



Post-doctoral position at INSA de Lyon, Villeurbanne, France

New bio-based organic aerogels for heat-insulating applications and energy-efficient buildings

With a view to seeking energy conservation and efficiency, the optimization of thermal insulation for residential or service buildings becomes a priority concern. Several families of insulating materials are currently available: fibrous materials (glass or rock wools), or cellular materials (expanded polystyrene, polyurethane, polyisocyanurate or phenolic foams). Among these, the most recent but also the most promising and innovating family could be aerogels that can be considered as superinsulation. Those materials indeed show an extremely high porosity, and therefore display thermal conductivity values among the lowest possibly attainable for a solid material. Aerogels can have an inorganic matrix (essentially silica) or an organic matrix (e.g. phenolic or polyurethane). They are often obtained by first preparing a liquid-swollen gel, then by a controlled extraction of the liquid in such a way that the initial structure of the solid component can be retained.

Project description and program

A new, bio-based monomer is now available and could be used to prepare water-swellaable networks (hydrogels) following different synthetic routes. Starting from those, novel aerogels could be designed and prepared. Specific objectives could include:

- A thorough analysis of the relevant scientific literature
- Defining a strategy for the preparation of these novel materials and inventory of the possible approaches
- Trial runs following the defined strategy
- Characterization and optimization of the prepared materials (morphology, mechanical properties, thermal conductivity, etc.)

Location

Based in La Doua Campus, close to Lyon, IMP develops activities from basic research to applicative goals, from synthesis of new macromolecular architectures and formulation of polymers to the establishment of structure-property relationships. Thermoset-based materials represent one of the main areas of expertise of the laboratory. In particular, various multiphasic and especially nanostructured polymer networks are studied from their chemistry and processing ability to their physical properties.

Duration: 12 months

Gross annual salary : around 28 000 €

Main location: Ingénierie des Matériaux Polymères IMP, INSA-Lyon, Villeurbanne, France,
www.imp.cnrs.fr

Contact : Jocelyne Galy, DR CNRS (jocelyne.galy@insa-lyon.fr)
Françoise Méchin, CR CNRS (francoise.mechin@insa-lyon.fr)

Industrial partners: René Saint-Loup, Roquette (rene.saint-loup@roquette.com)
Rémi Perrin, Soprema (rperrin@soprema.fr)

Skill set required : PhD in Polymer Chemistry / Physico-chemistry, with sufficient expertise in Polymer Materials Science & Engineering