

Open PhD position at INSA-Lyon, in cooperation with CEA Grenoble

Novel bimetallic nanoparticles characterization by advanced transmission electron microscopy

The national PEPR programme “DIADEM” (Integrated Devices for Accelerating the Deployment of Emerging Materials) has been launched to promote the economic development of the country, in particular by supporting the acceleration of research and the arrival on the market of more efficient, sustainable materials made from non-critical and non-toxic raw materials. Thanks to the synergy of scientific themes orchestrated by artificial intelligence, the objective of PEPR DIADEM is to impact each stage of the innovation chain “from idea to object” and thus to transform sustainably and in depth the way of approaching Materials Science.

In this framework, the project NACRE is a collaborative project between several laboratories: Institut Lumière Matière (Université Lyon 1), LiPhy (Université Grenoble Alpes), Matéis (INSA-Lyon), Instituto de Fisica (Brasil) and CEA Grenoble. The project aims at designing better catalysts using physically-synthesized bimetallic nanoparticles composed of more sustainable metals and with finely tuned structures and chemical orders.

In this context we are looking for a highly motivated candidate who is determined to work on the characterization of bimetallic nanoparticles, such as AuAg and PdPt with diameters of less than 10 nm using advanced transmission electron microscopy techniques. The aim of the PhD will be to study the chemical distribution within the volume of the particles and their behavior under given environmental conditions, i.e. gas and temperature. A major emphasis will be placed on the optimization of the experimental conditions and the application of machine learning and deep learning techniques to resolve the chemical distribution at the atomic level and, if possible, in 3D.

The PhD student will be located at MATEIS, INSA-Lyon and will be trained on three different microscopes having complementary configurations: Cold FEG NeoARM located in Saint Etienne dedicated to high-resolution imaging and EDX spectroscopy, Cold FEG NeoARM in Grenoble dedicated to fast 2D and 3D EDX and EELS spectroscopies, and ETEM Titan in Villeurbanne and dedicated to environmental analysis.

The candidate should have a Master degree in physics, chemistry or materials science. He/she should have a strong interest for experimental work and subsequent data analysis. He/she should be open-minded, thorough in his/her work, and able to work very carefully. He/she should also be able to work in team. Programming skills in Python will be a strong asset.

For more information and application please contact:

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