

Performance analysis of 500MWe coal fired power plant with post combustion CO₂ capture process

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Performance analysis of 500 MWe coal-fired power plant with post-combustion CO₂ capture system was performed. A chemical absorption process using chemical solvent, which is most suitable for thermal power plant, is considered. Based on a design condition of the flue gas from the 500 MWe supercritical coal-fired power plant in Republic of Korea, we have analyzed the amine based chemical absorption CO₂ capture systems using a process simulator. Simulation of the CO₂ capture system was done using AspenPlus software (Aspen Technology, Inc.) with ELECNRTL property packages. It was observed that thermal energy required to regenerate solvent reduce the efficiency of power plant by 7.4%, the energy required to compress the CO₂ from 0.1 MPa to 11 MPa is the next largest factor, reducing the efficiency by 2.9% and other energy requirement amount to 0.4%.