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Application of the Paternò-Büchi Reaction to the Synthesis of Novel Fluorinated Scaffolds

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► **To cite this version:**

Mario Andrés Gomez Fernandez, Corentin Lefebvre, Alexander Sudau, Pierre Genix, Jean-Pierre Vors, et al.. Application of the Paternò-Büchi Reaction to the Synthesis of Novel Fluorinated Scaffolds. BOSS XVII 17th Belgian Organic Synthesis Symposium, Jul 2022, Namur, Belgium. hal-03737604

HAL Id: hal-03737604

<https://cnrs.hal.science/hal-03737604>

Submitted on 25 Jul 2022

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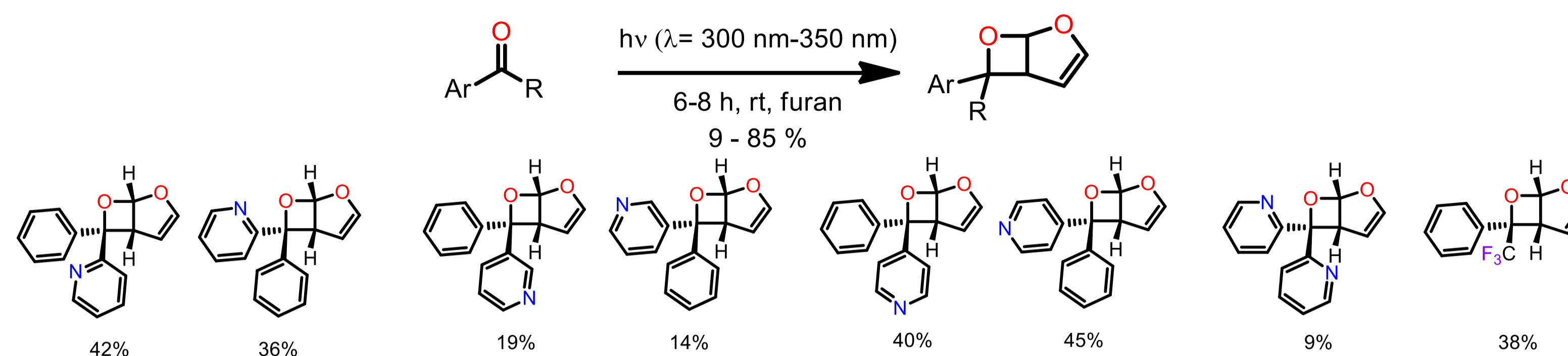
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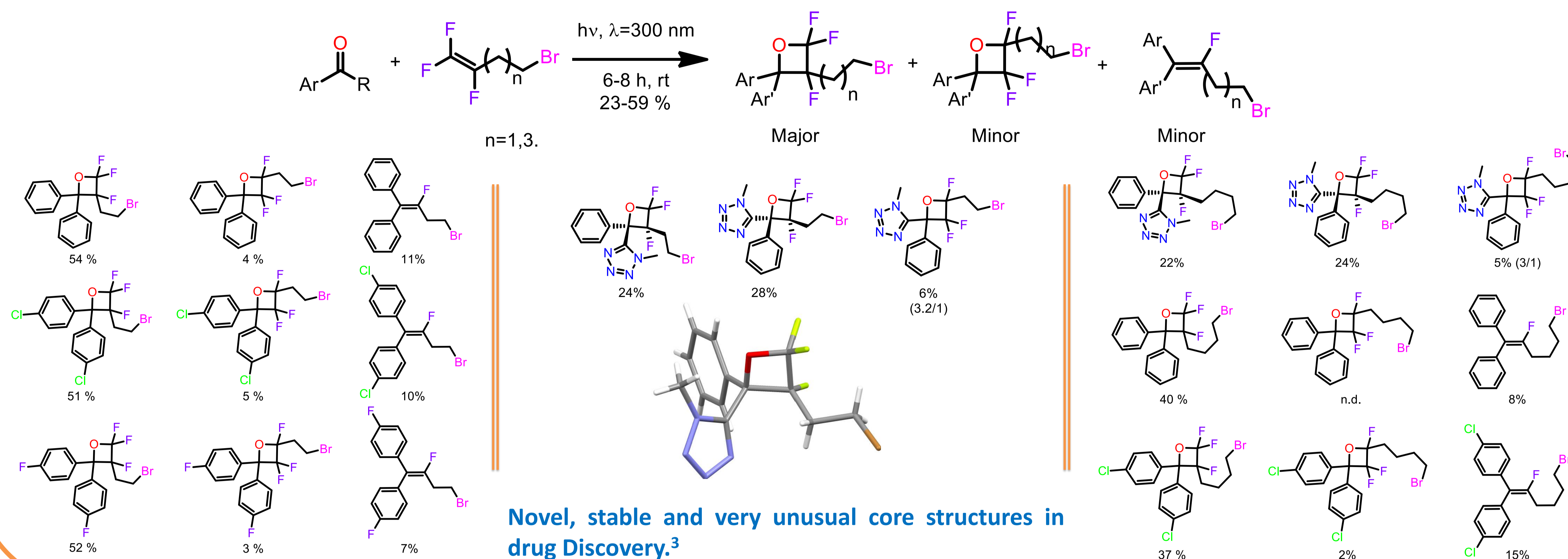
Main objectives

