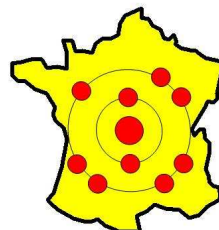




RÉSEAU FRANÇAIS DU FLUOR



UMR-CNRS 7285 - Institut de Chimie des Milieux et Matériaux de Poitiers
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Keywords : Catalysis, gas and liquid anhydrous HF, catalytic fluorination in liquid and gas phase, Cl/F exchanges, chlorinated hydrocarbons and aromatics, HF as fluorinating agent, metal fluorides and oxide hydroxide fluorides catalytic systems, solid catalysts synthesis.

Principal Investigators :



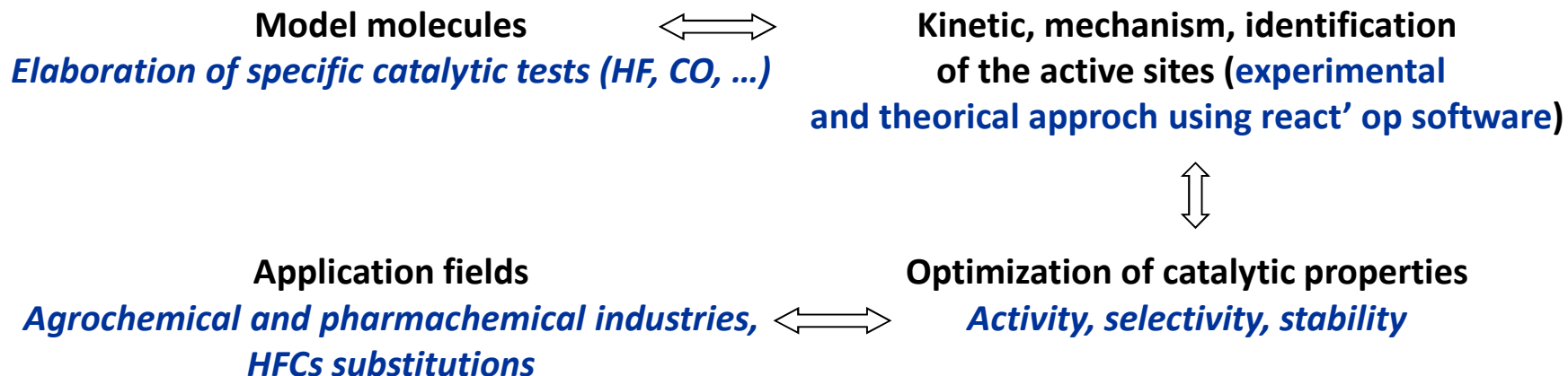
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Title : Catalytic fluorination of chlorinated substrates

Methodology:



- **Catalytic fluorination of chlorinated substrates** (aromatic and hydrocarbon) by Cl/F exchanges under severe conditions with HF and a catalyst (Lewis acid, oxides, fluorides...) in gas phase (heterogeneous catalysis) or in liquid phase (homogeneous catalysis)
- **Determination of the mechanism involved** and **identification** of the active sites in order to increase the selectivity towards fluorinated products.

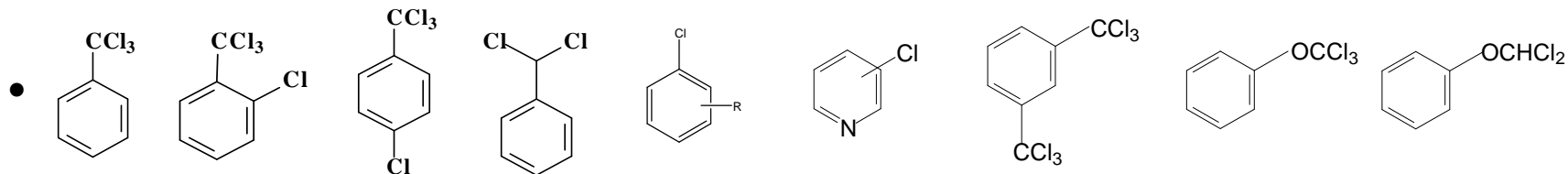
Collaborations : Arkema, Solvay, Bayer, ANR Fluorcat, UCCS Lille

