STeRéO Group Seminar - RCC Julien Botton

# A Photocatalyzed Aliphatic Fluorination

Steven Bloom, James Levi Knippel and Thomas Lectka

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Chemical Science

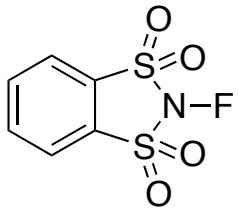
# Fluorinating Agents

* Nucleophilic Fluorine Source

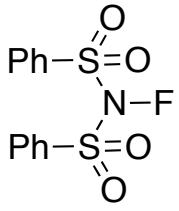
M- F  H-F

* Electrophilic Fluorine Source

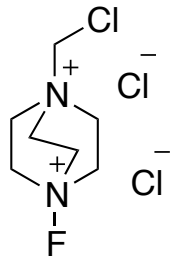
$F_2$




NFOBS



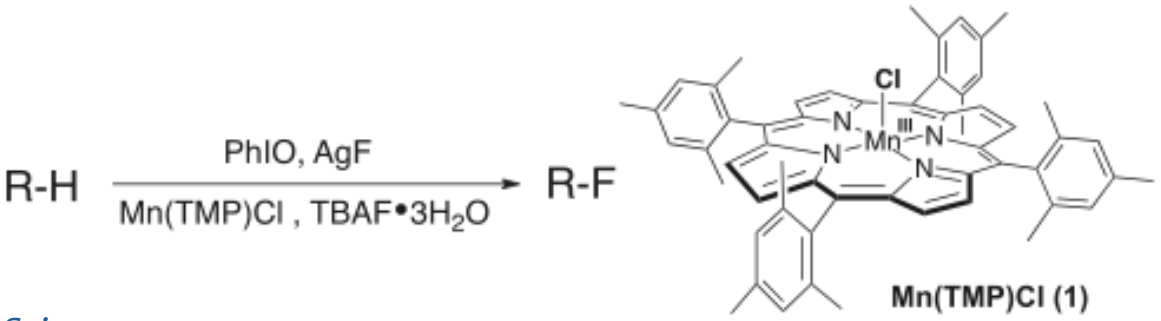

NFSI




Selectfluor

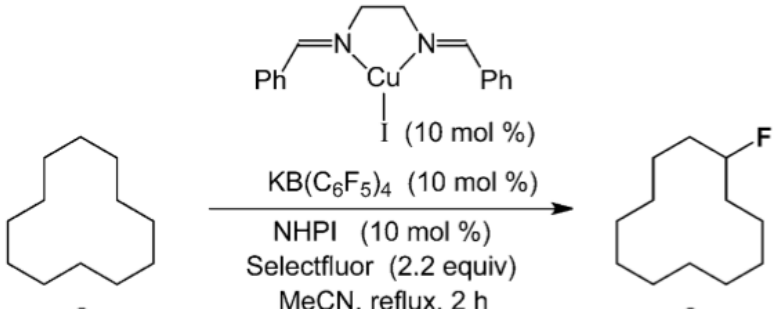
# Mild Aliphatic Fluorination State of Art

