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2016

COMPARISON OF GASES PERMEATION THROUGH THIN FILM COMPOSITE MEMBRANES

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The depleting energy sources lead to an intensive search for the equilibrium between economy and environmental sustainability. A biomass belongs to the most promising alternative energy sources. The biomass could be converted into biogas via anaerobic digestion by microorganisms. The biogas generally contains water vapour, 50–65 vol. % of CH_4, 30–40 vol. % of CO_2, traces of hydrogen sulphide, oxygen, nitrogen, ammonia, siloxanes and volatile organic compounds [1]. Removal of CO_2 and other impurities is owing to that heating value of biogas is proportional to CH_4 concentration. Furthermore, these impurities can cause corrosion and freezing problems in pipes and connections. Among all possible alternatives, membrane separations offer a lot of advantages such as energy saving, environmental friendliness, easy handling, continuous process, and small foot prints [2,3].

The membrane separation was studied for various feed composition, feed pressure, temperature in the permeation cell, *etc.* Furthermore, selectivity of the separation was studied with respect to obtaining of pure CO_2. This contribution is focused on comparison of the representative polyamide thin film composite (TFC) membranes for the biogas upgrading.

Application of the TFC membrane separation doesn't require any pre-treatment of the feed gas before the gas separation step compared to the other, e.g. glassy polymer membranes. This fact brings a lot of advantages, for example no lose performance due to plasticization by water vapour. The TFC membranes showed good permselectivity, in case that the feed stream contains at least 85% relative humidity, which condenses onto the membrane surface and guarantees a sufficient humidity of the membrane during the separation process. Moreover, humidity improves the solubility of H_2S and CO_2 in the water sorbed into the TFC membrane in comparison with CH_4.

Acknowledgement

The financial support from the Technology Agency of the Czech Republic (project TE01020080) is gratefully acknowledged.

Literature

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