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## **Comparison of Membrane Materials for Biogas Purification.**

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## Comparison of membrane materials for biogas purification

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The bio-methane seems to be very promising source of energy. This alternative source of energy can be obtained from the biomass after the removal of unwanted impurities. The methane concentration in biogas varies usually from 50 vol. % to 70 vol. % depending on its origin. The major impurity of biogas is carbon dioxide. Furthermore, the biogas contains traces of hydrogen sulphide, ammonia, siloxanes, and other compounds. It is usually not possible to remove the impurities in one or two technological steps due to their different chemical nature. The methods utilised for the biogas purification are for example physical or chemical absorption, water scrubbing, pressure swing adsorption, and membrane separation.

Among the possible biogas purification techniques, membrane processes present the technology with many advantages such as operation simplicity, easy maintenance, safety and low operation cost. The main attention has to be paid to the choice of a membrane material. Therefore, the choice of membrane for gas separation is based on specific physical and chemical properties, since these materials should be tailored to separate specific gas mixtures.

The aim of this study is the comparison of different membrane material for biogas separation. The comparison is based on the both our experimental results and found literature data for the binary mixtures containing methane and carbon dioxide. The compared membrane materials cover both flat sheet membranes (ethylene-octene copolymer membranes [1], elastomeric block co-polyamide membranes [2], water swollen thin film composite membranes [3,4], ionic liquid membranes [2,5,6] and mixed membrane matrix [1,7]) and hollow fibre modules (polyacrylonitrile PAN hollow fibre coated by Pebax [8]).

The most selective membranes were found to be ionic liquid membranes (selectivity up to 25) and very good selectivity were obtained for both water swollen membrane (selectivity up to 20) and PAN/Pebax (selectivity up to 18).

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### Literature

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