SUPPLEMENTARY MATERIAL

PDMS-Based Membranes

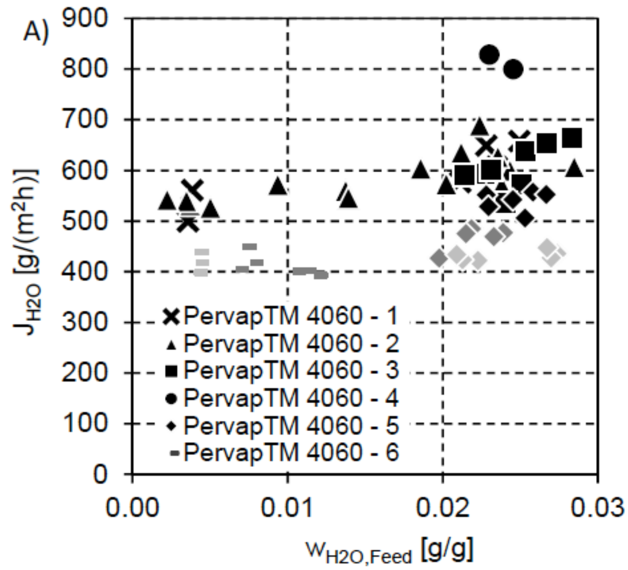

Figure A1: Permeate fluxes of water through different Pervap™ 4060 membranes *(T = 37 °C, p_{Perm} = 10 mbar)*. Pervaporation was carried out using binary mixtures of water with butanol (black), acetone (grey) and ethanol (light grey).

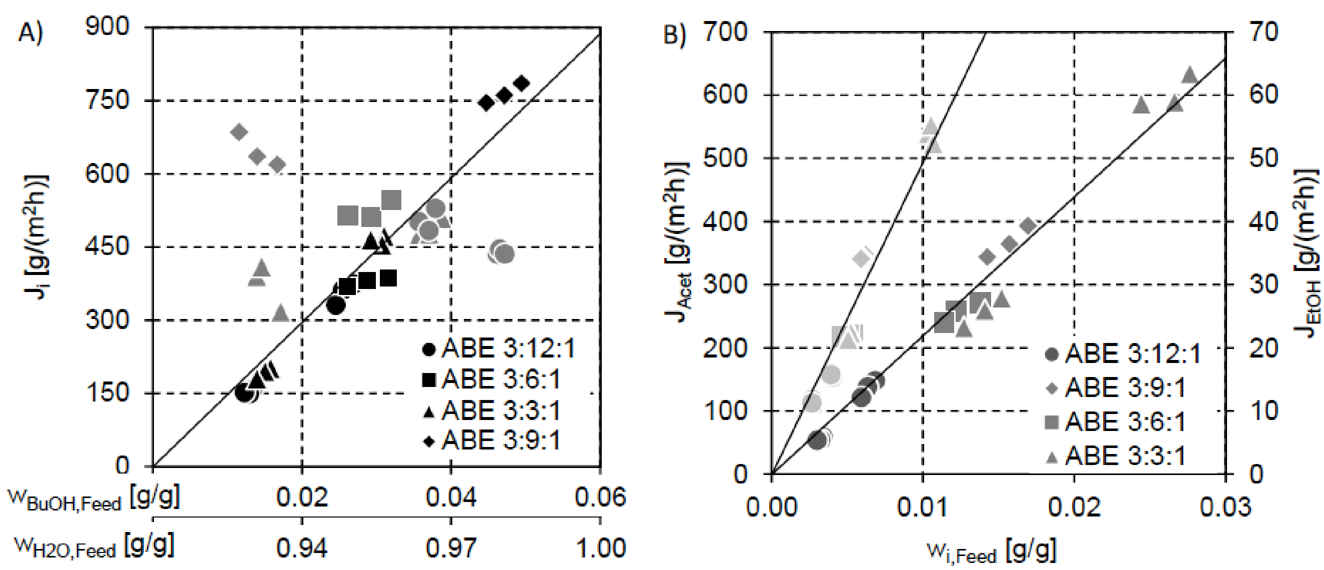

Figure A2: Permeate fluxes through Pervap™ 4060 membranes, determined for varying A:B:E ratios in the feed *(T = 37 °C, p_{Perm} = 10 mbar)*. (**A**) permeate fluxes of butanol (black) and water (grey); (**B**) permeate fluxes of acetone (grey) and ethanol (light grey).

