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<http://www.ilv.uvsq.fr/recherche/Echo/Fluor/fluor.html>

Keywords : Sulfoniums, sulfilimines, sulfoximines, fluorinated ionic liquid, trifluoromethoxy group, MOFs, antiestrogens

Principal Investigators :



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Patrick DITER



Bruce PEGOT

Title : Trifluoromethyl sulfoniums

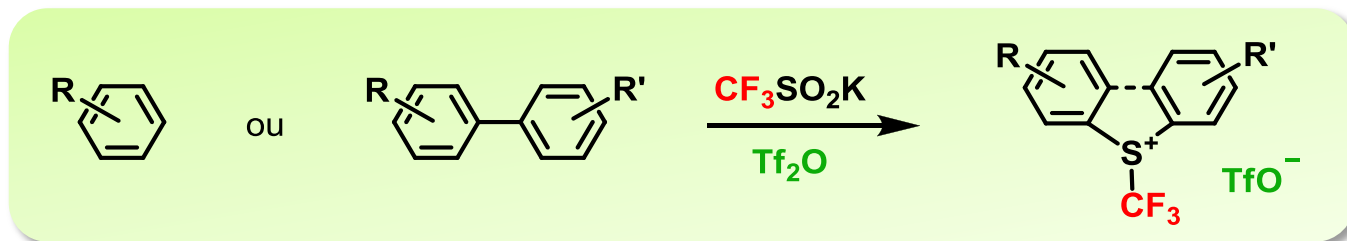
Aim: One step preparation of a library of electrophilic perfluoroalkylating reagents

Method: Aromatic functionalization with trifluoromethane sulfinate as key reagents

Background: *Angew. Chem. Int. Ed.* **2006**, 45, 1279; *Eur. J. Org. Chem.* **2009**, 1390; *Tetrahedron Lett.* **2010**, 51, 5388; *Eur. J. Org. Chem.* **2010**, 5772; *J. Fluorine Chem.* **2012**, 134, 156; *Org. Lett.* **2014**, 16, 1240,

Collaborations: G. Masson (ICSN, Gif sur Yvette)

