

Development of Separation and Purification Process of Demo Plant for 10 Ton Per Day DME Production

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In 21st century, increasing in production of high added value chemicals from natural gas. DME (dimethyl ether) currently used as a propellants, has received growing attention owing to its potential as a useful chemical intermediate. DME has been shown to have excellent properties as a diesel fuel giving emission level better than ULEV standard. So it has been attracting considerable as an alternative diesel fuel.

In this study, we carried out simulation of separation and purification process of demo plant for 10ton per day DME production, which causes the effect that is important in productivity, from operation results of pilot plant for 50kg per day DME production. The liquefied stream, which was separated by gas-liquid separator after DME reactor, includes CO₂, DME, Methanol and H₂O. We established two distillation columns and temperature swing adsorption (TSA) column for separation and purification of the stream. CO₂ was extracted from the stream by first distillation column, DME was extracted by second column and methanol was recovered by TSA. We investigated and analyzed the effect which the actual operation variables cause in efficiency of process and optimized process, finally we got the DME of purity 100%.