

Development of energy-saving CO₂ capture with phase separation absorbent

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To preventing global warming, carbon dioxide capture and storage process (CCS) has much attention as an applicable system. Amine process is one of conventional CO₂ capture process though it takes lots of energy around 4 GJ/ton-CO₂ for regeneration process.

We have developed the novel CO₂ absorbent "phase-separation solvent" which consists aqueous amine and organic solvent mixture and transforms into CO₂-rich phase and CO₂-lean phase after CO₂ absorption [1]. Phase separation solvent can decrease the regeneration temperature which makes CO₂ separation energy reduce. To optimize the structure and process using phase separation solvent, we conducted a screening test of several amine and organic solvent mixture, a measurement of properties (CO₂ solubility, density, viscosity), an estimating the required energy for CO₂ separation, and lab plant tests.

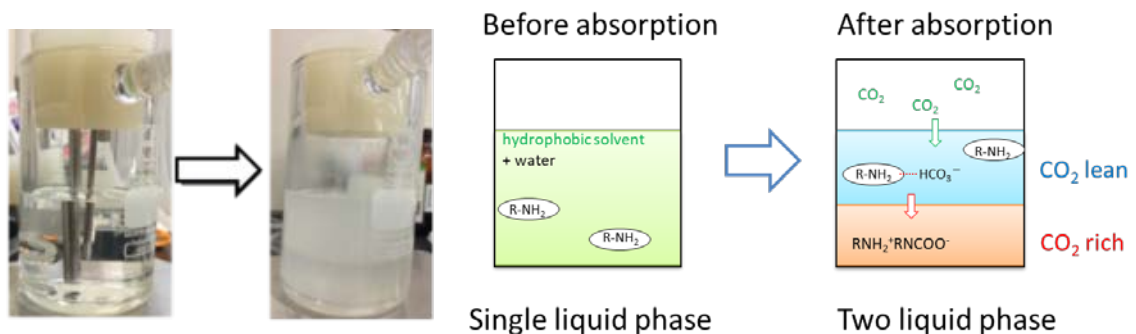


Figure 1: Concept of phase separation absorbent

References

- [1] Machida H, Oba K, Tomikawa T, Esaki T, Yamaguchi T, Horizoe H, Development of phase separation solvent for CO₂ capture by aqueous (amine+ether) solution, J. Chem. Thermodyn., 113 (2017) 64-70.