

Preparation of facilitated transport membrane for CO/N<sub>2</sub> separation

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In this study, we synthesized a series of comb-like copolymers poly (2-hydroxypropyl-2-(methacryloyloxy) ethyl phthalate-co-acrylic acid) (PHMEP-co-PAA) to use as a template for facilitating CO transport membrane. AgBF<sub>4</sub> and ionic liquid ([bmim][BF<sub>4</sub>]) were also introduced to the PHMEP-co-PAA matrix to prevent comb copolymer aggregation and improve CO/N<sub>2</sub> separation performance. Specifically, the phthalate and carboxyl group in the copolymer effectively incorporated into the Ag ions *via* chelation. Furthermore, we carried out the molecular dynamic simulation to engineering the definite mechanism of facilitated CO transport. The gas separation performance of PHMEP-co-PAA/AgBF<sub>4</sub>/IL membranes was also investigated with the monomeric ratio of PHMEP-co-PAA copolymer. When the membrane was optimized through high PHMEP content (70 wt%) and high Ag ions loading (copolymer: AgBF<sub>4</sub> = 1:4), the best separation performance was achieved; CO/N<sub>2</sub> selectivity of 16.2 with a CO permeance of 2.1 GPU.