

Design and Optimization of Hybrid Extraction–Distillation Process for the Dehydration of Acetic Acid

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This work proposed a new cost-effective process by proposing novel solvents for hybrid extraction and distillation process in acetic acid–water separation. Liquid–liquid equilibrium of the quaternary system methyl acetate/ethyl acetate + p-xylene + acetic acid + water were experimentally determined and used to fit parameters of the NRTL model. To obtain the suitable solvents, the feasibility of hybrid extraction and distillation schemes were designed and simulated in Aspen Plus. For the extraction process using methyl acetate+p-xylene, desired acetic acid product purity can be reached with lower energy consumption and higher product yield compared to conventional solvent. In conclusion, methyl acetate is a promising solvent for the extractive separation of acetic acid and water. This research was respectfully supported by Engineering Development Research Center (EDRC) funded by the Ministry of Trade, Industry & Energy (MOTIE) (No. N0000990). This work was also supported by Priority Research Centers Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2014R1A6A1031189).