



***in operando* analysis of the stability of buried solid/solid interfaces in solid state batteries**

Work place: DMEX, Université de Pau et des Pays de l'Adour, Pau, Nouvelle-Aquitaine, France

Keywords: all-solid-state battery, interfaces, x-ray imaging, 4D, in-situ testing

Occupation: Research and teaching

Context

The position is part of the ambitious five-year “**RAISE 2024**”-project (towaRd All solid State battery in 2024) and is funded by the E2S (Energy Environment Solutions) Initiative (<https://e2s-uppa.eu/en/index.html>). The RAISE2024 project aims at **developing a pilot-scale prototype of a polymer based solid-state battery**. To that extent three academic laboratories (IPREM, DMEX and PDP) joined forces with two major international companies, Arkema and SAFT. Targeted applications are electric vehicles and renewable energy storage, with safety, high energy density, no self-discharge, a long stability/cycle life, easily scalable, low cost as main requirements.

Position and assignments

Interfaces are the key to all-solid-state batteries performance and lifetime but their study remains very challenging so far because they are buried in the entire battery stack. X-ray tomography is a technique which enables inner inspection of opaque objects at high resolution and in a non-destructive way. The current postdoc project aims to take this a step further: *in operando* observation of buried interfaces during successive load cycles. To that extent the postdoc will develop a tailored test cell and devise a protocol for *in situ* testing. Next, a specific protocol will be developed to analyze the integrity of the buried interfaces by means of X-ray tomography and to provide 3D-morphological imaging of the particles and pore network at sub-micron scale (which can be complemented by SAXS for exploring structures right down to the nanometer). Finally, the postdoc will identify regions of interest in the 4D X-ray dataset, isolate that region and subject it to an in-depth morphological and chemical analysis using a ToF-SIMS. This work is conducted in close collaboration with a PhD and other Postdocs.

The postdoc position also include teaching duty at UPPA (64 h per year).

- 24 months, available from September 2020
- Gross salary: 2970 €/month

Profile request

The candidate has the following skills and expertise:

- A PhD in experimental physics, or an area with relevance to the project.
- A strong experience in x-ray imaging and electrochemical energy storage.
- Autonomy, dynamism, creativity, good communication skills.

Scientific contact: peter.moonen@univ-pau.fr

Secretary: romy.guerin@univ-pau.fr

Application procedure: To apply, please send your CV and cover letter to the advisors and to romy.guerin@univ-pau.fr

Application deadline: July 17th, 2020