

Effect of feed flow on the efficiency of bipolar membrane electro dialysis technique (BPMED), designed for seawater decarbonization

Motivation

Global climate change, ocean acidification and air pollution are the main drivers for a worldwide attempt to reduce CO₂ emissions. Seawater decarbonisation deacidifies the seawater, shifting the carbonate equilibrium [1]. Additionally, decarbonisation of seawater reduces the scaling potential of CaCO₃ and other sort of scaling in further (sea)water processes, such as in reverse osmosis [2]. Thus, it can be used as an alternative for using chemicals (such as anti-scalants and acids) to address scaling risks.

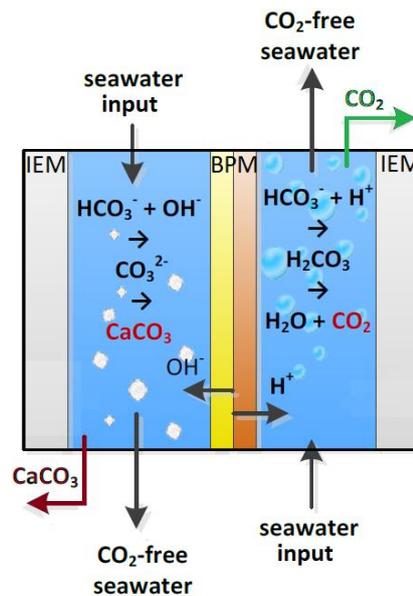


FIGURE 1. DECARBONIZATION IN BPMED

Method

A bipolar membrane can produce acid and base from feedwater when inserted in an electrical field (inside an electrochemical cell, Figure1), [3]. There are different losses (ohmic and non-ohmic) involved in this process. The aim of this research is to quantify the effect of feed flow (rate, path, etc.) on these losses and the total energy efficiency of the system.

Your profile

- Background in chemical/environmental engineering or other related fields.
- Familiar with terms such as electrochemistry, flow and mass equations and carbonate equilibrium.
- Experimental and analytical skills; this work requires working in the laboratory.
- Fluent in English (with good English writing skills).

Benefits and additional info

- Starting date September 2019, for a duration of 6-8 months.
- Location is Wetsus, European Centre of Excellence for Sustainable Water Technology, Leeuwarden (The Netherlands), with a monthly allowance of 350 €.

How to apply

Contact Rose Sharifian (Rose.Sharifian@wetsus.nl), include your CV and motivation letter.

1. Butler, J. N., 1982. *Carbon dioxide equilibria and their applications*.
2. hydranautics Nitto Group Company, chemical Pretreatment For RO and NF, Technical Application Bulletin No. 111.
3. Eisaman et al, 2017. Indirect ocean capture of atmospheric CO₂: Part I. Prototype of a negative emissions technology.