



Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,500 employees in one of Europe's biggest research centres and help us to shape change!

The Institute of Energy Technologies - Fundamental Electrochemistry (IET-1) focuses on the development of performance oriented and sustainable materials and components for the electrochemical energy storage and conversion. Aiming to develop sustainable and cost-effective batteries, fuel cells and electrolyzers with improved energy and power density, longer lifetime at maximal safety is the challenge of the projects. These key technologies drive forward the energy transition and structural change in the Rhineland region. Further info on our exciting projects: <https://go.fzj.de/IET-1>

We are offering a

PhD Position - Mitigating Degradation in High-Temperature Fuel Cells and Electrolysis for Power-to-X Applications

Your Job:

The PHOENIX - Launch Space Power-to-X joint project plays a central role in aligning the innovation cycles of P2X technologies with the long-term goals of the energy transition, the European "Green Deal" and the phase-out of lignite. Funded by the German Federal Ministry of Research, Technology and Space, the project focuses on two central aspects: accelerating technology development and designing sustainable P2X value chains.

As a PhD researcher, you will contribute to the new stack designs for high-temperature electrolysis and fuel cells (SOEC and SOFC). By combining numerical modeling with data-driven approaches, you will identify optimized operating conditions and strategies to improve both steady-state and dynamic performance in fuel cell (biogas) and co-electrolysis applications. To achieve this, you will employ computational fluid dynamics (CFD) and machine learning (ML) to investigate degradation mechanisms under various operating conditions and develop strategies to mitigate long-term

We look forward to receiving your application until 30.10.2025 via our **Online-Recruitment-System!** **Questions about the vacancy?**

Get in touch with us by using **our contact form**. Please note that for technical reasons we cannot accept applications via email. www.fz-juelich.de

performance losses. The solutions you propose will be tested on new stack designs and applied to a broad range of Power-to-X applications. Your main tasks:

- Develop and integrate degradation models for multiscale and multiphysics simulations of solid oxide cells
- Validate models using experimental data (e.g. IV curves, EIS measurements)
- Apply ML methods in combination with CFD simulations to determine operating strategies that can enhance steady-state and dynamic performance of new stack designs
- Document, analyze, and evaluate simulation results in the context of the latest scientific literature to address key R&D questions
- Collaborate closely with interdisciplinary teams at the research center as well as national and international partners from academia and industry
- Present your results at leading conferences, publish in peer-reviewed journals, and actively contribute to knowledge exchange within the project consortium

Your Profile:

- Master's degree in mechanical engineering, process engineering, chemical engineering, energy technology, or a related field
- Proven expertise in modeling and simulation; familiarity with CFD tools such as COMSOL, Ansys Fluent, or OpenFOAM
- Excellent knowledge of thermodynamics, fluid mechanics, and heat & mass transfer
- Strong programming skills in Python, C++, or similar languages
- Familiarity with machine learning methods for optimization is an advantage
- Background in fuel cells, electrolysis, or electrochemistry is advantageous
- Independent and responsible working style with openness to new topics
- Strong team spirit and motivation to work in an interdisciplinary environment
- Excellent written and spoken English

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We support you in your work with:

- **RESEARCH & INFRASTRUCTURE:** You will have access to excellent scientific and technical facilities for your work
- **SUPERVISION & SUPPORT:** We will accompany your doctoral studies with continuous, expert guidance from your academic supervisor
- **WORK-LIFE BALANCE:** We offer flexible working hours to help you balance your professional and personal life. You also have the option of flexible working (in terms of location), which is generally possible after consultation and in line with upcoming tasks and (on-site) appointments
- **VACATION:** You will receive 30 days of vacation plus additional days off (e.g. between Christmas and New Year's)
- **KNOWLEDGE & DEVELOPMENT:** Your professional development is important to us – we support you specifically and individually e.g., through training and networking opportunities specifically for doctoral candidates (JuDocS): <https://go.fzj.de/JuDocs>
- **HEALTH & WELL-BEING:** Your health is important to us. You can look forward to a comprehensive company health management programme with a wide range of options, including a beach volleyball court, running groups, yoga classes and much more. In addition, our company medical service and an experienced social counselling team are available to assist you on site
- **FAIR REMUNERATION:** Depending on your qualifications and assigned responsibilities, you will be classified according to pay group 13 (75%) of the TVöD-Bund. Additionally, you will receive a special payment ("Christmas bonus")

amounting to 60% of one month's salary. All information about the TVöD-Bund collective agreement can be found on the BMI website (pay scale table on page 66 of the PDF download): <https://go.fzj.de/bmi.tvloed>

- **FIXED-TERM:** The position is limited to 3 years
- **SUPPORT FOR INTERNATIONAL EMPLOYEES:** Our International Advisory Service makes it easier for international employees to get started

In addition to exciting tasks and a collegial working environment, we offer you much more: <https://go.fzj.de/benefits>

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.

The following links provide further information on diversity and equal opportunities:

<https://go.fzj.de/equality> and on specific support options:

<https://go.fzj.de/womens-job-journey>