

Supporting information for

Postfunctionalization of Nanoporous Block

Copolymer Membranes via Click Reaction on

Polydopamine for Liquid Phase Separation

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SEM images and image analysis

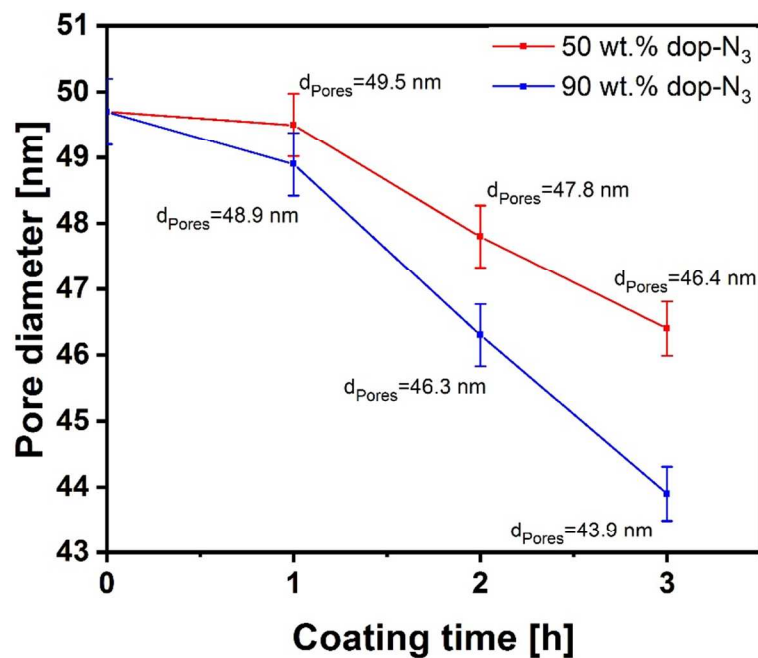


Figure S1. Plot of the average pore diameter of PS-*b*-P4VP membranes after coating with different compositions of poly(dop-N₃/dopamine) as function of the coating time

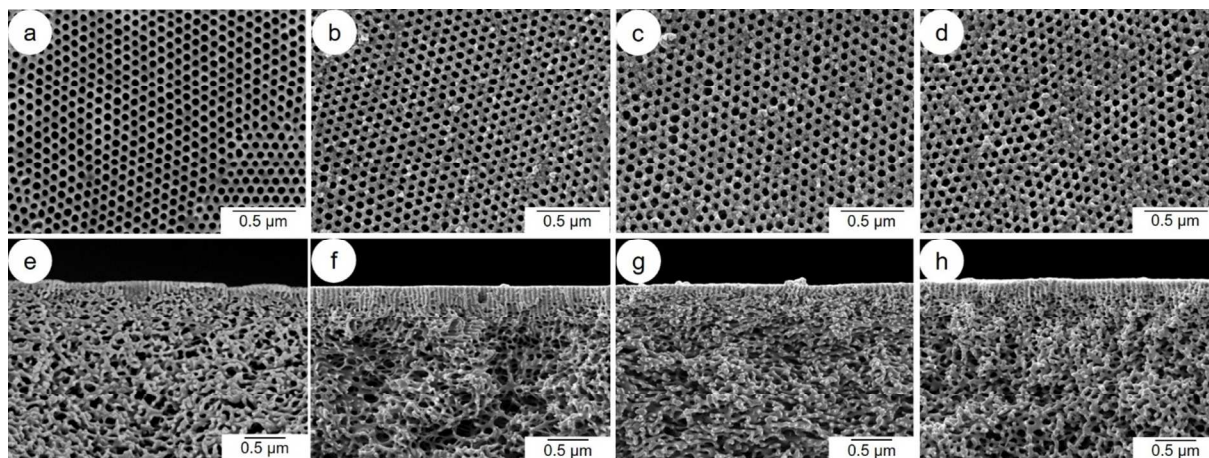


Figure S2. SEM images: surface and cross-sections of (a, e) pristine PS-*b*-P4VP membrane, (b, f) PS-*b*-P4VP membrane modified with 50 wt.% dop-N₃ for 2 h, (c, g) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” 1-nonyne, (d, h) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” PDMAPS

