N-fluoro-N-arylsulfonamides as efficient radical fluorinating agents: I-F exchange and carbofluorination of unactivated olefins

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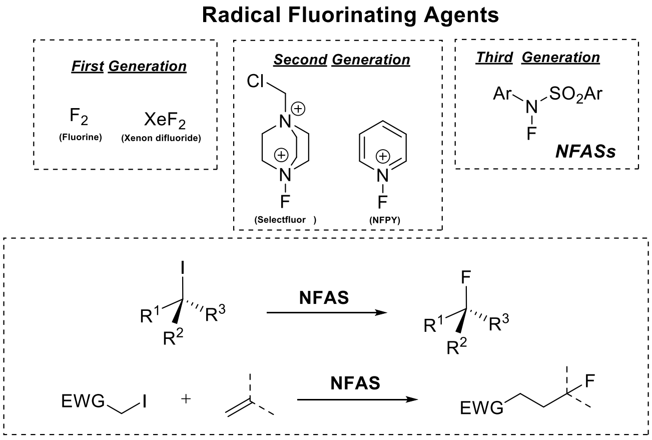
Due to their interesting physicochemical and biological properties, fluorinated organic compounds represent attractive synthetic targets, finding broad application on material sciences, pharmaceutical and agrochemical industries. As a result, the demand for efficient synthetic methods concerning the introduction of fluorine atoms have increased steadily over the years. To the date, the application of diverse electrophilic and nucleophilic fluorinating reagents has been under constant development, leading to well stablished fluorination protocols. On the other hand, although several techniques for radical fluorination have been reported, their synthetic application is commonly limited by the use of rather perilous reagents like F_2 or XeF_2 (First generation of radical fluorinating agents). Moreover, the application of a second generation of radical fluorinating agents such as Selectfluor® or N-fluoropyridiniumsalts (NFPY) is commonly hampered by the necessity of the use of transition metal catalysts and their oxidizing properties. [1]



Recently, our group reported a third generation of radical fluorinating agents based on N-fluoro-N-arylsulfonamides (NFASs) and successfully applied them to the catecholborane-mediated hydrofluorination of alkenes [2]. The newly developed NFASs showed to be suitable reagents for radical fluorination under mild conditions (BDE is in average 30–45 kJ mol^{-1} lower than that of the second-generation radical fluorinating agents). Hereby, we present a method for the radical fluorination of secondary and tertiary alkyl iodides. Furthermore, a carbofluorination strategy for unactivated olefins was developed, in which the functionalization of double bonds takes place through an ATRA reaction, followed by radical fluorination of the so-generated alkyl iodides.

[1] F. Yin, Z. Wang, Z. Li, C. Li. *J. Am. Chem. Soc.* **2012,** 134, 10401–10404.
[2] D. Meyer, H. Jangra, F. Walther, H. Zipse, P. Renaud, *Nat. Commun.* **2018**, 9, 4888.