Post-doctoral fellowship

NEW MATERIALS FOR THE FABRICATION OF TRANSPARENT, FLEXIBLE AND CONDUCTIVE ELECTRODES

Context: Research project and consortium description

Transparent conductive thin films are widely used in technologies like solar cells, light-emitting diodes and display technologies. The fabrication of transparent conductive films is currently realized with thin films of transparent conductive oxides and in particular indium tin oxide. The as-made ITO transparent conductors suffer from limitations like costly fabrication process and brittleness. The use of solution-processable nanomaterials appears as a promising alternative since it affords a large area, low-cost deposition method with high performances. In the past few years, extensive efforts have been performed to develop flexible transparent electrodes based on metallic nanowires and in particular silver nanowires. Among metal, silver has the highest thermal conductivity and the lowest electrical resistivity, thus it is as good candidate for fabrication of transparent conductive electrodes.

In this project we intend to develop new high aspect ratio nanomaterials as well as alloyed nanostructures for the fabrication of flexible transparent electrodes and their integration into functional devices (solar cells, thin film heaters).

This study will be developed within the framework of an ANR project with an academic research team from the University of Bordeaux, namely the Institute of Condensed Matter Chemistry of Bordeaux (ICMCB), and the Materials and Physical Engineering Laboratory (LMGP), from the University of Grenoble, in partnership with ARMOR company.

The ICMCB partner is in charge of the nanoparticle fabrication. We specialize in the wet synthesis of anisotropic nanomaterials. Our group, *Chimie des Nanomatériaux*, has expertise in nanoparticle synthesis with controlled architecture and low size dispersion, nanoparticle surface modification and encapsulation in thickness-controlled shells, and nanoparticle assembly on substrates via evaporation-induced self-assembly. Characterization facilities such as X-ray diffraction, UV-Vis or IR absorption spectroscopy, zetametry, scanning and transmission electron microscopies and surface analysis spectroscopies are available. Advanced optical and electrical characterization to determine opto-electronic properties of the devices will be performed in the LMGP, under the supervision of our partner.

Candidate's profile

The post-doctoral fellow will be posted at the ICMCB in Pessac.

A PhD with a good publication record as well as good written and oral skills is required. The candidate must have a solid background in chemistry and especially in the synthesis of nanoparticles. In particular, he or she must be an expert in transmission electron microscopy. He or she must be both dynamic and autonomous and work in a team with all partners of the consortium, especially physical-chemists and theoretical physicists. An ability to communicate in English is mandatory.

Contact

Prof. Mona Tréguer-Delapierre
mona.treguer@icmcb.cnrs.fr