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Abstract

Commercially available polytetrafluoroethylene (PTFE) hollow fiber membranes were investigated for the selective separation of carbon dioxide from a binary gas mixture of CO_2/CH_4. A series of experiments were carried out to evaluate the separation performance of different diameter PTFE hollow fiber membranes using physical and chemical absorbents from a gas mixture containing 2.5% CO_2 balanced in methane. DI-water and aqueous solutions of monoethanolamine (MEA), diethanolamine (DEA) and triethylamine (TEA) were employed as the absorbents. The effects of gas and liquid cross flow velocities, temperature, nature of absorbent, packing density, module configuration and flow pattern on the CO_2 mass transfer rate and separation efficiency of the membrane modules were examined. The experimental results indicated that CO_2 separation performance of the system enhanced with increasing the liquid phase velocity, decreasing with gas phase velocity, and using chemical scrubbing absorbents. For the physical absorbent, the CO_2 separation