XPS analysis

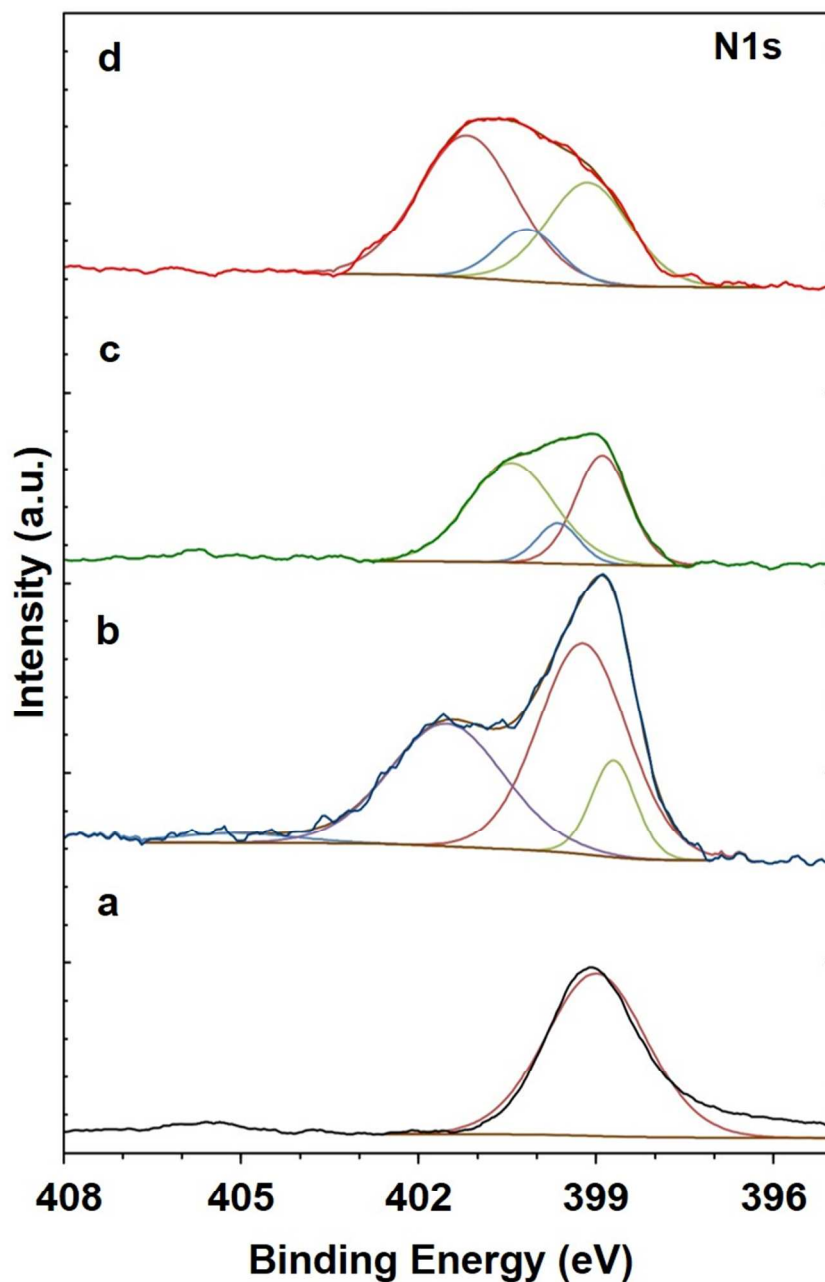


Figure S3. XPS spectra of the N1s region for (a) pristine PS-*b*-P4VP membrane (b) PS-*b*-P4VP membrane modified with 50 wt.% dop-N₃ for 2 h, (c) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” PDMAPS, (d) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” 1-nonyne

