INTERNSHIP OFFERING – Master 2

Electrochemical performances of a protic ionic liquid NiMH battery

Location & lab: Laboratoire de Réactivité de Surface (LRS) at Sorbonne Université – Paris

Contact person: Mireille TURMINE mireille.turmine@sorbonne-universite.fr

Research project

Ni-MH batteries are recognized for their good cyclability, competitive energy density, low memory effect, wide range of operating temperatures, low cost, and environmental friendliness. However, their performance remains limited by a relatively modest specific energy and by the problem of electrode ageing due to the use of quite aggressive water-based KOH electrolyte with a relatively small electrochemical potential window. Recent work has shown that the use of protic ionic liquids (PILs) allows the hydrogenation reaction on the negative electrode of Ni-MH batteries, with performances similar to those obtained in aqueous media, i.e., in which a proton from the water molecule is exchanged.

During this internship, we will focus on the fundamental study of the electrode/electrolyte interface of a negative electrode in a protic ionic liquid. An experimental study of interface reactions, including adsorption, formation (or dissolution) of a passive film, and the electrochemical mechanisms of proton transfer will be coupled to the modeling of interactions and interface properties to propose a detailed mechanism of operation.

Applicant profile

- Student in 2nd year of Master or 3rd year of engineering school with a good background in physical chemistry and electrochemistry and/or material science
- Autonomous, meticulous, rigorous
- A good level of English is required

Internship period: Ideally from mid-January 2024 for 6 months
Applications: Send CV + covering letter + grades for the year Bac +4

Possibility for a Doctoral thesis: Yes