

Process Simulation and Optimization of DME Production using Syngas from IGCC Power Plant

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Integrated Gasification Combined Cycle(IGCC) is a power plant which is combining a gasification system with cycle system. Dimethyl ether (DME), as a substitute of diesel oil and liquefied petroleum gas, derived from IGCC Power Plant. At present, DME synthesis through Korea IGCC Power Plant is using two-step method: Methanol formation from synthesis gas and then production of DME by dehydration of Methanol. However, two-step DME synthesis has some disadvantages. In addition, methanol conversion is low and this method needs methanol reactor additionally. In this study, process simulation and optimization are using as one-step method: methanol formation and production of DME by dehydration of methanol at the same time. One-step DME synthesis in this DME production process can produce almost same amount of DME product of the two-step process and has more benefits in energy efficiency and cost. The simulation result shows that there are possibilities of one-step DME synthesis from Korea IGCC Power Plant. In this study, we are going to design for distillation system and replace DME reflex system for cost reduction.