AFM images

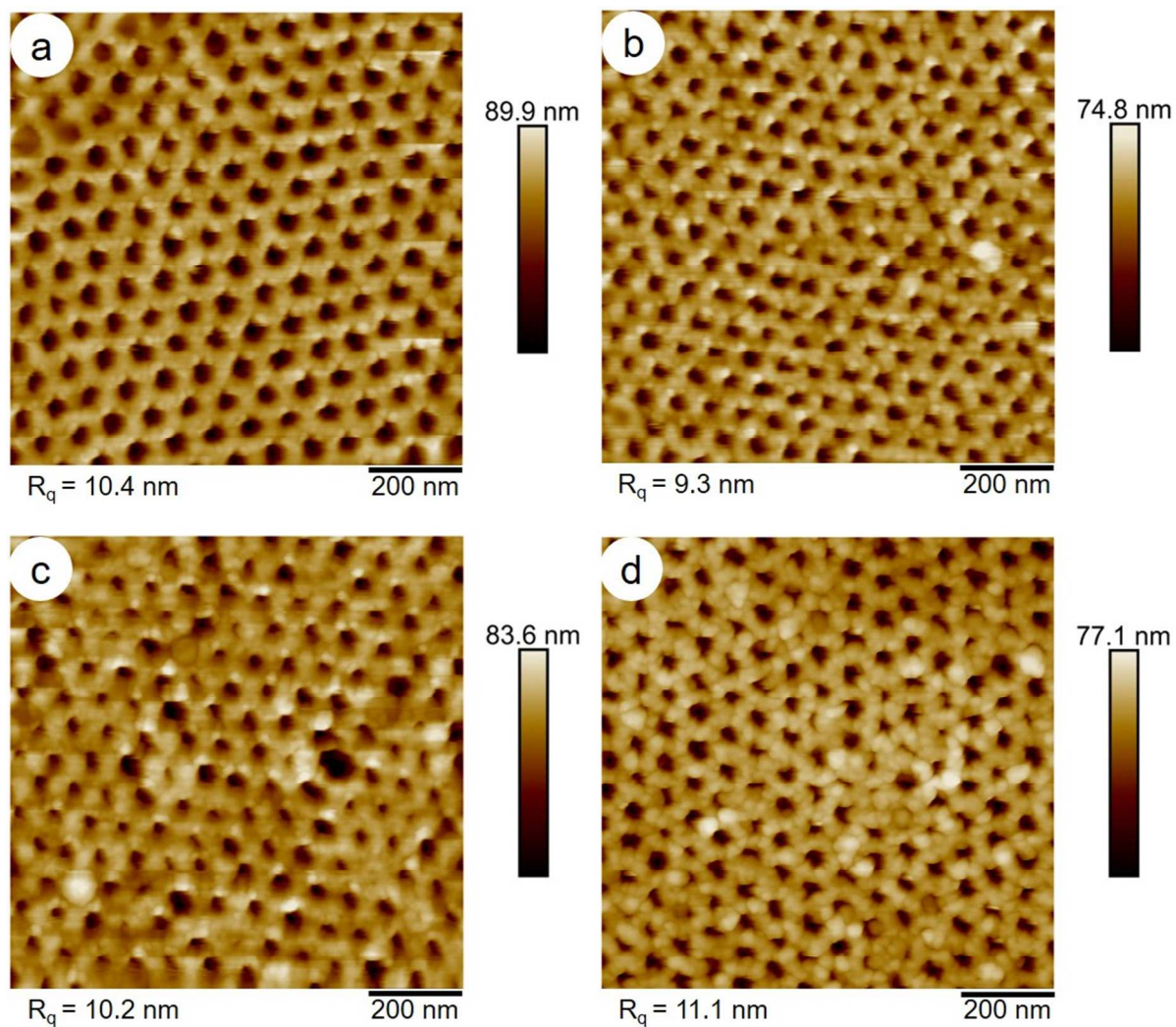


Figure S4. AFM surface height images in dry state (a) pristine PS-*b*-P4VP membrane, (b) PS-*b*-P4VP membrane modified with 90 wt.% dop-N₃ for 2 h, (c) PS-*b*-P4VP membrane + 90 wt.% dop-N₃ + “Click” 1-nonyne, (d) PS-*b*-P4VP membrane + 90 wt.% dop-N₃ + “Click” PDMAAPS

