

Atom-level Processes for Oxynitride Thin films as Electrocatalysts (APOTOF)

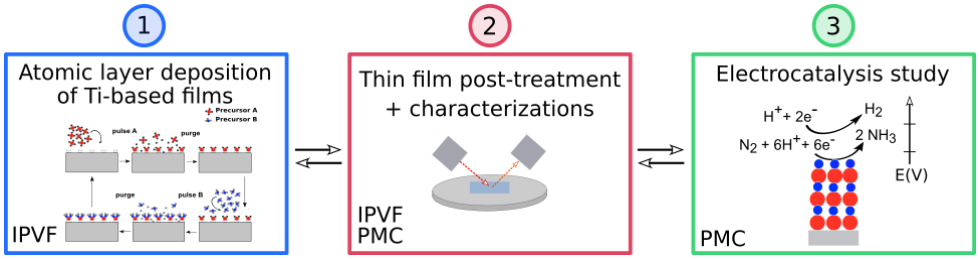
Keywords: nanomaterials, thin films, atomic layer deposition, electrochemistry
Master 2 internship (latest start February 2027, 6 months)

The offer

To promote carbon-free emission production, electrolysis is a key method for generating green H_2 and NH_3. Since these two reactions occur within the same potential range, they compete, with H_2 typically favored over NH_3. To promote NH_3 generation, selective electrocatalysts are required. Materials such as transition metal nitride (TMN) thin films are now being investigated due to the presence of N in their composition that can influence the adsorption of N-species on the electrode surface.
As electrochemical reactions occur at the interface between the electrolyte and the electrode, thin film electrocatalysts are ideal. In the APOTOF project, we use Atomic layer deposition (ALD) to obtain precise thin-film deposition with a fine control over thickness and composition. This method produces dense and uniform coatings on 3D substrates, enabling the preparation of systems with high specific area and making them highly suitable for application as electrocatalyst.

Missions

1/ Deposit of Ti-based thin films using an Atomic Layer Deposition (ALD) reactor at IPVF
2/ Post-treatment + characterize the obtained layers at IPVF and PMC
3/ Study the layers electrochemical performance at PMC
The aim is to understand the relationship between the layer characteristics and the electrochemical properties.



The internship is located in two labs on the Palaiseau plateau : Institut Photovoltaïque d'Ile-de-France, IPVF, and Laboratoire de Physique de la Matière Condensée, PMC, Ecole Polytechnique. It is granted thanks to E4C institute.

Profile

We are seeking for a highly motivated Master 2 student in Materials Science, Chemistry, or a related field to join for a comprehensive, hands-on research internship**.** This internship covers the entire research workflow: from sample preparation using Atomic Layer Deposition (ALD), through various characterization techniques, to electrochemical application assessment. The ideal candidate is highly interested about thin film deposition, electrocatalysis, and sustainable energy technologies**.** The trainee is curious, proactive, and motivated to learn new techniques, along with strong analytical and problem-solving skills in teamwork.

Supervision and contact

BADIE, Clémence, clemence.badie@polytechnique.edu
Laboratoire de Physique de la Matière Condensée, Ecole Polytechnique
SCHNEIDER, Nathanaelle, n.schneider@cnrs.fr
Institut Photovoltaïque d'Ile-de-France, IPVF, UMR 9006
To apply → resume + cover letter + academic transcript