T287-2025 - WISS. MITARBEITER:IN / DOKTORAND:IN (W/M/D) - OPERANDO-GASSENSORIK FÜR UMWELTANWENDUNGEN



TECHNISCHE UNIVERSITÄT DARMSTADT

♥ Darmstadt
♥ 58%
■ Befristet (3 Jahre)
Intgeltgruppe 13 TV TU Darmstadt
■ zum nächstmöglichen Zeitpunkt



About TU Darmstadt

TU Darmstadt stands for excellent and relevant science. We are playing a decisive role in shaping far-reaching processes of global change—from energy transition to artificial intelligence—through outstanding scientific knowledge and innovative academic programmes. We group our cutting-edge research into three fields: Energy and Environment, Information and Intelligence, Matter and Materials. We are a university with strong ties to the Frankfurt Rhine-Main metropolitan region and a very strong international focus. We are committed to European values and European integration.

About our research group

The Laboratory for Surface Chemistry and In Situ/Operando Spectroscopy, led by Prof. Christian Hess, is a multidisciplinary research group that works on understanding the mode of operation of catalysts, gas sensors and batteries at the molecular level. Novel spectroscopic approaches are developed and applied to the characterization of materials under working conditions (operando/transient approach). Relationships between (defect) structures and activity/selectivity are studied by combining variety of spectroscopic techniques. Controlled synthesis and nanoscale structuring using atomic layer deposition enable the design of surfaces for applications in catalysis and alternative energy.

Your tasks

The project

We are currently seeking a Research Assistant (f/m/d) to join our activities in the field of mechanistic investigation of chemical sensors using operando and transient spectroscopy.

Chemical sensors based on metal oxide semiconductors are widely used due to their high sensitivity to target gases and simple production processes. However, the underlying mechanisms (gas sensing, catalysis) remain unclear, hindering the rational design of improved materials. The goal of this project is to elucidate the working principles of technologically relevant metal oxide gas sensors, i.e., materials loaded with noble metals, using state-of-the-art operando and transient spectroscopic techniques. The aim is to develop a comprehensive mechanistic understanding that encompasses the metal oxide, the noble metal, and their interaction.

Your tasks

- Contributing to the above-mentioned research project
- Fabrication and characterization of metal oxide gas sensors (including XRD, XPS, Raman, UV-Vis, SEM/TEM)
- Investigation of the gas sensing behavior in different gas atmospheres
- Establishing structure-property relationships using operando and transient spectroscopy (IR, Raman, UV-Vis)
- Elucidation of the operating mechanisms of metal oxide gas sensors
- Documentation and presentation of research results
- Participation in teaching activities within the field of Physical Chemistry, e.g., supervision of tutorials and lab courses in Physical Chemistry

Your profil

- Completed university degree (M.Sc./Diploma) in Chemistry, Physics, or Materials Science
- Interest in interdisciplinary, experimental research
- Prior knowledge in gas sensing, solid-state chemistry/physics, and/or in situ/operando spectroscopy is advantageous

We offer

Technical University of Darmstadt offers varied and challenging assignments, freedom to work independently, the latest technologies, good collaboration between colleagues in partnership, needs-based training opportunities and customised personnel development.

The fulfillment of the duties likewise enables the scientific qualifications of the candidate.

- Development and organisation comprehensive in-house training offers, including the opportunity for continuing education and development;
- Annual leave/educational leave 30 days annual leave (full-time employment) and 5 days educational leave;
- Sustainable and mobile eligibility to free public transport in the state of Hesse with the LandesTicket Hessen (Hesse StateTicket) in accordance with the currently valid collective agreement, in addition to opportunities to working mobile at times;
- Fit and healthy free of charge preventive medical check-ups and a wide-ranging subsidised sports programme
- Work-life balance flexible working time models, plus BGM (*Betriebliches Gesundheitsmanagement* University Health Management);

- Pension scheme supplementary public service pension scheme (VBL) in accordance with the currently applicable regulations;
- University bicycle
- Family-friendliness/compatibility of family/care/career (university-run) childcare services, child allowance (based on the collective agreement), childcare programmes during school holidays

General information, data privacy

TU Darmstadt intends to increase the number of female employees and encourages female candidates to apply. In case of equal qualifications, applicants with a degree of disability of at least 50 or equal will be given preference. Remuneration is in accordance with the collective agreement for the Technical University of Darmstadt (TV - TU Darmstadt). Part-time employment is generally possible.

By submitting your application, you agree that your data may be stored and processed for the purpose of filling the vacancy. You can find our <u>privacy policy</u> on our webpage.

Ansprechperson

For further questions regarding this position, please contact **Prof. Dr. Christian Hess** Phone: +49 6151 16 21975

Please send your application to: christian.hess@tu-darmstadt.de