

HybSi[®] membranes for dehydration of organic solvents by pervaporation

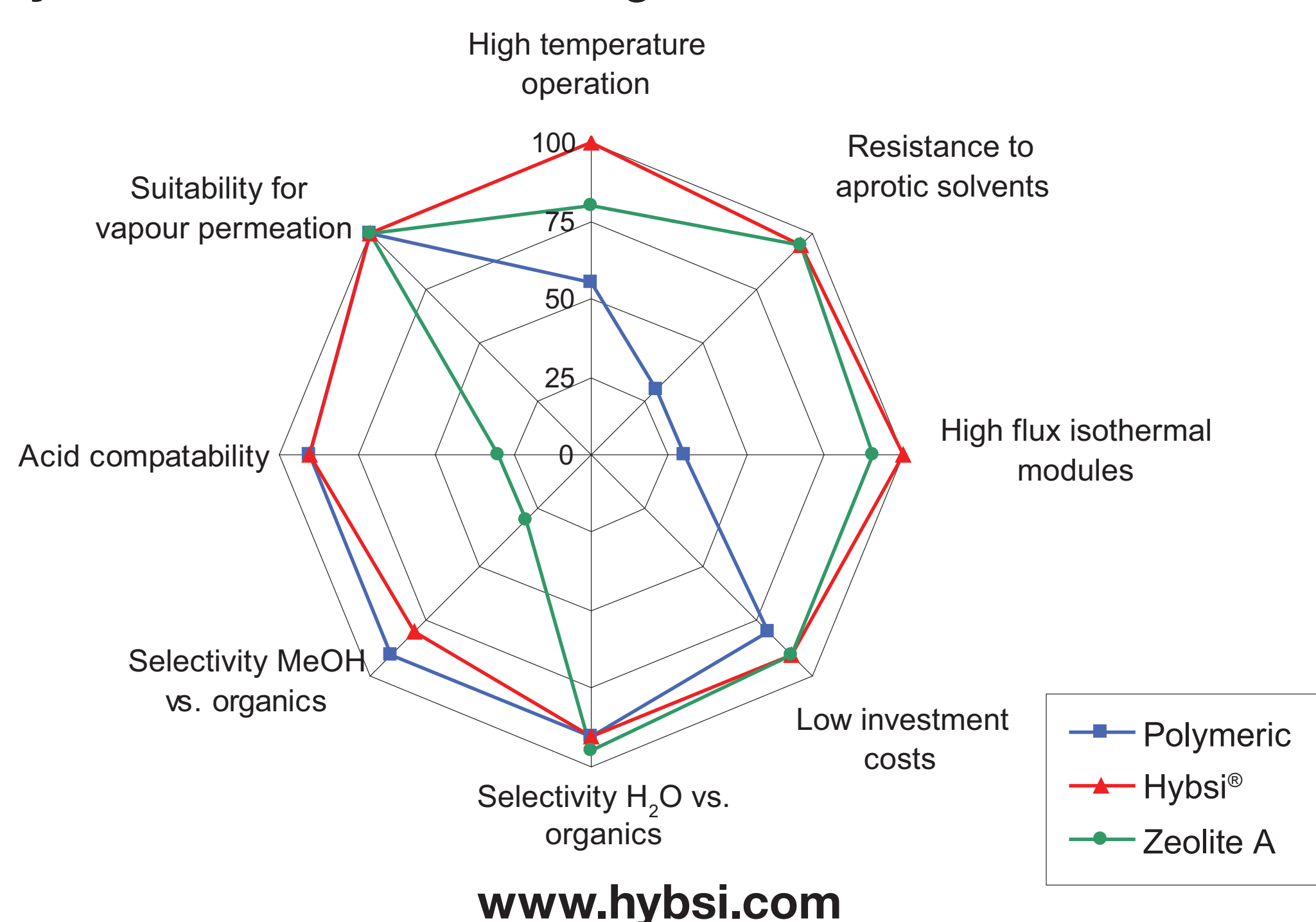


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Background

Hybrid silica HybSi[®] membranes for dehydration pervaporation available on m² scale. It has high performance and an unprecedented stability in dehydration pervaporation^{1,2,3}.

