fac-Tricarbonyl bipyridine Re complexes catalyze visible-light-driven carboxylation of phenyl vinyl sulfone with CO_2

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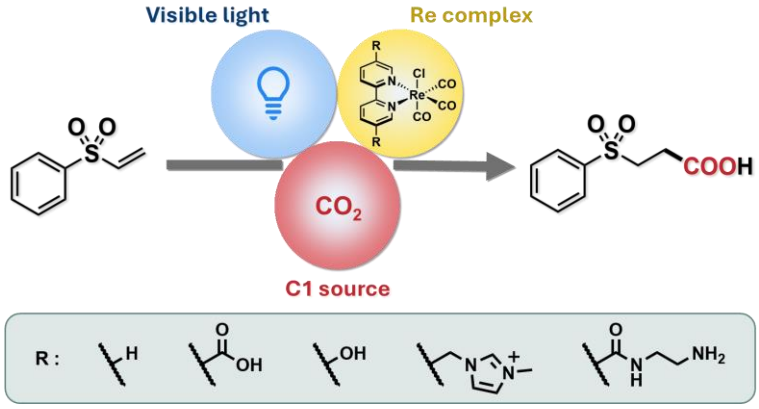
The direct carboxylation of organic molecules using CO_2 as an abundant and non-toxic C1 building block offers an appealing and atom-economic synthesis of carboxylic acids. However, this approach is highly energy-demanding due to the inherent stability of the CO_2 itself. Therefore, the development of effective catalysts has become of great interest.[1] Encouraged by our previous work,[2] we demonstrate in this work that *fac*-[Re(2,2'-bipyridine)$(CO)_3$Cl], a well-known photocatalyst for the conversion of CO_2 to CO,[3,4,5] has catalytic potential for the visible-light-driven carboxylation of alkene with CO_2. Our photocatalytic system successfully promoted the carboxylation of phenyl vinyl sulfone (PVS) to the corresponding carboxylic acid. We found that the photodimerization of PVS is the main competing reaction, and the product selectivity can be altered by changing the solvent. Additionally, we have developed a series of Re complexes using various derivatives of bipyridine ligands. The characterization and catalytic activity of these complexes will be presented.



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