LEPMI – Antenne Phelma Campus
1130 rue de La Piscine – BP 75
38402 Saint Martin d'Hères Cedex
https://lepmi.grenoble-inp.fr/

Enzo PINEIRA
enzo.pineira@grenoble-inp.fr

enzo.pineira@arkema.com

Protective coating for $LiNi_{0.6}Mn_{0.2}Co_{0.2}O_2$ active materials in Solid State Batteries

Keywords: solid-state, composite electrode, coating, electrochemical performance

Offer description:

Solid state batteries are attracting more and more interest, since they could solve both issues of safety and energy densities of the current Li-ion technology. The development of this new technology is relying on the choice of a solid electrolyte and lithium argyrodite, Li_6PS_5Cl (LPSCl), appears as good candidate since it has a high ionic conductivity 10^{-2}-10^{-3} S/cm, close to that of liquid electrolyte.

But replacing a liquid electrolyte by a solid one in a composite electrode made of $Ni_{0.6}Mn_{0.2}Co_{0.2}O_2$ (NMC) and LPSCl is far from trivial. Indeed, at the interface NMC/LPSCl there is a difference of potential that triggers parasite reactions. The degradation products hinder the ionic percolation within the electrode leading to poor electrochemical performance. Therefore, developing a thin, homogeneous and ionic conductive coating around the NMCvparticle could solve this issue.

In this context, we are offering master thesis in our laboratory and in collaboration with an industrial partner in the field of materials science and electrochemistry. The master thesis will focus on the development of a specific coating via sol-gel technique to protect NMC particles from side reactions during cycling. The student will prepare coatings with different chemistry and thickness and assess the electrochemical performance of the cell with and without coating. The coating will be characterized by several techniques such as scanning electron microscopy (SEM) and transmission electron microscopy (TEM) and X-ray photoemission spectroscopy (XPS). The electrochemical performance of the coating will be measured using advanced electrochemical methods such as CV, GCPL etc… The interfacial behavior will be evaluated by electrochemical impedance spectroscopy (EIS).

Location: LEPMI, Grenoble university campus, 1130 Rue de la Piscine, 38402 Saint Martin d'Hères, FRANCE

Student profile:

- Master student in Materials Science, Electrochemistry, Chemistry, or a related field.
- Knowledge in electrochemical characterization (galvanostatic cycling, EIS) or material morphology characterization
- Good experimental skills, ability to work collaboratively, curious and eager to learn, open.

This position offers an exciting opportunity to contribute to next-generation battery technology in a dynamic research environment. If you are passionate about advancing energy storage technologies and enjoy working on complex challenges, we encourage you to apply by sending your resume and cover letter to Enzo PINEIRA (enzo.pineira@grenoble-inp.fr).

Duration: 5 – 6 months

Starting date: February-March 2026