Carbon Dioxide Treating System with LNG Cryogenic Energy Utilization

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In this study, an energy effective process for CO_2 capture and liquefaction was modeled and optimized using commercially available process simulator. This process integrated CO_2 capture and liquefaction with Liquefied Natural Gas (LNG) re-gasification process, and utilized cold LNG as coolant. The LNG coolant was used for absorber inter-cooling and stripper overhead condensing in the CO_2 capture process, and compressor inter-stage cooling and condensing in CO2 liquefaction process. While the CO_2 was captured and liquefied, the LNG was re-gasified and recovered as high pressure natural gas. Using the proposed process, total operation energy of both CO_2 capture process and liquefaction process were reduced compared with the conventional process. In order to maximize the total energy saving, compression ratio and exergy efficienty of the system were also optimized.

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