Laboratoire Polymères et Matériaux Avancés

CNRS/Solvay UMR 5268

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Solvent and plasticizer diffusion through cellulose acetate matrices: how to control exudation

Two years post-doctoral position starting as soon as possible in 2016

At the CNRS/Solvay Joint Laboratory (Lyon, France)

We have developed recently a model for describing the dynamics of polymer-solvents systems close to and below the glass transition [1]. This model allows to describe how solvent diffusion is coupled to the dynamical state of the polymer matrix, and how it changes it, either when the solvent volume fraction increases: in that case the dynamics of the polymer matrix accelerates; or when the solvent volume fraction decreases: in that case, the matrix may become glassy and its dynamics slows down (aging). This is a coarse-grained model which allows to reach long time scales (up to 10^6 s or more) and macroscopic length scales (up to 1 mm). The aim of this project is to study in detail the dynamics of plasticizer exudation from cellulose acetate films, in close connection with experimental results. Since most experimental situations involve not one but several solvents/plasticizers, with different affinities and plasticizing powers, the aim is first to extend the current model to the case of three component systems, and the study the coupling between different solvent/plasticizers evaporation kinetics and possible ensuing phase separation.

The applicant should have a PhD in polymer physics or soft condensed matter physics, or condensed matter physics as a theorist.

The CNRS/Solvay Joint Laboratory (UMR: Unité Mixte de Recherche) 'Advanced Polymer Materials Laboratory' (LPMA) is located near Lyon, France. The objective of this Laboratory is to develop fundamental research on physical properties of heterogeneous polymer materials, with the view to enable Solvay to propose materials with tailored properties and improved usage properties for the customer. We aim at hiring PhD students or postdoctoral researchers willing to pursue a carrier either in the academia, or in the industry.

[1] E.M. Masnada, G. Julien, D.R. Long, DR, "Miscibility Maps for Polymer Blends: Effects of Temperature, Pressure, and Molecular Weight", J. Polym. Sci. Part B Polym. Phys. Ed, 52, 419-443 (2014) and PhD thesis, Grégoire Julien, Lyon (2014)

Informations and/or applications (resume, publications,… with the names and email addresses of three scientists for reference) should be asked/sent as early as possible to

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