

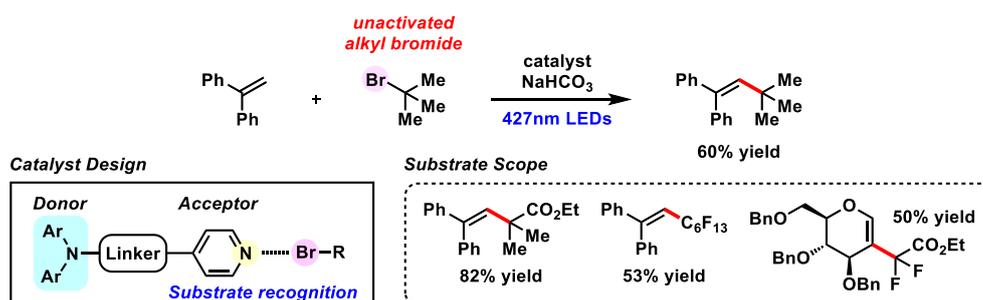
A Pyridine-based Organophotocatalyst Enabling Substrate Recognition for C-C Bond Forming Reaction

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Photoredox catalysis has emerged as a powerful tool enabling radical-mediated transformations under mild conditions and a wide variety of transition metal complexes and organic molecules has been developed as a photocatalyst exhibiting different photochemical properties.¹ Recently, several research groups started to introduce the substrate-binding site into catalyst molecules in order to achieve stereoselective reaction,² and in the course of the investigation to develop higher reactive catalysts, we envisaged that the design of an organic molecule bearing a substrate recognition site on donor-acceptor core would provide a stronger reductive catalyst for single electron transfer reaction.

On the basis of the concept, we designed and synthesized a series of pyridine-based donor-acceptor molecules, which are expected to bind with alkyl halides through halogen bonding, and investigated the C–C bond formation reaction between alkene and alkyl bromide, which is recognized as a useful radical precursor. As a result, donor-acceptor molecules bearing diarylamine as a donor moiety exhibits high reactivity and even an unactivated alkyl bromide such as *t*-BuBr bearing high redox potential ($E_{\text{red}} = \text{ca.} -2.0 \text{ V vs SCE}$)³ provided the desired product in 60% yield, despite of the lower redox potential of the catalyst. Several experimental analyses suggested that there is the interaction between a catalyst and alkyl bromide in solution and it would be the key to achieve the high reactivity of the catalyst.



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