

에너지 저감형 프로판/프로필렌 분리 공정 기술 개발

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The olefin and paraffin separation is one of the most energy-intensive processes in petrochemical industry. It uses approximately 40% of total energy demand in olefin complex. Because of its similar boiling point and a low vapor pressure, the distillation column has above 150 tray inside and refrigerant cooling require to provide the heat duty in condenser. Nevertheless, there have been no other viable technology that can substitute this cryogenic distillation. In this study, we investigate the adsorption and membrane based process for the separation of propane and propylene. For the adsorption process, a dual-VPSA process was developed to maximize propylene recovery and purity. It employs a kinetic selective MOF as an adsorbent. For the membrane process, a membrane-distillation hybrid process was developed using CMS. A mathematical model was constructed from the experimental data of adsorbent and membrane materials. Based on the developed model, a TEA (techno-economic analysis) study was conducted to elucidate the process feasibility and performance compared with the conventional distillation process.