Photochemistry of oxazolones

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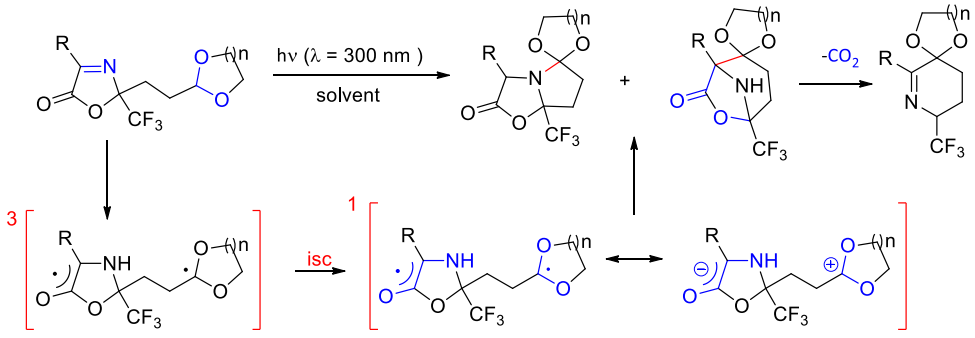
Photochemical reactions represent an important tool in organic synthesis.[1,2] Compounds or compound families become available that can only hardly or not at all be obtained by classical methods of organic synthesis. Research activities in this domain are constantly increasing. Photochemical reactions are also interesting in the context of sustainable chemistry as in many cases, light (the photon) is considered as a traceless reagent.[3,4]

The subject of this thesis is related to photochemical transformations of heterocycles and more particularly oxazolones possessing an imine function. We have previously studied reactions involving hydrogen transfer [5] or a Norrish I or II reaction.[6] Many of the results were obtained in the context of the ANR project "Photochemistry of imines: photoinduced radical reactions of imines" (IMPHOCHEM). One of these reactions has been studied using continuous flow conditions.[7] Some photo-cycloadditions have also been observed with oxazolones.

These studies will be continued. They may involve time-resolved spectroscopic methods and theoretical studies both in cooperation. Different mechanisms of hydrogen transfer and intramolecular energy transfer will be characterized. Selectivity, in particular stereoselectivity, will be studied under different conditions. To optimize and control selectivity, different reaction conditions will be applied, such as photocatalysis.

Organic synthesis and structure determination of new compounds are important tasks in daily work of this thesis. Candidates should have a solid experience in organic chemistry, an open mind for interdisciplinary research (photochemistry, photocatalysis, physical chemistry, spectroscopy or theoretical chemistry), autonomy and teamwork.



If you are interested, please send me your CV, a motivation letter, your Master 1 and Master 2 transcripts and the contact of at least one reference before **April 22th, 2025**.

[1] N. Hoffmann, Photochemical Reaction as Key Steps in Organic Synthesis. *Chem. Rev.* **2008**, *108*, 1052. https://pubs.acs.org/doi/10.1021/cr0680336
[2] *Chem. Rev.* **2016**, *116*, special issue 17 "Photochemistry in organic synthesis" https://pubs.acs.org/toc/chreay/116/17
[3] N. Hoffmann, Photochemical reactions of aromatic compounds and the concept of the photon as a traceless reagent. *Photochem. Photobiol. Sci.* **2012**, *11*, 1623. https://doi.org/10.1039/c2pp25074h
[4] C. Michelin, N. Hoffmann, Photosensitization and Photocatalyis – Perspectives in Organic Synthesis. *ACS Catal.* **2018**, *8*, 12046. https://pubs.acs.org/doi/abs/10.1021/acscatal.8b03050
[5] M. Latrache, C. Lefebvre, M. Abe, N. Hoffmann, Photochemcially Induced Hydrogen Atom Transfer and Intramolecular Radical Cyclization Reactions with Oxazolones. *J. Org. Chem.* **2023**, *88*, 16435. https://pubs.acs.org/doi/abs/10.1021/acs.joc.3c01951
[6] M. Latrache, PhD Thesis, University of Reims Champagne-Ardenne, 2023
[7] G. Lebrun, M. Schmitt, M. Oelgemöller, M. Vedrenne, J.-F. Blanco, K. Loubière, Investigating the photochemical reaction of an oxazolone derivative under continuous-flow conditions: from analytical monitoring to implementation in an advanced UVC-LED-driven micro reactor. *J. Flow Chem.* **2023**, *13*, 413. https://doi.org/10.1007/s41981-023-00284-y