

## **Post-doc opportunity:**

Integration and optimization of 3-terminal Organic/Si tandem solar cells

### **Project description :**

The goal of the IOTA (InnOvative Tandem Architectures, <https://www.pepr-tase.fr/projet/iota/>) project in the frame of the PEPR TASE is to develop new routes for low-cost, high-efficiency tandem solar cells. It focuses on thin-film/silicon solar cells in order to take advantage of the industrially mature silicon technology for the bottom cell, while exploring several options for the top cell, taking advantage of the materials already available in the community.

In the context of tandem architectures, the three-terminal (3T) tandem avoids the necessity of technically demanding tunnel junctions and of current matching between top and bottom sub cells.<sup>1</sup> The 3T architecture is based on an Interdigitated Back Contact (IBC) silicon bottom cell and a top cell made of a wide bandgap material.

The post-doc candidate will be part of this project with the main objective of integrating an organic wide band-gap top cell on a silicon bottom cell for the development of a 3T organic/Si tandem solar cells. Optimization of the organic top cell has been studied in the frame of the Organist ANR project<sup>2</sup> and the post-doctoral work will focus on the device integration:

- (i) Optimization of the organic/Si interface taking advantage of materials and methods developed in other work packages of the IOTA project. For instance, a strong improvement in the organic/Si 3T tandem cell relies on the possibility to deposit the organic top cell on textured c-Si substrate. The ALD technique is particularly well suited for conformal deposition on non-planar surfaces and technique will be investigated for interlayer fabrication between organic material and silicon, first on planar IBC cells and subsequently on textured ones.
- (ii) Bonding strategy will be investigated as alternative technique for organic/Si 3T tandem monolithic integration. It consists in associating the top and the bottom cells with a highly conductive and transparent gluing layer which is already studied in one task of IOTA project.
- (iii) Optimization of the tandem cell design will be performed with a focus on the top electrode and various interlayers to minimize resistive losses. To this aim, in-depth electrical and opto-electronic characterization of the individual top, bottom cells and the entire 3T tandem cell will be conducted. The last task of the project will be the development of a setup to characterize the performance of the final 3T tandem solar cell.

### **Candidate profile:**

The candidate must hold a doctorate in physics, preferably in the field of photovoltaics, with knowledge of semiconductors and devices. The candidate needs to be an experimentalist ready to develop new characterization tools and to explore various fabrication and characterization techniques.

**Location:** The post-doc will be part of the [Organic Electronics team at IMS laboratory](#) (CNRS UMR 5218), located inside the ENSMAC graduate school (16 avenue Pey Berland, 33607 PESSAC, France).

**Duration:** 12 months ; **Starting:** May-June 2026

**Application before April 15<sup>th</sup>**

**Supervisors:** Marie GUEUNIER-FARRET and Sylvain CHAMBON

Application should be sent to [marie.gueunier-farret@u-bordeaux.fr](mailto:marie.gueunier-farret@u-bordeaux.fr) and [sylvain.chambon@u-bordeaux.fr](mailto:sylvain.chambon@u-bordeaux.fr) and will include a CV and a cover letter.

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<sup>1</sup> M. Gholipoor, M. Rienaecker, X. Liu, et al. "Enhanced Bandgap Flexibility in Perovskite-Silicon Tandem Solar Cells via Three-Terminal Architecture." *Advanced Science* (2026): e20603. <https://doi.org/10.1002/advs.202520603>

<sup>2</sup> J. Capdevila, S. Waiprasoet, F-X. Capella Guardià, C. Ruiz Herrero, L. Hirsch, M. Campoy-Quiles, G. Wantz, P. Pattanasattayavong, S. Chambon, M.E. Gueunier-Farret ; Wide bandgap organic solar cells with improved photovoltaic performance via solid additive integration; *J. Mater. Chem. C*, 2025,13, 18450-18462; doi: 10.1039/D5TC02260F