

Abstract for NAMS 2007

Injection of hydrogen into the European gas network - and recovering the same from the gas mix by use of CMS-membranes at the end user.

Within the 6th European frame work program a large integrated project (NaturalHy) with 39 partners from academia and industry are investigating the possibility of using the existing natural gas network for transport of hydrogen (up to 30%) in mixture with natural gas (NG). The hydrogen will be injected into the gas net where it is being produced, and by the end user it will be separated out again from the gas mix. One option for this separation is by using membranes, and the focus for the research reported here, is carbon molecular sieve membranes with high H₂/CH₄ selectivity. The research group, Memfo at NTNU in Norway, is a partner in the NaturalHy-project and is tailoring CMS membranes for performing H₂-CH₄ separation.

In the main distribution net, the gas pressure will be high (~40 bar), while where the separation is to take place at the end user, the gas feed pressure to the membrane will be 6-8 bar.

The performance of the membrane investigated so far is done for single and mixed gas (mix of NG – H₂ in a range with 5 – 30vol% H₂), with feed pressure 2 - 6 bar and temperature 25° – 90°C. The H₂ permeability documented is in the range of 600 - 1000 Barrer, and with a selectivity H₂/CH₄ > 1000 for the mixed gas. The effect of aging and regeneration has also been investigated. The precursor used for the preparation of the CMS-membrane is cellulose derived from wood pulp with metal salts added – the best results were obtained with copper(II)nitrate and silver nitrate.

The concept of the project, as well as obtained results for membrane separation, will be discussed in the presentation.