

## Membrane Technology for Biogas Recovery and Purification

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Biogas produced in anaerobic digestion process has been considered as a renewable energy source. To recover biogas from the anaerobic effluent and thereby maximize the energy recovery from anaerobic processes, membrane contactor employing hydrophobic porous hollow fiber membrane has been applied. By optimizing the surface hydrophobicity and the porosity of membranes, a desirable CH<sub>4</sub> flux could be achieved. Next, we carried out the economic analysis of such membrane contacting process after developing a mathematical model to predict the performance in a large scale system. Biogas recovered can be upgraded by applying required purification processes for the injection into natural gas grid or for the use as vehicle fuel. We have synthesized various microporous materials including zeolites, metal-organic frameworks (MOFs) and amine-appended sorbents that are selectively transport CO<sub>2</sub> molecule and incorporated them into polymeric films to design high performance gas separation membranes.