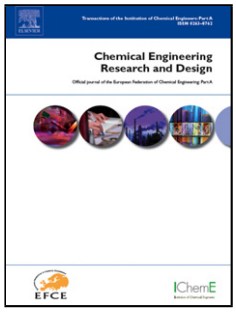

Title: Specific energy requirement of direct contact membrane distillation

Authors: Waritha Jantaporn, Aamer Ali, Pierre Aimar

PII: S0263-8762(17)30549-X
DOI: https://doi.org/10.1016/j.cherd.2017.09.031
Reference: CHERD 2835

To appear in:

Received date: 7-2-2017
Revised date: 26-7-2017
Accepted date: 25-9-2017

Please cite this article as: Jantaporn, Waritha, Ali, Aamer, Aimar, Pierre, Specific energy requirement of direct contact membrane distillation.Chemical Engineering Research and Design https://doi.org/10.1016/j.cherd.2017.09.031

Specific energy requirement of direct contact membrane distillation

Waritha Jantaporn[1], Aamer Ali[2], Pierre Aimar[1]

[1] Laboratoire de Génie Chimique, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

[2] Institute on Membrane Technology, National Research Council, Cubo 17C, Via Pietro BUCCI, 87036 Rende, CS, Italy

Highlights

- The Specific energy in DCMD depends on the feed recovery rate
- Performances of a heat exchanger located on a retentate line and on the distillate line are compared
- The use of a heat exchanger is efficient only at low recovery rate
- The impact of temperature polarization on the specific energy is considered

Abstract

The study aims to provide a clear picture of the thermal energy requirements of Direct Contact Membrane Distillation (DCMD) system as function of different variables influencing the specific energy consumption. This includes membrane properties, operating conditions, recovery factor and the option of heat recovery from the permeate and retentate streams. We simultaneously analyze the variation in specific energy demand and membrane surface area needed as a function of the membrane characteristics, operating conditions and recovery rate, taken as a design parameter. We observe that the specific energy demand of DCMD shows a relatively weak dependence on temperature polarization and