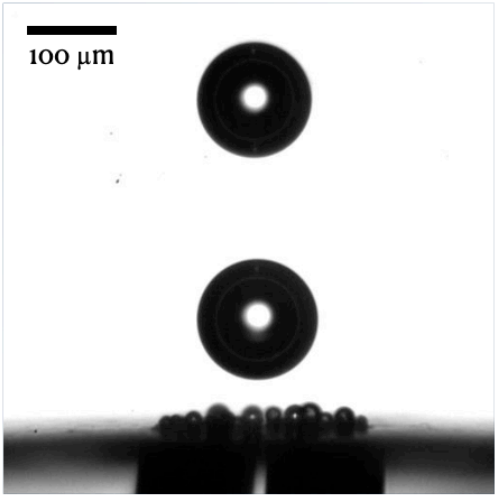
2 experimental PhD positions: *Mitigating bubble effects for efficient electrolysis*

Job description



Are you fascinated by physics and interested in conducting experiments to better understand real world problems? Are you ambitious and dynamic? Do you strive for excellence? We are looking for a PhD student to carry out state-of-the-art research on bubble dynamics in electrolysis.

As our society is trying to reduce its carbon footprint, the inherently intermittent nature of many renewable energy sources such as wind and solar power render efficient energy storage solutions indispensable. A promising option is to convert electrical power into hydrogen through electrolysis of water. Yet, current electrolysis cells suffer from low efficiency, which is largely due to flow and transport phenomena, in particular the nucleation of bubbles on the electrode surfaces. The fundamental understanding of the role of the bubbles in electrolysis is still limited. The goal of this project is to overcome this and to explore strategies for performance enhancement. To this end, you will perform cutting-edge experiments using optical techniques, and tailor-made electrode configurations.

The 2 PhD-projects are part of a larger research funded by NWO through a VIDI grant, which combines experimental and numerical work and also involves industrial partners in the Netherlands and Germany. The two experimental projects will respectively focus on

1) ***Developing strategies to control bubble formation on electrodes, informed by a deeper understanding of how bubbles influence reaction rates.***
2) ***Advancing fundamental understanding of the potential and limitations of bubble-free electrolyser concepts.***

Location

The work will be carried out in close collaboration between the Physics of Fluids group at the University of Twente (UT) in the Netherlands and the Institute of Aerodynamics and Chair of Fluid Mechanics (AIA) at RWTH Aachen in Germany. Both groups conduct research across a broad range of fluid mechanics topics, with a strong emphasis on understanding fundamental fluid physics through experiments, simulations, and theory. While the positions will initially be based at UT, it is expected that substantial parts of the work particularly in the later stages will be carried out in Aachen.

Your profile

You have a Masters degree (or equivalent) in applied physics, chemical or mechanical engineering, or in a closely related discipline. You have strong communication skills, including fluency in written and spoken English. You are enthusiastic and highly motivated to do a PhD. Experience with experimental work is a big plus.

Our offer

We want you to play a key role in an ambitious project in an inspiring and stimulating international work environment.

- We provide excellent mentorship and a stimulating, modern research environments with world-class research facilities.
- You will be embedded in two dynamic research groups with colleagues working on similar topics.
- Your employment will initially be at the University of Twente with a potential transfer to RWTH Aachen University at a later time.
- You will follow a high-quality personalised educational program.
- The employment is for a period of four years full-time and is expected to result in a doctoral thesis upon conclusion of the research period.
- Positions are available immediately and will remain open until filled.
- We strive for diversity and fairness in hiring.

How to apply

Potential applicants are encouraged to apply to Prof. Dr. Dominik Krug (jobs@aia.rwth-aachen.de)
Applications should include the following documents:

- A motivation letter describing why you want to apply for this position.
- Description of your research interests.
- A detailed CV.
- Academic transcripts from your Bachelor's and Master's degrees.
- Email addresses of at least two references who are willing to send a letter of recommendation on your behalf.
- An interview with a scientific presentation will be part of the interview process.

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.