



JUNIOR R&T ASSOCIATE: DEVELOPMENT OF NANO-ANALYTICAL METHODOLOGIES AND APPLICATION TO ENERGY MATERIALS (M/F)

Fixed term contract (24 months) | Fulltime/40h | Belvaux

Context

As a key player in research and innovation in Luxembourg, the Luxembourg Institute of Science and Technology (LIST), with its employees, is active in the domains of materials, the environment and IT. As an RTO (Research and Technology Organisation) and with its interdisciplinary impact-driven approach, LIST contributes to the development of Luxembourg's economy and society. The Materials Research and Technology Department (MRT) translates cutting-edge materials research into applicable technology, with about 150 collaborators. For this, the department cultivates close relationships and joint projects with both academic and industrial partners, and contributes to Luxembourg's and Europe's innovation agenda in Materials Research and Technology.

The Advanced Instrumentation for Ion Nano-Analytics (AINA) group of the MRT department at the LIST is renowned for developing innovative nano-analytical techniques for materials characterization and life science applications. During the past few years we have been developing in particular a Secondary Ion Mass Spectrometry (SIMS) add-on system for the Helium Ion Microscope (HIM) and for a Transmission Electron Microscope (TEM) as well as an Atomic Force Microscopy (AFM) system that we integrated in our NanoSIMS, allowing the advantages of high spatial resolution with high sensitivity chemical information to be combined. The research activities of the AINA group cover fundamentals, instrument development and applications.

Research in energy production and storage is a very broad field, spanning from the basic science aspects to the full device engineering. However, there is still a significant lack of understanding of the nanoscale composition and structure of materials which lead to the highest efficiencies, stability and homogeneity. In collaboration with research groups specialized in the elaboration and testing of energy materials and devices, we are developing nanoscale correlative microscopy methodologies, combining morphology information obtained from Secondary Electrons (SE) with analytical (chemical) data obtained through Secondary Ion Mass Spectrometry (SIMS). In this context, we are using innovative instrumentation that was developed at LIST such as the Helium Ion Microscope (HIM) equipped with a high-performance SIMS add-on system.

Description

The candidate will be in charge of developing nanoscale correlative microscopy methodologies, including the subsequent data treatment, and apply them to energy materials:

- Investigation by electron microscopy (SE) of the materials (structure, morphology)
- 2D chemical analysis by SIMS
- 3D chemical analysis of devices by SIMS
- Exploit and treat the data allowing a 2D, 3D and correlative SE-SIMS representation
- Providing a full 4D (1+3D) reconstruction based on correlative SE-SIMS mapping

Profile

Education

- PhD in Materials Science, Physics, Chemical Engineering, or a related field

Job reference: MRT-2018-038

Application file:

- A CV
- A motivation letter

Apply online: [MRT-Job offer](#)

Your working environment

The research department

The Materials Research and Technology department (MRT) focuses on two key enabling technologies: nanotechnologies and advanced materials, and investigates research questions related to transducing materials and actuators, photocatalysis and energy harvesters, transparent electronics and smart nanocomposites, point-of-care and drug delivery, modelling and design of structures and multifunctional composites, bio-based polymers and composites, adhesion and compatibilization of fibres/matrix, process engineering and advanced manufacturing.

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Competencies

- Experience with materials science characterization tools (e.g. Secondary Ion Mass Spectrometry (SIMS), Scanning Electron Microscopy (SEM), Focussed Ion Beam instrumentation (FIB)) with a clear vision how these techniques can be used
- Interest in working with prototype instrumentation, ability to design experiments and work independently with high level of scientific rigor
- Experience with sample preparation and materials processing techniques, including mechanical polishing, electro-polishing, and etching
- Basic knowledge in photovoltaics and battery technology would be an asset
- Ability to work in a team with team-spirit mandatory

Language

- Be fluent in English (both oral and written)

The Luxembourg Institute of Science and Technology (LIST) is a mission-driven Research and Technology Organisation (RTO) that develops advanced technologies and delivers innovative products and services to industry and society. Located at the heart of Luxembourg's vibrant Research and Innovation Campus in Esch-Belval, LIST can ideally connect its over 500 specialists in materials, the environment and IT with virtually all of Luxembourg's other main research players such as the University of Luxembourg, LIH, LISER, Technoport, Luxinnovation and the National Research Fund. **LIST.lu**

The LIST is committed with equality of opportunities and gender balance