* Use of Mn-porphyrin complexes




Groves *et. al., Science* **2012**, *337*, 1322–1325

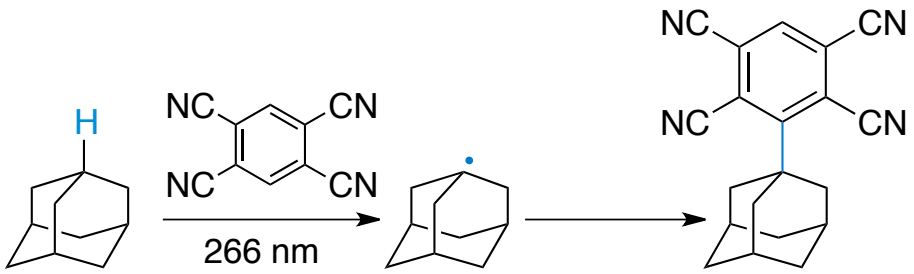
* Copper catalysis




Lectka *et. al., Angew. Chem. Int. Ed.* **2012**, *51*, 10580–10583

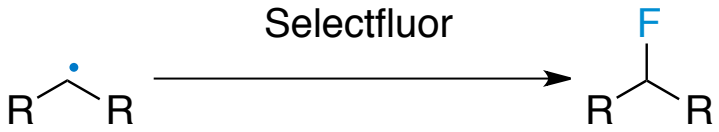
# Concepts Association

* Use of a sensitizer to generate alkyls radicals



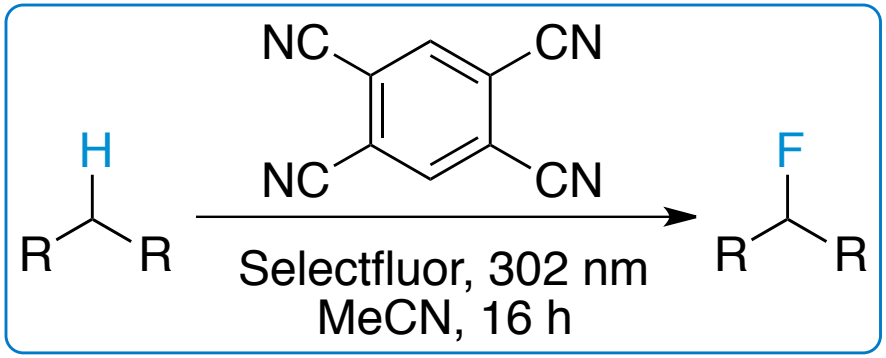

Nature, 2007, 446, 391–393; Org. Biomol. Chem., 2013, 11, 2811–2817

* Radical fluorination with Selectfluor



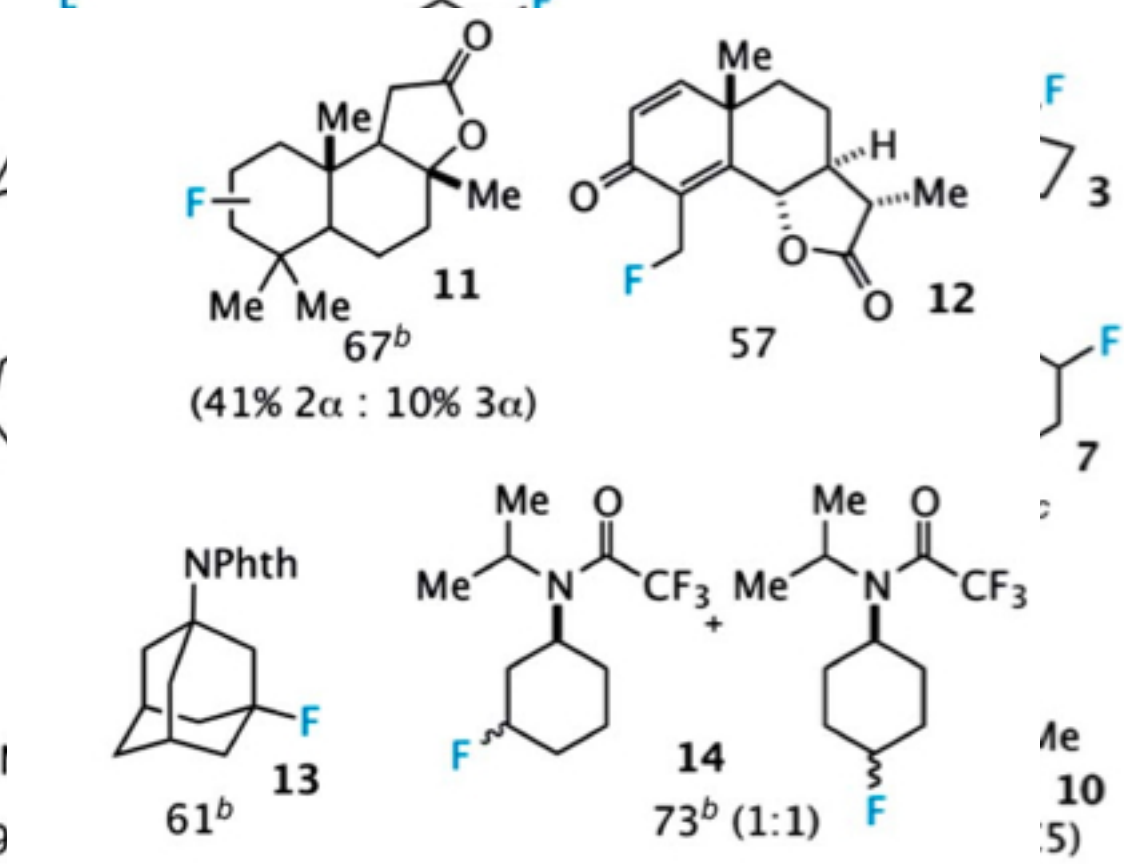

Li *et. al.*, *J. Am. Chem. Soc.* **2012**, *134*, 10401– 10404; Inoue *et. al.*, *Org. Lett.* **2013**, *15*, 2160–2163

