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SENTINEL

European Training Network in Single-Entity NanoElectrochemistry

Early stage researcher opportunity available based at

Ruhr-University Bochum

Analytical Chemistry: Center for Electrochemical Sciences (CES)

Project Description

ESR3: Single-nanoparticle electrocatalysis

This post will be co-supervised by the Electrochemistry Group at the University of Warwick.

Objectives: Development and characterisation of single nanoparticles immobilized on nano-electrodes as well as SECCM-based experiments for nanoparticle based electrocatalysis.

Expected Results: New insight into the intrinsic catalytic activity of single nanoparticle electrocatalysts under non-diffusion limited conditions. Evaluation of single catalyst particles at industrial current densities and elucidation of single entity electrocatalysis in important reactions for energy conversion such as e.g. CO₂ reduction or O₂ reduction/evolution.

Planned Secondments:

- University of Paris Diderot - hyphenation of electrochemical imaging with optical tomography. The ESR will learn to couple high-resolution optical microscopies to nano-electrochemical techniques, providing in operando complementary visualisation of single electrocatalytic nanoparticles.
- University of Warwick - modelling of interfacial properties at the nanoscale. The ESR will gain hands on experience of finite element method modelling (COMSOL platform) to treat experimental data and for experimental design.
- Keysight Technologies - single-entity characterisation with sub fA sensitivity. Keysight Labs recently developed a GHz-AFM (aka Scanning Microwave Microscope; SMM). Here the ESR will be able to image individual molecules while simultaneously recording the electrical and electrochemical properties with GHz frequency.

Employment: The ESR will be employed in a full-time contract based on the collective agreement of the federal states (TV-L).

About the Employer

Ruhr-University Bochum (RUB) is one of the leading research universities in Germany. The university draws its strengths from both the diversity and the proximity of scientific and engineering disciplines on a single, coherent campus. This highly dynamic setting enables students and researchers to work across traditional boundaries of academic subjects and faculties.

This position will work with the Chair of Analytical Chemistry at the Center for Electrochemical Science in the Electroanalysis & Sensors Research Group under supervision of Prof. Wolfgang Schuhmann. The Chair of Analytical Chemistry has a strong focus on a variety of different research topics all using electrochemical techniques. The equipment consists of all instruments needed for high-level research in electroanalytical chemistry, fabrication of nanoelectrodes, catalyst preparation and characterisation. The group currently has about 35 members, of which 20 are PhD students and 13 are post-docs. RUB will provide training for the fellow in transferrable skills through its Graduate School for Chemistry and Biochemistry and the Continuous Education office.

At Ruhr-University Bochum, we wish to promote careers of women in areas in which they have been underrepresented, and we would therefore like to encourage female candidates to apply. Applications by suitable candidates with severe disabilities and other applicants with equal legal status are likewise most welcome.



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