Visible light-induced bifunctional rhodium catalysis developed for decarbonylative coupling of imides with alkynes

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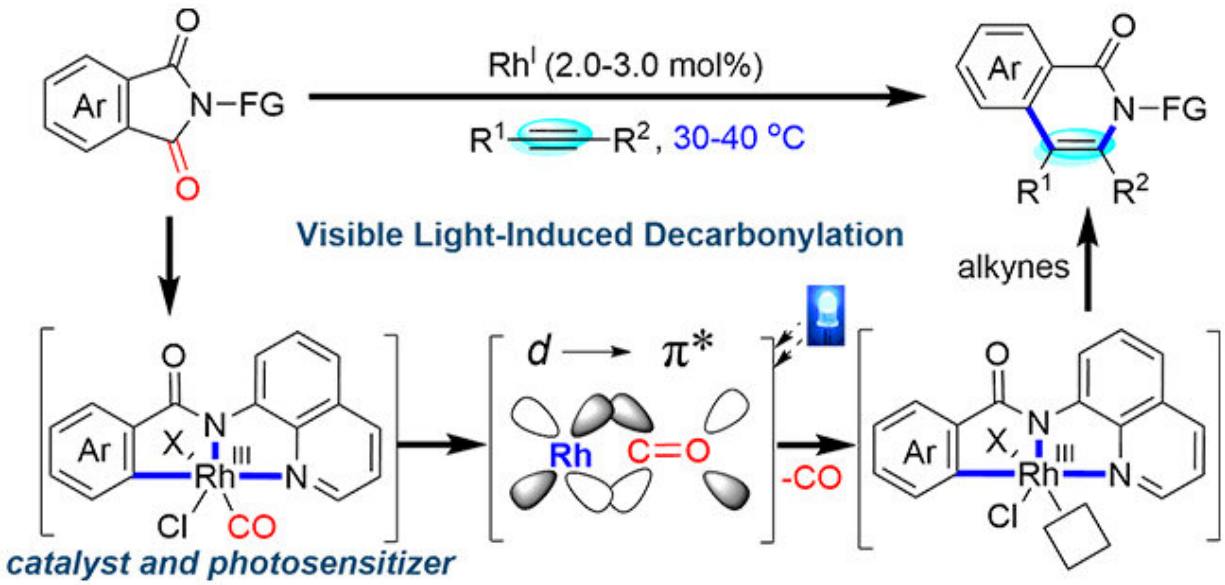

Light-induced bifunctional rhodium catalysis for decarbonylation. Credit: MIN Xiangting

Carbonyl groups are ubiquitous in pharmaceuticals, natural products, and agricultural chemicals, especially amides. Transition metal-catalyzed decarbonylation offers a distinct synthetic strategy for new chemical bond formation and carbonyl groups transformation. However, the π-backbonding between CO π* orbitals and metal center d-orbitals

impedes ligand dissociation to regenerate catalyst under mild condition.

Recently, a team led by Prof. CHEN Qing-an from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences (CAS) developed a visible light-induced bifunctional rhodium catalysis for decarbonylative coupling of imides with alkynes under ambient conditions.

This study was published in *Angew. Chem. Int. Ed*. on Sept. 29.

Initial mechanistic studies suggested that rhodium complex simultaneously served as the catalytic center and photosensitizer for decarbonylation. Under visible light irradiation, it generated the excited state Rh-complex where the transfer of an electron from the π-backbonding Rh-CO orbital into an antibonding orbital decreased the bond dissociation energy of the Rh-CO bond.

This visible light-promoted catalytic decarbonylation strategy offers new opportunities for carbonyl groups transformation.

More information: Xiang-Ting Min et al. Visible Light-Induced Bifunctional Rhodium Catalysis for Decarbonylative Coupling of Imides with Alkynes, *Angewandte Chemie International Edition* (2020). DOI: 10.1002/anie.202010782

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