Génie des Procédés FRIgorifiques pour la Sécurité alimentaire et l'Environnement

Biopolymères Interactions Assemblages

One-year post-doc position to start in July 2020 in Nantes

Development of two-phase secondary refrigerants composed of biosourced microcapsules

In order to limit the environmental impacts of human activity, renewable resources have seen their attractiveness increased. Therefore academic and industrial researchers have deployed intense efforts on the use of biomass for energy and/or substitution of petroleum products.

In addition, the environmental and regulatory constraints of cold production promote the use of secondary refrigeration and cold storage (via secondary refrigeration). Designing new two-phase refrigerants (FFD) composed of phase-change materials (PCM) for food refrigeration is a major challenge to meet these constraints. This project aims to develop two-phase refrigerants where microcapsules containing MCP are stabilized by biosourced particles.

This project combines expertise developed by two groups: The "Nanostructured Assemblies" group of the BIA Unit located in Nantes has developed expertise on encapsulation stabilized by cellulose nanocrystals. The Enerfri group of the FRISE unit in Antony is studying two-phase refrigerants.

The post-doc will have access to all the techniques available at the two locations: BIA prepares cellulosic biosourced nanoparticles, then studies and characterizes their adsorption to the interfaces forming Pickering emulsions, notably by nanosizer, rheology and microscopies MET and MEB (BIBS platform). FRISE has several characterization tools for the rheological and thermal behavior of fluids, the aging of capsules.

The objective of the study is to evaluate the thermophysical characteristics of these new fluids in order to improve the performance of two-phase refrigerants and to develop ways of improving the nanoparticle manufacturing process.

Required skill: Physicochemist or chemist of polymers, knowledge in chemical engineering.

Period : 1 year to start beginning of July

Salary range : 2300 to 2900 € (gross salary)based on experience

Practical information: This project will be located 6 months at BIA in Nantes (44), and 6 months at Antony (92). The candidate has to provide a CV with a motivation letter and references. To apply and for any information contact by e-mail:

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References:

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- Guilpart, J., E. Stamatiou, A. Delahaye and **L. Fournaison** (2006). "Comparison of the performance of different ice slurry types depending on the application temperature." International Journal of Refrigeration 29(5): 781-788.
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