L’Université d’Orléans recrute

Post-doc researcher in atmospheric pressure plasma source W/M

## **Research project Presentation**

The space atomic layers deposition (SALD) is a recent variant of atomic layer deposition (ALD) which, while retaining the main unique strengths of ALD, namely the control of thickness up to the nanometer, the unique conformability of the film and the high quality of the material at low temperatures, allows deposition rates up to two orders of magnitude faster, even at atmospheric pressure and therefore gives more interesting prospects than ALD for scaling up and mass production.

To expand the range of materials accessible by SALD, activation by plasma at atmospheric pressure is envisaged as part of a PRCI project funded by the ANR. The new precursors and plasma processes developed as part of this project called REACTIVE will be used to deposit new oxides and oxynitrides for applications in optoelectronic devices. Eventually, thin oxide films can be made and then integrated into the manufacture of all-oxide solar cells based on p-type oxide semiconductors, and oxynitride thin films can be used to manufacture transparent conductive materials.

As part of the REACTIVE project, the GREMI laboratory's mission is to create a plasma source at atmospheric pressure allowing the production of nitrogen atoms from nitrous gas despite a high binding energy making dissociation very difficult. It will therefore be a question of designing a plasma source using dielectric barrier discharge (DBD) that can be implemented on the SALD head designed by the project partners (LMGP, Grenoble) and be capable of providing expected chemical species.

# GREMI Laboratory

Gremi (Groupe de Recherches sur l'Energétique des Milieux Ionisés) is a Joint Research Unit of the University of Orléans and the CNRS. The main site of the laboratory is located on the Orleans campus with a second site located in Bourges. The laboratory has about 70 people including 30 researchers and teacher-researchers, 11 permanent and non-permanent IT and 29 doctoral and post-doctoral students. The laboratory is recognized for its expertise in plasma and laser sources and processes, with a balance between fundamental and experimental research, with applications in a wide variety of fields: energy, materials, microelectronics, nanotechnologies, metrology, radiation sources, biomedical, propulsion, transport and environment.

WEB: <http://www.univ-orleans.fr/gremi/>

**Activities**

Areas: generation and investigation of non-thermal plasma source at atmospheric pressure.

**The activities of the person recruited will be as follows:**

- Design, optimize and characterize a non-equilibrium plasma source at atmospheric pressure dedicated to the production of nitrogen atoms;

- Process and interpret experimental data;

- Present and promote the results obtained (reports, publications, conferences);

- Collaborate with team and consortium members, exchange and share knowledge;

- Ensure compliance with milestones and deliverables.

**Context and work environment**

The researcher will conduct most of his experiments at GREMI in Orléans, France. He will carry out short missions in Grenoble to implement the coupling of the plasma source made to the SALD deposition head developed by researchers from the LMGP laboratory in Grenoble, the coordinator of the ANR REACTIVE project.

# Specificities

Working place

GREMI Laboratory, at Orléans, France

Contract duration

**14 months**

Date of the beginning

**From 1 December 1st 2022** (the start may be slightly postponed depending on the administrative procedures (ZRR in particular) or the need of the person recruited (for example, pending the thesis defense).

Remuneration:

32839 € gross annual (for a candidate with less than 3 years of experience after the thesis).

## Special constraints

As the GREMI laboratory is a restrictive regime zone (ZRR), a mandatory investigation by the authority is necessary before the actual arrival.

**Presentation of the expected profile**

Expected skills:

- PhD in the field of physico-chemistry of non-thermal plasmas;

- Attracted by experimentation and process development;

- Autonomous experimenter;

- Good knowledge of the techniques and diagnostics of atmospheric pressure plasmas (DBD ...);

- Good knowledge of spectroscopy;

- Some knowledge of chemistry would be appreciated.

Knowledge of tools:

- Diagnostics of plasmas at atmospheric pressure (spectroscopy, processing of electrical signals...);

- Gas characterization techniques (FTIR, μGC, etc.);

- A mastery of CAD software would be appreciated.

### Affectation :

**GREMI** : Groupe de Recherches sur l’Énergétique des Milieux Ionisés (UMR 7344 Université d’Orléans – CNRS





www.univ-orleans.fr

Qualities:

- Strong interest in experimental work;

- Autonomy and attracted by teamwork (6 GREMI’ staffs are involved in this project);

- English and French: well mastered for one and good knowledge for the other;

- French and or English writing and oral skills;

- Know how to communicate and promote research;

- Spirit of initiative, analysis and synthesis;

- Organized, rigorous, respectful of safety instructions.

**Apply**

Send, before 19/09/2022, your cover letter, your CV, 1 letter of recommendation from the thesis supervisor and the defense report if it is already available.

**Hearing**

**28-30/09/2022**

**Decision**

**1/10/2022**