

## Effects of absorbent flow rate on CO<sub>2</sub> absorption through a super hydrophobic hollow fiber membrane contactor

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### Abstrak

The aim of this study is to evaluate the effects of absorbent flow rate on CO<sub>2</sub> absorption through a super hydrophobic hollow fiber contactor. The absorbent used in this study was a physical absorbent, namely a polyethyleneglycol-300 (PEG-300) solution. Meanwhile, the feed gases used in the experiments were pure CO<sub>2</sub> and a mixture of 30% CO<sub>2</sub> and 70% CH<sub>4</sub>. Gas absorption using a physical absorbent provides various benefits; for example, it can produce sufficiently high selectivity towards CO<sub>2</sub> and it is less corrosive than chemical solvents. Three super hydrophobic hollow fiber contactors, each 6 cm in diameter and 25 cm in length consist of 1000, 3000 and 5000 fibers, respectively, were used in this study. The type of super hydrophobic fiber membrane used was polypropylene-based, with an outer and inner diameter of about 525 and 235  $\mu\text{m}$ , respectively. During the experiments, the absorbent was flowed through the lumen fibers, whilst the feed gas flowed through the shell side of the membrane contactors. The experimental results showed that the mass transfer coefficient, the flux, and the absorption efficiency increased, but the CO<sub>2</sub> loading decreased, with increasing absorbent flow rate in the membrane contactor. Meanwhile, it was found that an increase in the number of fibers in the membrane contactor, in general, will increase the absorption efficiency and the CO<sub>2</sub> loading, but will decrease the overall mass transfer coefficient and the flux.