Energy Efficiency Evaluation of Hybrid Systems Combining Distillation with Vapor Permeation for Isopropanol Dehydration

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

High purity of isopropanol is extremely needed due to its wide applications. Several new configurations of hybrid systems were proposed, modelled and simulated by using Aspen Custom Modeler and Aspen Plus for the purpose of energy efficiency analysis in obtaining the desired product. These hybrid processes consisting distillation columns and vapor permeation unit. Furthermore, the effect of the main design variables is illustrated through parametric studies. This work also compared these hybrid processes with the existing process in energetic point of view. It was found that the hybrid system distillation-vapor permeation with P84 co-polyimide membrane (hollow fiber) was the most interesting process from an energetic point of view, could lead to a saving in total costs of 78.314% compared to azeotropic distillation. 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.