

## High Performance Chabazite Zeolite Membrane; Studies on a Relation between Membrane Performances and Module Properties

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CHA (Chabazite) zeolite membranes are effective for the separation of CO<sub>2</sub> from N<sub>2</sub> and CH<sub>4</sub> via their regular micropores. In particular, a feature that the CHA membrane can secure its great separation performance under wet condition makes it an attractive candidate for a membrane-based carbon capture process. For the realization of practical use, we scaled up the CHA membrane by changing supports from flat discs to tubes. Thereafter, differences in the CO<sub>2</sub> perm-selectivities were investigated via CO<sub>2</sub>/N<sub>2</sub> and CO<sub>2</sub>/CH<sub>4</sub> separation performance tests. The CHA membrane showed the separation factors as high as ~30 for CO<sub>2</sub>/N<sub>2</sub> and ~200 for CO<sub>2</sub>/CH<sub>4</sub> mixtures. In addition, ~75% CO<sub>2</sub> recovery and ~60% CO<sub>2</sub> purity could be achieved by the CHA membrane with respect to the CO<sub>2</sub>/N<sub>2</sub> mixture having a molar ratio of 15:85 under wet condition. Finally, we correlated and derived a relationship between the convective mass transfer and the gas flow property of feed streams, resulting that the CO<sub>2</sub> perm-selectivity of the CHA membrane was a strong function of the mass transfer resistance in the feed side.