

Postdoc position for operando X-ray photoelectron spectroscopy

University of Twente, MESA+ Institute for Nanotechnology, Netherlands
Supervisor: Asst. Prof. Chris Baeumer

Job description

Operando characterization becomes ever more important for the rational design of energy materials. For electrocatalysts, e.g. for green hydrogen production, the surface properties define the catalytic properties and require more in-depth understanding. But most chemically-sensitive operando characterization tools lack surface sensitivity. In this project, funded via an ERC Grant of the European Commission, you will work on the development of photoelectron spectroscopy towards surface-sensitive operando characterization of the solid liquid interface.

The project relies on a new “operando photoemission” platform at the University of Twente, which combines advanced liquid-cell options and multi-color X-ray sources. The “operando photoemission” platform is created with the ambition to establish the first-of-its-kind laboratory-based XPS platform for operando characterization of the solid-liquid interface with maximum interface-sensitivity, and is made possible through a national infrastructure grant.

The key research idea relies on single-crystal-like, atomically defined surfaces achieved in the form of thin films or 2D materials. In collaboration with materials synthesis and spectroscopy experts from the Inorganic Materials Science group, you will make use of these materials to further develop the concepts of “meniscus XPS” and/or “membrane XPS”. In the end, this will help clarify the central research question: How do the composition and electronic structure of the outermost atomic layer in state-of-the-art electrocatalysts impact the catalytic activity and how can we optimize materials design for maximum efficiency.

Your profile

- PhD in Physics, Chemistry or Materials Science or a related field.
- You are an expert XPS user.
- Experience with APXPS and/or HAXPES, pulsed laser deposition, thin film analysis or electrochemical characterization are a big plus.
- You are a highly motivated, enthusiastic, and self-driven researcher.
- You are a problem solver with excellent analytical and communication skills.
- You have a track record of experimental research in the given discipline, with scientific publications in peer-reviewed journals.
- You are fluent in English.

Our offer

- Full time postdoc position for up to three years, starting spring-summer 2023
- Access to a new lab-based, multicolor APXPS system with innovative liquid cell
- Dynamic ecosystem with enthusiastic colleagues in a stimulating scientific and entrepreneurial environment on a green and lively campus with lots of sports facilities.
- Gross salary between € 3,557 - € 4,670,- per month depending on experience and qualifications according to the Dutch Collective Labour Agreement for Universities (CAO)
- Excellent benefits including a holiday allowance of 8% of the gross annual salary, a year-end bonus of 8.3% and a solid pension scheme.
- Minimum of 29 leave days in case of full-time employment.
- Excellent facilities for professional and personal development

Information and application

For more information, please contact Dr. Chris Baeumer (c.baeumer@utwente.nl). You can apply by clicking on the button "Apply now" at <https://utwentecareers.nl/en/vacancies/1078/postdoc-position-for-operando-x-ray-photoelectron-spectroscopy/>.

The application should include

- a motivation letter emphasizing your expertise, your research interest and motivation to apply for this position
- a detailed CV
- contact details of at least 2 references
- a half-A4 page summary of your PhD research, a 200-word summary of your (AP)XPS expertise as a separate document (emphasize any experience with working with liquids in the XPS)
- a TOEFL or IELTS score to verify sufficient mastering of the English language

An interview will be part of the selection procedure.

Employer

Inorganic Materials Science is a research group devoted to thin film growth studies, (nano)structuring techniques, and properties of complex materials, in particular oxides. It includes materials with diverse properties, like ferroelectrics, ferromagnetics and multiferroics, piezo's, high-K dielectrics, transparent conducting oxides, non-linear optical materials, ion conductors, superconducting and related materials, and anti-reflection coatings. Its research field is focussed on thin films with modified properties by doping or by artificial layered structures and superstructures. Applications are found in, e.g., nano-electronics and spintronics, optical systems, fuel and solar cells, fluidics, bio-nano sensors.

The University of Twente: We stand for life sciences and technology. High tech and human touch. Education and research that matter. New technology which leads change, innovation and progress in society. The University of Twente is the only campus university of the Netherlands; divided over five faculties we provide more than fifty educational programs. We have a strong focus on personal development and talented researchers are given scope for carrying out groundbreaking research.

We are an equal opportunity employer and value diversity at our company. We do not discriminate on the basis of race, religion, color, national origin, gender, sexual orientation, age, marital status or disability status. Because of our diversity values we do particularly support women to apply.

The **Faculty of Science & Technology** (Technische Natuurwetenschappen, TNW) engages some 700 staff members and 2000 students in education and research on the cutting edge of chemical technology, applied physics and biomedical technology. Our fields of application include sustainable energy, process technology and materials science, nanotechnology and technical medicine. As part of a people-first tech university that aims to shape society, individuals and connections, our faculty works together intensively with industrial partners and researchers in the Netherlands and abroad, and conducts extensive research for external commissioning parties and funders. Our research has a high profile both in the Netherlands and internationally and is strengthened by the many young researchers working on innovative projects with as doctoral candidates and post-docs. It has been accommodated in three multidisciplinary UT research institutes: Mesa+ Institute, TechMed Centre and Digital Society Institute.

MESA+ Institute for Nanotechnology

The MESA+ Institute for Nanotechnology, which is one of the largest nanotechnology research institutes in the world with more than 500 researchers working together on cutting-edge research. The Thin Film laboratory of the MESA+ institute (under the shared responsibility of the involved PI's) is dedicated to the growth and characterization of thin films with state-of-the-art deposition systems for the thin film growth of electrocatalyst materials. A wide range of structural and electrochemical characterization techniques are present to enable ex-situ as well as in-situ analysis. The recent development of an unique lab-based multicolour XPS platform for operando characterization in combination with the thin film infrastructure and the close proximity of many materials science and catalysis experts within the 'Nanoelectronic Materials' and 'Process and Catalysis Engineering' clusters makes the University of Twente the perfect host institute.