18 months post doctoral offer

Title	Development of PEDOT thin films by oCVD for innovative OLEDs
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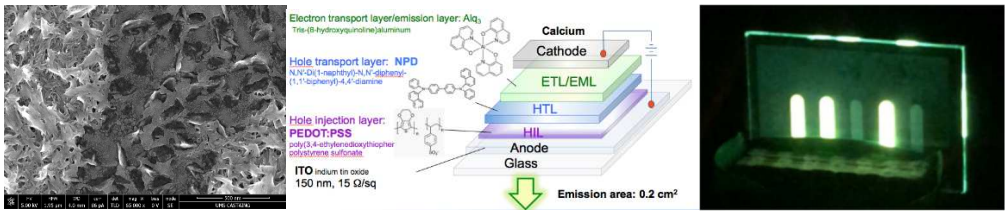
Context and Project

Conductive polymers attract more and more attention these last years because they are multifunctional organic materials combining optical transparency, lightness, electrical conductivity, and they can be deposited on flexible substrates like plastics or fabrics. Poly (3,4-ethylenedioxythiophene) (PEDOT) is one of the most significant conductive polymers thanks to its high electrical conductivity (up to 6000 S/cm). Its potential applications concern innovative fields such as organic solar cells, flexible electronic devices and OLEDs (organic light emitting diodes).

Team consortium and environment

In the frame of a PhD thesis [Mirabedin, 2020], LGC in collaboration with CIRIMAT have developed a reliable oCVD process, allowing to produce PEDOT thin films of controllable thickness at the nanometer scale, uniform on several tens of cm^2, conformal on complex substrates with an electrical conductivity reaching 1000 S/cm and an optical transmittance of 95% at 550 nm. These characteristics appear promising for this PEDOT to be tested into LAPLACE where innovative OLEDs are developed and studied. First attempts started in 2020 provided promising results.



FEG SEM view of an oCVD PEDOT film (LGC/CIRIMAT) - OLEDs structure and photography (LAPLACE)

Job description

The post doc project aims to develop innovative OLEDs by replacing some of the present constitutive materials (PEDOT:PSS, then PEDOT:PSS+ITO) by PEDOT produced by an original gas phase process, called oCVD (oxidative Chemical Vapor Deposition). This process presents marked advantages in comparison with the existing technologies such as the possibility to produce PEDOT thin films without water nor solvent, with controlled thickness, uniform and conformal even on complex patterned substrates. These advantages should lead to more reliable and efficient OLEDs. The replacement of ITO (indium tin oxide) by oCVD PEDOT should allow to reduce the costs and the environmental and energetic footprints of OLEDs, in order to answer to the market needs in aeronautic, automotive or urban lighting fields

The post doc will be organized in the frame of a project funded by the French Occitanie region involving the complementary consortium composed of LGC for PEDOT synthesis by oCVD, CIRIMAT for film characterization (thickness, chemical composition, morphology, electrical conductivity, …) and LAPLACE for OLEDs design and characterization.

The post doc fellow will have to manage all the activities of this project by sharing his/her time between the two sites (LGC/CIRIMAT/ENSIACET and LAPLACE/UPS) and should have competences in CVD or ALD processes, thin films characterization technics and optoelectronics.

Qualification required

Candidates should demonstrate high degree of motivation and willingness for teamwork, as well as a structured and targeted way of work including preparation of reports and presentations in regular meetings. Selection will occur until mid-October 2020 according to suitability, qualification and professional performance applied to the following criteria:

- PhD thesis either in Materials Science applied to CVD or in Optoelectronics with good knowledge in thin film synthesis and characterization,
- Serious and autonomous student, with a high capacity to team work,
- Excellent ability to write scientific reports,
- Good communication skills in French or English.

The salary will depend on qualifications (social security provided).

The application should be written in French or English and include:

1. Letter of motivation with a short description of your previous research and why you consider you are a good match for the position (1-2 pages).
2. Curriculum vitae, including a description of relevant skills and experiences, as well as a full publication list.
3. Copy of PhD diploma.
4. Names, e-mail addresses and telephone numbers of 2-3 reference persons.

Contact before the end of September 2020: brigitte.caussat@ensiacet.fr

Bibliography

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