



Master thesis proposal at LiPhy Laboratory in Grenoble in collaboration with Saint-Gobain

Dissolution of gas and growth of bubbles in a polymeric material

Description

More than sixty years ago, Epstein and Plesset presented solution for the growth rate and dissolution of a gas bubble in an oversaturated liquid-gas solution. The objective of this internship is to study these same phenomena but in a complex medium, typically a soft polymer rather than in a simple liquid. In this type of medium, the elastic and plastic properties modify the dynamics of nucleation and growth of the bubble.

At Saint-Gobain, this question arises when manufacturing laminated glass, consisting of two glass plates glued together with a polymer. The glass obtained with this process, which is more solid while retaining its qualities of optical transparency, is particularly used in windshields of cars and also in some glazing for the building. In this context, it is then crucial to avoid the appearance of bubbles during the manufacturing process.

An experimental device was developed in 2017 at the LiPhy laboratory, to allow the visualization of a sample of laminated glass subjected to different pressure and temperature conditions. The objective of this internship is to continue the development of this experimental system by including a control of the rate of heating and cooling using a thermostatic bath, and to use it to study the kinetics of dissolution and of growth of gas bubbles under different conditions.

Who?

Master 2 or 3rd year of engineering school with background in physico-chemistry, polymers and interfaces and / or fluid mechanics, rheology. Taste pronounced for experimentation.

When?: 6 months, ideally first semester 2018.

Where? : The trainee will spend most of his time at the LiPhy laboratory in Grenoble and will spend a few weeks at the Saint-Gobain research and development center in Paris.

Contacts

Keyvan Piroird
Saint-Gobain Recherche
39 Quai Lucien Lefranc
93303 Aubervilliers cedex
Téléphone : 01 48 39 58 30
e-mail : keyvan.piroird@saint-gobain.com

Elise Lorenceau
LiPhy, CNRS et Université Grenoble-Alpes
140 Avenue de la Physique BP 87
38402 Saint Martin d'Hérès
Téléphone : 04 76 51 47 47
e-mail : elise.lorenceau@univ-grenoble-alpes.fr