Fluorine & Chirality: Asymmetric Synthesis of Fluorinated Molecules

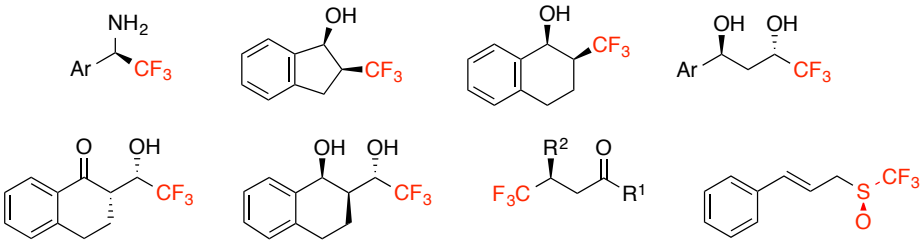
Dominique Cahard

CNRS – UMR 6014 C.O.B.R.A. – Normandie Université, 76821 Mont-Saint-Aignan, France

e-mail : dominique.cahard@univ-rouen.fr

Organofluorine chemistry is a research field of tremendous expansion because the scope of applications of fluorinated molecules is impressively large, impacting all domains of society from pharmaceutical and agrochemical sciences to materials science and energy.

The synthesis of enantiopure molecules featuring a fluorine atom or a fluorinated motif at a stereogenic carbon centre has stimulated considerable interest. The subtle effects of fluorine atom(s) on the course of asymmetric reactions often offer interesting results when compared with the chemistry of non-fluorinated molecules.[1] The asymmetric construction of fluorinated molecules can be approached either by direct introduction of a fluoro group or by transformation of prochiral fluorinated substrates. In this context, the stereoselective construction of CF_3-bearing stereogenic carbon centres remains highly challenging. As tool for this purpose, we have investigated the enantioselective transfer hydrogenation of a variety of prostereogenic trifluoromethylated substrates. Examples of direct transfer hydrogenations[2] or through isomerization[3] will be discussed in the lecture. In addition, I will also present recent results in the asymmetric synthesis of chiral SCF_3 compounds through direct nucleophilic and electrophilic trifluoromethylthiolations.[4]



References

1. Cahard, D.; Bizet, V. *Chem. Soc. Rev.* **2014**, *43*, 135–147.
2. a) Dai, X.; Cahard, D. *Adv. Synth. Catal.*, **2014**, *356*, 1317–1328. b) Cotman, A. E.; Cahard, D.; Mohar, B. *Angew. Chem. Int. Ed.,* **2016**, 55, 5294–5298.
3. Bizet, V.; Renaud, J.L.; Cahard, D. *Angew. Chem. Int. Ed,.* **2012**, *51*, 6467–6470.
4. a) Bailly, L.; Petit, E.; Maeno, M.; Shibata, N.; Chataigner, I.; Cardinael, P.; Trapp, O.; Cahard, D. *Chirality* **2016**, *28*, 136–142. b) Chachignon, H.; Kondrashov, E.; Cahard, D. *Adv. Synth. Catal.*, **2018**, *360*, 965–971. c) Zeng, J-L.; Chachignon, H.; Ma, J-A.; Cahard, D. *Org. Lett.*, **2017**, *19*, 1974–1977.