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Effect of temperature difference on performance of membrane crystallization-based membrane distillation system

Young-Sun Park[a,b], Chang-Kyu Lee[b], Seog-Ku Kim[b], Hyun-Je Oh[b], Sang-Ho Lee[c], June-Seok Choi[b,*]

[a]*Department of Construction Environment Engineering, University of Science & Technology, Deajeon 305-333, Korea*
[b]*Korea Institute of Construction Technology, Goyang-Si, Gyeonggi-Do 411-712, Korea*
Tel. +82 31 910 0759; Fax: +82 31 910 0790; email: jschoi@kict.re.kr
[c]*Department of Construction and Environmental Engineering, Kookmin University, Seoul 136-702, Korea*

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ABSTRACT

This study explores membrane distillation (MD) is suitable to recover pure water and to generate the supersaturation condition for the crystal formation. The system was carried out under a different temperature of feed solution. It was observed that the increase in the mass flux of product solution is due to the increase in the temperature difference between the feed and product solution. Although the temperature difference is important for the mass flux of product solution, it needs to consider a reasonable temperature difference. The highest rejection (%) was observed at feed temperature 60˚C and it is easy to control. It was found that both surface crystallization and bulk crystallization influenced the flux decline of MD. Calcium sulfate crystals can be produced by MD crystallization with a growing crystal size distribution and average size of 100 μm.

Keywords: Seawater desalination; RO brines; Membrane distillation; Calcium sulfate; Crystallization

*Corresponding author.

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