

**Enhancement of CO<sub>2</sub> absorption rate in post combustion process using carbonic anhydrase**

Mari Vinoba, 추대현<sup>1</sup>, 김성아, 정순관\*  
한국에너지기술연구원; <sup>1</sup>고려대학교

In this study, the enhancement of carbon dioxide (CO<sub>2</sub>) absorption rate of monoethanol amine (MEA), diethanol amine (DEA), methyldiethanol amine (MDEA), and 2-amino-2-methyl 1-propanol (AMP) solution has been investigated upon addition of bovine carbonic anhydrase (CA), using VLE (vapor-liquid equilibrium) device. The enthalpy ( $-\Delta H_{\text{abs}}$ ) of CO<sub>2</sub> absorption and absorption capacities of the aqueous amines were measured in the presence and/or absence of CA enzyme by differential reaction calorimeter (DRC). The reaction temperature increase ( $\Delta T$ ) in adiabatic mode was also studied by DRC analysis. The bicarbonate and carbamate species formation mechanism were illustrated by <sup>1</sup>H and <sup>13</sup>C NMR spectra. The CO<sub>2</sub> absorption rate (flux), rate constant ( $K_{\text{app}}$ ) for the above amines was found to be in the order MEA > DEA > AMP > MDEA and MDEA > AMP > DEA > MEA with respect absence and, presence of CA. This study demonstrates that CA promotes CO<sub>2</sub> absorption rate of MDEA was three fold higher than MEA. The thermal effects suggest that higher activity CA at 40°C.