

“Post-doctoral fellowship

FABRICATION OF SELF-ASSEMBLED 2D METAMATERIALS AS NEAR-INFRARED REFLECTORS

Context: Research project and consortium description

Current infrastructures and vehicles need near-infrared (NIR) reflectors for heat protection and energy savings. Such devices constitute interfaces that reflect electromagnetic radiation at wavelengths where radiative heat transfer may occur.

Within the framework of the Laboratory of Excellence “Advanced Materials by Design” ([AMADEus](#)), three academic research teams from laboratories at the University of Bordeaux, namely the Institute of Condensed Matter Chemistry of Bordeaux ([ICMCB](#)), the Centre de Recherche Paul Pascal ([CRPP](#)), and the Laboratory of Future ([LOF](#)) aim to find solutions among metamaterials. Metamaterials exhibit unusual properties unattainable in natural materials due to unique wave resonances arising from artificial geometries or chemical compositions.

The consortium intends to develop materials consisting of specifically-tailored nanoparticles, *i.e.* the plasmonic resonators, dispersed in a continuous matrix that may take the form of an ink, paint or coating destined to reflect NIR solar radiance. We gather complementary skills and tools from theory, modelling, synthesis, formulation and optical characterization.

The ICMCB partner is in charge of the nanoparticle fabrication. We specialize in the wet synthesis of nanomaterials and nanohybrids materials (metal, metal oxide, semiconductor and organic) for optical, environmental and medical applications. 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 characterization to determine particle refractive index and scattering will be performed in the CRPP, 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

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