NF Membranes for Organic Solvents

Separation of small molecules

SolSep BV

Solutions for Separations

SolSep Membranes

SolSep BV produces membrane modules that are stable in organic solvents. These modules are available in spiral wound designs.

The choice of a membrane depends on the system: solvent and solute are important. It is important to have reliable characterization data to choose the proper membranes easily. We have compared two test methods that could be used.

Performance SolSep Membranes

Indicative retention performances are shown in table 1. The retention values in **acetone/sunflower** oil or **hexane/SF** are quick tests SolSep is using. Molecular weight cut off (MWCO) has been measured by EMI-Twente using a new characterization test for non-aqueous systems. (exactly same samples were measured)

Table 1. Retention/cut off of SolSep membranes

Membrane	Retention (%)-SF			MWCO (g/mole)	
	acetone	hexane		acetone/PS	hexane/PIB
SolSep 010206	99+	70		<200	7000
SolSep 010306	95	30		<200	>7000
SolSep 030105	80	50		300	8000
SolSep 030306	70	85+		>1000	1600

SF: sunflower oil (MW~990g/mole; 5wt% in solvent)
PS: polystyrene, PIB: polyisobutylene (wt 0.3% in solvent)
MCWO tests executed by EMI Twente

Quick-test and MWCO measurements yield the same separation order. It is clear that in hexane the membranes are much more open. As PIB is a highly linear molecule this might be even more pronounced.

Advantage of the MWCO test is that the membrane properties are given as a (minimal) mol mass that is retained (90%). This is much more conform established practice and terminology in membrane technology.

EMI Twente

MWCO tests have been executed by the European Membrane Institute Twente www.membrane.nl

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New developments

The current commercial (see left column) membranes have their practical limit in separation of small molecules typically around 200 g/mole). Below, SolSep presents newly developed membranes that can separate smaller molecules from solvents like acetone and MEK

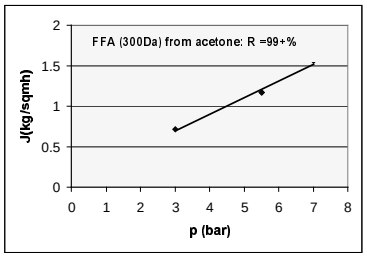

Figure 1. Separation of free fatty acids (Mw = 300g/mole) from acetone. Retention 99+%

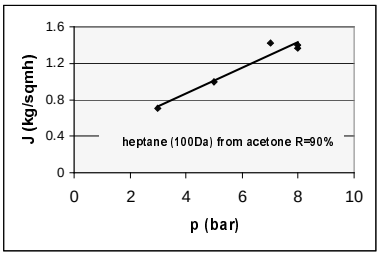

Figure 2. Separation of heptane (Mw =100Da) from acetone. Retention = 90%.

Final remarks

It is possible to make membranes that separate small molecules and even solvents. The importance of solvent type becomes more important. This is because the interaction between solvent, solute and membrane needs to be more intense to render a sufficient separation. Eventually, reverse osmosis seems possible for at least some solvent systems.

Solsep BV info: Dr Ir F.P.Cuperus, cuperus@solsep.com;tel:+31 55 534 9885