Institut de Chimie des Milieux et des Matériaux de Poitiers
(UMR 7285)

SUPERACID LAB

http://superacidgroup.labo.univ-poitiers.fr

Keywords **: Superacids, Superelectrophiles, Fluorination, Molecular Reorganization, Rearrangement, Mechanistic Studies, Hydrogen Fluoride, Strong Acids, HF/base, Late Stage Functionalization**

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SUPERACID LAB

Method: Exploitation of superacid and strong acids as complementary synthetic methods to generate high valued products. Capacity to use superacids, strong acids, hydrogen fluoride, HF/base reagents. Ability to transfer this activation strategies under flow conditions.

Competitors: The chemistry developed in superacid lab is a European specificity where international competitors are the following ones - G. K. S. Prakash (USA), D. Klumpp (USA), T. Ohwada (Japan), A. Vasyliev (Russia)

Background and specific aim: The principal research interests of the team is to exploit the uniqueness of superacid chemistry. (Poly)protonated in superacid, molecules can be strongly activated (superelectrophilic activation). It favors the development of original synthetic methods that have no equivalent in classical organic synthesis. The direct synthesis of elaborated original compounds of high synthetic and biological values are especially targeted. With chemical diversification and small molecules remaining a vital part of the drug development process, especially when conventional synthetic methods for analogue generation showed limitations, the development of original synthetic strategies (electrochemical activation, photoredox activation, flow activation, molecular editing strategies) is of crucial importance. In this context, superacid technology would offer a fast, versatile and complementary approach to generate high valued products.

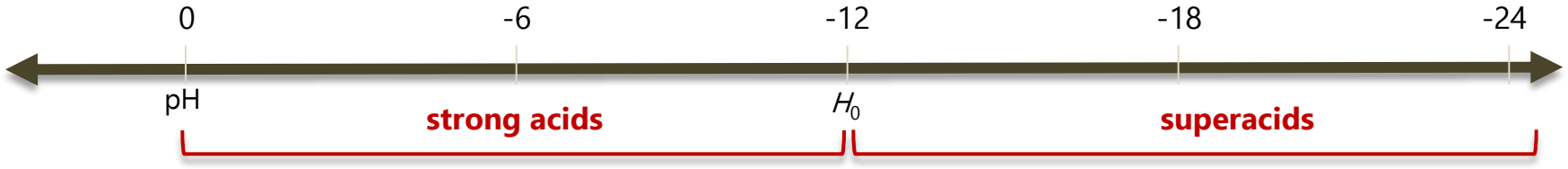
Collaborations:

- Dr. J. Jimenez-Barbero (CIC bioGUNE Center for Cooperative Research in Biosciences – Bilbao Espagne) / ANR Sweetcat, ANR Oxycarb, ANR Brownsugar, international research project IRP GLYCOMIMIC CNRS (2022-2027).
- Pr. I. Krossing (Uni Freiburg – Freibourg Allemagne) / ANR Flowers.
- Pr. T. Ohwada (University of Tokyo – Japon) / Slash project CNRS-University of Tokyo.
- Dr. C. Rovira (University of Barcelona – ICREA) / PICS CNRS 2016-2019 GLYCOSUP, international research project IRP GLYCOMIMIC CNRS (2022-2027).
- Pr. C. T. Supuran (Université de Florence - Italie) / EU Marie Curie project.

- ACTIV-H society: Collaborative Lab in the context of Poitiers University Innovation framework program / Superacid Flow Technology and Drug Discovery Programs

SOLUTION : CHARGE-DRIVEN REACTIVITY

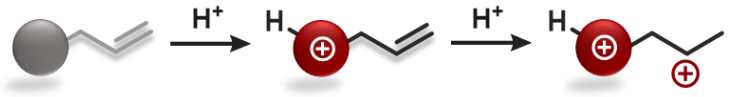
- Developing chemistry with acids from pH = 0 to H_0 < -24 in batch and flow conditions



- Charge-driven selective transformations

Superelectrophilic activation

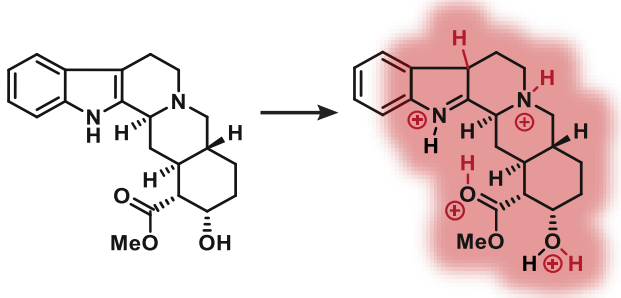
From reactive cations to highly reactive polycations



Reaction with no equivalent in standard conditions

Protection by protonation

Functionalization of classically inert positions



- Complementary reactions available from mg to 10 g scale

1. ADDITIONS
2. CH-BOND FUNCTIONALIZATION
3. MOLECULAR REORGANIZATION
4. LATE STAGE FUNCTIONALIZATION