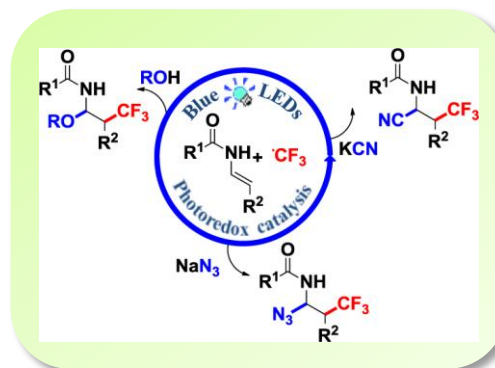
→ One pot synthesis



→ Mechanistical studies

→ Ionic liquids as new media for electrophilic trifluoromethylation

→ Trifluoromethylation of enecarbamates
Induced by photoredox catalysis



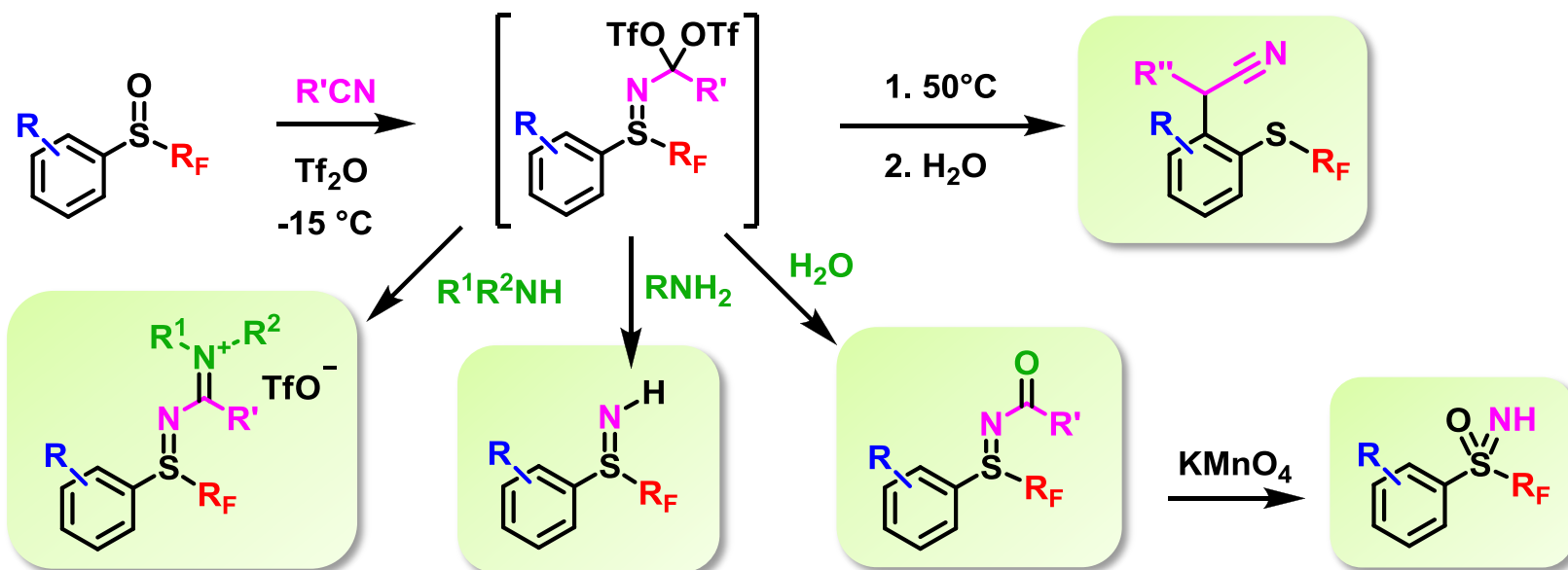
Title: Sulfilimes and sulfoximines

Aim: Easy, scalable and reliable synthesis of perfluoroalkylated sulfur (IV) and (VI) compounds

Method: Ritter-like reaction between sulfoxide and nitriles. Smooth oxydation of the resulting sulfilimines.

Background: *Eur. J. Org. Chem.* **2009**, 52, 3150; *Eur. J. Org. Chem.* **2009**, 52, 5313; *Adv. Synth. Catal.* **2010**, 352, 2805; *Tetrahedron*, **2011**, 67, 7575; *Eur. J. Org. Chem.* **2011**, 4862; *Chem. Eur. J.*, **2012**, 18, 12487; *Synthesis* **2013**, 45, 1505; *Eur. J. Org. Chem.* **2013**, 7800.

Collaborations: Dr. Mireille Blanchard-Desce (ISM, Bordeaux); Pr. G. Vo-Thanh (ICMMO, Orsay)



→ New synthetic routes and N-functionalization of sulfoximines

→ Electrophilic perfluoroalkylating reagents

→ Super electronwithdrawing groups. Application for fluorescent materials.

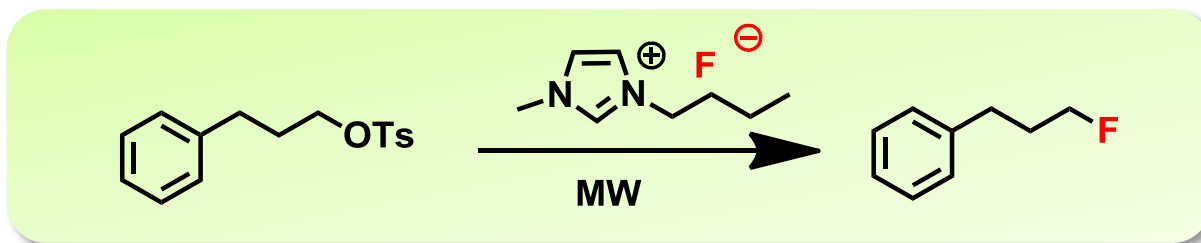
→ Sulfoximines as organocatalysts or ligands for catalysis

Title: Fluorinated ionic liquid as source of fluoride anion

Aim: The description of new ionic liquid for the nucleophilic introduction of the fluorine atom

Method: Use of cheap KF as primary source of fluorine

Background: *Tetrahedron Lett.* **2014**, 55, 826

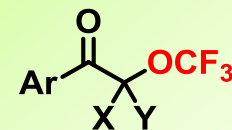
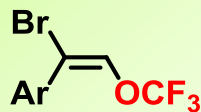
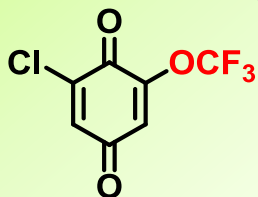
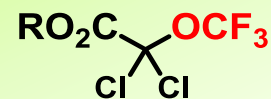
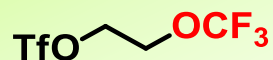


Title: trifluoromethoxy aliphatic compounds

Aim: Preparation of highly functionalized small molecules bearing the OCF_3 moiety

Method: Fluodesulfurization of xanthates

Background: *J. Org Chem*, **2001**, *66*, 1061; *J. Fluorine Chem.* **2002**, *117*, 161; *Tetrahedron. Lett.* **2008**, *49*, 4575; *Synlett* **2009**, *7*, 1131.



