

# PHOTOREDOX MANIFOLD FOR DEHYDROGENATIVE COUPLING USING PROTONS AS THE SOLE OXIDANTS

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We report a metal-free photocatalytic process for arene C-H functionalization that employs an acridinium-type catalyst and produces dihydrogen as the only by-product. Throughout the catalytic cycle, the catalyst acts as an oxidising, a hydrogen atom transfer, and a proton-reducing agent enabling a cross-dehydrogenative transformation without the need for external oxidants. The reaction is conveniently performed using visible light and the high oxidation potential of the catalyst allows to engage even electron-deficient arenes as substrates. The catalytic mechanism disclosed herein has a potential to become a general logic for the development of various cross-dehydrogenative reactions adaptable for use in pharmaceutical and material sciences.