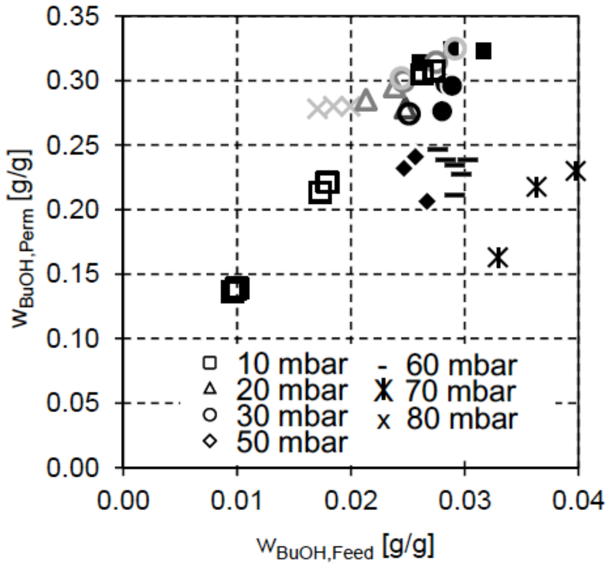

Figure A3: Butanol permeate concentrations determined with Pervap^{TM} 4060 membranes for varying temperatures (black = 37 °C; grey = 50 °C; bright grey = 60 °C) and permeate pressures (10 mbar to 80 mbar). Feed mixtures contained acetone, butanol and ethanol in a 3:6:1 ratio.

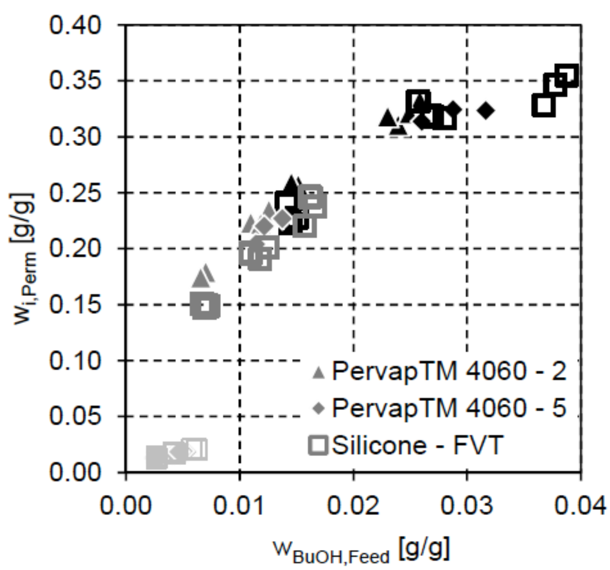

Figure A4: Comparison of permeate concentrations of butanol (black), acetone (grey) and ethanol (bright grey) obtained with the commercially available Pervap^{TM} 4060 membranes and the silicone membrane produced by our group (Silicone-FVT).

