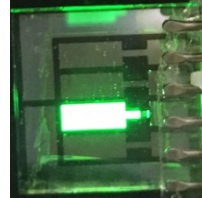


Internship offer - Offre de stage
IMS UMR CNRS 5218 – Elorga team

“Additive-assisted improved morphology of perovskite materials for enhanced efficiency of perovskite light-emitting diodes “

Project description:

Hybrid perovskite materials showed during the last few years a great potential in several optoelectronics applications. For example, recently a considerably high record efficiency of 23.6% was achieved with perovskite solar cells¹, competing with the state-of-the-art silicon solar cells. Moreover, these materials have gained a large interest from researchers for light-emitting applications. Indeed, in late 2018 several groups published an external quantum efficiency (EQE) over 20% with perovskite light-emitting diodes (PeLEDs)², approaching values to compete with more mature technologies such as OLEDs and quantum dot LEDs.



These promising results led to the opening of a PhD position at IMS laboratory in early 2018 on the fabrication and characterization of efficient PeLEDs, in collaboration with the CEA-Leti in Grenoble. Several materials optimizations have been performed, which enabled to reach reasonably high efficiency PeLEDs close to 10%. Yet, a lot of improvements are still needed, both on the active material and on the transport layers/architecture.

The internship proposed here will deal with the use of additives in perovskite precursors in order to improve the perovskite morphology, the interface with adjacent layers and also the reproducibility of the experiments, and hence improve the efficiency of the devices. It will include the fabrication, characterization and optimization of PeLED devices, using various techniques. The intern will work in close collaboration with the PhD student on several studies.

Skills required: We are looking for a master student (1st or 2nd year) or equivalent in engineering school, in fields related to physics and/or chemistry. The intern should have some skills in one or several of the fields mentioned thereafter: semiconductors, photonics, optoelectronics, nanomaterials, thin-film deposition, organic molecules and polymers, materials, morphology characterizations. More importantly, autonomy and cooperation capabilities are required.

Location: The PhD student will be based at the University of Bordeaux / Bordeaux INP in the IMS Lab, UMR CNRS 5218, ENSCBP, 16 Av Pey Berland, 33607 PESSAC, France. The intern will have access to all fabrication and characterization techniques available at IMS laboratory, as well as external equipment if necessary.

Starting date and duration: Depending on applicant availability; between January and June 2020. Duration: 3 to 6 months.

Supervisors: Guillaume Wantz (Professor) and Simon Sandrez (PhD student).

Application: CV + motivation letter to be sent to simon.sandrez@ims-bordeaux.fr.

¹ Wang, Z. et al. *Nat. Energy* **3**, 855–861 (2018)

² B. Zhao et al. *Nature Photonics* (2018) ; Y. Cao et al. *Nature* vol 562, 249-253 (2018) ; K. Lin. *Nature* vol 562 (2018)