

Post-doc position on X-ray structural characterization of polymers and composites.

Context

The determination and understanding of the structure-property relationships of materials is a key point for improving their performances. This project is carried out in the framework of a collaboration between the “Unité Matériaux Et Transformation” (Université de Lille) and the Hutchinson company. The scope of the project is to study complex blends of polymers (thermoplastic, but also thermoplastic elastomer) based upon industrial formulations and designed in order to respect defined specifications. The goals of the study will be i) to determine the relationships existing between the composition of the materials, their (micro)structure and their mechanical behavior and ii) to determine the influence of thermal aging on both the microstructure and the mechanical behavior of the materials. The in-depth structural characterization of these industrial composites at different length scales will thus consist in the core of the project.

Mission

The main work of the post-doc will be to characterize the structure and the morphology of industrial composites elaborated by Hutchinson. Both Small- and Wide-Angle X-ray Scattering techniques (SAXS and WAXS) will be used in order to determine the structure-mechanical properties relationships of these materials. Depending on the candidate’s profile, the mission would also include the characterization of the mechanical behavior and/or the morphological characterization by means of Atomic Force Microscopy (AFM).

More precisely, the tasks to be carried out will be:

- To carry out the structural characterization of materials by means of X-ray diffraction / scattering experiments (WAXS and SAXS respectively).
- To develop analysis and data processing methodologies adapted to the materials analyzed and to write the associated protocols.
- To analyse the SAXS and WAXS results in terms of:
 - o Phase identification (amorphous/crystalline, type of crystalline phase...).
 - o Texture analysis.
 - o Crystallinity degree quantification.
 - o Morphological analyses through the modeling of the SAXS intensity profiles.
- To determine the relationships between structure and mechanical behavior of the studied materials.

Profile

The candidate should have a PhD in materials science with skills and knowledge dealing with the physical chemistry of polymers. In particular, the candidate should have knowledge regarding the morphology and (micro) structure of polymers and skills in terms of polymer characterization techniques. Experience with structural characterization by diffraction and / or X-ray scattering would be highly appreciated. Finally, the candidate must show a marked interest in experimental and applied research and demonstrate curiosity, dynamism and autonomy.

Relevant details

- Job location : UMET (Villeneuve d'Ascq – 59)
- Duration : CDD of 13 months.
- The position is open from december 2021.
- Salary: the employer being the University of Lille, the salary will be defined according to the official grids depending on diplomas and experience of the candidate.

Contact

For any information please contact:

- Grégory STOCLET (UMET): gregory.stoclet@polytech-lille.fr
- Pierre PUBELLIER (HUTCHINSON): pierre.pubellier@hutchinson.com

In order to apply a CV, a brief description of your research activities and two recommendation letters have to be sent to the two aforementioned.