

Dynamic Simulation of a Hollow Fiber Membrane Module for Coalbed Methane Separation

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Dynamic simulation model is developed for a gas separation membrane module by deriving a mole fraction balance and an energy balance. A hollow fiber membrane with counter-current flow is adopted which recovers CH₄ form coalbed methane (CBM) by removing CO₂. In the dynamic simulation model, the CBM feed gas is supplied into the bore side, and the shell side discharges the permeate gas. The simulation results are very similar to the experimental data of Airrane Co. Ltd. in Korea. By using the validated simulation model, the effects of design and operating conditions on the performances are also investigated. This work is the base study for scale up design up to a commercial scale membrane module.

Keywords: CoalBed Methane (CBM), Hollow Fiber Membrane, Dynamic Simulation, Design, Operation