OP 14

High Throughput CO_2 Solubility Measurement in Amine Solution using HS-GC

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Key Word (3 words)

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Abstract (less than 300 words)

CO_2 solubility is one of the key factors in evaluating the energy consumption of the CO_2 capture process from flue gas or air. High-throughput CO_2 solubility measurement techniques such as small samples, rapid equilibration time, automated sample change, and high reproducibility are important, especially in the amine screening phase. We have developed a measurement apparatus of CO_2 solubility in amine solutions using headspace gas chromatography (HS-GC). Measurements of CO_2 solubility by HS-GC were reported by Maurer et al [1]. We used a GC-3200 gas chromatograph (GL Sciences) with a Turbomatrix HS16 headspace autosampler (Perkin Elmer) and a thermal conductivity detector. The equilibrium time and calibration curve were checked first. Developed apparatus showed high reproducibility with reference CO_2 solubility data in amine solution. Using HS-GC system, we have been evaluating new type of CO_2 capture solution including phase separation solvent [2], water-lean solvent and polyamine solutions.

[1] Ermatchkov, V.; Pérez-Salado Kamps, Á.; Maurer, Solubility of Carbon Dioxide in Aqueous Solutions of N-Methyldiethanolamine in the Low Gas Loading Region. *Ind. Eng. Chem. Res.* **2006**, *45* (17), 6081–6091.

[2] Machida, H.; Oba, K.; Tomikawa, T.; Esaki, T.; Yamaguchi, T.; Horizoe, H. Development of Phase Separation Solvent for CO_2 Capture by Aqueous (Amine + Ether) Solution. *J. Chem. Thermodyn.* **2017**, *113*, 64–70.