

Process modeling and design of MEA-based CO₂ capture process

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CO₂ emissions have an impact on global climate change. Carbon capture and storage (CCS) is a technology that can reduce the global warming problem. One of the methods for CCS is post-combustion CO₂ capture with chemical absorption. In this work, the CO₂ capture process with monoethanolamine is modeled using the simulation tool Aspen HYSYS. The process model is established to reduce regeneration energy and to improve process efficiency. Validation of the simulation model is made against literature results and pilot studies, and sensitivity analysis is carried out to assess how CO₂ removal and heat consumption is influenced by lean loading, absorption temperature, and other design parameters. The case study will be presented to investigate design options for improving energy efficiency with the aid of process simulation and superstructure-based optimization techniques. Acknowledgement: This work was supported by the "Energy Efficiency & Resources Programs" of the Korea Institute of Energy Technology Evaluation and Planning (KETEP) grant funded by the Ministry of Trade, Industry and Energy of the Korean government (No. 20122010200071).