



ADRIEN LETOFFE

From Sweden to France



Project: **Optimal oxidation processes for starch in wood adhesives**

Research topic: **Chemistry**

Swedish Institution: **Swedish University of Agricultural Sciences**

French Institution: **University of Lorraine**

Dates of mobility: **10/09/2023 to 24/09/2023**

Program: **SFVE-A**

PRESENTATION

[Adrien Letoffe](#) is a Postdoc at the [Department of Forest Biomaterials and Technology](#) at the Swedish University of Agricultural Sciences ([SLU](#)). He obtained his PhD in Materials Chemistry in 2020 from the Institut Jean Lamour ([IJL](#)) at the [University of Lorraine](#). He is interested in polymers, biomaterials and nanocomposites elaboration, nano-fillers, thermal analysis, spectroscopy and wood adhesives.

ACTIVITIES IN FRANCE

Adrien Letoffe visited the IJL in Nancy to work with Dr. [Stéphane Cuynet](#), specialized in plasma science, Assc. Prof. [Sébastien Fontana](#), specialized in carbon nano-material, and PhD student [Ronny Jean-Marie-Desirée](#). His main objective was to investigate a new plasma setup for polysaccharide modifications. The idea was based on the similarity between the starch oxidation reaction applied by Letoffe and a new oxidation treatment of graphite based on a high-frequency electrical discharge plasma developed at the IJL in recent years. Accordingly, they focused on modifying starch samples with the plasma set-up under various conditions, subsequently freeze-dried and characterized by FTIR spectroscopy and optical microscopy. Due to the good results obtained in the first week, it was decided to broaden the scope of the tests during the second week. A dielectric barrier discharge plasma (DBD) was used as a second type of plasma. In this case, starch and cellulose samples were put in a DBD reactor under an ammoniac atmosphere and treated with a high-frequency DBD plasma. After treatment, the cellulose samples present new FTIR vibrational bands associated with the presence of amine/amide groups. Those bands were also observed for the starch samples but at a lower intensity. All the samples were sent to SLU for further analysis. It was decided to continue this work through the development of a new international project between the SLU Department of Forest Biomaterials and Technology and the [Plasmas - Procédés – Surfaces](#) group, IJL. The project will be submitted to different calls shortly.