

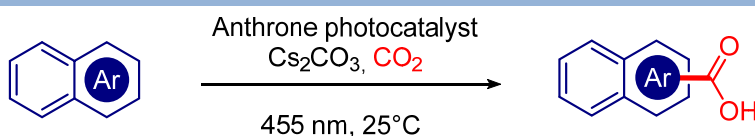
# Chemical Photosynthesis - towards ideal chemical transformations

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Ideal chemical transformations in terms of green and sustainable chemistry convert abundant, low energy starting materials into high value products without losing a single atom.<sup>1</sup> Light-driven catalysis offers tools for such reactions.<sup>2</sup> We discuss in the lecture key photocatalytic principles and how they can be applied to redox-neutral reactions, such as C-H carboxylations of alkanes and arenes with carbon dioxide.<sup>3</sup> Cross-coupling reactions are another very important class of reactions in chemical synthesis, which benefit from light in terms of efficiency and predictability.<sup>4</sup> Current scope and limitations are shown and a perspective is given where the use of light may lead to better catalysis.<sup>5</sup>



Redox-neutral photocatalytic C-H carboxylation



## Acknowledgement



- <sup>1</sup> Trost, B.M., *Science* **1991**, 254, 1471 – 1477.
- <sup>2</sup> Marzo, L.; Pagire, S.K.; Reiser, O.; König, B. *Angew. Chem. Int. Ed.* **2018**, 57, 10034 – 10072.
- <sup>3</sup> Donabauer, K.; König, B. *Acc. Chem. Res.* **2021**, 54, 242–252.
- <sup>4</sup> Y.-M. Tian, E. Hofmann, W. Meneses-da-Silva, X. Pu, D. Touraud, R. M. Gschwind, W. Kunz, B. König, *Angew. Chem. Int. Ed.* **2023** e202218775.
- <sup>5</sup> Wang, H.; Tian, Y.-M.; König, B. *Nature Reviews Chemistry* **2022**, 6, 745 – 755.