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Development of new fluorinated molecules by merging fluorine and heteroatoms. Applications to medicinal chemistry and medical imaging.

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Due to the particular properties of the fluorine atom, fluorinated molecules have become increasingly popular in recent years in a large number of application fields ranging from materials science to life sciences.

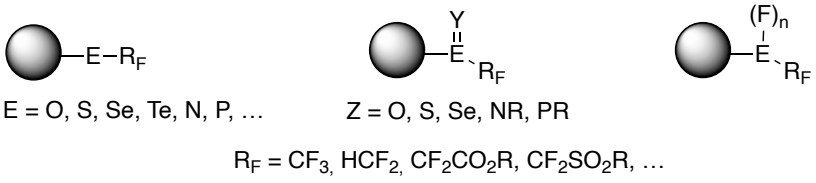
Thus, fluorinated compounds have become essential in many current topics: batteries, polymers, agrochemistry, drugs, early diagnostics ....

In order to propose new compounds that are increasingly efficient for "targeted applications", the development of new innovative fluorinated groups has become a hot topic. In this race for new fluorinated moieties, the merging of fluorine atoms and heteroelements has emerged in recent years as an extremely efficient and promising solution.

We have been involved in this field for several years by developing various reagents and methods to propose new pathways to innovative fluorinated molecules with very specific properties.

This work will focus on further developing this chemistry by proposing new innovative motifs, as yet undescribed, and by developing efficient methods of introduction onto organic compounds following a "late-stage" strategy.

These pathways will be based on the development of new reagents and their use in reactions as C-H functionalizations, Photoredox, couplings, flow chemistry, ...



Examples of new emerging fluorinated groups.

In addition, a part of the laboratory being localized to the Groupement Hospitalier Est, some of these strategies will be used in the design of new diagnostic tools, particularly in the field of neurodegenerative diseases.

Bibliography : *iScience* **2020**, *23*, 101467 ; *ACS Omega* **2020**, *5*, 10633; *Emerging Fluorinated Motifs: Synthesis, Properties and Applications*. Wiley, Weinheim, Germany, **2020** ; Chem. Eur. J. **2021**, ***2021***, *27*, 15986 ; *Eur. J. Org. Chem.* **2020**, 6943; *Angew. Chem. Int. Ed.* **2019**, *58*, 18937 ; *Org. Lett.* **2018**, *20*, 56 ; *Chem. Commun.* **2018**, *54*, 9909 ; *Angew. Chem. Int. Ed.* **2018**, *57*, 11781 ; *Adv. Synth. Catal.* **2017**, *359*, 3414 ; *Angew. Chem. Int. Ed.* **2017**, *56*, 169 ; *Angew. Chem. Int. Ed.* **2016**, *55*, 4790 ; *J. Org. Chem.* **2016**, *81*, 8268 ; *Chem. Eur. J.* **2015**, *21*, 14694 ; *Angew. Chem. Int. Ed.* **2013**, *52*, 10814 ; *Angew. Chem. Int. Ed.* **2012**, *51*, 10382.

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