# Metal-free α-trifluoromethylthiolation and α-trifluoromethylselenolation of carbonyl derivatives

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The incorporation of a $SCF_3$ or a $SeCF_3$ group into organic molecules is a topic of great interest, especially for the pharmaceutical and agrochemical industries [1,2]. Due to their high lipophilicity and high electron-withdrawing character (Hansch lipophilicity parameter $\pi_R$ =1.44 ($SCF_3$) vs $\pi_R$ =1.29 ($SeCF_3$)), these moieties represent a powerful opportunity to influence the pharmacokinetics properties of a drug molecule.

In the last years, new structural units, rising from the association between chalcogens and fluorinated moieties, have been introduced into carbonyl compounds, as emerging class with potential applications on several fields. New reagents have been developed as sources of electrophilic $SCF_3$ and $SeCF_3$ groups; however, a widespread use of such fluorinated compounds is hampered by the very limited number of strategies available for their preparation. In this contest, we have developed two methodologies for the preparation of α-$SCF_3$ [3] and α-$SeCF_3$ substituted carbonyl derivatives starting from non activated ketones or their derivatives (Fig. 1).

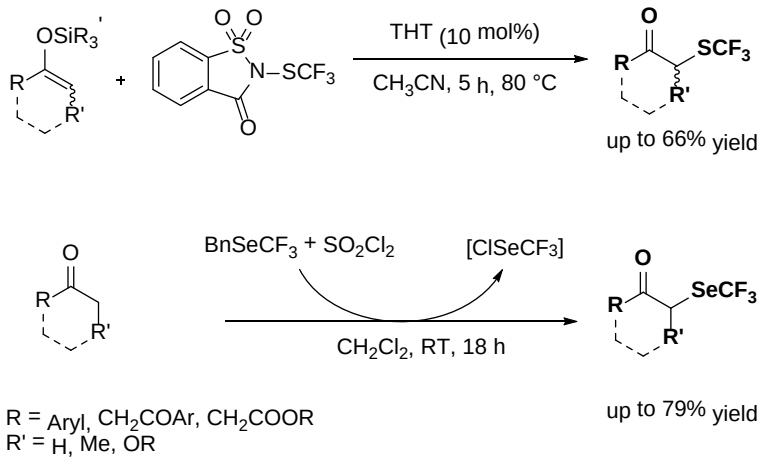


**Figure 1**: α-trifluoromethylthiolation and α-trifluoromethylselenolation of carbonyl derivatives

[1] W.K. Hagmann, *J. Med. Chem.*, **2008**, 51, 4359-4369
[2] M. Carland, T. Fenner, "The Use of Selenium-Based Drugs in Medicine" *published in* "Metallotherapeutic Drugs and Metal-Based Diagnostic Agents: The Use of Metals in Medicine", Marcel Gielen and Edward R.T. Tiekink editors. **2005**, 313-332.
[3] S. S. Abubakar, M. Benaglia, S. Rossi, R. Annunziata, *Catalysis Today* **2017,** doi:10.1016/j.cattod.2017.09.013