

Effects of adding acid to reduce MEA absorbent regeneration energy in the CO₂ capture process

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Chemical absorption technologies are the most popular to capture CO₂ and relevant to large scale power plant system. In the CO₂ absorption process, MEA(Mono-ethanolamine) aqueous solution has been used largely because it has high reactivity, low solvent cost and low absorption of hydrocarbons. However, the regeneration energy of MEA solution is higher than those of other amine based solvents. The energy requirement for regenerating solvent accounts for a great part of CO₂ capture cost in absorption process.

This work focuses on the reduction of solvent regeneration energy using aqueous acid solution in a stripper instead of general distillation. At temperature lower than normal condition in the stripper of absorption technology, CO₂ solubility in aqueous MEA solution and in a mixture of aqueous MEA and benzoic acid solutions were measured at different weight percent ratio of MEA and benzoic acid. Through the solubility data, effects of adding acid to reduce MEA absorbent regeneration energy could be confirmed and effect of residual amount of acid and percentage decrease of MEA solvent could be estimated.