- Establish routes for the synthesis of new scaffolds using photochemical reactions.
- Use simple and inexpensive starting materials to create complexity.

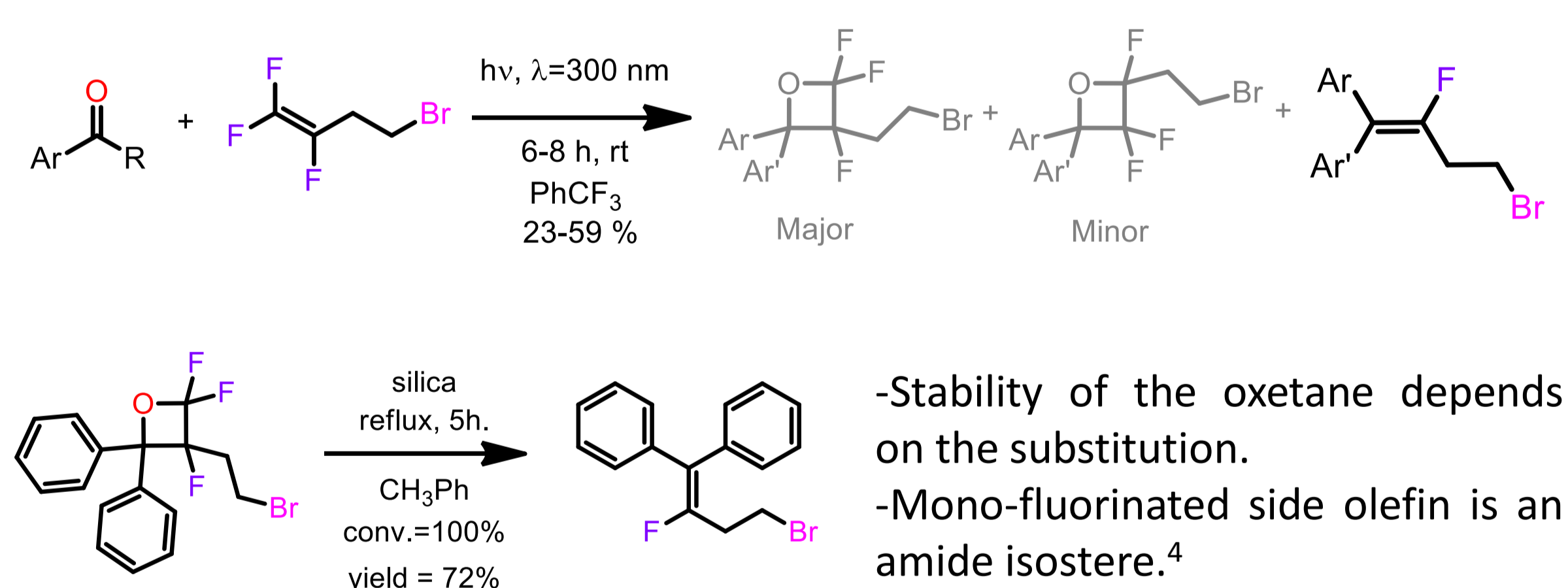
First Results: The Paternò-Büchi reaction¹



