Job Posting

Recruiting organisation

Central European Institute of Technology – Brno University of Technology (CEITEC-BUT), Czech Republic

Subproject title

Characterisation of electrochemical double layers with rapid-scan ESR spectroscopy in ns-range

Starting date

Preferably from 1st April 2026 , latest 1st September 2026

Salary

The Doctoral Network "SPACER" is financed by the European Union under the framework of the program HORIZON Europe, Marie Skłodowska-Curie Actions. The doctoral candidate will be hired for 36 months under contract by CEITEC-BUT, with a monthly gross salary of approx. 2800 € (including mobility allowance, but excluding other allowances that depend on eligibility, e.g. family allowance, special needs allowance).

Background Information

Marie Skłodowska-Curie Doctoral Networks are joint research and training projects funded by the European Union. Funding is provided for doctoral candidates from both inside and outside Europe to carry out individual project work in a European country other than their own. The training network "SPACER" is made up of 21 partners, coordinated by Fraunhofer ICT in Germany. The network will recruit a total of 17 doctoral candidates for project work lasting for 36 months.

SPACER aims to develop new architectures for porous electrodes to improve the power density and energy efficiency of redox flow batteries (RFB), enabling affordable and durable long-duration energy storage. The approach is to use hierarchical structures, i.e. complex material layers that can be optimized to specific battery chemistries and flow phenomena from the microscale up. The developed technologies will be validated in half-cells and full working batteries at industrial partners at TRL 6.

Our objectives

- Multiscale **modelling** to better understand RFB behavior and identify optimal hierarchical shaped pore- and electrode-structure to encounter optimum electrolyte as well as electrical flow.
- **Prototyping** of the identified structures via stereolithographic, 3D printing and textile techniques like tufting, machine-based embroidery techniques or non-interlaced 3D pre-forming.
- Development of **advanced imaging and characterization technologies** (X-ray micro tomography, EPR imaging and spectroscopy) to evaluate performance of electrodes and to map electrolyte chemical composition in micrometer resolution, allowing validation of the model predictions.
- **Validation and evaluation** of the RFBs with optimized hierarchical electrodes.

Job Description

The advertised subproject is fully funded by the Marie Skłodowska-Curie European Training Network "SPACER". It will be carried out by one doctoral candidate at CEITEC-BUT, (PhD supervision at BUT) over a period of 36 months.

CEITEC-BUT is a leading central European center of excellence science, known for its cutting-edge infrastructure, global research talent, and open science. As the first Czech institute to unite life sciences, materials science, nanotechnology, and cybernetics, CEITEC operates with 25,000 m² of advanced labs for 52 research groups publishing over 300 peer-reviewed articles per year. CEITEC-BUT offers a fully equipped, state-of-the-art laboratory for Electron Spin Resonance (ESR), which plays a key role in advance battery cell research. In addition, the institute hosts numerous ESR experts who can provide valuable knowledge and support to achieve the outlined research goals.

The goal of this doctoral thesis is to design and implement ultra-fast terahertz EPR experiments for the characterization of porous electrodes used in redox flow batteries. The work will include the design of a sample holder for ultra-fast THz ESR spectroscopy

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studies on battery cells. The appointed researcher will investigate and optimize the kinetics of vanadium in porous electrodes. The insights gained in this work are expected to contribute to enhancing the performance and efficiency of redox flow battery systems.

Benefits

The recruited researcher will have the opportunity to work as part of an international, interdisciplinary team of 17 doctoral candidates, based at universities and industrial firms throughout Europe. She/he will be supported by two mentors within the SPACER project and will have multiple opportunities to participate in professional and personal development training. Through her/his work she/he will gain a unique skill-set at the interface between modelling and prototyping of electrode materials, including characterization of electrodes using spectroscopical and electrochemical techniques at different levels from micro-scale to macro-scale.

She/he is expected to finish the project with a PhD thesis and to disseminate the results through patents (if applicable), publications in peer-reviewed journals and presentations at international conferences.

Working at CEITEC offers a friendly and collaborative environment, opportunities to interact with experts across diverse research fields, specialized training relevant to the renewable energy industry, and an excellent work–life balance.

Requirements

Qualifications/experience

- In accordance with the European Union's funding rules for doctoral networks, applicants must NOT yet have a PhD
- Very good master´s degree in physics, engineering, material science, physical chemistry, or a related discipline
- Familiarity with magnetic resonance techniques, development of instrumental analytical techniques in chemistry, surface chemistry or physics
- Experience and interest in working in a ESR laboratory and in a cross-disciplinary collaborative project
- Willingness to cooperate with project partners, to report results in conferences and project meetings

Mobility:

The applicant must not have resided or carried out her/his main activity (work, studies etc.) in Czech Republic for more than 12 months in the past 3 years.

How to apply

Please send your CV by e-mail (preferred) or by post, quoting the reference SPACER-DC12-CEI

Dr. Ing. Petr Neugebauer | CEITEC BUT
Purkyňova 656/123
Room C1.06
612 00 Brno
Czech Republic

petr.neugebauer@ceitec.vutbr.cz

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