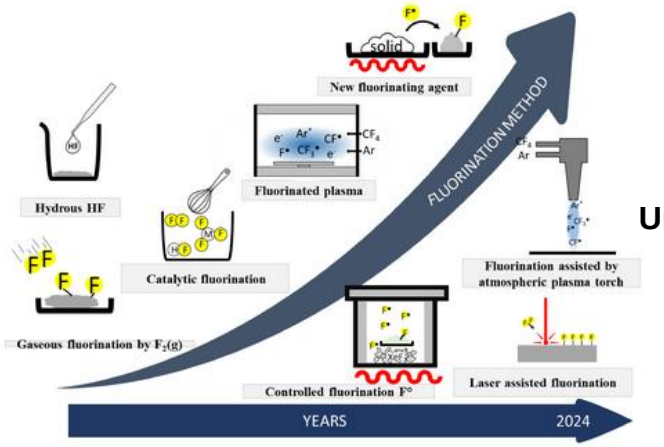
GIS Fluor CNRS "Réseau Français du Fluor"



UMR-CNRS 6296 - Institut de Chimie de Clermont-Ferrand
Thématique « Fluoration et Matériaux fluorés »
Université Clermont Auvergne, 24, avenue Blaise Pascal, 63171 Aubière, France

Keywords **:** Synthesis, functionnalization, nanostructuration, fluorine atmosphere, inorganic (nano)fluorides, fluorinated (nano)carbons, high-pressure structure, energy vectors, catalysis, lubrication, nanocomposites, environmental materials, nuclear fuel cycle

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Fluorinated materials for energy and environment

Method:

- ✓ **Synthesis in fluorinated atmosphere F_2(g), anhydrous or aqueous HF(aq,g), catalytic atmopshere, using solid fluorinated decomposition (TbF_4, XeF_2, …), ceramic process, solvothermal way or fluorinated plasma**
- ✓ **Fluorinated inorganic structure stabilized by high-pressure synthesis**
- ✓ **Fluorinated nanocarbons as electrode materials for primary lithium batteries**
- ✓ **Nanostructured metal fluorides or oxyfluorides as electrode materials for secondary lithium batteries and photo/electrocatalysis**

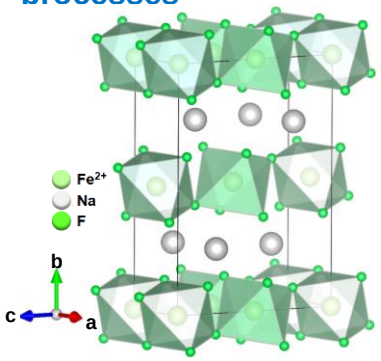
Competitors*: *SAFT, Centre National d'Etudes Spatiales (CNES), European Space Agency (ESA), SAFRAN, ORANO, IFPEN, UMICORE

Background: Knowledges on solid gas fluorination and cristallochemistry of fluorinated compounds taught by Pr HAMWI and Pr AVIGNANT

Collaborations

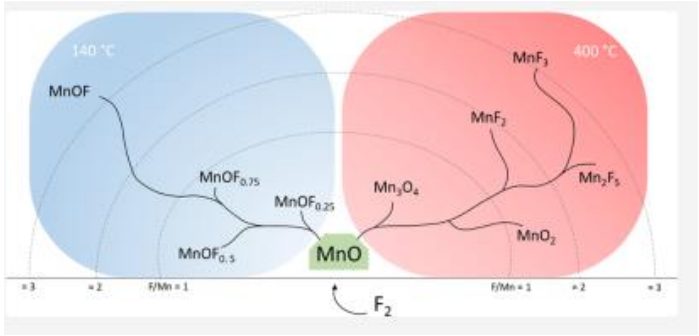
Dr Parmentier, Dr Ghimbeu, Institut de Science des Matériaux de Mulhouse, Dr Louvain, Institut Charles Gerhardt Montpellier, Dr Berthon-Fabry, MinesParis, Equipe du Dr Maisonneuve, Institut des matériaux du Mans, Dr Demourgues, Institut de Chimie de la matière condensée de Bordeaux, Dr Alloin, Dr Iojoiu, Laboratoire d'électrochimie et de physicochimie des matériaux et des interfaces de Grenoble, Equipe du Dr Herold et du Dr Celzard, Institut Jean Lamour de Nancy, Dr Belin, Synchrotron Soleil

