

Design and Optimization of Combined Vapor Permeation / Distillation Process for the Dehydration of Isopropanol

그레고리 리오누그로호 할비안토, Faizan Ahmad,
Le Cao Nhien, 김서은, 이문용†
영남대학교
(mynlee@ynu.ac.kr†)

Since azeotropic distillation is highly cost-energy intensive to purify isopropanol, this work proposed a new combination of vapor permeation and distillation process. The feasibility of numerous hybrid schemes has been studied by simulation and optimization in Aspen Plus. A model for the membrane system is implemented by developing a mathematical model in Aspen Custom Modeler and integrating it with Aspen Plus simultaneously. Furthermore, this work also employed response surface methodology (RSM) for optimizing total cost. The RSM based optimization effectively optimizing variables and its predictions agreed well with the results of rigorous simulation. It was shown that the most significant savings in total costs can be achieved by applying distillation-vapor permeation configuration (approximately 77%). This research was respectfully supported by Engineering Development Research Center (EDRC) funded by the Ministry of Trade, Industry & Energy (MOTIE). (No. N0000990). This study was also supported by a grant from the Gas Plant R & D center funded by the Ministry of Land, Transportation and Maritime Affairs (MLTM) of the Korean government.