PhD position in Nanoscale Electrodeposition: Multiscale modelling

Applicants are invited for a four-year PhD position starting in September 2021 in the Electrochemical and Surface Engineering (SURF) research group at the Vrije Universiteit Brussel (VUB- https://www.surfgroup.be) and Chemistry of Surfaces, Interfaces and Nanomaterials (ChemSIN - https://chemsin.ulb.be) at the Université Libre de Bruxelles (ULB), Brussels, Belgium. The project is situated within the framework for the Fonds Wetenschappelijk Onderzoek (FWO) and Slovenia Research Agency (ARRS). The student will develop and apply state-of-the-art multiscale (electro)chemical modelling approaches for simulating and predicting the initial stages of electrochemical phase formation (Nanoscale electrodeposition) taking non-classical growth pathways into account.

Description

You will work in a multidisciplinary and multicultural research group, with people from all over the world, uniting all languages and cultures in one large community, oriented to study electrochemical processes by combining both modelling and experimental approaches. Nanoscale electrodeposition offers the most versatile and scalable route for material growth. However, our current understanding is inaccurate and incomplete: electrochemical nucleation and growth does not proceed only by a classical pathway (direct attachment of ions from solution), but also by non-classical routes (nanocluster surface diffusion & aggregation, etc.). The main goal of the project is to develop compressive model that allows prediction of the initial stages of electrochemical phase formation considering classical and non-classical growth pathways. A hybrid multiscale modelling/Advanced experimental methodology is applied due to the high level of complexity of the processes and the different time and length scale involved that need to be understood, measured and modelled. The modelling work will be highly challenging and involve extensive collaboration with other partners of the project, both from Belgium and Slovenia, with diverse background, which enabling the PhD candidate to also develop her/his interdisciplinary skills.

Requirements

- Master’s degree or equivalent in Physics, Chemistry, Engineering, Mathematics or related fields.
- Strong interest in numerical modeling/computational approaches is mandatory.
- Self-motivated, independent and creative
- Good interpersonal, collaborative and analytical skills
- Basic knowledge in two or more of the following fields: Numerical modelling, Finite element, Brownian dynamics, electrochemistry, electrodeposition, nucleation and growth, diffusion-kinetic model, scanning electrochemical microscopy
- Experience of computational algorithm development and coding experience (C/C++, Python, ...) will be advantageous.
- Excellent written and spoken communication skills in English
- Previous experience with finite element software (e.g., COMSOL, FEniCS...) will be advantageous.
Contacts

The interested candidates should send a single PDF file containing the candidate’s motivation letter, CV, publication list (if any) and academic track record (transcript and diploma) to:

Prof. Dr.ir. Annick Hubin (Annick.hubin@vub.be)

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