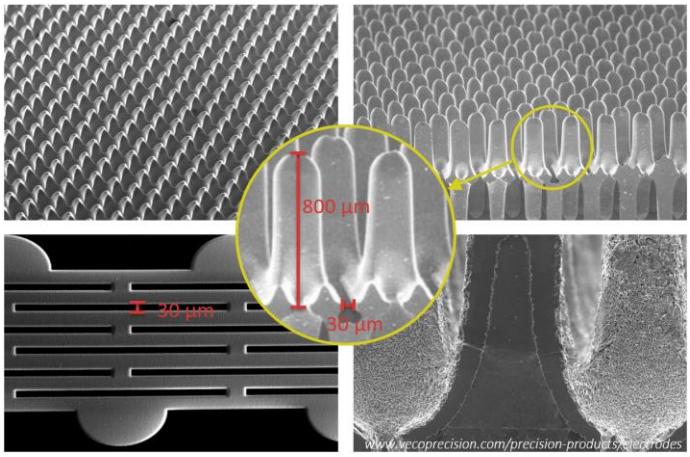
ELECTROCHEMICAL CHARACTERIZATION OF NOVEL NICKEL ELECTRODES

POSITION	Research internship
FIELD	Electrochemistry, Chemical Engineering, Sustainable Energy
DURATION	min 6 months, from July 1st 2021 (flexible)
LOCATION	Wetsus, European Centre of Excellence for Sustainable Water Technology (Leeuwarden, NL)

PROJECT

The performance of electrolysis depends heavily on the electrodes, which need to be highly catalytic to facilitate the gas' formation. Platinum group metals have outstanding catalytic performance but are expensive. Therefore, new cost-effective alternatives are necessary. Since the development of electrolysers, nickel-based materials have remained state of the art non-noble hydrogen evolution reaction (HER) catalysts for alkaline water electrolysis. While nickel is the most active non-noble metal, it does not outperform platinum group metals. Thus, much effort must be put into optimizing nickel-based catalysts' chemical structure and morphology. This research investigates the electrochemical properties of novel high specific surface area nickel electrodes, especially focusing on the effect of surface geometry on the catalytic activity towards the HER.



YOUR TASKS

Your task will be to operate an existing electrochemical system with the aim to characterise pillared nickel electrodes and optimize their design for H_2 production via alkaline water electrolysis. You will investigate a number of material parameters (surface area/ porosity/ stability/ catalytic activity, etc.) and use suitable electrochemical techniques for the characterisation, including electrochemical impedance spectroscopy (EIS), cyclic voltammetry, SEM analysis, etc., to obtain an all-round electrochemical characterisation of the electrodes.

OUR OFFER

- An excellent opportunity to develop your research skills in a cutting-edge water technology research institute
- A multidisciplinary international working environment
- Monthly allowance of 175 EUR (only for students not recieving any other grant or funding)

REQUIREMENTS

- Being enrolled as a BSc or MSc student in a relevant discipline (Electrochemistry, Chem Eng, Sustainable Energy)*
- Basic knowledge of electrochemistry (previous experience with electrolysis is an advantage)
- Good experimental and analytical skills
- Fluent English
- Willingness to learn and cooperate

ABOUT WETSUS

Wetsus, *European Centre of Excellence for Sustainable Water Technology*, is an international research institute located in Leeuwarden, The Netherlands. The aim of Wetsus is to create innovative and sustainable technologies for the water sector by coordinating a network of 106 companies and 23 European universities. More info: www.wetsus.nl

HOW TO APPLY

Interested students are invited to send their applications or further questions about the project to Ragne Pärnamäe (ragne.parnamae@wetsus.nl). Please include your CV.

* Non-EU citizens are eligible only if enrolled to a Dutch university

wetsus

Ragne Pärnamäe, *MSc*