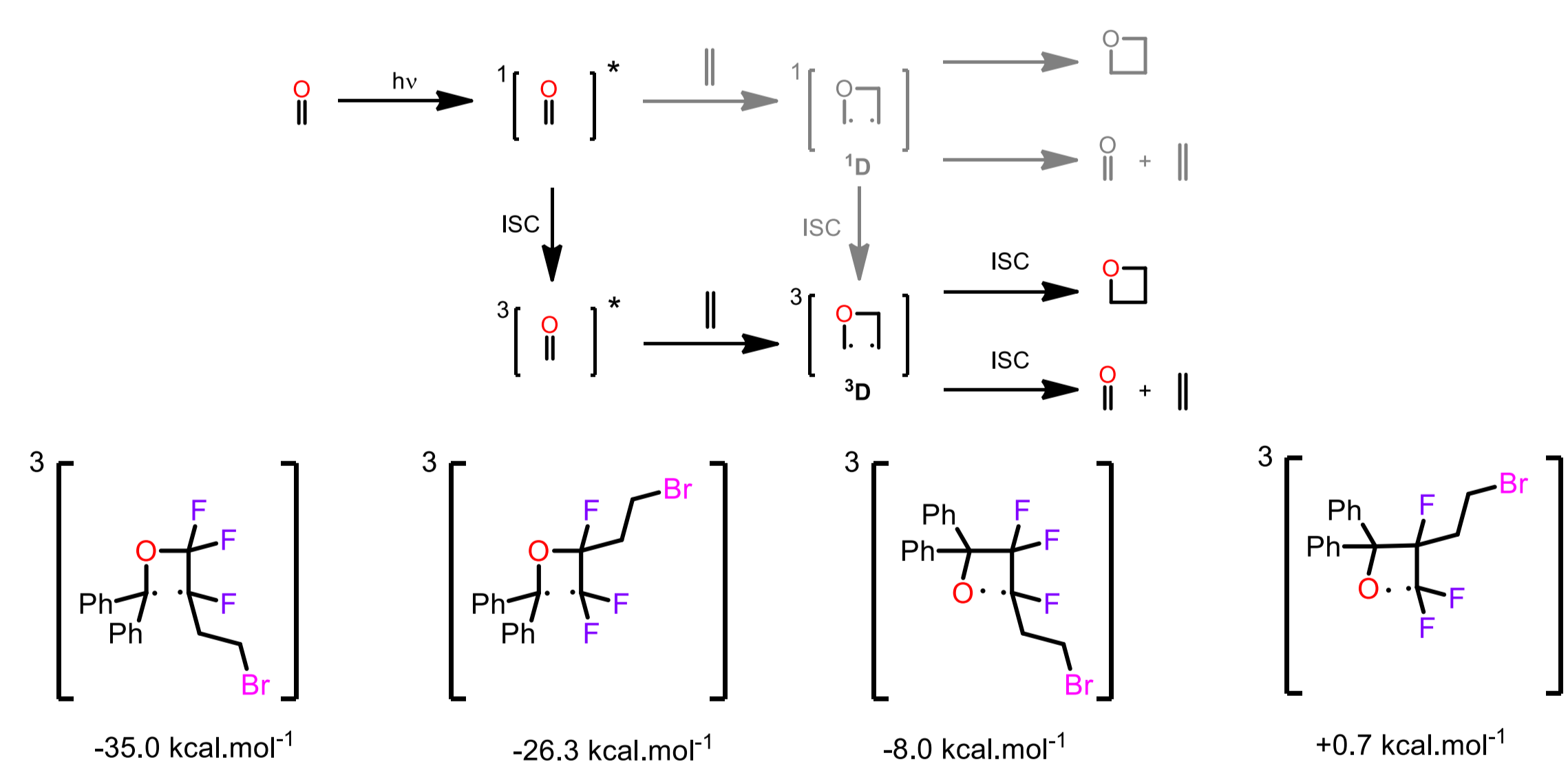
Paternò-Büchi reaction using fluorinated olefins²



