

6-months trainee position

Centre for Materials Forming (CEMEF) of Mines ParisTech, Sophia Antipolis, France

In collaboration with
Institute of Molecular and Cellular Pharmacology (IPMC), Sophia Antipolis, France
and
The Institute of Physics of Nice (INPHYNI), Sophia Antipolis, France

Bio-aerogels for fluorescence amplification

Project description

Fluorescence is widely used in biology and medicine for the detection, quantification and imaging of various structures. However, to detect rare “markers” remains a challenge, and various amplification options are under investigation. One of the directions is to use the physical principle of random lasers and the multiple scattering of light. As fluorescence detection is targeted to bio-medical applications, non-toxic components should be used. So-called biological lasers that use biological conditions is now a hot topic.

In this work we want to use new fully bio-based materials, bio-aerogels, to act as fluorescence amplifiers. Bio-aerogels are ultra-light, highly porous and nanostructured materials based on natural polymers.

The goal of this work is to prepare bio-aerogels and test them as fluorescence amplifiers.

In this internship, the student will prepare aerogels from cellulose and starch incorporating particles with very high refractive index. Density, morphology and specific surface area of aerogels will be characterised. Fluorescence intensity will then be measured and correlated with aerogel properties.

The work is at the frontier of materials’ science (polymers, materials) and physics (interactions light/matter, scattering). It will involve the use of various techniques, including formulation, rheology, optical and electron microscopies, aerogel characterisation and fluorescence spectroscopy.

Most of the work will be performed in CEMEF in close collaboration with two neighbouring Institutes, IPMC and INPHYNI. In IPMC a “twin” student will perform biological characterisation of the samples prepared in CEMEF. Both students and laboratories will work in close collaboration.

CEMEF is world leader in the development of biomass-based materials, in particular, of bio-aerogels. INPHYNI is well-known for its work in optical physics, and IPMC is specialized among others, in neuroscience, living cells, etc.

Keywords: natural polymers, aerogels, structure, porosity.

Skills: knowledge in polymer physics, capability to work in group, motivation and sense of initiative and capability to report regularly on his/her work.

Duration: 6 months

Gratification: about 550 €/month.

The position is available to start now for 6 months.

Application:

The position is for an undergraduate student, at the level of the final Master degree project. Expertise in polymers and/or materials’ engineering is expected.

Please send your CV, motivation letter, your marks from the last two years and email of a reference person to Tatiana Budtova, CEMEF, email : tatiana.budtova@mines-paristech.fr

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