

# Synthesis of Thiol-substituted Polyenes via Photoinduced Cyclizations in Fluorinated Environments

Nicolás Rascón<sup>a,b</sup>, Julia Westermayr<sup>a</sup>, Tanja Gulder<sup>\*a,b</sup>

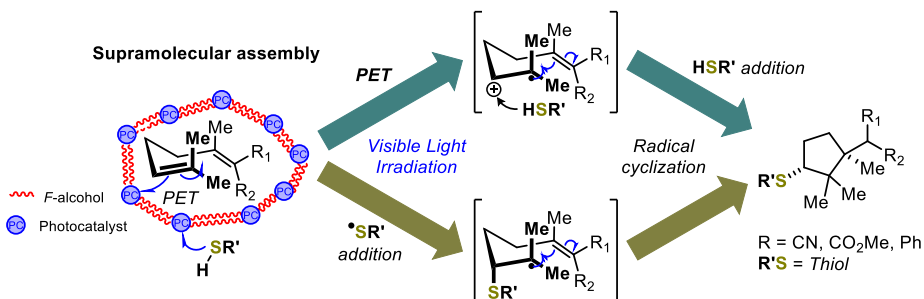
<sup>a</sup> Faculty of Chemistry and Mineralogy, Leipzig University, 04103 Leipzig, Germany

<sup>b</sup> Organic Chemistry, Saarland University, 66123 Saarbruecken, Germany

[nicolas.rascon@studserv.uni-leipzig.de](mailto:nicolas.rascon@studserv.uni-leipzig.de)

Terpenes are the largest group of natural compounds with over 80000 examples. Many of them have biological activities and thus are used to treat many diseases,[1] so the development of new synthetic methods to obtain these compounds is important. In nature, terpene cyclizations are performed with great precision and selectivity by terpene cyclases. While nature efficiently catalyzes the cyclization of linear terpenes, replicating this process in an organic synthetic laboratory remains challenging. Our group previously demonstrated that hexafluoroisopropanol (HFIP) and perfluoro-tert-butanol (PFTB) can induce halogenation- and protonation-driven polyene cyclizations in a biomimetic manner [2-4]. We attribute the success of these reactions to the unique properties of fluorinated solvents, particularly HFIP, which promote the formation of supramolecular structures in solution. These structures preorganize the substrate, modulate the reactivity of the reagent, and stabilize the cationic intermediates and transition states.

Within the presented study, we are utilizing the advantageous properties of microstructured, fluorinated reaction solutions for photocatalyzed terpene cyclization. Our particular focus is on the influence of the H-bonding network on the catalyst's photophysical and photochemical properties and how these affects the reaction mechanism.



- (1) Christianson, D. W. *Chem. Rev.* **2017**, *117*, 11570–11648.
- (2) Arnold, A. M.; Dullinger, P.; Biswas, A.; Jandl, C.; Horinek, D.; Gulder, T. *Nat. Commun.* **2023**, *14*, 813.
- (3) Binder, J.; Biswas, A.; Gulder, T. *Chem. Sci.* **2023**, *14*, 3907–3912.
- (4) Arnold, A. M.; Pöthig, A.; Drees, M.; Gulder, T. *J. Am. Chem. Soc.* **2018**, *140*, 4344–4353.