

## PhD position in electrodeposition and nano-electrochemistry

The Electrochemical and Surface Engineering (SURF) research group of the Vrije Universiteit Brussel (VUB) and the Chemistry of Surfaces, Interfaces and Nanomaterials (ChemSIN) of the Université libre de Bruxelles (ULB) are looking for a highly motivated researcher to carry a PhD thesis on electrodeposition and nano-electrochemistry, under the supervision of Prof. Jon Ustarroz and Prof. Annick Hubin.

The project, financed by the Fonds Wetenschappelijk Onderzoek (FWO), aims at predicting the Initial stages of electrochemical phase formation by multi-scale modelling, local electrochemistry and in-situ transmission electron microscopy. This challenging project will be carried out by 3 PhD students in a consortium that brings together two Belgian universities (VUB and ULB) and two research centers, the Jozef Stefan Institut (JSI) and the National Institute of Chemistry, in Ljubljana, Slovenia.

### Description

You will work in two multidisciplinary and multicultural research groups, with people from all over the world, oriented to study surface science and electrochemical processes by combining both modelling and experimental approaches.

The aim of the project is to develop a comprehensive model to **predict the initial stages of electrochemical phase formation**. Electrodeposition offers the most versatile and scalable route for material growth. However, our current understanding is inaccurate and incomplete: electrochemical nucleation and growth (EN&G) does not proceed only by a classical pathway, but also by non-classical routes (nanocluster surface diffusion & aggregation, etc.). To fully understand the EN&G process, we combine electrochemistry with *in-situ* electrochemical transmission electron microscopy (EC-TEM). We propose a combined modelling-experimental approach to (1) optimize the EC-TEM experiments; and (2) model the effect of electron beam irradiation so kinetics of EN&G can be correctly interpreted.

You will study the early stages of metal nucleation & growth by combining traditional electrochemistry, local electrochemistry by Scanning Electrochemical Cell Microscopy (SECCM), and high-resolution microscopy, both *ex-situ* and *in-situ*. You will collaborate with 2 other PhD students who are in charge of the electrochemical modelling (VUB) and *in-situ* EC-TEM (JSI). You will regularly visit JSI to participate in the *in-situ* EC-TEM measurements.

### Requirements

- You hold master's degree in chemistry, physics, materials science, or engineering.
- You are independent and highly motivated, quality-oriented, creative and cooperative
- You have experience in electrochemistry and microscopy
- You have programming skills in LabVIEW for data acquisition and/or software for data processing (Matlab, Python, IgorPro, etc.).
- Experience in at least one of the following areas is a strong plus: (electrochemical) 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.

## Benefits

- A PhD scholarship position (100%) for a period of 4 years. Starting with a maximum of 1-year as trial period. **The salary is approximately 2000-2200 Euros/Month.**
- A challenging, dynamic and stimulating work in two internationally renowned research groups.
- State-of-the-art facilities and equipment : a wide range of electrochemical workstations (including local electrochemistry by SECCM) and surface analytical methods.
- A multicultural and international work environment.
- An international network dealing with state-of-the-art research.
- Working and living in Brussels, the Capital of Europe, one of the most cosmopolitan cities of the world. A vibrant and charming city, which combines history, modernity, arts and gastronomy.

## Contacts

Applications should be sent by email to [jon.ustarroz@ulb.be](mailto:jon.ustarroz@ulb.be) no later than the **15<sup>th</sup> March 2021** and should include **a single pdf file** containing:

- a cover letter motivating the application and describing how the applicant meets the selection criteria
- a CV, including a list of academic grades and contact details of two persons who can provide a reference
- A sample of your previous scientific activities that most represent your skills (i.e., full text of first author peer-reviewed manuscript, copy of master thesis, etc.).

Vrije Universiteit Brussel (VUB), Dept. of Chemistry and Materials (MACH), Research group of Electrochemical and Surface Engineering (SURF), Faculty of Engineering Sciences, Pleinlaan 2 - 1050 Brussel - [www.vub.be](http://www.vub.be); [www.surfgroup.be](http://www.surfgroup.be)