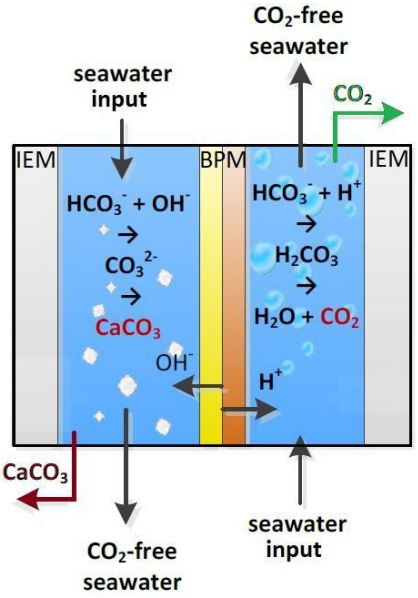
Electrodialytic seawater CO_2 capture through $CaCO_3$ production

Motivation

Global climate change, ocean acidification and air pollution are the main drivers for a worldwide attempt to reduce CO_2 emissions. Seawater decarbonisation deacidifies the seawater, shifting the carbonate equilibrium. Additionally, decarbonisation of seawater reduces the scaling potential of $CaCO_3$ and other sort of scaling in further (sea) water processes, such as in reverse osmosis .Thus, it can be used as an alternative for using chemicals (such as anti-scalants and acids) to address scaling risks.

Method

A bipolar membrane can produce acid and base from feed water when inserted in an electrical field [1]. When using the base route (i.e., left side of BPM in the figure), carbonate ions will be the dominant carbonic species, ready to react with calcium ions to produce calcium carbonate precipitation. We are planning to monitor this precipitation (using optical methods such as confocal laser scanning microscopy), and investigate the effect of flow rate, ion concentration, pH and temperature on the process.



Your profile

- Background in chemical/environmental engineering or other related fields.
- Familiar with electrochemistry, flow and mass equations, carbonate equilibrium and lab work.
- Experimental and analytical skills; this work requires daily work in the laboratory.
- EU nationality or Non EU enrolled at a Dutch University (due to work/ resident permit difficulties).
- Fluent in English.

Benefits and additional info

- Starting in February 2020, for a duration of 6 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. Please read reference [1], before applying.

1. Eisaman et al, 2017. Indirect ocean capture of atmospheric CO2: Part I. Prototype of a negative emissions technology.