Side Product: Photo-Wittig reaction

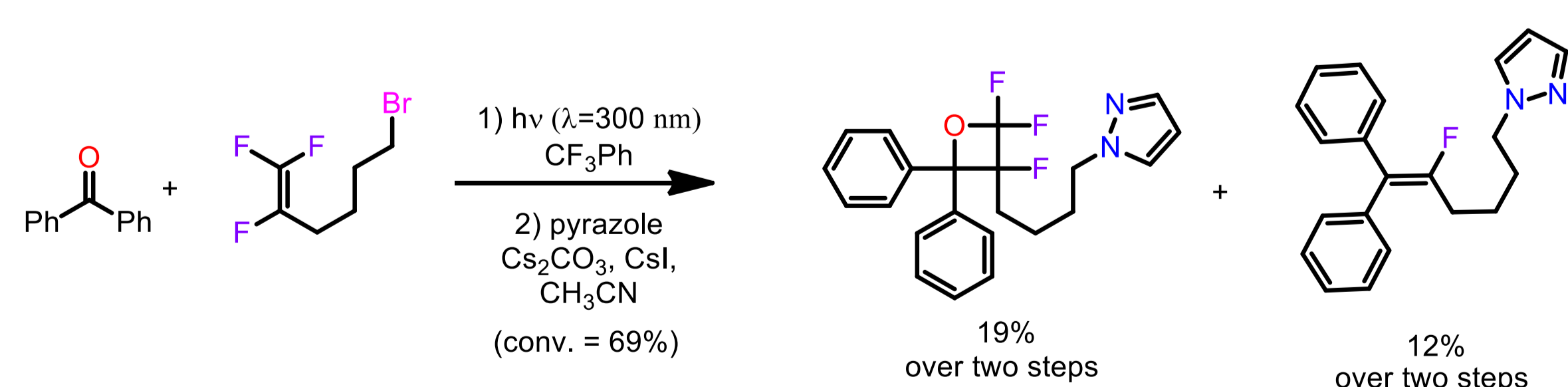


Regioselectivity: Theoretical calculations (Prof. M. Abe)

