



Tenured Position at CNRS – to join the "Materials for Optics and Optoelectronics" Team at IRCP-Chimie-Paristech.

Metal-halide perovskites for advanced optoelectronic and/or photovoltaic applications

The Centre National de la recherche scientifique (CNRS) recruits permanent researchers (Chargé de Recherche) through a competitive examination at national level with no pre-allocation to an Institute or a University. See https://www.cnrs.fr/sites/default/files/download-file/Guide%20concours%20chercheurs%202024_EN_V1.pdf

Description of the possible research axes:

Metal halide perovskite (MHP) semiconductors have many notable advantages for various optoelectronic applications, including photovoltaics. The host group has been a pioneer in France in the preparation perovskite solar cells.

The applicant will have to elaborate a research project in collaboration with the contact person to join the "Materials for Optics and Optoelectronics (MPOE)" team and work on the "Optoelectronics, Photovoltaics and Nanostructures" research axis.

The new researcher will develop a research project focusing on the synthesis of MHP semiconductor materials, prepared from solutions, and designed with targeted properties for application in advanced devices. Property control will extend from chemistry (composition, defects, structure, resistance to aging etc.) to physical and electronic properties. Functionalization of layers and interfaces, contact with organic or inorganic layers such as semiconductor oxides that may enable better adaptation to targeted applications can be an axis of the project.

These may concern one or more of the following themes: photovoltaic solar cells, imaging, sensors, communication, and interconnection (IoT).

The researcher recruited will benefit from the wide range of equipments available within the MPOE team (<https://www.pauportegroup.com/equipments>) and of the Institut de Recherche de Chimie Paris (UMR8247) laboratory platforms.

Description of the host group:

The research of the host group focuses on the development of techniques for the synthesis of advanced materials with a structure control at the micro- and nano-scales. They are designed to play an active role in devices and for boosting their efficiency. The combination of materials and their assemblies are particularly investigated by the group in order to get new or boosted properties (self-assembled monolayers, junctions, sensitizing, photon management...). The prepared materials are mainly semiconductors of n- or p-type, especially oxides and halide perovskites. These semiconductors have adjustable bandgaps, their doping is finely controlled, and they are prepared as thin films, nanostructured layers, nano-objects or single crystals.

The techniques employed for the materials synthesis are mostly low temperature processes in which the chemical precursors are dissolved in solution.

The group prepares layers to be integrated in various efficient devices such as photovoltaic solar cells (perovskite solar cells, quantum dots solar cells, dye-sensitized solar cells and p/n junctions), in light emitting diodes (LEDs) emitting in the UV or visible range, in photodetectors, as well as in sensors and scintillators.

The present research axes on MHP are :

- More efficient and Stable Perovskite solar cells
- Less expensive Perovskite solar cells
- Less Toxic Perovskite solar cells
- 2D MHPs for photovoltaics, photodetection and imaging
- MHPs for X-ray detection...

The laboratory : The Institut de Recherche de Chimie Paris (UMR8247) is localized in Paris 5ème. It focuses on integrated research, from upstream to downstream, and from fundamentals to applications. Its themes cover a wide range of chemistry fields, from molecular and polymer chemistry to energy, materials and processes. (www.ircp.cnrs.fr).

Education, experience, knowledges, and competences required.

Education : PhD in Materials science, physical chemistry, chemistry of semiconductors... A post-doc experience abroad is required.

Knowledges: Preparations of halide perovskites, optoelectronics, semiconductors, devices fabrication with metal halide perovskites. Characterizations by SEM, XRD, optical spectroscopies...

An establish track record of successful research with publications of quality, a diversity of methodological skills are mandatory.

The applicant must show strong interests for teamwork, motivation, excellent disposition towards challenging problems, a good level of English to be at ease to interact in an international environment.

French speaking is not mandatory.

How to apply

The applicant must contact Dr. Thierry Pauporté (thierry.pauporte@chimieparistech.psl.eu) (www.pauportegroup.com) and send him a full CV including contact details.