

18 months Postdoctoral position at CEREGE/BIA

## Reactivity of metallic atomic clusters

This post-doctoral position is part of a collaborative project funded by the LABEX SERENADE (Safe(r) Ecodesign Research and Education applied to NANomaterial DEVELOPMENT). Labex SERENADE aims to build a dynamic network of academic research laboratories and industries to design tomorrow's nanomaterials that will be safer for both humans and the environment.

Literature on the synthesis and properties of nanomaterials with sizes above 2-3 nm is abundant. At the opposite, only very few studies focus on atomic clusters made of very few atoms with sizes ranging from few atoms (3-5 atoms) to tens of atoms (<2nm) probably because of the difficulty to synthesize and characterize them. However, those clusters exhibit enhanced properties compared to their nanoparticulate and bulk form and may become strategic materials for future applications. For example, past studies have shown that Ag atomic clusters are resistant to oxidation and exhibit very interesting catalytic properties (oxidation of thiolated compounds) contrary to Ag nanoparticles which readily dissolve in solution and is inert from a catalytic point of view. Size is not the only parameter to consider, their interactions with a surface also affect their properties but has been poorly investigated.

In this context, we propose to investigate the properties of these atomic clusters in terms of stability and properties (optical, electrical and catalytic) associated with various surfaces or in confined systems. In particular, the reactivity of Ag and Cu atomic clusters in contact with various surfaces will be investigated. The clusters will be synthesized in collaboration with our Spanish partners, expert on the synthesis and characterization of these clusters (Prof. M. Arturo López-Quintela, University of Santiago de Compostela). We will also synthesize and characterize the properties of atomic clusters formed in confined system *in situ*. The host material will consist in bio-geo inspired material such as imogolite (an inorganic nanotube) and thin films made of nano cellulose crystals.

The candidate has to provide a CV with detailed information of his (her) research experience, a motivation letter, his (her) scientific production and recommendation letters. Due date before October 31<sup>st</sup>.

### Location:

CEREGE, Aix en Provence, FRANCE.

BIA, Nantes, FRANCE

Skills: Physico-chemistry, nanomaterial synthesis, material science, X-ray based characterization tools will be appreciated

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