JOB DESCRIPTION

Functions:	**Post-doctoral researcher in material chemistry (F/H) – Development of hybrid solid electrolyte to prevent sluggish kinetic in all-solid-state batteries**
Emploi-type :	**Chercheur**
Catégorie :	**A**
Corps :	**Chercheur**

Activities in the job description may evolve with knowledge of the position and the service requirements.

Presentation of Sorbonne University

Sorbonne University is a multidisciplinary, research-intensive, world-class university. Located in the heart of Paris, with a regional presence, it is committed to the success of its students and to meeting the scientific challenges of the 21st century. Thanks to its 54 000 students, 6 300 academic researchers and partner researchers, and 3,600 administrative and technical staff who make it a daily reality, Sorbonne University promotes diversity, creativity, innovation and openness to the world.

The university is structured in three faculties: « **Art and Humanities** », « **Medicine** » et « **Science and Engineering** » each disposing of an important autonomy in the application of the university's strategy.

To learn more about Sorbonne University: https://www.sorbonne-universite.fr/en

This position is available within the Faculty of Science and Engineering: http://sciences.sorbonne-universite.fr

Within Sorbonne University, **the Faculty of Science and Engineering** covers a large spectrum of scientific disciplines.

It is composed of **79 research laboratoriess**, 22 teaching departments and 6 UFR (Formation and Research Units) in chemistry, engineering, mathematics, physics, life sciences as well as Earth, Environment and Biodiversity. It also comprises the university's engineering school - Polytech Sorbonne -, the Paris Astrophysic Institute, the Henri Poincaré Institute, three marine stations located in Banyuls-sur-Mer, Roscoff and Villefranche-sur-Mer.

It is hosting 20 800 students among which 2 700 doctoral researchers and accounts for 4 800 academic and research staff and 3 252 administrative and technical staff.

Laboratoire de Chimie de la Matière Condensée de Paris (UMR 7574)

Laboratoire de Chimie de la Matière Condensée de Paris (UMR 7574) : https://lcmcp.upmc.fr/

within the **Reactive Materials for Energy deviceS (RMES) team:** https://lcmcp.upmc.fr/site/rmes

The postdoctoral researcher will integrate the LCMCP, laboratory internationally recognized in the field of Material Sciences for the elaboration of **functional inorganic and hybrid materials**, and the evaluation of their physico-chemical properties at multiple scales. The lab brings together all facets of chemistry of materials with a strong coupling between synthesis methods and processing of materials. These materials target applications with a strong societal impact in the fields of **energy**, **health,** and **environment**.

The **RMES team's** expertise covers organic/inorganic/hybrid materials, processing and sintering of ceramics and electrochemical characterization methods that place it in an ideal position to develop innovative ideas at the crossroads of material science disciplines, a scientific culture largely developed at the LCMCP. The RMES team is part of the French Network on Energy Storage (https://www.energie-rs2e.com/en) which nurtures strong scientific connections between research labs to accelerate the development of energy storage through dynamic collaborations and the development and mutualization of advanced in situ/operando characterization techniques, including at synchrotron facilities.

Project and main Activities

Context of the project:

This position is part of a concerted national research effort (PEPR BATTERIES under France 2030 research program) to develop next generation batteries. This project, led by the CNRS and CEA, involves multiple research labs in France with unique and complementary expertise on battery energy storage technologies, including several laboratories of the French Network of Energy Storage. The goal of the LIMASSE (LI-MetAl Solid-State BattEries) project is to develop large all-solid-state battery prototypes using metallic lithium as an anode (Gen4b: Li/NMC and Gen5: Li/S at TRL 4).

https://www.cnrs.fr/fr/pepr/pepr-dacceleration-batteries

https://www.cea.fr/presse/Pages/actualites-communiques/energies/france-2030-programme-recherche-innovation-developper-futures-generations-batteries.aspx

Mission:

The post-doctoral researcher will more specifically take part in the development of inorganic and hybrid solid electrolyte, which includes synthesis and processing of inorganic and polymer materials, structural and electrochemical characterization. He/she will develop hybrid electrolyte with controlled microstructure to achieve state-of-the-art ionic conductivity in a way that is compatible with the large-scale processing methods (extrusion, calendaring, 3D printing) used in the project. Ionic conductivity is key to prevent sluggish kinetics in all-solid-state batteries.

He/she will benefit from the expertise developed by the RMES team on hybrid materials, the characterization platforms of LCMCP and the Faculty of Science and Engineering, as well as from the broad range of expertise of the partners of the project (10 CNRS laboratories and 3 CEA institutes).

Excellent communication will be key to create synergy with the partners and the researcher will be expected to develop strong collaborative interactions.

Main activities:

- Synthesis of inorganic and hybrid materials
- Material processing
- Structural and physical properties characterization
- Electrochemical properties characterization
- Reporting on scientific results (meetings, communications in congress, scientific publications)

Knowledge and Skills*

Education, Qualifications and Training :

- PhD in Chemistry or Materials Science (or very close to completion)

Experience in areas including (but not limited to) :

- Inorganic/hybrid material synthesis and processing
- Assembly and electrochemical characterization of materials for energy storage applications (batteries, fuel cells, capacitors…).
- Air-sensitive synthesis and measurement techniques
- Multiple characterization techniques (PXRD, XPS, XAS, NMR…)

General and interpersonal skills :

- Ability to work as a team member and foster positive relationships.
- Demonstrate proactivity, availability, and reactivity in leading research projects.
- Excellent communication skills.
- Clear reporting and scientific writing.

General knowledge:

- Understanding of the organization of Research and Higher Education French system.
- Understanding of Sorbonne University’s organization.
- Regulations applicable to one’s own professional activity field.

Specific dispositions related to the position and exposure to occupational hazards

Contract: *24 months CDD contract*

Salary (depending on experience): *32k-37k€/year*

Expected starting date: *September 2023*

Interested candidate should send a CV, cover letter and contact information for two references (PhD advisor, supervisor) to Dr. Arnaud Perez (arnaud.perez@sorbonne-universite.fr).

Exposure to occupational hazards :

☐ Non

X Yes **: Chemical risk**

**Conformément à l'annexe de l'arrêté du 18 mars 2013 (NOR : MENH1305559A)*