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PHOTOREDOX-CATALYZED DIFUNCTIONALIZATION OF ALKENES INVOLVING CARBON–, SULFUR–, AND OXYGEN–CENTERED RADICALS

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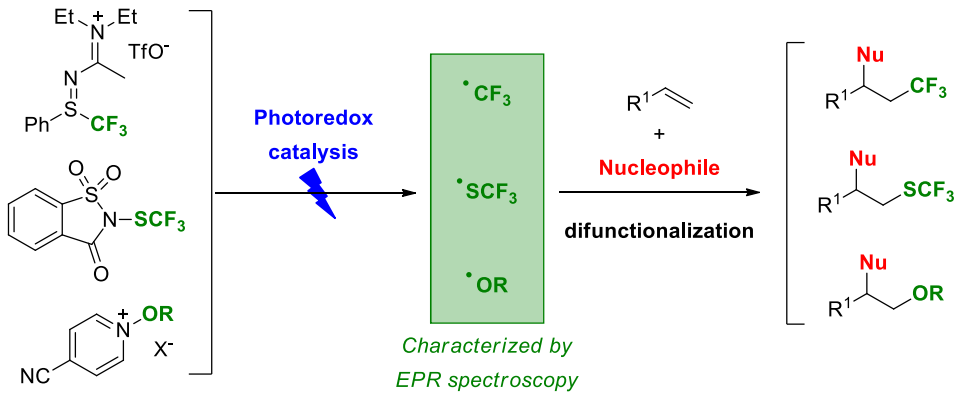
Multicomponent reactions (MCRs) are reactions in which three or more starting materials react in a one-pot fashion to form a product.[1] These reactions have many advantages: they are convergent, quite efficient since multistep sequences are avoided, and they enable the access to highly complex molecules from very simple and readily available building blocks.

Notably, alkenes are substrates of choice for MCRs. They can indeed participate in difunctionalization reactions, which consist in the concomitant introduction of two different functional groups across the carbon-carbon double bond.[2]

One of the most efficient approach to difunctionalize alkenes is probably photoredox catalysis.[3] This method has recently emerged as a powerful tool to perform radical-based transformations under very mild reaction conditions (visible-light irradiation, room temperature, low photocatalyst loadings).[4]

In this context, we have recently developed difunctionalization of alkenes under photoredox catalysis. These reactions have involved the design of new reagents to generate fluorine-containing carbon–[5] and sulfur-centered[6] radicals of high interest, as well as highly reactive oxygen-centered[7] radicals. Challenges, scope and limitations of theses transformations will be presented, and mechanistic investigations by EPR spectroscopy will be discussed.



[1] A) A. Dömling in: *Multicomponent Reactions* (J. Zhu, H. Bienayme) Wiley-VCH, Weinheim **2005**, p. 76; b) A. Dömling, W. Wang, K. Wang, *Chem. Rev.* **2012**, *112*, 3083.
[2] Selected reviews: a) H. Egami, M. Sodeoka *Angew. Chem. Int. Ed.* **2014**, *53*, 8294; b) X.-W. Lan, N.-X. Wang, Y. Xing, *Eur. J. Org. Chem.* **2017**, *39*, 5821.
[3] Review: M.-Y. Cao, X. Ren, Z. Lu, *Tetrahedron Lett.* **2015**, *56*, 3732.
[4] Selected reviews: T. P. Yoon, M. A. Ischay, J. Du, *Nat. Chem.* **2010**, *2*, 527; b) J. M. R. Narayanam, C. R. J. Stephenson, *Chem. Soc. Rev.* **2011**, *40*, 102; c) C. K. Prier, D. A. Rankic, D. W. C. MacMillan, *Chem. Rev.* **2013**, *113*, 5322.
[5] M. Daniel, G. Dagousset, P. Diter, P.-A. Klein, B. Tuccio, A.-M. Goncalves, G. Masson, E. Magnier, *Angew. Chem. Int. Ed.* **2017**, *56*, 3997.
[6] G. Dagousset, C. Simon, E. Anselmi, B. Tuccio, T. Billard, E. Magnier, *Chem. Eur. J.* **2017**, *23*, 4282.
[7] A.-L. Barthelemy, B. Tuccio, E. Magnier, G. Dagousset, *Angew. Chem. Int. Ed.* **2018**, DOI: 10.1002/anie.201806522.