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Influence of operating parameters on mass and heat transfer in Feed Gap Air Gap Membrane Distillation

Membrane distillation is a thermal driven evaporation process in which a hydrophobic membrane serves as vapor space. The driving force is generally implemented by a temperature difference between a hot and cold (feed) solution on either side of the membrane. The distillate permeates through the pores of the membrane due to the vapor pressure difference established by the temperature gradient. There are several possibilities on how to package the configuration of the flow baring channels and one such concept is a so- called Feed Gap Air Gap (FGAGMD) channel configuration, in which the heating and cooling solution is separated from the feed solution, bringing forth various advantages.

Comprehensive studies on the influence of typical operation parameters on this new channel configuration are required to adapt the current calculation tools for MD module design based on this new variant.

As part of the studies, a detailed experimental plan is developed. The testing is carried out in a flat sheet testing facility with parameter variations of flows, temperatures, feed solution composition and geometrical variations of the channel set up. The monitoring of results is done continuously and analysis of mass- and heat transfer phenomena will be carried out using typical key performance indicators. Subsequently, the results are compared with previous experiments and literature findings. Finally, the outcome will encompass recommendations for an optimized MD module design with the new FG channel configuration.

Auslandsorientierter Studiengang „Water Resources Engineering and Management - WAREM“

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