



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!

At the 'Institute of Energy Materials and Devices - Materials Synthesis and Processing (IMD-2)', we work in a dynamic and international team of over one hundred materials scientists, chemists, physicists, mechanical engineers and technical staff on the development of advanced energy converters and high-performance storage devices (in particular oxide ceramic fuel cells, solid-state batteries, thermal barrier coatings for gas turbines and gas separation membranes). The focus is on inorganic materials processed as functional layers from powders or via the gas phase. For this purpose, we use scalable, industry-relevant processes that ensure rapid transfer of our research results to industry.

Join our team to the next possible date as

## Master Thesis "Manufacturing of optimized ceramic Na-metal batteries"

### Your Job:

The storage of renewable energy and electromobility are two of the major social challenges of our time. While today's batteries already offer sufficiently high energy densities and safety for use in consumer electronics, research and development work is still needed for widespread application in other areas.

Future battery concepts such as Li or Na metal batteries offer a promising approach here. Replacing the flammable liquid electrolyte in conventional ion batteries with a non-flammable ceramic ion conductor not only increases safety. Due to their greater electrochemical stability range, they allow the use of metallic Li or Na as the anode. This can significantly increase the energy density of these batteries. In order to manufacture high-performance Na metal batteries, the compatibility between Na metal and ceramic separators must be increased.

As part of a master's thesis, the interface between Na metal and the Na ion conductor  $\text{Na}_2\text{Zr}_2\text{SiP}_2\text{O}_{12}$  is to be optimized through the use of thin intermediate layers. The influence of these layers on the interfacial resistance and critical current density is to be investigated in symmetrical cells. Finally, the most promising intermediate layer will be

We look forward to receiving your application until 03.11.2025 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](http://www.fz-juelich.de)

integrated into full cells to determine its effect on performance and cycle stability. Electrochemical characterization will be performed using impedance spectroscopy, galvanostatic cycling, and cyclovoltammetry. Various scanning electron microscopes are available for characterizing the microstructure.

**Your Profile:**

- Student in the field of chemistry, process engineering, materials science, or a comparable field of natural sciences or engineering, preferably already at the master's level
- Knowledge in the areas of inorganic synthesis and electrochemistry is an advantage
- Experience in the areas of cell construction, electrochemical characterization, and ceramic manufacturing processes is desirable but not a prerequisite
- Ability to work independently

**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:

- **MEANINGFUL TASKS:** Your thesis deals with a future-oriented, socially relevant topic with direct practical relevance in an international environment
- **PRACTICAL RELEVANCE:** With us, you will gain valuable practical experience alongside your studies and actively participate in interdisciplinary projects
- **SCIENTIFIC ENVIRONMENT:** You can expect excellent scientific equipment, modern technologies, and qualified support from experienced colleagues
- **ONBOARDING & TEAMWORK:** You can look forward to working in a dedicated, international, and collegial team. It is important to us that you quickly settle into the team and are given structured training for your tasks. We also support you from the very beginning and make your start easier with our Welcome Days and Welcome Guide: <https://go.fzj.de/welcome>
- **FLEXIBILITY:** Flexible working hours make it easier for you to balance work and study
- **CAMPUS EXPERIENCE:** Our research campus in the countryside creates ideal conditions for collegial exchange and sporting activities right on site. Our cafeteria offers a wide range of options - you can enjoy a relaxing lunch break with a lake view

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>