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!

Polymer electrolyte fuel cells (PEMFCs) are an intriguing technology for clean power production instead of fossil fuel-based generation and, hence, an integral part of the energy transition. Ionic Liquids, especially protic phosphonium-based ionic liquids, emerge as promising candidates as electrolytes for the IT-PEMFC due to their high ionic conductivity at elevated temperatures and anhydrous conditions. In this master`s thesis, the influence of water content and temperature on the electrochemical behaviour of the PPILs will be investigated using electrochemical and physicochemical methods in the Physicochemical Laboratory of the Institute of Energy Technologies – Electrochemical Process Engineering (IET-4). Here, you can find more information about our mission and projects: go.fzj.de/pcl

Starting in July 2024 or later we offer a

Master Thesis - Electrochemical Investigation of Ionic Liquids for IT-PEMFC

Your Job:

The centrepiece of PEM-FCs is the polymer electrolyte membrane (PEM), which should provide sufficient ionic conductivity and mechanical stability. However, the state-of-the-art PEMs Nafion and H3PO4/PBI either require sufficient hydration for good ion conductivity or lead to catalyst poisoning. This makes it necessary to look for alternatives with good ion conduction, even in the anhydrous state. Ionic liquids, especially protic phosphonium-based ionic liquids (PPILs), are promising candidates due to their high ionic conductivity at elevated temperatures and under anhydrous conditions. With this background, we need you to electrochemically characterize PPILs under different conditions. Your tasks in detail will be:

- Determination of electrochemical and physicochemical properties of the ionic liquids with various methods: conductivity via Electrochemical Impedance Spectroscopy (EIS), Walden plot for the determination of the proton conduction mechanism, electrochemical stability via Linear Sweep Voltammetry (LSV), Oxygen Solubility and

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application 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

Oxygen Diffusion Coefficient via Chronoamperometry (CA), thermal stability via Thermal Gravimetric Analysis (TGA) and Infrared Spectroscopy (ATR-IR)
- Electrode preparation via polishing
- Close collaboration with internal and external cooperation partners
- Detailed evaluation and procession of measurement data

Your Profile:
- Enrolled in a master's program in chemistry, physics, materials science, or a related discipline
- Experience in practical lab work
- Theoretical knowledge of electrochemistry and electrochemical techniques is advantageous
- Strong analytical skills and a willingness to engage in experimental research
- A proactive and independent working attitude
- Good written and oral communication skills in English and/or German

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:
- Ideal conditions for gaining practical experience alongside your studies
- An interesting and socially relevant topic for your thesis with future-oriented themes and potential applications in energy storage and electrochemical systems
- A large research campus with green spaces, offering the best possible means for networking with colleagues and pursuing sports alongside work
- An interdisciplinary collaboration on projects in an international, committed and collegial team
- The chance to prepare and work on your tasks independently
- Access to state-of-the-art research infrastructure and the latest analytical techniques
- Guidance and mentorship from experienced researchers
- A stimulating environment that fosters independent research and critical thinking
- Flexible working arrangements e.g. working from home
- The opportunity for a PhD position at the IET-4 might be offered to you following your Master`s thesis with sufficient skills and available job funding provided
- The position is for a fixed term of 6 months

In addition to exciting tasks and a collaborative working atmosphere in Jülich, we have a lot more to offer: 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.