

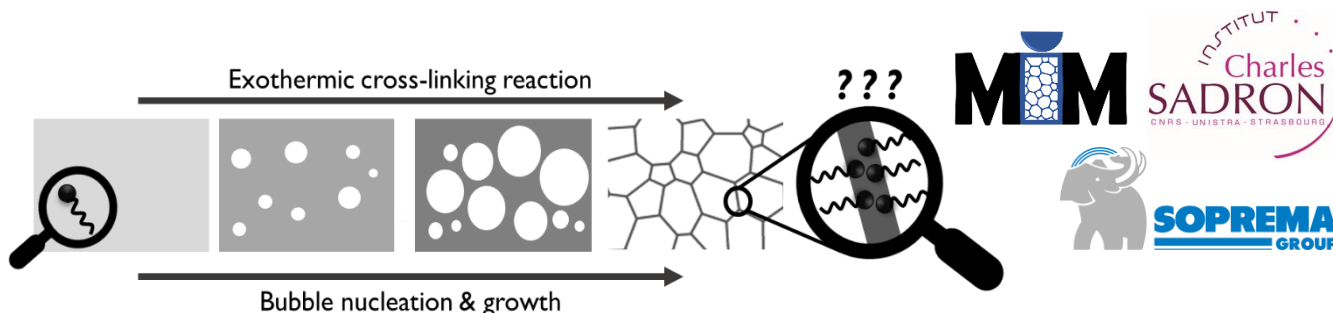
Research practical proposal in

“Towards sustainable polymer foams for thermal insulation” at the Charles Sadron Institute in Strasbourg

Description

Isocyanate-based polyurethane foams have been successfully optimized for thermal insulation for several generations, creating an annual production of billions of tons. However, increasing environmental concerns ask not only for even better insulation, but also for less harmful formulations.

Goal of this experimental project is therefore to participate in the activities of a collaboration between the MIM team at the ICS and the company SOPREMA to explore alternative, isocyanate-free formulations for the generation of new generations of thermally insulating polymer foams. We will focus on initially liquid systems containing physical blowing agents which evaporate into gas bubbles during an exothermic cross-linking reaction which eventually solidifies the foam. Of particular interest will be to establish the influence of the formulation on the final pore size and pore connectivity. We will also attempt to identify the relative importance of stabilizing agents with respect to the reaction kinetics. In order to establish the underlying mechanisms, we will combine foaming experiments with spectroscopic analysis, rheology and tomography.



Context

The internship will take place in the team “Mechanics of Interfaces and Multiphase Systems” (MIM) at the Institut Charles Sadron, an internationally renowned, interdisciplinary institute of the CNRS uniting chemists, physical chemists, physicists and engineers on a wide range of questions related to polymer science and materials. The internship student will interact closely with a postdoc working on this subject. The project is funded by a SOPREMA donation to the Strasbourg University Foundation and involves regular meetings with the company.

Possible techniques to be used

- Foaming techniques
- Interfacial tension measurements
- Rheology of reactive mixtures
- Mechanical, thermal and spectroscopic analysis of reactive blends and foams
- Computer tomography and scanning electron microscopy

Requirements & Application

We are looking for a motivated Masters student interested to work on an applied research problem. Good English skills are important for this internship.

Please address your application to drenckhan@unistra.fr and vipin.gopalakrishnan@ics-cnrs.unistra.fr.