



Open Position for Post doc Candidates: October 2023 - September 2024

## Recycling of Fluorinated Copolymers for Fuel Cell Applications

Fluoropolymers display outstanding properties and can be involved in many High Tech applications<sup>1</sup> (optical fibers, resistant coatings<sup>2</sup>, fuel cell membranes, various components in Lithium Ion batteries<sup>2</sup>, photovoltaics, actuators, fuel cell membranes (PEMFC), etc). Nowadays, because of Environment pressure and recent regulations, fluoropolymers also belong to polymers family that need to be recycled.<sup>3</sup>

**The objective** of this project deals with the recycling and reuse of fluorofunctional copolymers used in PEMFC:

- i) First, recycling of fluorinated polymers in various ways (primary, secondary or tertiary recycling); possibly, ionic liquids may be synthesized for selective extraction;
- ii) the resulting recovered products (extractible and insoluble parts) will be characterized by various techniques involving chemical analysis, NMR and IR spectroscopies, MALDI Tof spectrometry, as well as their thermal properties (e.g., TGA);
- iii) Possible castings/ processing into films, the properties of which will be attempted by other partners of the project.

The project results in a French collaboration under PEPR Framework and the research will be carried out at the Institute Charles Gerhardt.

### References

1. J.T. Goldbach, R. Amin-Sanayei et al., Commercial Synthesis and Applications of Poly(vinylidene fluoride). In: B. Ameduri, H. Sawada, eds. Fluorinated Polymer. Applications. Vol. 2. Oxford, Royal Society of Chemistry; **2016**. p. 127-157.
2. B. Ameduri, S. Fomin, Fascinating Fluoropolymers and their Applications, Elsevier, Amsterdam, **2020**.
3. B. Ameduri, H. Hori; Recycling and the end of life assessment of fluoropolymers: recent developments, challenges and future trends, *Chem. Soc. Rev.* 2023, **52**, 4208-4247.

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Post doc candidates (with a good knowledge of Polymer Science and Organic Chemistry; possibly in Polymer recycling) can directly contact B. Ameduri (UMR-CNRS 5253, Institut Charles Gerhardt bruno.ameduri@enscm.fr) submitting a CV and a cover letter.