

# Acetic acid dehydration using HybSi<sup>®</sup>-AR membranes

## Authors

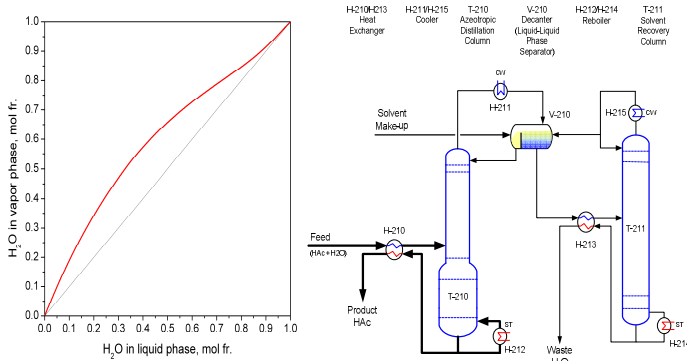
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## Introduction

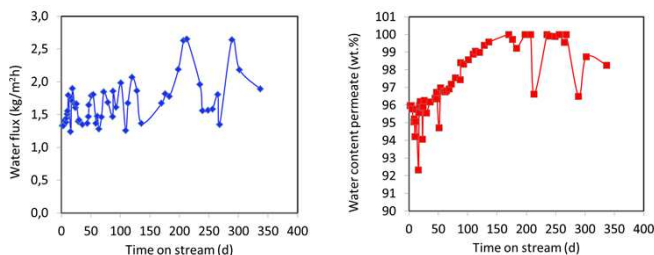
### Pervaporation based process for energy efficient dehydration of acetic acid (HAc):

- HAc: important commodity chemical
- HAc - H<sub>2</sub>O: close boiling points and narrow VLE curve
- Distillation + liquid-liquid extraction can reduce the energy consumption by 20-40%, though large recycle is needed
- Further efficiency improvement by pervaporation to separate main part of the water
- New HybSi<sup>®</sup>-Acid Resistant membrane developed with high acid stability and enabling high temperature use, see [www.hybsi.com](http://www.hybsi.com)



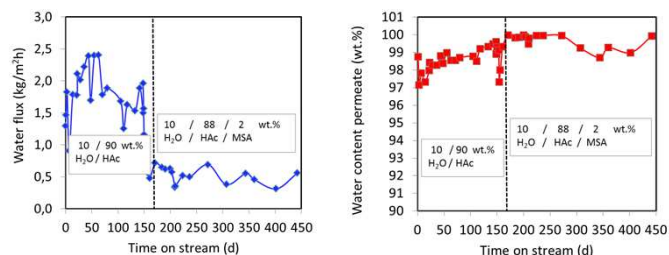
## Increased acid resistance

- Feed: 10 wt.% H<sub>2</sub>O in HAc at ~ 100°C
- Membrane performance is good and even increases during > 300 days of continuous testing



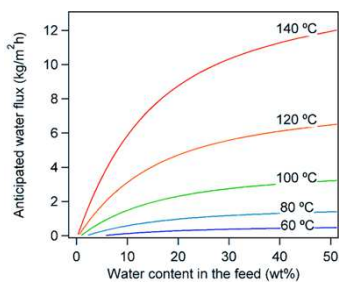
## Further acid resistance

- Add 2 wt.% Methane Sulphonic Acid = decrease pH to ~ 0.5
- Reduced flux due to reduced driving force
- Stable membrane performance for > 300 days continuous operation

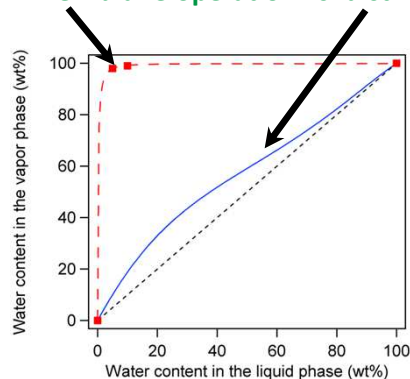


## Outlook

- High selectivity one step purification
- High fluxes possible under industrial conditions
- Membrane resistant against selected media and conditions
- Potential use in esterification and acetalisation reactions: conversion increase by water removal and equilibrium shift



## HybSi<sup>®</sup>-AR membrane operation vs. distillation



## Conclusions

- The new HybSi<sup>®</sup>-AR membrane is resistant against organic acids even at very low pH values
- Energy savings ~ 20% and few years pay back time possible in acetic acid dehydration
- Expected is that in dehydration of all kind of organic acids important process improvements are possible

## Acknowledgements

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