

In the Study of CO₂ Capacity Performance of Different Frothing Agents through Process Simulation

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Abstract : Presently, the increasing CO₂ concentration in the atmosphere has been taken as one of the major challenges faced by the modern world. The average CO₂ in the atmosphere reached the highest value of 414.72 ppm in 2021, as reported in a conference of the parties (COP26). This study focuses on (i) the comparative study of MEA, NaOH, Acetic acid, and Na₂CO₃ in terms of their CO₂ capture performance, (ii) the significance of adding various frothing agents achieving improved absorption capacity of Na₂CO₃ and (iii) the overall economic evaluation of process with the help of Aspen Plus. The results obtained suggest that the addition of frothing agents significantly increased the absorption rate of dilute sodium carbonate such that from 45% to 99.9%. The effect of temperature, pressure and flow rate of liquid and flue gas streams on CO₂ absorption capacity was also investigated. It was found that the absorption capacity of Na₂CO₃ decreased with increasing temperature of the liquid stream and decreasing flow rate of the liquid stream and pressure of the gas stream.

Keywords : CO₂, absorbents, frothing agents, process simulation

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