



# Research assistant (f/m/d)

## Mechanisms, activity and stability of methanation catalysts via in-situ X-ray scattering

Lehrstuhl und Institut für Kristallographie

**Job-ID:** V000001441

**Location:** Aachen

**Contract duration:** Fixed-term employment

**Job evaluation:** EG 13 TV-L

**Start date:** 01.01.2022

**Working hours:** Part-time, 26,55h

**Published:** 25.10.2021

**Application time:** 11.11.2021

**Job type:** Academic staff

### Our Profile

The Institute of Crystallography at RWTH Aachen University is placed in the interdisciplinary field of chemistry, physics, geo- and material sciences. Our research aims at a better understanding of the structure and dynamics of nanoscale solid-liquid and solid-gas interfaces, because of their importance in catalysts, energy materials, geosciences and nanomaterials. To achieve these goals, we employ modern X-ray and neutron scattering techniques, both in the laboratory and at large scale research facilities.

**Project description.** The methanation of CO<sub>2</sub> using H<sub>2</sub> produced via electrolysis of water is an approach for long-term storage of energy from renewable resources. For this purpose, catalysts are needed, that can resist changing gas feed composition. In this project we want to investigate the structure-activity correlation of metal organic framework-derived Ni@Al<sub>2</sub>O<sub>3</sub> and Ni@C catalysts during catalytic cycling. We will carry out in-situ X-ray scattering experiments with subsequent analysis of the pair distribution function (PDF) to track not only nanoparticle growth due to sintering, but furthermore the intricate local structural changes such as restructuring at the interface of nanoparticle and support or the effect of gas adsorption onto the nanoparticle structure. This project is a collaboration with the Technical University Kaiserslautern (Kleist group – catalyst preparation) and Paderborn University (Bauer group – XAS measurements). It is likely to be embedded within the priority programme SPP2080 "Catalysts and reactors under dynamic operation conditions for energy storage and conversion". Within the priority program, the PhD candidate will benefit from special workshops for PhD candidates and interdisciplinary networking.

**Application.** Applications must be submitted as 1 PDF file electronically in German or English until November, 11th, 2021, and must include

- Letter motivating the application and background for this position
- CV
- Diploma and transcripts of records (BSc and MSc)
- Possibly up to 2 reference letters / contact information.

### Your Profile

- University degree (M.Sc. or equivalent) in physics, chemistry, materials science, geoscience or related field.
- Experience in at least two of the following: heterogeneous catalyst preparation, mass spectrometry, X-ray scattering, data analysis / scientific programming (Origin Pro, Igor Pro, Python).
- High motivation for further training, independent and goal-oriented way of working.
- Good communication skills in English and possibly German.
- You are also interested in further academic qualifications (doctorate).

## Your Duties and Responsibilities

- Physicochemical characterization of heterogeneous catalysts and sample preparation for beamtimes, employing e.g. TGA, ICP-OES, MS, TEM.
- X-ray diffraction experiments at laboratory diffractometers and synchrotron radiation facilities (national and international)
- Data analysis of XRD and PDF data for structure refinement and modelling of heterogeneous catalysts
- Publication of results in peer-reviewed scientific journals and presentation at conferences.

## What We Offer

The successful candidate will be employed under a regular employment contract.

The position is to be filled by 1/1/2022 and offered for a fixed term of 3 years.

The fixed-term employment is possible as it constitutes one of the fixed-term options of the Wissenschaftszeitvertragsgesetz (German Act on Fixed-term Scientific Contracts).

This is a part-time contract position.

The standard weekly hours will be 26,55 hours.

The successful candidate has the opportunity to pursue a doctoral degree in this position.

The salary is based on the German public service salary scale (TV-L).

The position corresponds to a pay grade of EG 13 TV-L.

## About us

RWTH is a certified family-friendly University. We support our employees in maintaining a good work-life balance with a wide range of health, advising, and prevention services, for example university sports. We also offer a comprehensive continuing education scheme and a public transportation ticket available at a significantly reduced price.

RWTH is an equal opportunities employer. We therefore welcome and encourage applications from all suitably qualified candidates, particularly from groups that are underrepresented at the University. All qualified applicants will receive consideration for employment and will not be discriminated against on the basis of national or ethnic origin, sex, sexual orientation, gender identity, religion, disability or age. RWTH is strongly committed to encouraging women in their careers. Female applicants are given preference if they are equally suitable, competent, and professionally qualified, unless a fellow candidate is favored for a specific reason.

As RWTH is committed to equality of opportunity, we ask you not to include a photo in your application.

You can find information on the personal data we collect from applicants in accordance with Articles 13 and 14 of the European Union's General Data Protection Regulation (GDPR) at <http://www.rwth-aachen.de/dsgvo-information-bewerbung>.

## Contact & Application

### Contact regarding the application

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### Additional Contact

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