Photoexcited cobaloxime catalyzed radical desaturation transformations

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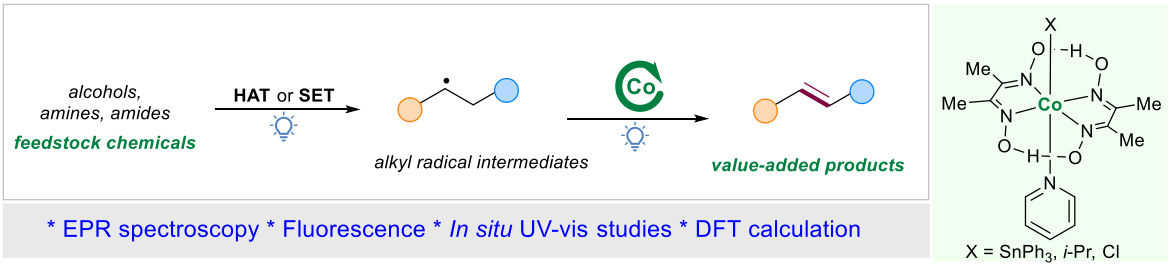
Alkenes are among the most versatile functional groups in organic synthesis, as they can be readily transformed into a wide range of other functional groups. However, alkenes are relatively scarce in nature, whereas alkanes are the most abundant organic compounds but are notoriously challenging to functionalize selectively. Consequently, the development of innovative strategies for the selective dehydrogenation of aliphatic C–H bonds to generate alkenes represents a valuable and demanding class of C–H functionalization reactions.

Inspired by enzymatic processes in nature,[1,2] we have developed a series of transformations for the synthesis of alkenes from alcohol and amine feedstocks using photoexcited cobaloxime catalysis.[3,4,5] These reactions proceed via the generation of radical intermediates through single-electron transfer (SET), hydrogen atom transfer (HAT), or radical addition to olefins, followed by cobaloxime-catalyzed radical desaturation. The mechanism of this excited-state cobalt-catalyzed transformation has been thoroughly investigated through a combination of experimental studies, spectroscopic analyses, and theoretical calculations.



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