Elaboration and characterization of memory-shape PE-based thermoplastics for domestic pipe applications

Aalberts hydronic flow control is a division of the Aalberts Group, specializing in the design, manufacture, and marketing of building-integrated thermal solutions "from source to emitter". Through our two brands, COMAP and FLAMCO, we provide unique technological solutions that optimize systems, reduce energy consumption, and guarantee maximum user comfort. The Group's identity is based on entrepreneurial values. Each one of our employees is invited to take part in the company project through their own initiatives, in a spirit of continuous improvement and professional integrity. We grow by sharing experience, capitalizing on best practice, and our social responsibility is supported by actions in favor of sustainable development.

IMP is a joint research unit between the CNRS and Université de Lyon1. Its research activities range from the tailored synthesis of macromolecular architectures and polymer processing to the elaboration of complex materials and establishment of structure- properties relationships. The IMP gathers complementary skills: synthesis, structural characterization, and physico-chemical properties, in the fields of polymers and materials science.

Context

Domestic pipes can be described as pipes for hot and/or cold water in pressurized heating and drinking water networks within buildings. The domestic pipe market has been traditionally dominated by copper and galvanized steel pipe. Over the last 25-30 years, plastics have made significant inroads in this market. Their advantages are no corrosion, resistant to many, flexible, easy to install and lightweight, which makes them easy to transport and to handle on site. The dominating plastic material used in domestic pipe is PE (Polyethylene). Traditionally PE is not suitable because of too low upper service temperature. Crosslinking of the polyethylene (PEX) is needed to obtain the desired long-term hydrostatic strength (LTHS) at high temperature. Nevertheless, the creation of a 3D network makes PEX very difficult to dispose/recycle wastes. A new generation Polyethylene of Raised Temperature Resistance (PERT) shows excellent LTHS without the need of crosslinking. However, PERT cannot meet all requirements, mainly due to the limited mechanical properties.

In Flex n'Fit project, the objective is to develop a new generation of ecofriendly, easy-to-fabricate and sustainable PE-based thermoplastics for domestic pipe applications.

The internship will take place in the Laboratoire Ingénierie des Matériaux Polymères (IMP). Travel to the Aalberts hfc in Lyon (twice per month) and factory in Nevers (Ideally bimonthly) are to be expected.

Candidate looks forward to working in a collaborative, multicultural, and open-minded team and must show enthusiasm, initiative, and autonomy. You are in Master 2 You should demonstrate a good knowledge in physico-chemistry of polymers and a strong inclination for experimentation and techniques of polymer characterization.

You are interested in continuing the internship by a doctoral study under co-supervision of R&D manager and funded by the Aalberts hfc.

Application material: cover letter, CV in French or English
Application deadline: January 10th, 2024
Starting date: February 15th, 2024 to March 31st, 2024 (very latest)
Contract duration: 6 months for the master's program (possible PhD position follow-up)

Please send your complete application material with subject "Master Position Application Aalberts-IMP" to:
Dr. Fabrice GOUANVE (fabrice.gouanve@univ-lyon1.fr)