

Experimental Study of CO₂ Absorption in Different Blend Solutions as Solvent for CO₂ Capture

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Abstract : Nowadays, removal of CO₂ as one of the major contributors to global warming using alternative solvents with high CO₂ absorption efficiency, is an important industrial operation. In this study, three amines, including 2-methylpiperazine, potassium sarcosinate and potassium lysinate as potential additives, were added to the potassium carbonate solution as a base solvent for CO₂ capture. In order to study the absorption performance of CO₂ in terms of loading capacity of CO₂ and absorption rate, the absorption experiments in a blend of additives with potassium carbonate were carried out using the vapor-liquid equilibrium apparatus at a temperature of 313.15 K, CO₂ partial pressures ranging from 0 to 50 kPa and at mole fractions 0.2, 0.3, and 0.4. Furthermore, the performance of CO₂ absorption in these blend solutions was compared with pure monoethanolamine and with pure potassium carbonate. Finally, a correlation with good accuracy was developed using the nonlinear regression analysis in order to predict CO₂ loading capacity.

Keywords : absorption rate, carbon dioxide, CO₂ capture, global warming, loading capacity

Conference Title : ICCD 2017 : International Conference on Carbon Dioxide

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2017