

# 1 POSTDOCTORAL POSITION NANO-ELECTROCHEMISTRY

**ANALYTICAL AND INTERFACIAL CHEMISTRY (CHANI)  
FACULTY OF SCIENCES – DEPARTMENT OF CHEMISTRY**

## Job description

A fully funded 2-year postdoctoral position is available with Prof. Jon Ustarroz at the Analytical and Interfacial Chemistry group - CHANI, at the Faculty of Sciences of the Université Libre de Bruxelles (ULB). The project – EDNANO aims at resolving the electrochemical nucleation and growth of single entities by using a nanopipette-based experimental approach.

Sustainable energy conversion and storage devices are based on supported nanostructured electroactive materials. Electrodeposition allows the growth of these materials directly on the final support, improving their electrocatalytic properties. Yet, an appropriate association between the electrochemical synthesis, structural and functional properties of these materials is still missing. Although electrochemical nucleation and growth have been studied for decades, new concepts concerning nontraditional nucleation and growth pathways (growth self-termination, cluster mobility and aggregation) have recently been discovered and have the potential to change the perspective from which the electrochemical synthesis of nanomaterials is studied and exploited.

The project aims at experimentally resolving the earliest stages of electrochemical nucleation and growth, by focusing on the formation of single-entities and their interaction, between themselves and with the substrates of interest. This is possible by using Scanning Electrochemical Cell Microscopy (SECCM), where the reaction cell is confined to the meniscus formed between a nanopipette and a substrate, together with in-situ complementary microscopic and spectroscopic techniques.

The successful candidate will first setup and validate the SECCM platform to study single nucleation events. For that, the postdoctoral researcher will first study the electrodeposition of noble metals from aqueous solutions. Later, he/she will use multi-barrel nanopipettes to study more complex electrodeposition systems, in which different processes coexist during deposition: the electrodeposition of Pt, Pd, Ni, Co and/or their alloys, from both aqueous and non-aqueous solvents. In the next stage of the project, the postdoctoral researcher will explore the coupling of the SECCM platform with in-situ complementary microscopic and spectroscopic techniques.

The Analytical and Interfacial Chemistry group - CHANI is a dynamic international research group that has recognized expertise in electrochemistry, surface analysis, analytical chemistry and plasma chemistry. The current project contributes to the development of a new research direction within CHANI: the electrodeposition and nano-electrochemistry lab, led by Prof. Jon Ustarroz. The successful candidate will benefit from a recently acquired state-of-art SECCM platform, together with electrochemical workstations and surface analytical methods such as XPS, FESEM, FE-Auger, or AFM,

available both at CHANI (ULB) and at the SURF research group (VUB), where Prof. Ustarroz holds a part-time research professorship.

## Profile

- You hold a PhD degree in chemistry, physics, materials science, engineering or a related field.
- You can submit outstanding academic results.
- You are independent and self-motivated, quality-oriented, creative and cooperative
- You have demonstrated experience in electrochemistry.
- Programming skills in LabVIEW for data acquisition and processing are strongly appreciated.
- Experience in at least one of the following areas is a strong plus: nucleation and growth, local (nano) electrochemistry, scanning probe microscopy (AFM, STM, ...).
- Language skills: excellent English (oral and written) is mandatory.
- Scientific communication skills: good at communicating orally and writing scientific results.
- Eligible applicants must not have resided or carried out their main activity (work, studies, etc.) in Belgium for more than 24 months during the 3 years preceding the start of the fellowship.

## Interested ?

Applications should be sent by email to [jon.ustarroz@ulb.be](mailto:jon.ustarroz@ulb.be) no later than the 30<sup>th</sup> March 2019 and should include:

- a cover letter motivating the application and describing how the applicant meets the selection criteria
- a CV, including a list of publications and contact details of two persons who can provide a reference
- 2 samples of your previous scientific activities that most represent your skills (i.e., full text of first author peer-reviewed manuscripts, or copy of PhD thesis).

The postdoctoral fellow will be hired for a two-year period. The net salary will be between 2.400 and 2.600 euros, based on seniority level. The grant will be offered from the prestigious Belgian National Research Fund, FNRS (<http://www.fnrs.be/>). The starting date is envisaged from May 1<sup>st</sup> to July 1<sup>st</sup> 2019, according to the availability of the successful candidate.