



Post-doc Position

PolyCell: New oxidative process for added-value celluloses production

Project summary

The production of dissolving pulp is increasing due to the demand and the need to replace fossil-based resources by natural resources. Nevertheless, the processes currently used to produce this type of pulp require significant modifications or are environmentally restrictive. Among the bioproducts of high added value, microfibrillated cellulose (MFC) also occupies a privileged place. MFCs have many interesting properties (barrier, mechanical reinforcement, binder, plasticizer, absorber of active molecules, etc.). The production of MFC requires a high supply of electrical energy and/or an often expensive and polluting chemical pretreatment (TEMPO).

This is in this context, that the PolyCell project proposes to increase the flexibility of paper pulp mills by developing an innovative oxidizing process to produce celluloses of high added value: dissolving pulp and pulp for MFC, in parallel to the production of the conventional bleached kraft pulp. This process will be easily implemented in current pulp mills since it will use chlorine dioxide, ClO₂, which is a main chemical applied in bleaching processes. Chlorine dioxide will be applied under revisited operating conditions, leading to the chemical modification of celluloses. The multi-scale characterization of oxidized celluloses will make it possible to qualify and optimize these new chemical treatments.

Previous studies demonstrated the concept of pulp production with properties close to that of dissolving pulp, through the use of a new bleaching stage patented by LGP2 and CTP (Dalk^{mod}). The objectives of the research project are (i) to optimize the operating conditions of the Dalk^{mod} stage in order to produce dissolving pulp with reduced costs and low environmental impact and (ii) to adapt the Dalk^{mod} conditions to produce a pulp for CMF and in parallel (3) to understand the reaction mechanisms involved in the pulp modification.

Location and practical aspects

This is 18 months post doc position offer. The successful applicant will be hosted by the LGP2 (Laboratory of Process Engineering for Biorefinery, Bio-based Materials and Functional Printing, Grenoble INP, France) in the "BioChip (Biorefinery: chemistry and eco-processes)" team and in the CTP (Centre Technique du Papier, Grenoble). He/she will work under the supervision of Pr. Gérard MORTHA and Dr. Nathalie MARLIN from LGP2, and Dr. Auphélia BURNET from CTP. The post-doc will start at the beginning of 2023. The gross salary will be between 2600 and 3000 euros, depending on the working time and the experience of the candidate after his thesis.

Qualifications of the applicant

The applicant must have a PhD degree and strong academic background in chemical engineering, basic chemistry, both organic and analytical chemistry. Applicants who have already worked in laboratory on lignocellulosic materials are of special interest. Personal skills include social competence. An open and inclusive personality, an independent thinking and attitude are all useful qualities. The position requires a very high level of accomplishment in writing and communication in English.

Applications

Interested candidates should send their CV and cover letter by e-mail to Nathalie MARLIN, Gérard MORTHA and Auphélia BURNET: nathalie.marlin@pagora.grenoble-inp.fr, gerard.mortha@grenoble-inp.fr and Auphelia.Burnet@webCTP.com