عنوان مقاله:

Effects of operating parameters in sweeping gas membrane distillation process: Numerical simulation of Persian Gulf seawater desalination

محل انتشار:

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خلاصه مقاله:

In this communication, an advanced, simultaneous mass and heat transfer model has been developed to take a meticulous glance on the influences of different parameters on Persian Gulf seawater desalination using Sweeping Gas Membrane Distillation (SGMD) technique. This essay focuses on the increasing the distillate flux by investigation of the physical properties and feed temperature of the sweeping gas membrane distillation on the seawater desalination. The effects of operating parameters, including feed temperature, salt concentration, sweeping gas temperature, and heat transfer coefficient on the distillate flux of the Persian Gulf seawater have been investigated. Theeffect of feed temperature on temperature polarization has also been studied. By increasing the feed temperature from 25 oC to 60 oC, the temperature polarization increases and the polarization coefficient (TPC) decreases; for instance, for membranes with PP, the TPC decreases from 0.95 to 0.905. By increasing the feed temperature, higher fluxes are achieved for both the gas velocities. Therefore, by increasing the feed temperature from 50 oC up to 80 oC, the distillate flux grows 9 times. Also, the distillate flux for membrane with PVDF as polymer increased from 0 to 4.2 by increasing the feed temperature from 40 oC to 70 oC. The model predictions show a small error of 3.6% with the experimental data reported in literature which indicates the reliability of simulated results

کلمات کلیدی:

Distillate flux; Numerical simulation; Seawater; Sweeping gas membrane distillation (SGMD);Temperature polarization

لینک ثابت مقاله در پایگاه سیویلیکا: