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Jun Liu^{a,b,c,d}, Meiling Liu^{a,b,c,d}, Hong Guo^{a,b,c,d}, Wei Zhang^{a,b,c,d}, Kai Xu^{a,b,c,d}, Baoan
Li^{a,b,c,d*}

^aSchool of Chemical Engineering and Technology, Tianjin University, Tianjin, China,
300072

^bCollaborative Innovation Center of Chemical Science and Engineering (Tianjin),
Tianjin, China, 300072

^cState Key Laboratory of Chemical Engineering (Tianjin University), Tianjin, China,
300072

^dTianjin Key Laboratory of Membrane Science and Desalination Technology, Tianjin,
China, 300072

*Corresponding author. Tel.: +86 22 2740 7854; fax: +86 22 2740 4496.
libaoan@tju.edu.cn

Abstract

The mass transfer process within the homogenous and the heterogeneous membranes with experiments and simulation works were investigated and compared in this paper. The combined Knudsen-viscous regime of flow was adopted to describe the mass transfer process in the membrane pores. The mass transfer resistance distribution in the heterogeneous membrane were considered and the sensitivity of membrane characters including the pore size, the porosity, the membrane thickness and the pore tortuosity on permeate flux were investigated. The results show that the mass transfer regime of the vacuum membrane distillation (VMD) process is dominated by the combined Knudsen-viscous flow within large temperature and vacuum pressure ranges. It is found that the pore size is the most sensitive parameter affecting the permeate flux. The simulation work indicates that the mass transfer resistance model

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