Title : chlorinated substrates - experimental set up

- Aliphatic Cl/F exchanges, trifluoromethylation, nucleophilic substitutions, aromatic nucleophilic substitution,

Substrates :

- $\text{CCl}_2=\text{CCl}_2$, $\text{CF}_3\text{CH}_2\text{Cl}$, CH_2Cl_2 , CF_3CHCl_2 , $\text{CF}_2=\text{CHCl}$



Liquid phase set up:



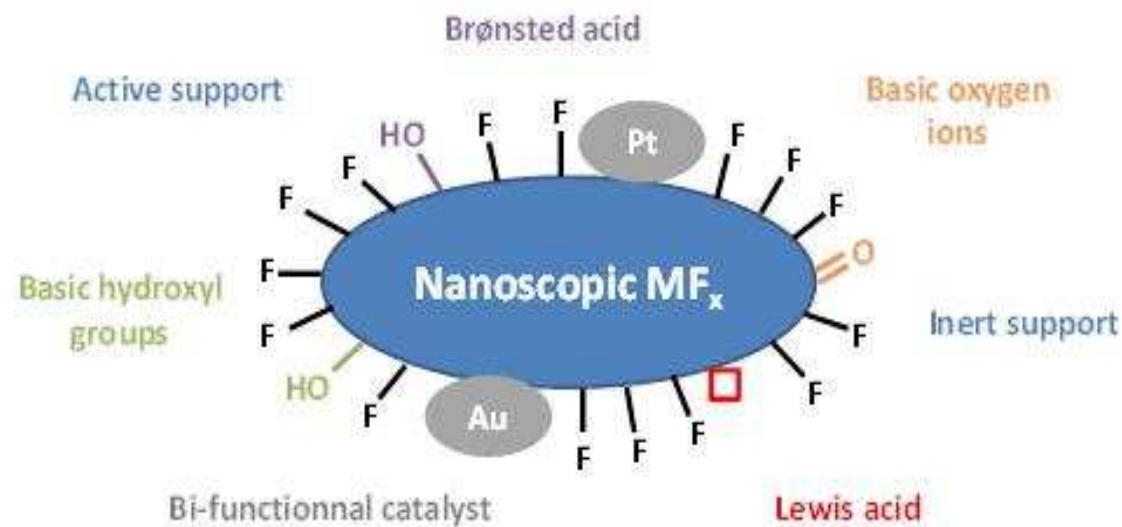
Gas phase set up:



Collaborations : Arkema, Solvay, Bayer, ANR Fluorcat, UCCS Lille, ...

Title : heterogeneous catalytic systems based on metal fluorides and oxide hydroxide fluorides

- Oxide hydroxide fluorides with various acid/base properties can be used as catalyst or active/inert support
- The Lewis/Brønsted acid sites ratio can be tuned with the synthesis parameters
- Bi-functional solid catalysts based on metal fluorides can be prepared



Applications in heterogeneous processes at IC2MP:

acylation reaction, alkylation reaction, glycerol and furanic compounds valorization,

Title : Catalysts

Synthesis method:

- Sol-gel
- Co-precipitation
- Decomposition of metal trifluoroacetates

Catalysts:

- Homogeneous Lewis acids :
 - SbCl_5 , SbF_5 , SbClF_4
 - NbCl_5 , TaCl_5 , TiCl_4 , MoCl_5 , SbCl_3 ,
- Solid catalysts with tunable acid-base properties :
 - oxide hydroxide fluorides or metal fluorides : MgF_2 , BaF_2 , ZnF_2 , CeF_3 , LaF_3 , CaF_3 , FeF_3 , AlF_3 , $\text{MF}_x\text{O}_y(\text{OH})_z$ with $\text{M} = \text{Al}, \text{Mg}$
 - Chromium based catalysts unsupported and supported over AlF_3 : $\text{Cr}_2\text{O}_y\text{F}_x$, NiCr , ZnCr , MgCr , ...