

Exergy Analysis and Evaluation of the Different Flowsheeting Configurations for CO₂ Capture Plant Using 2-Amino-2-Methyl-1-Propanol

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Abstract : Exergy analysis provides the identification of the location, sources of thermodynamic inefficiencies, and magnitude in a thermal system. Thus, both the qualitative and quantitative assessment can be evaluated with exergy, unlike energy which is based on quantitative assessment only. The main purpose of exergy analysis is to identify where exergy is destroyed. Thus, reduction of the exergy destruction and losses associated with the capture plant systems can improve work potential. Furthermore, thermodynamic analysis of different configurations of the process helps to identify opportunities for reducing the steam requirements for each of the configurations. This paper presents steady-state simulation and exergy analysis of the 2-amino-2-methyl-1-propanol (AMP)-based post-combustion capture (PCC) plant. Exergy analysis performed for the AMP-based plant and the different configurations revealed that the rich split with intercooling configuration gave the highest exergy efficiency of 73.6%, while that of the intercooling and the reference AMP-based plant were 57.3% and 55.8% respectively.

Keywords : 2-amino-2-methyl-1-propanol, modelling, and simulation, post-combustion capture plant, exergy analysis, flowsheeting configurations

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