Post-doctoral position

Synthesis of luminescent nanoparticles in water: structure and dynamics of the intermediate states.

Context

This project is a collaboration between expert teams in nanoscience working at CEA/Saclay and Ecole Polytechnique located near Paris in France. The goal is to tackle generic questions regarding the nucleation processes of crystalline oxide nanoparticles synthesised in water [Fleury et al., *ACS Nano* 2014]. We address this particular problem in order to improve the synthesis of luminescent nanoparticles used as biological probes and precursors for thin luminescent films [Casanova et al. *Nat. Nanotechnol.* 2009].

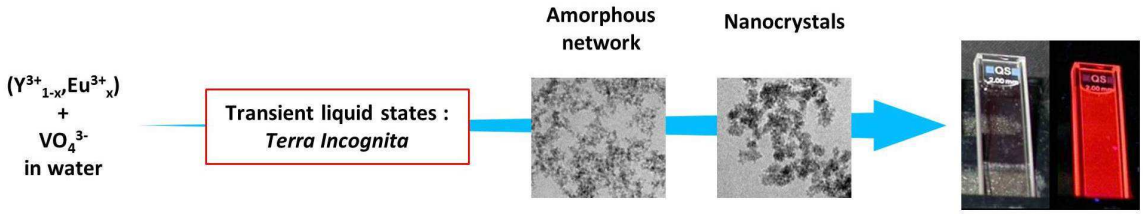

Figure: The synthesis of luminescent YVO_4:Eu nanoparticles in water involves non-crystalline intermediate states which determine the final nanostructure.

More specifically, the nucleation process from the initial liquid mixture to the final nanostructure involves several stages of badly characterized amorphous liquid/solid/crystalline nanophases. It is believed that these intermediate structures crucially determine the final nanostructure, hence the properties in the final application.

Job scope

In this context, we are looking for a candidate to conduct challenging experimental characterisations with special focus on the structure and dynamics of nanoparticles in water at short reaction times (<< 1 s) using time-resolved emission spectroscopy.

Details and profile

This post-doctoral position is funded for 18 months and will be at the LIDyL laboratory in CEA/Saclay, in close collaboration with the LIONS (CEA/Saclay) and the PMC (Ecole Polytechnique) laboratories. The candidate will be in charge of 1) coupling an existing laser-based time-resolved emission setup at LIDyL with a microfluidic device developed at LIONS, and 2) elucidating the emission dynamics (time scale = ps – ms) during the nucleation process (timescale = ms – hour). This competitive scientific question requires a candidate already familiar with time-resolved emission spectroscopy and having experience in optics, opto-mechanics, programming and interfacing of scientific equipment (LabView)

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See also: Fleury, B. *et al.* Amorphous to Crystal Conversion as a Mechanism Governing the Structure of Luminescent YVO_4 :Eu Nanoparticles. *ACS Nano* **8,** 2602–2608 (2014). **DOI:** 10.1021/nn4062534