Deutsches Zentrum
für Luft- und Raumfahrt
German Aerospace Center

Linder Höhe
D-51147 Köln
Telephone: +49 (0)2203 601-0
Internet: https://www.dlr.de

DAAD
Deutscher Akademischer Austauschdienst
German Academic Exchange Service

Kennedyallee 50
D-53175 Bonn
Telephone: +49 (0)228 882-0
E-mail: dlr-daad-program@daad.de
Internet: https://www.daad.de/dlr

DLR – DAAD Fellowships

Fellowship No. 405

Research Area : Energy

Research Topic: **Development of high-performance ultra-low Pt loaded and Pt-free cathode catalyst layers for PEM fuel cell based on advanced coating engineering and tailored catalysts**

DLR Institute: Institute of Engineering Thermodynamics, DLR Stuttgart

Position: Doctoral Fellow

Openings: 1

Job Specification: There is an opening for a doctoral fellow with the Department of Electrochemical Energy Technology to work in the area of proton exchange membrane (PEM) fuel cells. The fellow will conduct research focusing on the development of high performance electrodes for PEM fuel cell applications. It is crucial to approach the EU long-term objective of reducing Pt loading to 0.1 mg/cm^2 and simultaneously increasing cell performance to 2 W/cm^2. Moreover, the PEMFCs need to fulfill challenging durability targets which are 6,000 h for automotive and 20,000 h for heavy duty applications. Within the project ultra-low Pt loaded ORR catalysts and surface modified/tailored Pt-based nanoparticles will be developed and different coating techniques for MEA preparation will be investigated (e.g. ultrasonic spray coating, inkjet printing, electrospray deposition and screen printing) to reach the projected goal. In addition, this work also covers the development of MEAs using PGM-free ORR catalysts. Through different in-situ and ex-situ characterization methods correlation among catalyst properties, electrode morphology/structure and cell performance will be established. Therefore the work will provide fundamental understanding and practical guidelines on how to design an ultra-low/zero-Pt loading MEA allowing to achieve the targeted longevity and performance.

Required Qualification: Master degree from an accredited university in the area of materials science and engineering, chemistry, chemical engineering, surface engineering or relevant fields. The candidate should have solid background of material synthesis and catalysis. High level of English (oral and written) is mandatory.

Advantageous Skills: The candidate must be self-motivated who can engage in conducting the experimental work independently following the projected target and keen to address scientific challenges. Following set of skills are of great advantage:

- Excellent knowledge of material preparation and synthesis, catalysis, physical chemistry, surface chemistry and engineering.
- Experience in nanoparticle synthesis, processing and characterization
- Experience of electrode preparation
- Experience in different physical characterization methods, e.g. XRD, XPS, SEM/EDX, TEM, etc.
- Basic knowledge in electrochemistry and PEM fuel cells
- Team spirit
- Willing to learn German
- Scientific publication skills

English competence: See requirements on www.daad.de/dlr

Earliest Start Date: January 1st, 2020. The position is for 36 months with possibility of extension for 12 further months.

Application Deadline: Until the position is filled.

Further Information: http://www.dlr.de
http://www.daad.de/dlr