

*We are a young, innovative university in the middle of the Metropole Ruhr. Excellent in research and teaching, we think in terms of possibilities instead of limits and develop ideas with a future. We live diversity, promote potential and are committed to educational equity worthy of the name.*

The University of Duisburg-Essen is searching for a position in the Faculty of Physics, Department of Experimental Physics at the Campus Duisburg to work on *Elucidating the Mechanism of Urea Oxidation on Ni-Oxides using Ultrafast Nonlinear Optical and Photocurrent Spectroscopies* as a

### **Research assistant (f/m/d) at universities (Entgeltgruppe 13 TV-L)**

#### **Main research topics and duties:**

The oxidation of urea to  $N_2$  and  $CO_2$  is important in water purification, the construction of an *artificial kidney* and as a potential anodic reaction for the production of  $H_2$  from water splitting. Devices based on the latter chemistry are particularly appealing:  $H_2$  can be produced as a byproduct of necessary water purification. Despite these incentives basic insight into the properties of suitable electrocatalysts for this reaction are lacking. While prior work suggests the possible utility of various nickel oxides, and the distinct lack of suitability of oxides of other metals, why nickel is so important and how its activity might be enhanced by selective doping, is largely unknown. This lack of insight is the result of a lack of insight into the *mechanism* of urea oxidation. We seek a scientific researcher (in the context of a pursuit of a PhD degree) to overcome this limitation in a project *Elucidating the Mechanism of Urea Oxidation on Ni-Oxides using Ultrafast Nonlinear Optical and Photocurrent Spectroscopies*. The aim of the work is to develop and employ nonlinear optical tools to *watch* electron transfer during urea oxidation. The resulting 'femtoelectrochemical' observables are completely new and offer the possibility of qualitatively new experimental insight into the mechanism of this important reaction. The successful applicant will be associated with the *Integrated Graduation School Solvation Science* (of the RESOLV Cluster of Excellence) or the Integrated Research Training Group *Understanding Oxidation Catalysis* (of the Collaborative Research Center 247) depending on interest. The project is a collaboration with theorists and chemical engineers in the United States within the context of a bilateral DFG/US-NSF project and thus offers particular opportunities for close collaboration and international internships.

#### **Your profile:**

- Completed university degree in physics, chemistry or related discipline (e.g. materials science, chemical engineering, etc) of at least 8 semesters or comparable. Generally top-level grades, e.g. A or > 1.5 in the German system, are required. Course work in spectroscopy, electrochemistry, statistical mechanics and optics/photonics is particularly relevant.
- Completion of, at least one, undergraduate research project, preferably in photoelectrocatalysis or spectroscopy with non-standard data analysis, is strongly preferred. Experience with pulsed lasers is particularly prized.
- Fluent in oral and written English.

#### **We offer:**

- a varied, diverse range of tasks
- Training and further education offers
- company ticket
- Sports and health offers (university sports)

**Start of position:** 01.01.2022  
**Contract period:** 3 years  
**Working time:** 75% of a fulltime position  
**Application deadline:** 05.12.2021

The University of Duisburg-Essen aims to promote the diversity of its members  
(see <http://www.uni-due.de/diversity>)

It is seeking to increase the number of women on its scientific staff and therefore strongly encourages suitably qualified women to apply. In case of equal qualification, women will be given preference in accordance with state equal opportunity legislation. Applications from suitable handicapped persons and equivalent applicants according to Article 2, Paragraph 3 of the social code (SGB IX) are also welcome.

Your application should contain:  
curriculum vitae, list of any publications, copies of your academic certificates.  
At least one letter of reference by people familiar with your work to be sent directly to Prof. R. Kramer Campen ([richard.campen@uni-due.de](mailto:richard.campen@uni-due.de)).

Quote the reference **number 837-21** Send your application to: Professor R. Kramer Campen, Fakultät für Physik, Universität Duisburg–Essen, Lotharstraße 1, D-47048 Duisburg, Germany, or as e–mail to [Richard.campen@uni-due.de](mailto:Richard.campen@uni-due.de)

Questions relating to the formal application procedure should be addressed to:  
Sekretariat AG Campen, Natalie Miladic [natalie.miladic@uni-due.de](mailto:natalie.miladic@uni-due.de)

*Information on the Faculty and the advertised vacancy is available at:*  
<https://www.uni-due.de/physik/>

[www.uni-due.de](http://www.uni-due.de)

