

M2 internship in electrocatalysis

Duration: 5 – 7 Months

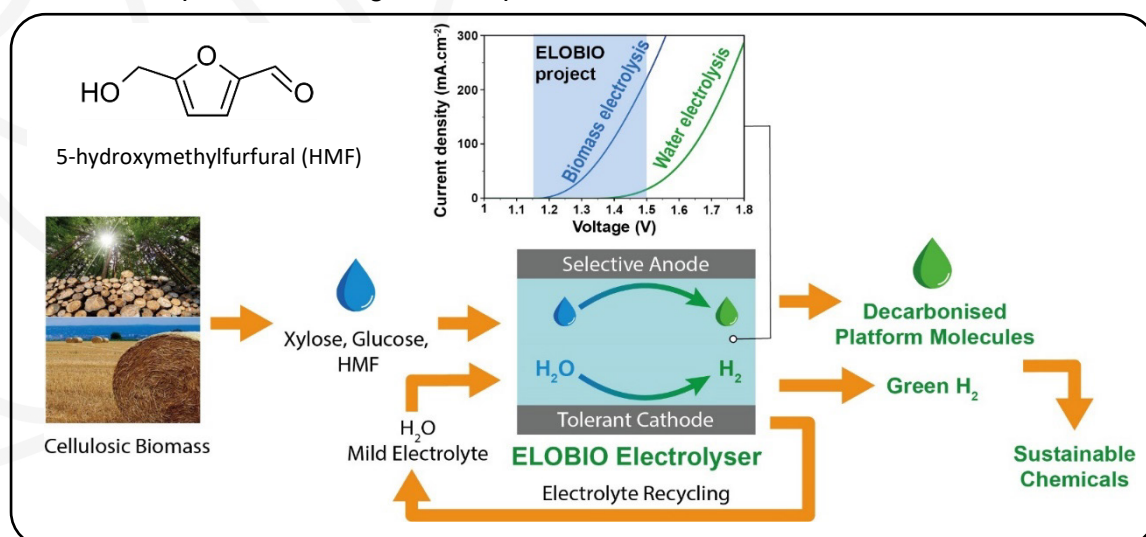
Location: IRCELYON/CNRS (Villeurbanne, France)

Starting date : 1st quarter 2023

Grant : 580 euros/month

IRCELYON (*Institut de Recherches sur la Catalyse et l'Environnement de Lyon*, <http://www.ircelyon.univ-lyon1.fr/>) is the largest CNRS department devoted for fundamental and applied research in Catalysis. The work will be carried out in the framework of the European HORIZON EIC project ELOBIO (Electrolysis of Biomass), coordinated by IRCELYON (2023-2026).

Context: Green hydrogen will play a major role in the future decarbonized energy systems. The most promising technology for the green hydrogen production is water electrolysis, which consists in breaking water molecules into H_2 and O_2 using only renewable electricity in an electrochemical cell. However, water electrolysis is energy demanding due thermodynamic and kinetic limitations. The **ELOBIO** project targets the development of electrolyzers capable of simultaneously producing **pure green H_2** and **value-added decarbonized chemicals** from renewable lignocellulosic biomass from wood/forestry or agricultural residues, with low energy input. IRCELYON will develop non-critical anodes for the selective electrooxidation of biomass, such as 5-hydroxymethylfurfural (HMF), as well as efficient and stable cathode materials in presence of organic compounds.



Work description: The student will be in charge of the synthesis and characterisation (XRD, N_2 physisorption, electron microscopy, Raman spectroscopy...) of anode and cathode materials by different chemical routes (e.g. colloidal, hydrothermal, electrodeposition...) and of the measurement of their electrochemical performances in a 3-electrode electrochemical cell by combining electrochemical techniques (cyclic voltammetry, chronoamperometry, impedance spectroscopy...) and analytic tools (liquid chromatography, gas chromatography, mass spectrometry...).



Education value: The student will be trained in electrocatalysis, hydrogen production and analytical chemistry. Internship in an international environment in collaboration with 5 academic European laboratories. The internship may lead to a PhD position on the same topic in the framework of the ELOBIO European project.

Profile required: Master in electrochemistry, catalysis, physical-chemistry or materials science.

Contact: Please send your CV to Philippe Vernoux (philippe.vernoux@ircelyon.univ-lyon1.fr) and Mathieu Prévot (mathieu.prevot@ircelyon.univ-lyon1.fr).