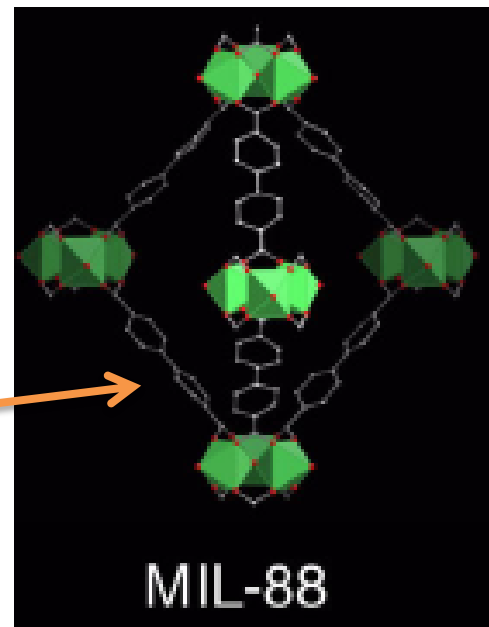
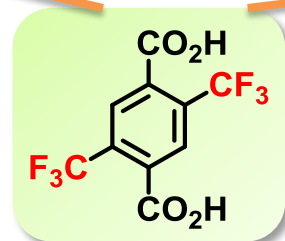
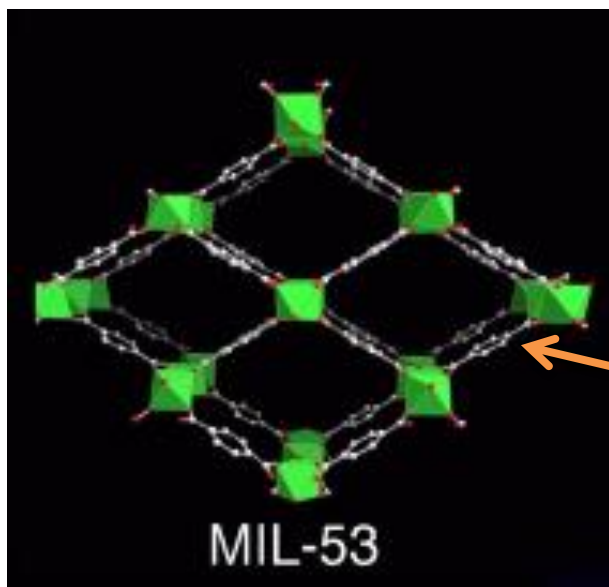
Title: Perfluorinated MOFs (Metal Organic Frameworks)

Aim: Preparation of fluorinated ligands for porous solids

Method: Scalable synthesis of fluorinated terephthalate and pyrazolates derivatives

Background: *J. Am. Chem. Soc.* **2010**, *132*, 1127; *Dalton Trans.* **2011** *40*, 4879; *J. Am. Chem. Soc.* **2011**, *133*, 17839; *Chem. Mater.* **2013**, *25*, 479.

Collaborations: Dr. C. Serre, Dr. T. Devic, Dr. P. Horcajada (ILV, Versailles)



Title: Fluorinated analogues of natural compounds or of therapeutic interest

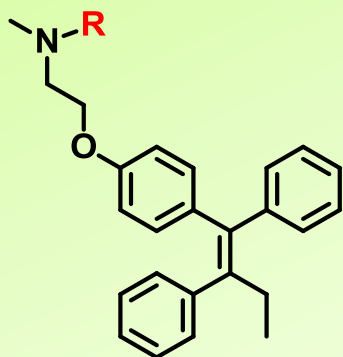
Aim: Preparation of fluorinated analogues of estradiol or fulvestrantTM, fluorinated derivatives of tamoxifenTM

Method: Multistep synthesis starting from the tamoxifen and estradiol core

Background: *J. Org. Chem.* **2005**, *22*, 8907; *Bioorg. Med. Chem.* **2006**, *14*, 7531; *Steroids*. **2008**, *73*, 320; *J. Med. Chem.* **2009**, *52*, 5313

Collaborations: Pr. Guy Leclercq (UJB, Bruxelles)

✓ Tamoxifene analogues



R-

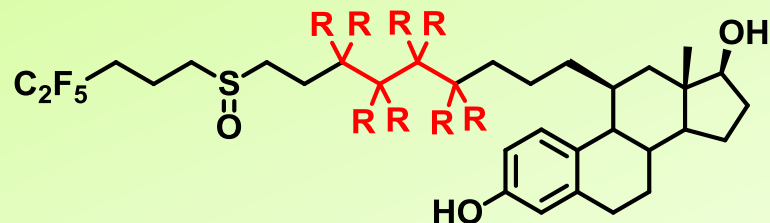
CH₃ / tamoxifene

CF₃-CH₂

CF₃-CH₂-CH₂

CF₃O-CH₂-CH₂

✓ Fulvestrant analogues



R = H

15 steps

4.6 % of global yield

R = F

12 steps

2.2 % of global yield