



1 Supplementary Material

2 Selective Separation of 1-Butanol from Aqueous

3 Solution through Pervaporation Using PTSMP-Silica

4 Nano Hybrid Membrane

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15 Measurement of release of SNPs into the methanol:

16 A clean hybrid membrane was cut into square shape with size of 2x2 cm and then was soaked

17 in methanol for 24 hours. After soaking the membrane was dried at 50 °C for 1 hour using oven. The 18 mass of dried membrane before and after soaking was measured using Ohaus DV215CD

18 mass of dried membrane before and after soaking was measured using Ohaus DV215CD 19 balance with the precision of 0.00005g and remained unchanged. The control sample of neat

20 membrane was subjected to the same procedure and also showed no detectable weight loss.



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22Figure S1. Arrhenius-type plot for for 1.5 w/w% feed 1-butanol concentration. Apparent activation23energy for pervaporation: $E_{a,hybrid} = 14.2 \text{ kJ/mol}$, $E_{a,PTMSP} = 22.3 \text{ kJ/mol}$. Solid lines represent hybrid24PTMSP membrane and dotted lines represent neat PTMSP membrane.



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Figure S2. Plots illustrating the activation energy for the permeability coefficient of 1-butanol and water using 1.5 w/w% feed 1-butanol concentration. Solid lines represent hybrid PTMSP membrane and dotted lines represent neat PTMSP membrane. (■−1-butanol and ●−water).



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Figure S3. Plots illustrating the activation energy for permeability coefficient of 1-butanol and water
 using 3 w/w% feed concentration. Solid lines represent hybrid PTMSP membrane and dotted lines
 represent neat PTMSP membrane. (=-1-butanol and •-water).



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Figure S4. Plots illustrating the activation energy for permeability coefficient of 1-butanol and water
 at using 4.5 w/w% feed concentration. Solid lines represent hybrid PTMSP membrane and dotted
 lines represent neat PTMSP membrane. (=-1-butanol and •-water).

37 Table S1. Activation energy for both hybrid and neat membrane at shown concentrations of 1-butanol38 in the feed.

	Hybrid Membrane (kJ·mol ⁻¹)			Neat Membrane (kJ·mol ⁻¹)		
_	1.5 w/w%	3 w/w%	4.5 w/w%	1.5 w/w%	3 w/w%	4.5 w/w%
1-Butanol	-10.1	-44.4	-24.3	-44.5	-18.7	-39.5
Water	-43.0	-47.3	-52.7	-20.1	-21.5	-33.8

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