PEBA Membranes

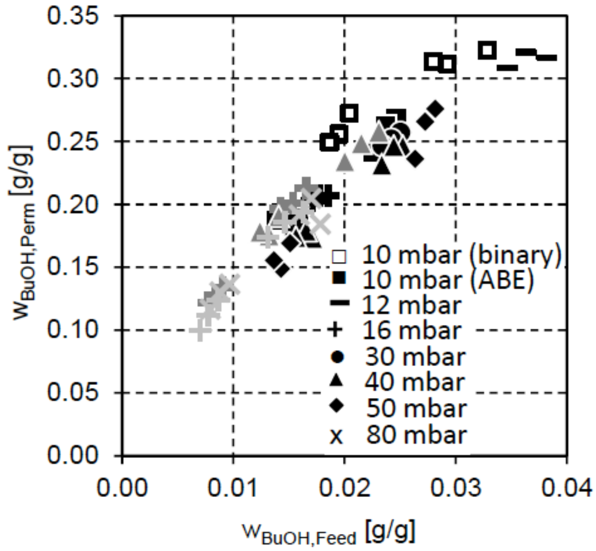

Figure A5: Butanol permeate concentrations determined with PEBA membranes for varying temperatures (dark grey = 37 °C; grey = 50 °C; bright grey = 60 °C) and permeate pressures (10 mbar to 80 mbar). Feed mixtures contained acetone, butanol and ethanol in a 3:6:1 ratio.

Table A1: NRTL Binary Parameter Sets for Calculation of Vapour-Liquid Equilibria with Aspen Properties®

Component 1 Component 2	Water Butanol	Water Acetone	Water Ethanol	Water Acetic ac.	Water Butyric Ac.	Butanol Acetone	Butanol Ethanol	Butanol Acetic ac.
Source	Regression[a)]	APV72 VLE-IG	APV72 VLE-IG	APV72 VLE-HOC	APV72 VLE-LIT	APV72 VLE-LIT	APV72 VLE-LIT	APV72 VLE-HOC
a_{12} [-]	4.812	0.0544	3.4578	3.329	0	0	0	0
a_{21} [-]	-0.274	6.398	-0.801	-1.976	0	0	0	0
b_{12} [K]	-295.802	419.971	-586.080	-723.888	1176.962	299.218	8.437	-381.596
b_{21} [K]	132.137	-1808.991	246.18	609.889	14.810	-43.141	33.483	550.162
c_{12} [-]	0.3	0.3	0.3	0.3	0.397	0.3	0.347	0.3

Component i Component j	Acetone Ethanol	Acetone Acetic ac.	Ethanol Acetic ac.	Acetic ac. Butyric Ac.	Butanol Butyric Ac.	Ethanol Butyric Ac.	Acetone Butyric Ac.
Source	APV72 VLE-RK	APV72 VLE-HOC	APV72 VLE-HOC	UNIFAC	UNIFAC	UNIFAC	UNIFAC
a_{12} [-]	-1.030	0	0	0.469	-0.287	0.348	0.169
a_{21} [-]	-0.259	0	0	-0.408	0.224	-0.163	-0.148
b_{12} [K]	416.749	667.699	225.476	49.707	-204.316	103.343	675.567
b_{21} [K]	228.279	-392.710	-252.482	-15.044	300.426	-122.242	-389.848
c_{12} [-]	0.3	0.3	0.3	0.3	0.3	0.3	0.3

[a]Regression was necessary to reliably describe activity coefficients of butanol at small concentrations and at infinite dilution. The data used for fitting were taken from:

- Iwakabe K, Kosuge H. Isobaric vapor-liquid-liquid equilibria with a newly developed still. Fluid Phase Equilib 2001; 192, 1-2: 171-186.
- Gao Z, Wang S, Sun Q, Zhang F. Isobaric phase equilibria of the system 1-butanol + water containing penicillin G potassium salt at low pressures. Fluid Phase Equilib 2003; 214, 2: 137-149.
- Tikhonov MB, Markuzin NP, Toikka AM. Liquid-vapor equilibrium and open evaporation in dibutyl ether-water-n-butyl alcohol systems. Zh Obshch Khim 1995; 65, 2: 180-184.
- Butler JAV, Thompson, DW, MacLennan WH. 173. The free energy of the normal aliphatic alcohols in aqueous solution. J of the Chem Soc 1933: 674-686.
- Kojima K, Zhang S, Hiaki T. Measuring methods of infinite dilution activity coefficients and a database for systems including water. Fluid Phase Equilib 1997; 131, 1-2: 145-179.