating the need for a photocatalyst via taking advantage of a donor-acceptor complex (DAC), which theor. can greatly expand the number of compatible nucleophiles and radical traps. It was found that it is possible to open a strained cyclic ring and substitute with a nucleophile, but the radical was terminated by a hydrogen atom rather than coupled with the targeted radical. Future work will deal with trapping the radical by either adding in a radical trap such as an allyl sulfone, or by changing the electronics of the donor and acceptor via the addition of various electron-withdrawing/donating groups.