POZNAŃ UNIVERSITY OF TECHNOLOGY

FACULTY OF CHEMICAL TECHNOLOGY
INSTITUTE OF CHEMISTRY AND TECHNICAL ELECTROCHEMISTRY

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Proposition of a Post-Doctoral position

We offer a Post-Doctoral position in the Power Sources Group at Poznan University of Technology (Poland) for a collaborative work in the frame of the **EDLstruct** Beethoven project implemented by the Polish National Science Centre (NCN) and supported by the Polish-German Funding Initiative with German Research Foundation (DFG).

The goal of **EDLstruct** is to analyze the charge storage mechanisms in electrical double-layer capacitors (EDLCs) to ensure a further enhancement of the energy stored in these devices. The study will consider both the microscopic properties of the electrode/electrolyte system (pore size distribution of carbon electrodes, relative size of ions and their solvation sphere, solvent nature and electrolyte concentration) and the macroscopic ones (electrodes performance in terms of capacitance and resistance, cathodic and anodic decomposition potentials of the electrolytic solution). By implementing a variety of electrolytes and porous carbons, **EDLstruct** intends to figure out the influence of pore size and size of electrolyte molecules on the ions/solvent ratio (so-called EDL structure) under polarization, and to find correlations between the solvation rate and the decay of electrochemical performance depending on temperature and electrodes potential.

Within the frame of **EDLstruct**, the Post-Doctoral fellow will synthesize and characterize template carbons (by gas adsorption, temperature-programmed desorption, Raman spectroscopy, …). She/he will also determine the physico-chemical and electrochemical properties of electrolytes (by differential scanning calorimetry, viscosimetry, electrochemical impedance spectroscopy, …). To examine the performance of electrodes and EDLCs in various electrolytes, the fellow will use galvanostatic charge/discharge, cyclic voltammetry, chronoamperometry and electrochemical impedance spectroscopy. She/he will also apply operando techniques, such as electrochemical on-line mass spectrometry (EOMS) and electrochemical dilatometry to monitor ageing and changes of electrodes dimensions during polarization in various conditions. Finally, the research will be completed by establishing models of the carbons porous texture and charge/discharge of the electrical double-layer.

This ambitious work program, in collaboration with Friedrich-Schiller University in Jena, Germany, is recommended for a Post-Doctoral fellow interested by fundamental and applied chemistry, and aiming at developing a future carrier connected with research and industrial developments. The fellow should possess a solid background in materials science and electrochemistry. She/he should be good team player and have ability and willing to taking initiative. Good English speaking and writing is also required.

Starting date of employment between December 1st, 2020 and March 1st, 2021

Duration of employment: 18 months

The candidates wishing to apply are requested to send the following documents to Professor F. Béguin (francois.beguin@put.poznan.pl) **before November 10th, 2020**:

i) Curriculum Vitae, including a detailed description of research experience and foreign traineeships (if available), a list of publications and presentations during conferences;

ii) recommendation/reference letter(s) from their current scientific supervisors;

iii) a letter expressing in detail their motivation to conduct the research on the proposed topics in the Power Sources Group;

iv) copies of the most representative research publications (maximum 3);

v) attested copies of all education certificates at university including grade reports and other documents

Applications with any missing required information/document or including general purpose files which are not specied to the advertised position will not be considered.

More information on the Power Sources Group website: http://powersourcesgroup.put.poznan.pl/