



Fixed-term postdoctoral researcher position in materials science in the framework of LABEX Tec-21 / Carnot-PolyNat institute

A one-year fixed-term postdoctoral researcher position is open in the “Structure and properties of glycomaterials” team in Cermav, Grenoble, France. The contract can start from March/April 2019.

Project and position description

Cellulose oligomers possess a good processability and amphiphilicity that attracts considerable industrial interests. Its potential application includes food additives as sweeteners and dietary fibers and building blocks of amphiphilic compounds. Despite the potential in industrial applications the use of cellulose oligomers is largely constrained due to their high cost and poor availability.

The main objective of this project is to enable bulk production of cellulose oligomers with a desired degree of polymerization (DP) via concentrated acid hydrolysis of high DP cellulose. The method is known to produce near monodisperse oligomers upon regeneration/crystallization of cellulose from the solution by contacting poor solvents. However, little is known how such a simple method provides a narrow DP distribution of resulting oligomers. Deciphering the underlying molecular mechanism of this regeneration process will lead to precise control of the oligomer production.

The main task of the recruited postdoctoral researcher will be to elucidate the regeneration behavior, particularly crystallization behavior of cellulose oligomers from the concentrated acid solution. Structural characterization of regenerated crystals of cellulose oligomers will be performed using X-ray/neutron/electron diffraction, solid-state NMR spectroscopy and infrared spectroscopy to understand how the structure forms upon the regeneration. Effects of regeneration conditions (poor solvents, concentration, etc) on crystallization behaviors will be examined. Crystallization of model compounds (i.e. cellotetraose) will be also carried out to study crystallization kinetics of cellulose oligomers.

This project is a collaboration among four laboratories in Grenoble (Cermav, LiPhy, LGP2, FCBA). The postdoctoral researcher will be located in Cermav and expected to work closely with researchers in partner laboratories.

Desired skills and experiences

- Recent PhD (within 3 years) in materials science or related fields, preferably in soft matter chemistry or physics.
- Good knowledge of X-ray/neutron diffraction analysis. Knowledge of electron microscopy and/or solid-state NMR spectroscopy is a plus.
- Experience in crystallization of polymers and/or small organic compounds is advantageous.
- Good oral and written skills in English are required. (PI does not speak French)
- Knowledge of polysaccharides would be a plus but not necessary.

For further information, please contact Dr. Yu Ogawa (yu.ogawa@cermav.cnrs.fr)

Applications

Please send your electronic application including a cover letter, curriculum vitae (max. 2 pages), list of publications, and contact information of a reference in a single pdf file to:

Dr. Yu Ogawa
Univ. Grenoble Alps, CNRS, Cermav

via E-mail: yu.ogawa@cermav.cnrs.fr

Deadline

31st January 2019