# New System

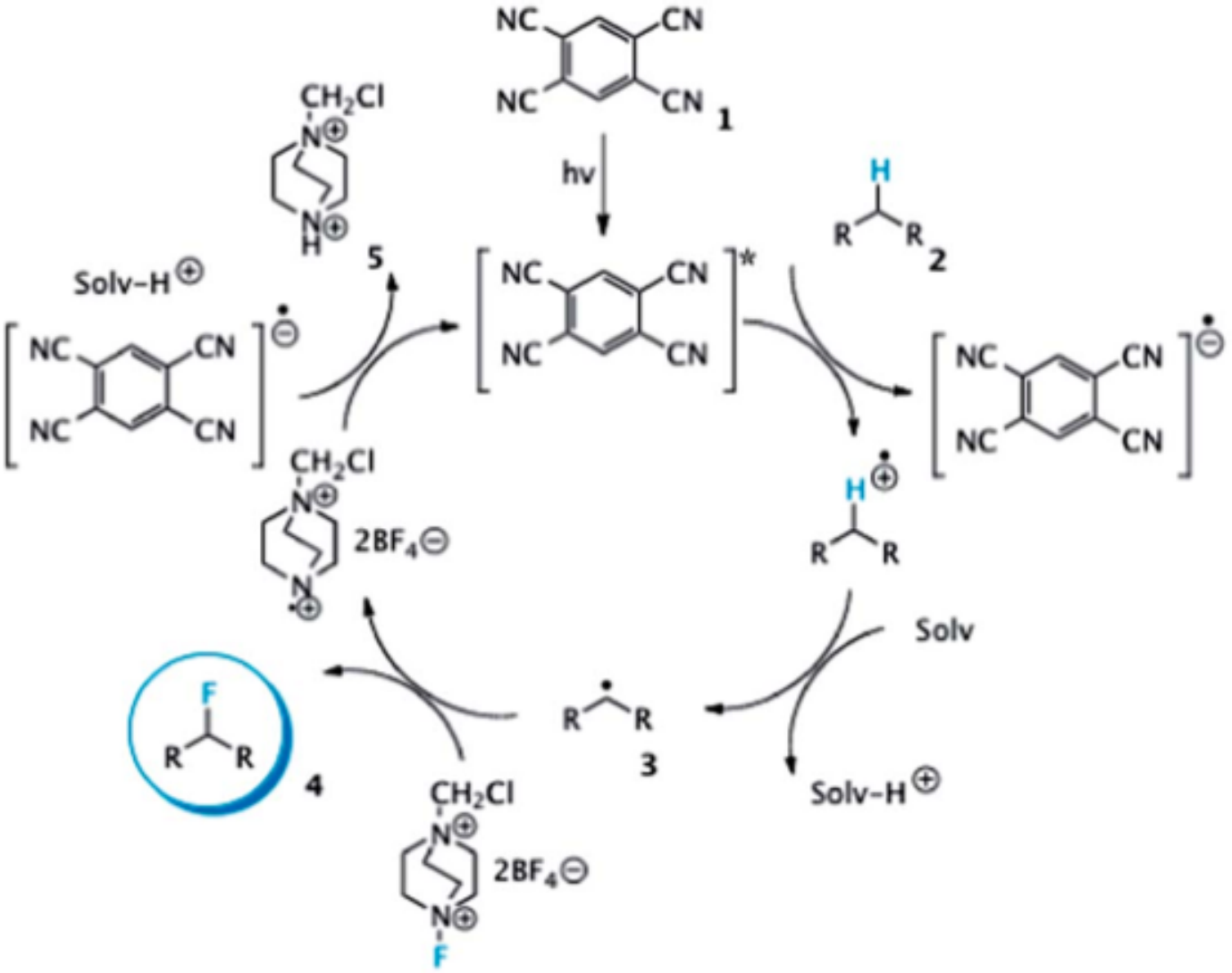



* Monofluorinated products generally obtained from the most stable radical
* No rebounding TCB adducts observed

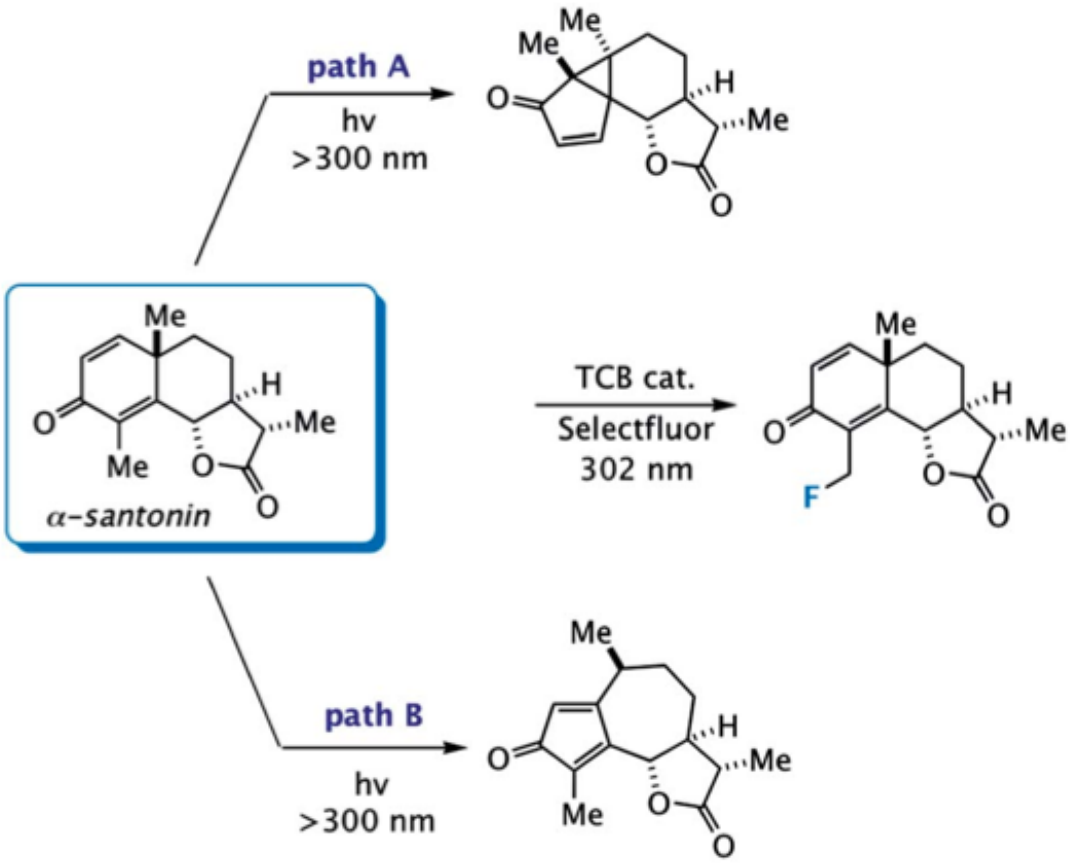
# Scope


F
O
Me
O
F
Me
Me
Me
11
67b
(41% 2α : 10% 3α)
Me
H
O
Me
F
O
O
12
57
NPhth
F
13
61b
Me
O
Me
N
CF3
F
+
Me
O
Me
N
CF3
F
14
73b (1:1)

# Proposed Mechanism



# Mechanistic Study



# Conclusion

* New mild conditions for aliphatic fluorination
* Selective method with high yield
* Efficient on complex structures

*Thank you for your attention*