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Photoinduced Thiol-Ene “Click” Reaction

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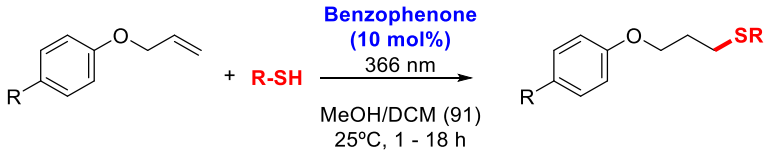
ABSTRACT

The hydrothiolation of alkenes known as the thio-ene click (TEC) reaction,[1] is a powerful tool for construction of C-S bonds in natural products, pharmaceuticals and organic materials.[2] A radical TEC reaction is reported for alkenes using benzophenone as an inexpensive photocatalyst at room temperature. Upon direct irradiation of benzophenone with light of 366 nm in the presence of the allyl ether and a series of alkyl and aryl thiols led to prepare a wide variety of thioethers in good to excellent yields. The photoreaction is depicted in Scheme 1.



Scheme 1.

Additional control experiments were further carried out to gain more insights into the reaction mechanism. Inhibition test with TEMPO clearly demonstrated a radical chain process during the formation of thioethers. Performing the photoreaction with deuterated solvents showed a HAT reaction from the solvent to the radical intermediate. Based on these experimental results and previous literature reports, a reaction mechanism was also proposed.

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