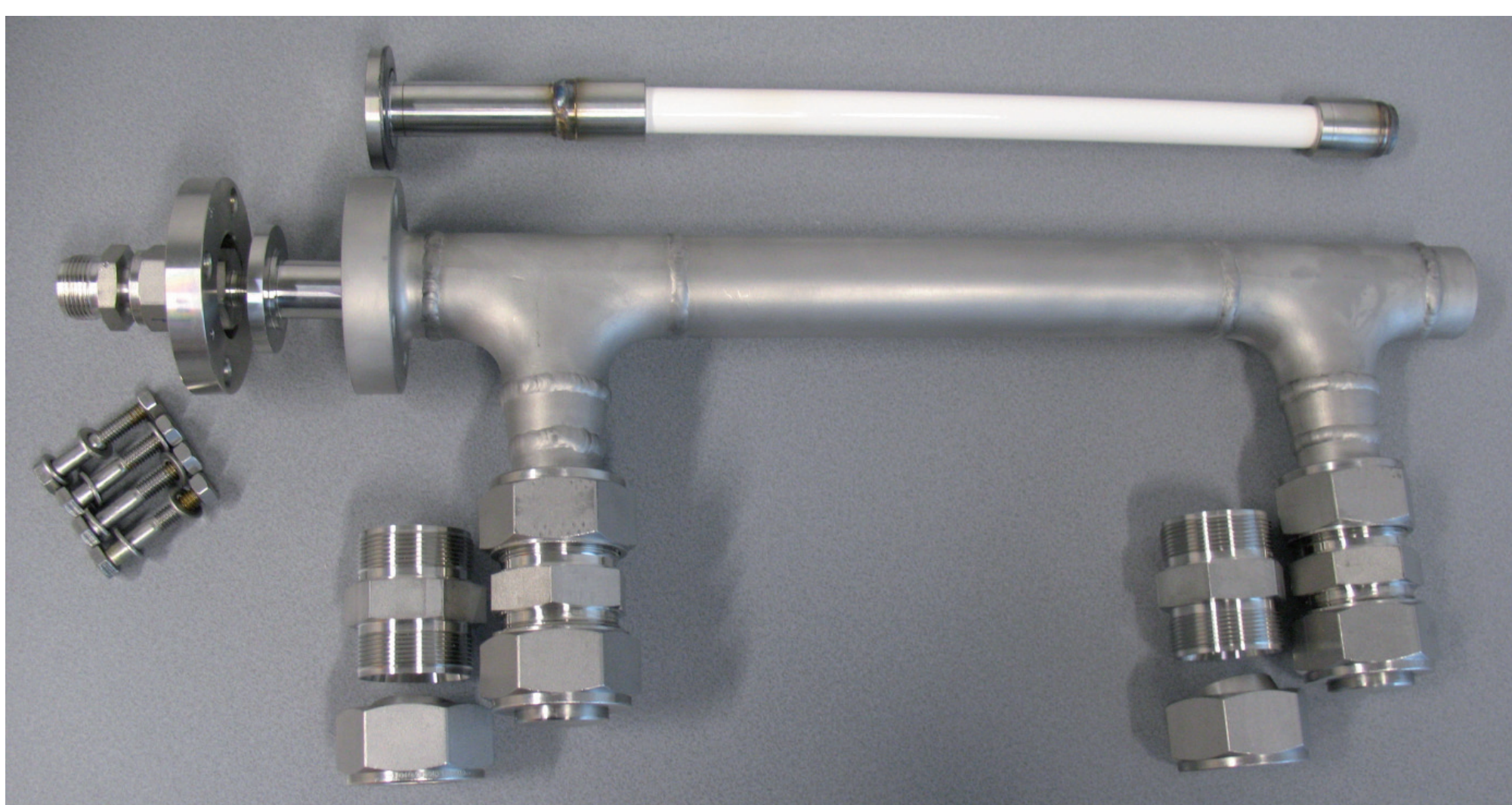
HybSi[®] membrane advantages



Applications

- Azeotropes of water with e.g. ethanol, acetonitrile, methylethylketone, methylacetate, tetrahydrofuran.
- Dehydration of solvents like dimethylfuran or n-methyl pyrrolidone.
- Complex distillations in production processes like acrylates, carbonates, bisphenol A, terephthalic compounds.

