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. 567

Research Area : Energy

Research Topic: **Conceptual Design of Large-Scale High Temperature Electrolyser/Fuel Cell Systems and Process Integration**

DLR Institute: Institute of Engineering Thermodynamics, DLR Stuttgart

Position: Postdoctoral Fellow

Openings: 1

Job Specification: Large-scale production of green hydrogen and syngas is essential for the defossilisation of many industries. Furthermore, flexible and highly efficient electricity generation is vital for green island grid and maritime applications. In this light, high temperature solid oxide cell (SOC) electrochemical reactors provide an efficient avenue to achieve both goals. Having the ability to operate as electrolysers to produce hydrogen or syngas through co-electrolysis, or as fuel cells to produce electricity, both with the utmost efficiency, they can be utilised in many processes to minimise fossil fuel consumption. Furthermore, SOCs can support the expansion of renewables through the coupling of energy and industrial sectors to provide energy security.

The Electrochemical High Temperature Processes (EHT) group of the DLR works on the development of large scale SOC based systems. This involves both experimental and modelling/simulation based research. These activities are split into four pillars: Conceptual process design, Reactor scale experiments, Transient process simulations, and Large system experiments.

Our group is looking to expand our research output within the Conceptual process design pillar. Here we look into how electrochemical reactors could be utilised in large systems to produce high-value products through electrolysis, or to efficiently power complex processes as fuel cells. We are looking for a postdoc that can oversee and push

forward the scientific publication activities within our concepting team. This will involve working with and guiding PhD candidates in our group on best practises for publishing papers in the field, as well as making your own contributions.

The concepting pillar of our group relies on using modelling tools to accomplish our tasks. This is primarily done through our python based concepting tool CELESTE with some use of flowsheeting software such as ASPEN Plus. Various thermodynamic and process key performance indicators (KPIs) are used to characterise the performance of the system such as exergy, CO_2 utilisation, and product yield. Furthermore, we use our transient modelling framework, TEMPEST to add a further dimension to our concept analysis.

You will benefit from working on industry relevant projects, utilising your creativity and knowledge of process engineering to produce high quality scientific contributions.

Required Qualification: Doctorate degree in Mechanical/Chemical/Process Engineering related fields with a background in reaction, separation and heat transfer processes. Preference will be given to applicants with strong research experience in process intensification.

Advantageous Skills: Significant experience in scientific research and publishing is highly advantageous, as is strong knowledge of thermodynamics and process modelling. Experience with programming tools (e.g. Python, MATLAB, C++) is highly advantageous. Additionally, experience with process flowsheeting software (e.g. ASPEN Plus) is also welcomed.

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

Earliest Start Date: January 2023

Application Deadline: Until position filled

Technical contact: Faisal Sedeqi (Faisal.Sedeqi@dlr.de)

Further Information: www.dlr.de/tt/en/esi/eht
http://www.dlr.de
http://www.daad.de/dlr