Post-Doctoral Position

Materials and processes for the elaboration of Perovskite-based tandem photovoltaic devices

Duration : 12 months (+ 12 months renewable)
PhD degree needed
Competences: Materials, chemistry, Process

CEA/LITEN/DTS/SMPV/ Laboratory of Organic Photovoltaic Modules
INES (National Institute of Solar Energy)
Savoie Technolac BP332
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73377 Le Bourget du lac, France

Context:

In the context of the increase of the photovoltaic (PV) technologies, the question of the cost remains central. Indeed, the price of the electricity reached by this technology remains high with regard to the conventional energies. The current strategy to remain competitive articulates around two main strategies: the increase of the efficiency of the PV cells and the decrease of the costs linked to the raw material. In this context, our teams within CEA at National Institute of solar Energy work to combine on one hand silicon heterojunction cells (SHJ) and on the other hand perovskite ones to obtain a 2-terminal tandem device in standard architecture with the target of highly efficient conversion up to 30 %. Perovskite Solar Cells (PSCs) have recently emerged as one of today's most promising upcoming photovoltaic technology reaching more than 22% PV efficiency for single junction device. Yet, a number of challenges are still to be met to ensure a bright industrial future for PSCs especially for tandem device in combination with SHJ cells.

Objectives:

The main objectives of this position is to develop new processing routes towards the elaboration of highly efficient tandem perovskite / silicon devices. This imply to work on different aspects:

- the perovskite sub-cell development
- the recombinaison/tunnel layer development
- the optimization of the complete devices and associated processes

In parallel, advanced characterizations (optical, electrical, and morphological) will be needed to clearly understand and solve technological limitations.
The work will be conducted within dynamic team with engineers, technicians, PhD students, other postdoctoral students dedicated to perovskite device elaboration.

Technological platforms:

Several technological platforms (laboratories and clean rooms) will be accessible for the elaboration and characterization of materials and PV devices. Among them:

- Equipment for layer deposition by dry processes (e.g. PVD, PECVD, ALD)
- Equipment for layer deposition by wet processes (Spin coating, Dr Blade, Slot Die coating, inkjet printing)
- Optoelectronic characterizations (J-V, EQE, photoluminescence, …), morphological characterization (MEB), ellipsometry, profilometry, …

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To apply CV and motivation letter have to be sent