



## Effect of the preparation conditions on the properties of polyetherimide hollow fibre membranes for gas separation

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### ABSTRACT

Preparation and properties of polyetherimide (PEI) hollow fiber membrane are described in a paper. PEI hollow fibers were produced on the spinning machine by phase inversion process. Experiments were designed with the aim to optimize the process parameters for the production of asymmetric polyetherimide hollow fibers. These parameters include polymer solution flow through the nozzle, bore liquid flow, air-gap distance, and the fiber take-up speed. CO<sub>2</sub>/CH<sub>4</sub> gas mixture permeation experiments were performed on produced membranes as well as the morphology studies by optical microscopy and scanning electron microscopy (SEM). The impact of the process parameters on the hollow fiber morphology and mixed gas transport and separation properties was investigated. Results show the critical influence of the bore liquid flow and the take-up speed on the fiber structure. With higher values of these parameters the membranes exhibited higher CO<sub>2</sub>/CH<sub>4</sub> selectivities. Tubular aspects of the fiber were obtained without deformations when high bore liquid flows were used. Smaller fiber diameters were achieved when the fiber take-up speed was higher.

*Keywords:* Hollow fiber membrane; Asymmetric membrane; Design of experiments; Selectivity; Polyetherimide; Permeance; Gas separation

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