

# Tuned bipolar membrane interface for enhanced acid-base flow battery performance

(BSc/MSc thesis project)

## Background

Recently, there have been significant advancements in energy storage systems capable of storing GWh-scale energy capacity. Such systems, despite being promising, still possess several environmental and safety issues. In this project, the acid-base flow battery (ABFB) is employed as a new and sustainable energy storage system with water and salt as starting materials. Figure 1 is an illustration of the general system concept where water is dissociated into acid and base at the junction of the bipolar membrane during charging. Acid and base produced are stored in tanks till discharge where they recombine to produce water and salt. The project focuses on modifying the bipolar membrane interface in order to be capable of splitting and recombining the water at higher rates thus enhancing the battery efficiency.

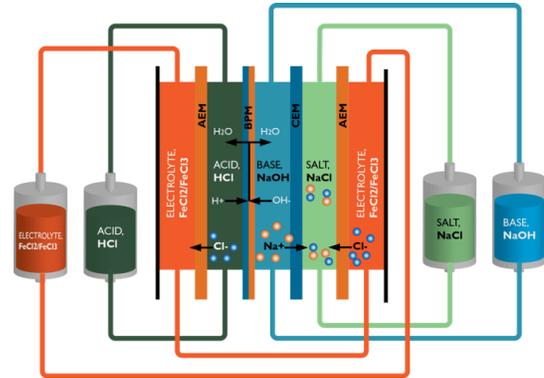


Figure 1: a Schematic illustration of Acid-Base flow battery

## Your task

- Working to develop efficient bipolar membrane by modifying the anion and cation layers and the interface in between.
- Characterizing the fabricated bipolar membrane for both water splitting and acid-base flow battery.
- Data analysis and scientific reporting.

## Your profile

- Specialization in material science, chemical engineering, membrane engineering, preferably with a background or experience in Polymer chemistry.
- Enrolled in undergraduate (BSc) or graduate (MSc) studies.
- Interest for practical laboratory experience and analytical work.
- Fluent in English language (writing and communication skills).
- Good motivation and team-working spirit.

**Duration:** 5 months (minimum), **starting date:** 1<sup>st</sup> of April 2019 (Flexible).

## Benefits:

- Gaining practical research experience.
- Working in motivating multicultural multidisciplinary environment.
- Allowance: 350 €.

## How to apply:

Interested students are invited to send their transcript of records, motivational letter and a CV (max. 2 pages) to Emad Al-Dhubhani ([emad.al-dhubhani@wetsus.nl](mailto:emad.al-dhubhani@wetsus.nl)). Please indicate (*Acid-base flow battery student application*) as the subject of the email.