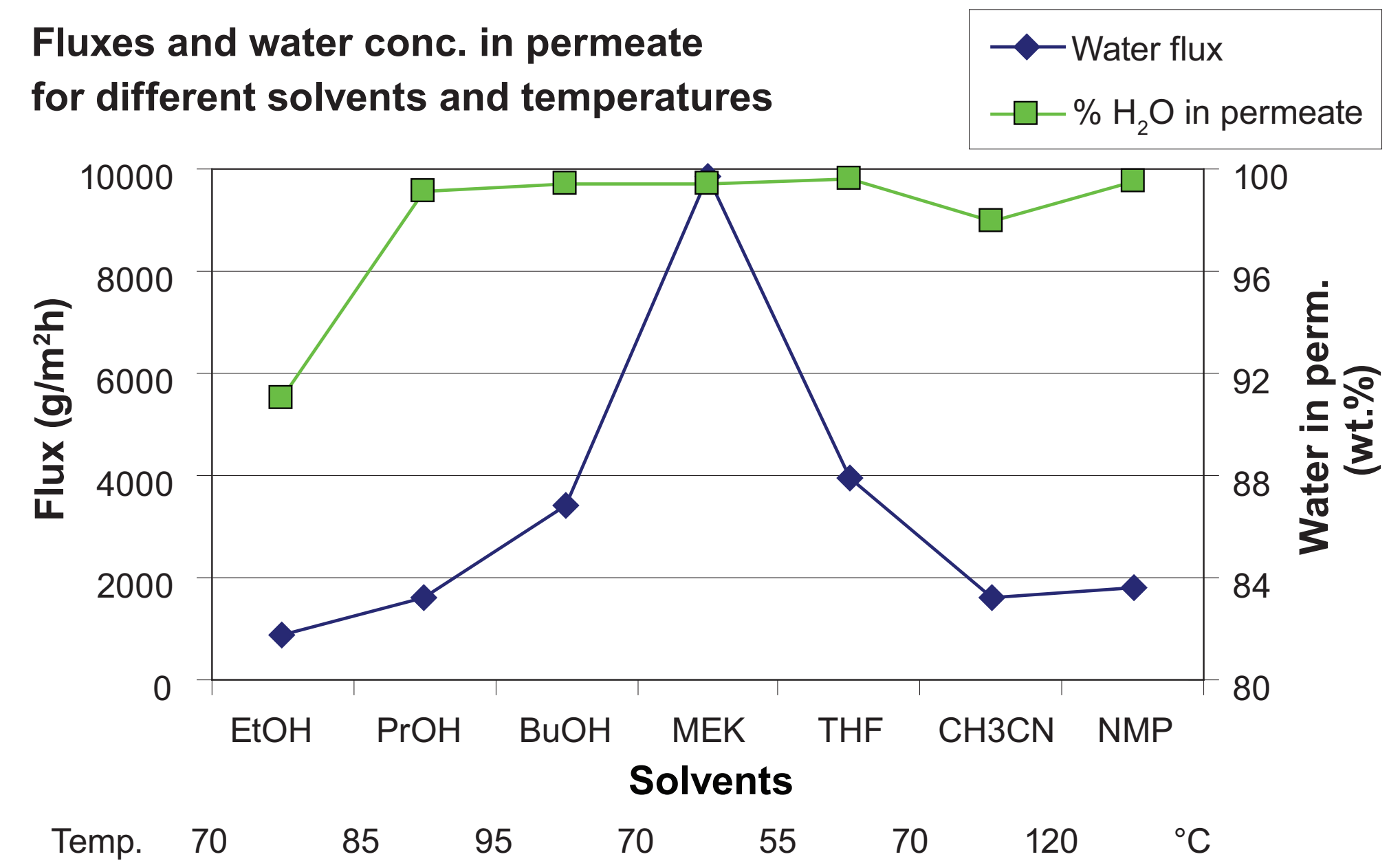
Lab scale membrane and module



Pervaporation test results

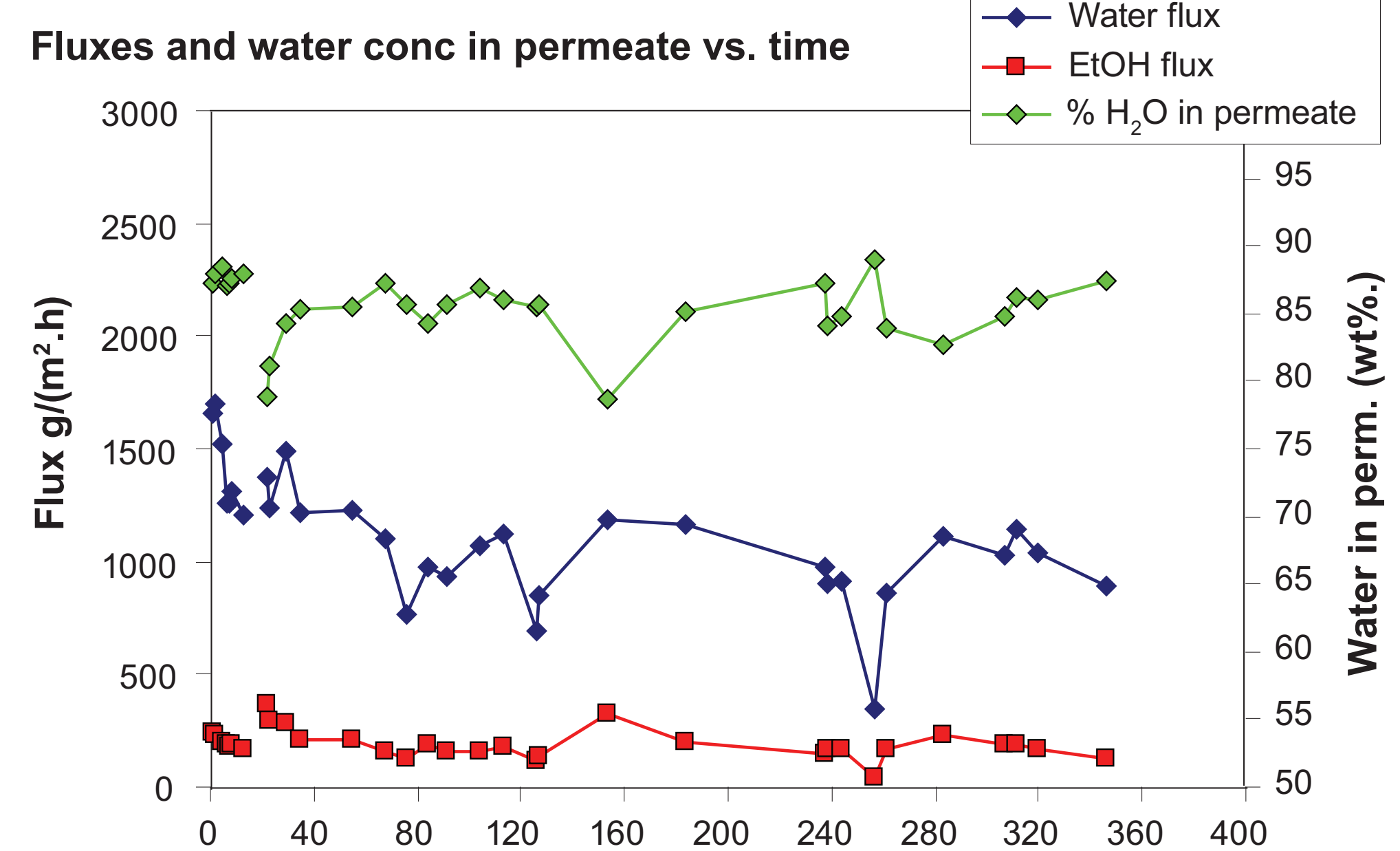
(Feed = 5 wt.% H₂O in solvent at different temp.)

Fluxes and water conc. in permeate for different solvents and temperatures



(Feed = 5 wt.% H₂O in EtOH + 1.5 wt.% HAc, 70°C)

Fluxes and water conc in permeate vs. time



Conclusions about HybSi[®]

- Protected by ECN patents.
- Stable > 2.5 years in pervaporation at 150°C.
- Dehydration of aprotic solvents and acids.
- Energy savings up to 70% and return on investments < 3 years.
- Pilot scale demonstration started.
- First license signed with membrane producer.

References

1. H. Castricum, Chem. Commun., (2008) 1103-1105
2. H. Castricum, J. Membr. Sci., 324 (2008) 111-118
3. R. Kreiter, ChemSusChem, 2 (2009) 158-160