Asymmetric Transformations of Unsaturated Compounds via Light-Driven 3d Metal Catalysis

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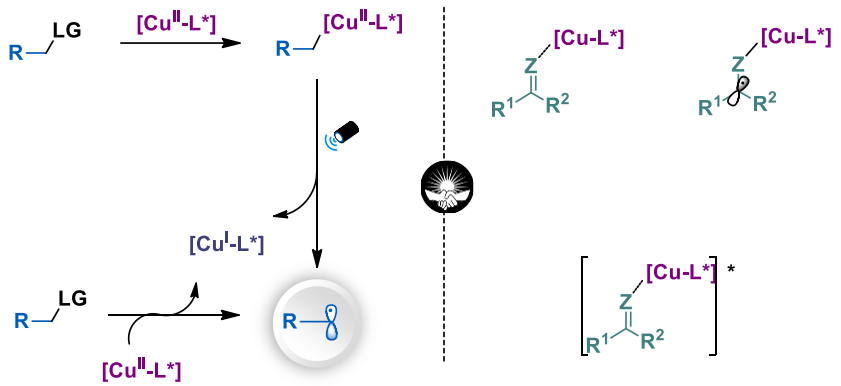
Asymmetric photocatalysis presents enticing avenues for devising innovative strategies toward the synthesis of chiral molecules via previously unexplored reaction pathways.[1] However, the task of employing chiral complexes of first-row transition metals, notably copper and cobalt, in stereoselective photochemical syntheses remains a formidable challenge. Herein, we present our endeavors in harnessing the potential of bisoxazoline-based copper and cobalt complexes as bifunctional catalysts or co-catalytic partners alongside proven photocatalysts. Our focus lies in facilitating direct transformations of a broad spectrum of unsaturated substrates, including imines, aldehydes, ketones, α-keto esters, and α,β-unsaturated carbonyl compounds, with an array of radical precursors, extending even to alkanes. These endeavors have yielded high stereoselectivities under economically viable and mild conditions, thereby exemplifying the elegance of our approach.[2-8]



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