



A preliminary study on the volume reduction of pre-treatment sludge in seawater desalination by forward osmosis

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ABSTRACT

Forward Osmosis (FO) can be applied to recover water from the pre-treatment sludge of seawater reverse osmosis process. This study investigated the effect of the concentration of two draw solutions (MgCl_2 and NaCl) in the reduction of $\text{Fe}(\text{OH})_3$ sludge volume and the effect of cross flow velocity on flux through FO membrane. Higher the concentration of NaCl and MgCl_2 higher the water flux observed. However, the percentage increase was not significant due to the occurrence of internal concentration polarisation. MgCl_2 draws marginally increased water flux than NaCl , when the conditions of feed and draw solutions were similar. Increase in cross flow velocity (from 0.25 to 1.0 m/s) marginally changed the flux with both draw solutions as higher cross flow velocities were unproductive to beat the external CP effect along the membrane surface. However, at 1 m/s, highest fluxes were obtained for both draw solutions.

Keywords: Concentration polarisation; Desalination; Forward osmosis; Pre-treatment; Sludge

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