

Expertises

Synthesis of fluorinated materials

SYNTHESIS IN FLUORINATED ATMOSPHERE:

- $F_2(g)$
- $HF(g)$, aqueous HF
- Solid fluorinated reagents (TbF_4 , XeF_2 , ...)
- Under UF_6 atmosphere



FUNCTIONALIZATION USING FLUORINE:

- Surface treatment of commercial polymers and carbonaceous nanomaterials
- Functionalization of commercial polymers
- Synthesis of fluorinated graphene and fluorinated nanofillers

ELECTROCHEMICAL EXFOLIATION OF GRAPHITE FLUORIDES

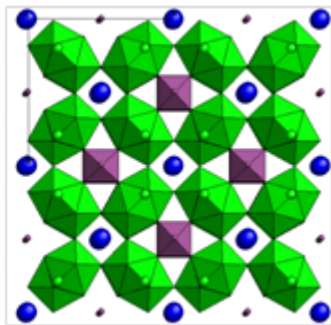
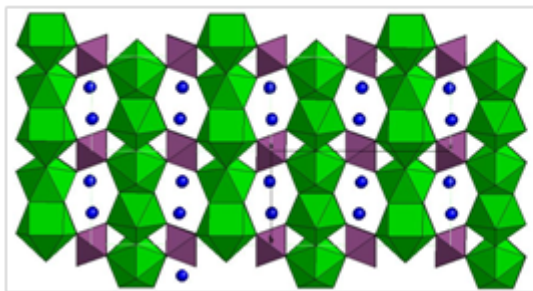
SYNTHESES WITH SOLID AND LIQUID ROUTES:

- Hydrothermal and microemulsion methods

Study of the structure of fluorinated materials

CRYSTAL CHEMISTRY OF FLUORIDE:

- Chemistry of fluorophosphates, terbium fluorides, uranium fluorides and oxyfluorides
- Syntheses and characterization of fluorides and mixed valence oxyfluorides



CHARACTERIZATION OF FLUORINATED MATERIALS:

- X-ray diffraction with single crystals and powders
- Raman spectroscopy
- Solid state nuclear magnetic resonance (^{19}F , ^{13}C , ^1H , ...) and Electron paramagnetic resonance
- N_2 adsorption

Evaluation of the applicative properties of fluorinated materials

- Evaluation of the electrochemical performances in lithium batteries (galvanostatic cycling at various temperatures, cyclic voltamperometry, EIS, in situ XRD- electrochemistry, raman-electrochemistry, ESR-electrochemistry)
- Wettability (superhydrophobicity, printability, adhesion)
- Interaction with solvents, ionic liquids, polymers
- Capacities of filtration/sensitivity to polluting gas -Evaluation of the tribological performances (sliding tests at temperatures in between RT and 400°C under controlled amount of humidity)

Chemistry of gaseous, liquid and solid uranium fluorides

- Adsorption of gaseous fluorides
- Syntheses and characterization of uranium fluorides and mixed valence oxyfluorides

<https://iccf.uca.fr/english-version/research/inorganic-materials/fluoridation-and-fluorinated-materials/expertises>