Enantioselective \(\alpha\)-Trifluoromethylation of Aldehydes via Photoredox Organocatalysis


**Photoredox Organocatalysis: Asymmetric \(\alpha\)-Perfluoroalkylation of Aldehydes**

**Significance:** MacMillan and co-workers report an efficient and highly enantioselective \(\alpha\)-perfluoroalkylation of aldehydes employing photoredox organocatalysis. The proposed mechanism involves an organocatalytic and a photoredox catalytic cycle. The organocatalyst 1 reacts with the aldehyde to form an enamine intermediate which reacts with the trifluoromethyl radical, formed in the photoredox catalytic cycle. The resulting \(\alpha\)-amino radical is oxidized by an excited state species of the photocatalyst 2, generated by irradiation. The reduced photocatalyst is reoxidized by trifluoromethyl iodide to give 2 and a new trifluoromethyl radical.

**Comment:** Since fluorine-containing molecules exhibit interesting biological properties, their stereoselective synthesis has gained much interest during the last years. Herein, the authors present a very sophisticated strategy for the asymmetric \(\alpha\)-trifluoromethylation of aldehydes based on their previously introduced concept of merging organocatalysis with photoredox catalysis (*Science* 2008, 322, 77). The products are obtained in high enantioselectivities and can be converted into other useful enantioenriched fluorine-containing compounds as shown nicely by the authors. Further applications of these coupled catalytic cycles can be expected.

**SYNFACTS Contributors:** Benjamin List, Steffen Müller

SYNFACTS 2009, 10, 1153-1153  Published online: xx.xx. 2009 Published online: 22.09.2009

DOI: 10.1055/s-0029-1217944; Reg-No.: B09709SF