

Advanced Materials Laboratory

**Post-doctoral position:
Microscopic dynamics in polymer/solvent
and polymer/polymer blends**

We offer an experimental post-doctoral position to study the microscopic dynamics of heterogeneous polymer systems, such as polymer/solvent blends, A-B copolymers or polymer blends (possibly compatibilized by interfacial agents), particularly near the glass transition. Dynamical heterogeneities in A-B blends in which A and B have very different Tg's, can lead to a quite complex behaviour (a single, broadened glass transition or two distinct glass transitions), depending on the nano-structuration or on the degree of miscibility of A and B. In polymer/solvent blends near Tg, the microscopic dynamics is also strongly heterogeneous, which leads to diffusion times considerably shorter (up to 6 orders of magnitude) than terminal relaxation times such as measured by mechanical or dielectric experiments [M. Souche, D. Long, Europhys. Lett. 2007, 77, 48002]. Understanding the microscopic dynamics in heterogeneous polymer systems is a fundamental scientific challenge and is essential to control the mechanical and/or barrier properties of polymer materials. The microscopic relaxation mechanisms will be studied mainly by dielectric spectroscopy, over a wide range of time scales, as a function of solvent activity and temperature, using a specific measuring cell in which both the chemical potential of the solvent and temperature may be controlled.

This project takes place in the new Rhodia/CNRS joint Laboratory 'Advanced Materials Laboratory', located near Lyon, France, which was created in September 2006. Fundamental research on physical properties of heterogeneous polymer materials is developed in this Lab, with the objective to enable Rhodia to propose materials with tailored properties.

Thermoplastic or rubber blends of particular interest for Rhodia (such as PA/PE or SBR/BR) will be studied. Preparation of samples is part of this work. It will rely on processing facilities of the Lab or of other Rhodia Labs.

The candidate must have a PhD in experimental polymer physics, with advanced skills in polymer dynamics characterization (dielectric and mechanical spectroscopy, rheology, ...), or in the processing of systems based on polymer blends. An inclination for the conception of innovative materials will be highly appreciated. This post-doctoral position opens for both an industrial or academic subsequent carrier.

The position shall start in fall, 2007. Applications should be received before end April, 2007.

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