

Recent Trends in Azeotropic Mixture Separation

Christel Joy S. Cortel¹, Kristine O. Flordeliza¹, Shayne Ruzzel A. Galvez¹, Maria Angeline Y. Magalong¹, Trisha Mae G. Mendoza¹, and Rubi Vicente C. Rubi^{1,2,*}

¹Chemical Engineering Department, College of Engineering, Pamantasan ng Lungsod ng Maynila, General Luna, corner Muralla St., Intramuros, Manila 1002, Philippines; cscortel2020@plm.edu.ph (C.J.S.C.); koflordeliza2019@plm.edu.ph (K.O.F.); sragalvez2020@plm.edu.ph (S.R.A.G.); maymagalong2019@plm.edu.ph (M.A.Y.M.); tmgmendoza2020@plm.edu.ph (T.M.G.M.)

²Chemical Engineering Department, College of Engineering, Adamson University, 900 San Marcelino St. Ermita, Manila 1002, Philippines; rugi.vicente.rubi@adamson.edu.ph (R.V.C.R.)

*Correspondence: rugi.vicente.rubi@adamson.edu.ph

ABSTRACT

In chemical and process industries, different techniques are implemented to enable the separation of azeotropic mixtures. These separation methods are broadly classified between azeotropic distillation procedures, which employ the use of entrainer, and membrane-based processes, which mainly use semi-permeable membrane materials. This paper seeks to examine the current trends employed in the separation procedures for azeotropic mixtures in the industries, particularly the techniques and methods applied in the actual processes. Additionally, this paper also outlines the common encountered in the current setups for the separation of azeotropic mixtures. Several studies show that in comparison to conventional separation techniques, the application of alternative distillation methods and advanced membrane-based techniques for the separation of azeotropic mixtures results in better separation efficiency and reduced energy consumption while also maintaining the cost-effectiveness of the overall process. In addition to this, advancements in the available techniques for separation would also improve the viability and ensure the long-term sustainability of the proposed developments to address the current gaps in knowledge while ensuring that the existing challenges in the procedures like membrane fouling and limited scalability are properly addressed. Furthermore, this paper also highlights the outlook in research of the processes involved in the separation of azeotropic mixture.

Keywords: azeotropic mixture separation; azeotropic distillation; membrane-based separation