

March, 21, 2018

Offer for a 18 month-post-doc position.

For what purpose? Preparation of supported metal catalysts: Decomposition by cold plasma of organic agents stabilizing metal colloids after adsorption on an oxide support

Where? in Paris, University Pierre et Marie Curie (now Sorbonne Université)

With whom? Dr Catherine Louis (Lab. Réactivité de Surface) and Dr Jérôme Pulpytel (Lab. Interfaces et Systèmes Electrochimiques)

When? Possible to start as soon as possible

How much? Net monthly salary: around 2100 euros (from the LabEx Matisse at UPMC)

The project deals with the preparation of supported metal catalysts obtained from the deposition of metal colloids onto oxide supports. An advantage over preparations based on deposition of metal precursors followed by thermal treatments, is that the size of the metal nanoparticles is expected to be better controlled.

However, it is also well established that the organics stabilizing the colloids are detrimental for gas phase reactions, and must therefore be eliminated after deposition. Most often, this is performed through thermal treatments, which are efficient, but detrimental for the metal particle size.

To avoid metal particle sintering and broadening of size distribution, the use of cold plasma will be investigated, in collaboration with a specialist of plasma, Dr Jérôme Pulpytel. This technique is used in surface science for flat surfaces but not for powder materials because of the very superficial efficiency of the plasma treatment. To overcome this issue, a new device, specially designed for this purpose, will be used. The various parameters of the plasma treatment will be investigated while organic decomposition will be monitored by emission spectroscopy.

Hence, the project involves: synthesis of colloids, catalyst preparation, plasma treatments, characterization by XPS and electron microscopy and possibly other techniques, and catalytic reactions in gas phase.

Initially, a rather simple monometallic gold catalyst will be investigated. Several stabilizing agents can be studied. *In fine*, one proposes to investigate bimetallic catalysts; the issue will be to preserve the structure of the colloidal bimetallic particles, core-shell or alloy-type.

The candidate must have a PhD, if possible with a background in colloid chemistry and/or heterogeneous catalysis.

The application will include a motivation letter, a curriculum vitae, a list of publications and the names and contacts of at least one referee.

To apply to this position, please **contact**: Dr Catherine Louis, catherine.louis@upmc.fr