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Reuse of discarded membrane distillation membranes in microfiltration technology

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Abstract

Membrane distillation (MD) technology is being implemented in industry thanks to the incessant progress made so far in membrane modules, membrane design and their fabrication. The main drawback of MD is the irreversible membrane pore wetting. Special care must be made in order to maintain the membrane pores dry. Once the pores are getting wet and/or blocked the efficiency of the MD process is reduced and the membrane is finally discarded. It is to be noted that MD membranes are more expensive than the membranes used in other membrane processes (e.g. pressure driven membrane processes microfiltration, MF; ultrafiltration, UF or reverse osmosis, RO). Reuse of disposed MD membranes is a possible solution to prevent membrane disposal and save costs. In this study, polytetrafluoroethylene (PTFE) membranes were used for the treatment of synthetic (i.e. 65 g/L NaCl aqueous solutions) and RO brines (~50 g/L TDS) at different feed temperatures (between 318 to 348 K) by air gap membrane distillation (AGMD) until the membrane pores were blocked or wetted. These