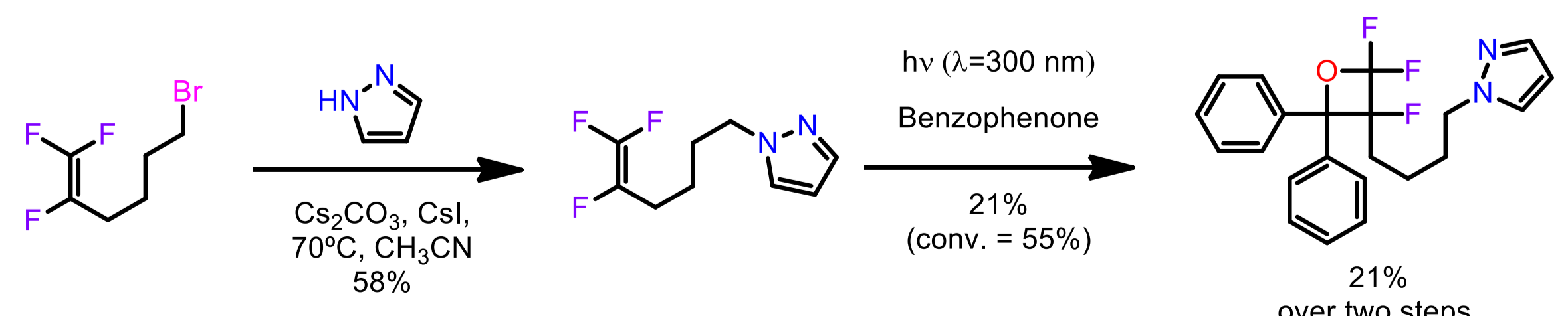


Application to the obtention of Libraries of fluorinated oxetanes³

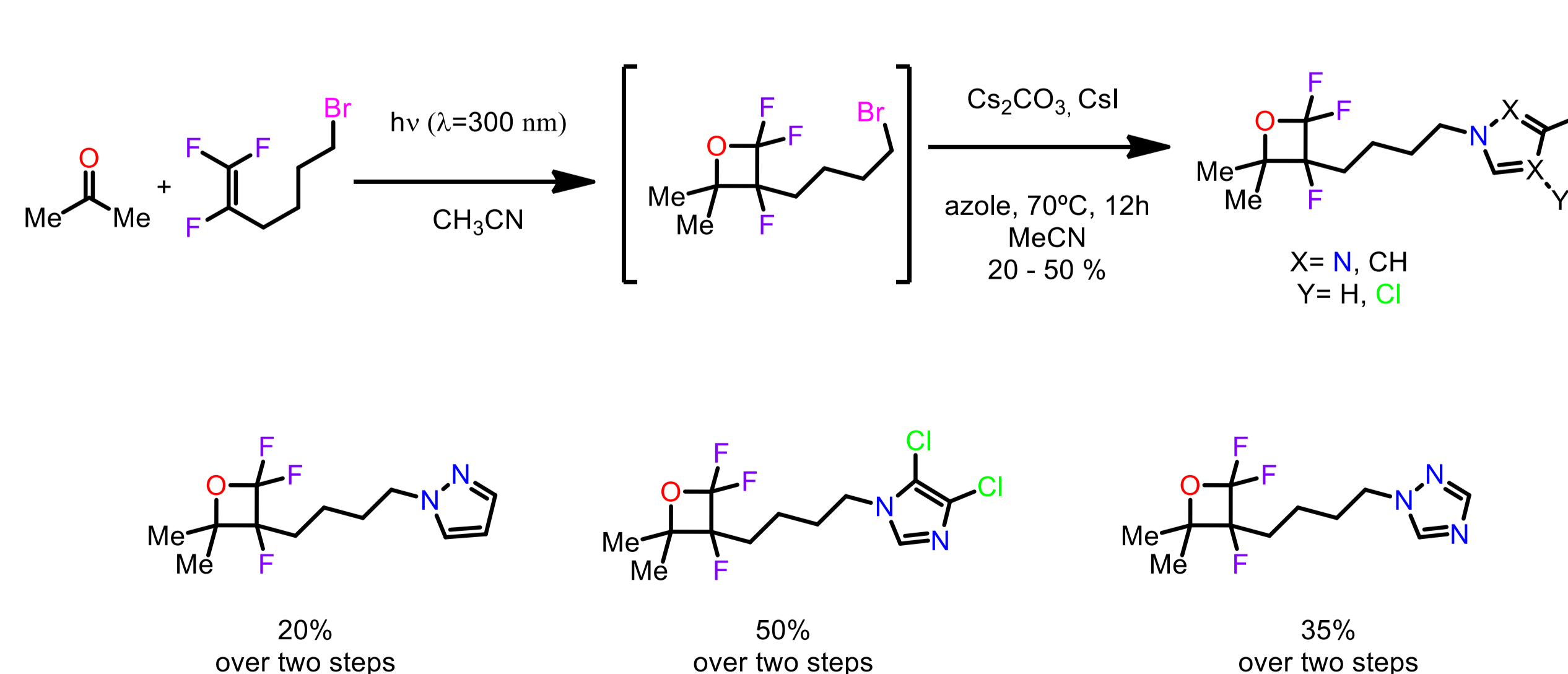
Photocycloaddition followed by nucleophilic substitution



Nucleophilic substitution followed by photocycloaddition



Use of acetone to obtain small lipophilic pending motifs



1) a) M. D'Auria, The Paternò-Büchi reaction-a comprehensive review, *Photochem. Photobiol. Sci.*, **2019**, *18*, 2297-2362. b) M. Fréneau, N. Hoffmann, The Paternò-Büchi reaction-Mechanism and application to organic synthesis, *J. Photochem. Photobiol. C*, **2017**, *33*, 83-108.

2) J. F. Harris, D. D. Coffman, Synthesis of Polyfluorooxetanes by Photoinitiated Addition of Fluorocarbonyl Compounds to Fluoroolefins, *J. Am. Chem. Soc.*, **1962**, *84*, 1553-1561.

3) M. A. Gomez Fernandez, C. Lefebvre, A. Sudau, P. Genix, J.-P. Vors, M. Abe, N. Hoffmann, Studies on The Application of The Paternò-Büchi Reaction to The Synthesis of Novel Fluorinated Scaffolds, *Chem. Eur. J.*, **2021**, *27*, 15722-15729.

4) D. O'Hagan, Understanding organofluorine chemistry. An introduction to the C-F bond, *Chem. Soc. Rev.*, **2008**, *37*, 308-319.