

Effective CO<sub>2</sub> absorption–stripping process in membrane contactors for CH<sub>4</sub>/CO<sub>2</sub> separation

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Porous polypropylene (PP) hollow fiber membrane contactors have been investigated for production of biomethane from simulated biogas and operated by combined absorption/desorption processes using water. To confirm the effect of operating parameters, the connection of modules, flow rates, and operating pressures were observed. For CO<sub>2</sub>/CH<sub>4</sub> separation, results in single absorption processes showed a good yield (85%) of high purity CH<sub>4</sub> (97%). The series connection in two absorption modules facilitated CO<sub>2</sub> absorption because of an increase in contact area at the liquid–gas interface. In two 1" absorption modules and four 2" desorption modules connected in series, CH<sub>4</sub> was recovered in 75% yield and 98% purity. Even though the result in single absorption processes was somewhat higher than combined processes due to limits in desorption performance, the combined process proved the potential of membrane contactor to produce renewable methane as a fuel for vehicles (methane purity: >95%). The membrane contractor in the combined absorption/desorption processes required periodic maintenance to maintain an acceptable performance, while the single absorption processes was operated continuously.