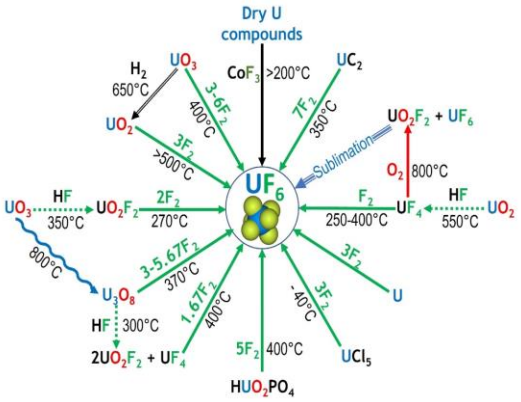
Aim1: To obtain new or nanostructured / nanoporous materials for energy and environment through fluorination processes



HP-$NaFeF_3$

Post-perovskite





Surface Engineering

Method:

- ✓ **Synthesis in fluorinated atmosphere F_2(g)**
- ✓ **Fluorination of graphene, carbon nanotubes, nanofibres and nanodiscs for tribology**
- ✓ **Surface treatment of polymers to reach multifunctionality (hydrophobicity, gas barrier for CO_2, O_2 and water, antibacterial, …)**
- ✓ **Surface treatment of wood or metallic object**
- ✓ **Preparation of fluorinated nanocarbon/polymer composites**

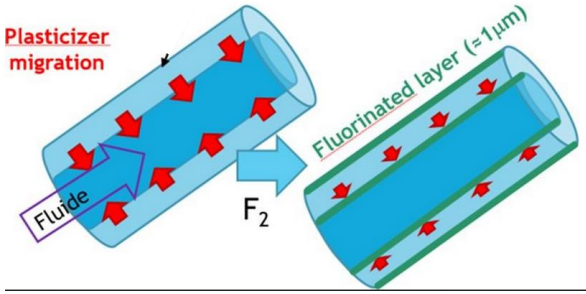
Competitors: ***GILSON, SOLVAY, MICHELIN***

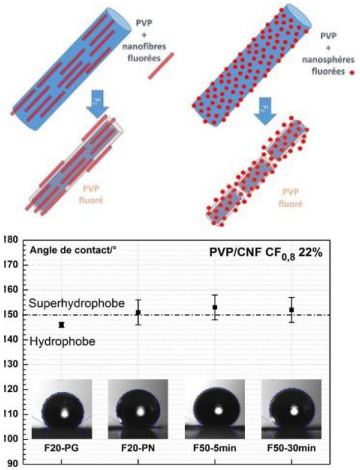
Background: Knowledges on solid gas fluorination and cristallochemistry of fluorinated compounds taught by Pr HAMWI and Pr AVIGNANT

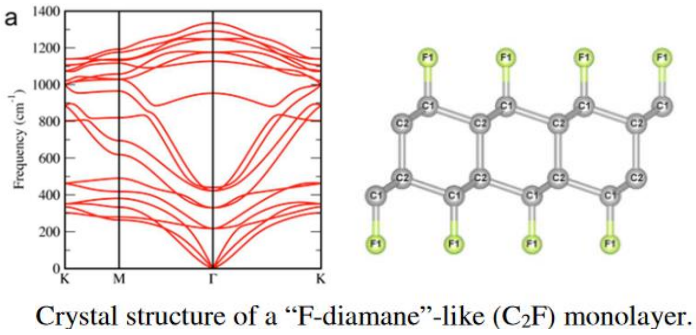
Collaborations

Dr Komatsu, Shiga University Medical Science (Japon), Philippe Thomas, GTSI (Univ. des Antilles et de la Guyane), Equipe Dr Pischedda, Institut Lumière Matière de Lyon, Dr Chen , University of Newcastle (australie)

Aim2: To Synthesize and functionnalize in fluorinated atmosphere inorganic (nano)fluorides and fluorinated (nano)carbons for lubrication and nanocomposites (fluorinated nanofillers)







Crystal structure of a "F-diamane"-like (C_2F) monolayer.