

Gas Separation by Water-Swollen Membrane

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Abstract : The need to minimize the costs of biogas upgrading leads to a continuous search for new and more effective membrane materials. The improvement of biogas combustion efficiency is connected with polar gases removal from a feed stream. One of the possibilities is the use of water-swollen polyamide layer of thin film composite reverse osmosis membrane for simultaneous carbon dioxide and hydrogen sulphide removal. Transport properties and basic characteristics of a thin film composite membrane were compared in the term of appropriate water-swollen membrane choice for biogas upgrading. SEM analysis showed that the surface of the best performing composites changed significantly upon swelling by water. The surface changes were found to be a proof that the selective skin polyamide layer was swollen well. Further, the presence of a sufficient number of associative centers, namely amido groups, inside the upper layer of the hydrophilic thin composite membrane can play an important role in the polar gas separation from a non-polar gas. The next key factor is a high porosity of the membrane support.

Keywords : biogas upgrading, carbon dioxide separation, hydrogen sulphide separation, water-swollen membrane

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