



Extension of the scope of Pervatech pervaporation membranes

Demonstration of the usefulness of silica-based ceramic membranes for pervaporation



Project: CS-01-05
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Partners: Pervatech, DSM, Huntsman, NL GUTS
Budget: 49,8 K€
Duration: Successfully completed

Incentive:

The incentive of the project is to demonstrate the usefulness of Pervatech membranes in a few new applications and broadening the scope of applicability. In one industrial application both organophilic and hydrophilic pervaporation will be studied for the selective separation and dehydration of a specific organic molecule. Two processes are to be researched:

At DSM:

Selective separation of an organophilic compound by organophilic pervaporation, followed by dehydration with ceramic hydrophilic pervaporation membranes.

At Huntsman:

Dehydration of methanol streams.
Better use of the methanol in the chemical reaction

Objective:

DSM:

With organophilic pervaporation membranes the by-products of the fermentation and chemical reaction can be selectively separated. The permeate contains water, reaction products and low molecular weight species which poison the chemical reaction. In-situ removal of those species during the reaction will result in higher yield and higher quality of the desired product. After organophilic separation the permeate is further dehydrated by means of the ceramic pervaporation membranes.

Huntsman:

By introduction of ceramic pervaporation membranes the impact of the build-up of the impurities can be reduced or eliminated. Other technologies were not successful to get rid of the impurities.

Approach:

A test program is defined for the specific point of implementation of the pervaporation process. Tests will be carried out to determine the feasibility and process impact with pervaporation.

Step one is "proof of principal" with model feed stock, followed by testing with real life feed stock.

The pervaporation process parameters will be optimized according to the findings of the measurements.

Cleaning protocol will be studied, as the project will continue.

Evaluation and recommendation for scale up towards industrial implementation.

Results:

- 1) Proof of eliminating the drawbacks of the conventional process compared to pervaporation with ceramic membranes.
- 2) Indication of economical feasibility, process stability and sensitivity for fouling, cleaning protocol.
- 3) The outlines for industrial implementation of ceramic pervaporation membranes in the target processes at DSM and Huntsman.

