

The effect of additives containing amine and hydroxyl group on CO₂ absorption kinetics in aqueous ammonia solution

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Reducing ammonia loss is the key challenge in CO₂ capture process using aqueous ammonia absorbent, and using additives containing amine and hydroxyl group is known to reduce ammonia loss in aqueous ammonia solution. However, there are no further researches on CO₂ absorption kinetics with additives in ammonia solution for practical use. Herein, we investigated the effect of additives on CO₂ absorption kinetics in wetted wall column. In this experiment, 5~12.5wt% of aqueous ammonia, 1wt% of additive, and 5~15% of CO₂ were used and the temperature range was from 288K to 303K. Generally, the overall mass transfer coefficient was increased as temperature and concentration of ammonia solution increased. The CO₂ mass transfer in absorbent with additives was better than in additive-free absorbent in low absorbent concentration and temperature region, while additive-free absorbent transferred CO₂ more in high absorbent concentration and temperature region. This result was considered that hydroxyl group in additives played a hindrance role in reaction between CO₂ and NH₃.