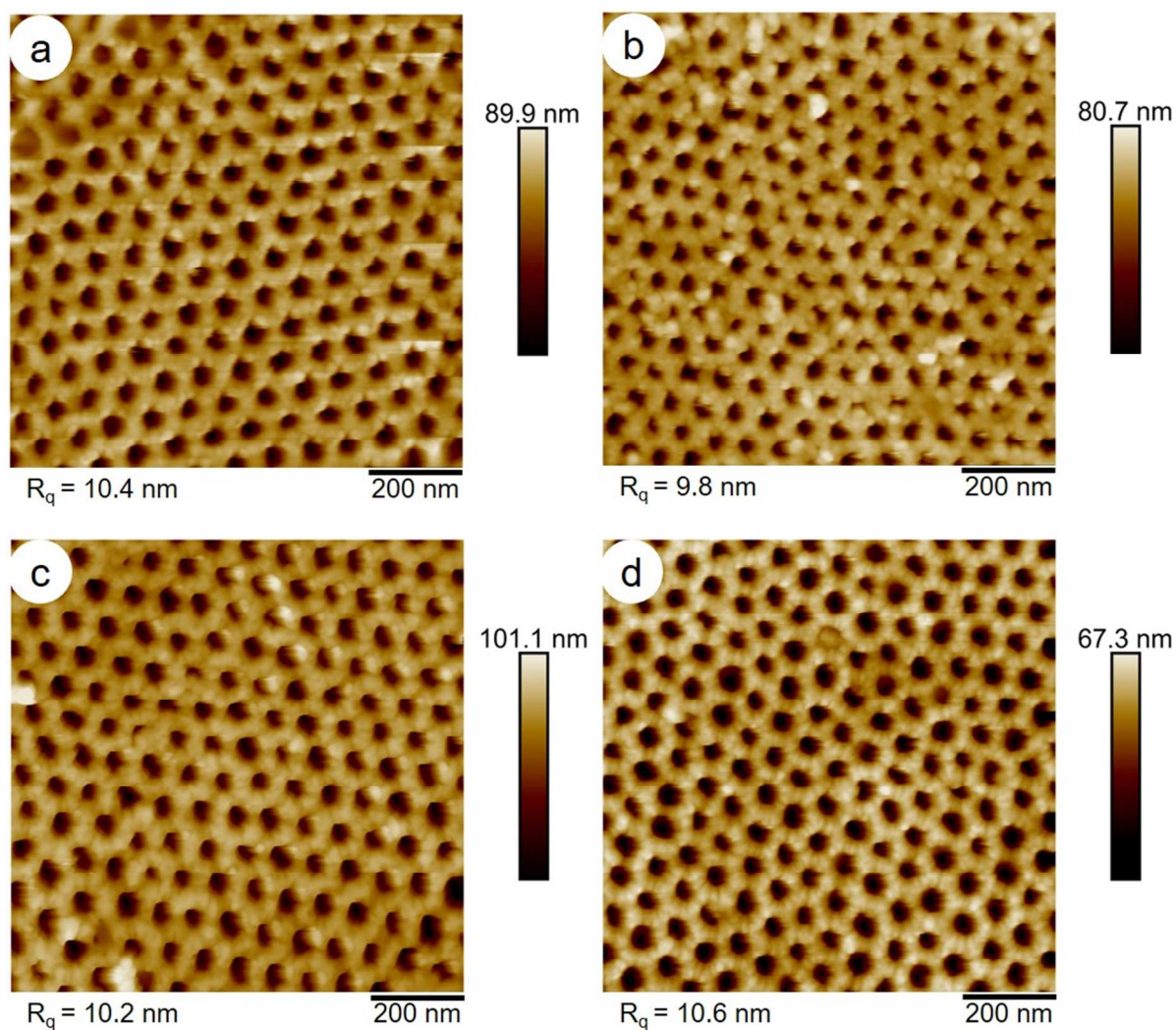


Figure S5. AFM surface height images in dry state (a) pristine PS-*b*-P4VP membrane, (b) PS-*b*-P4VP membrane modified with 50 wt.% dop-N₃ for 2 h, (c) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” 1-nonyne, (d) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” PDMAPS

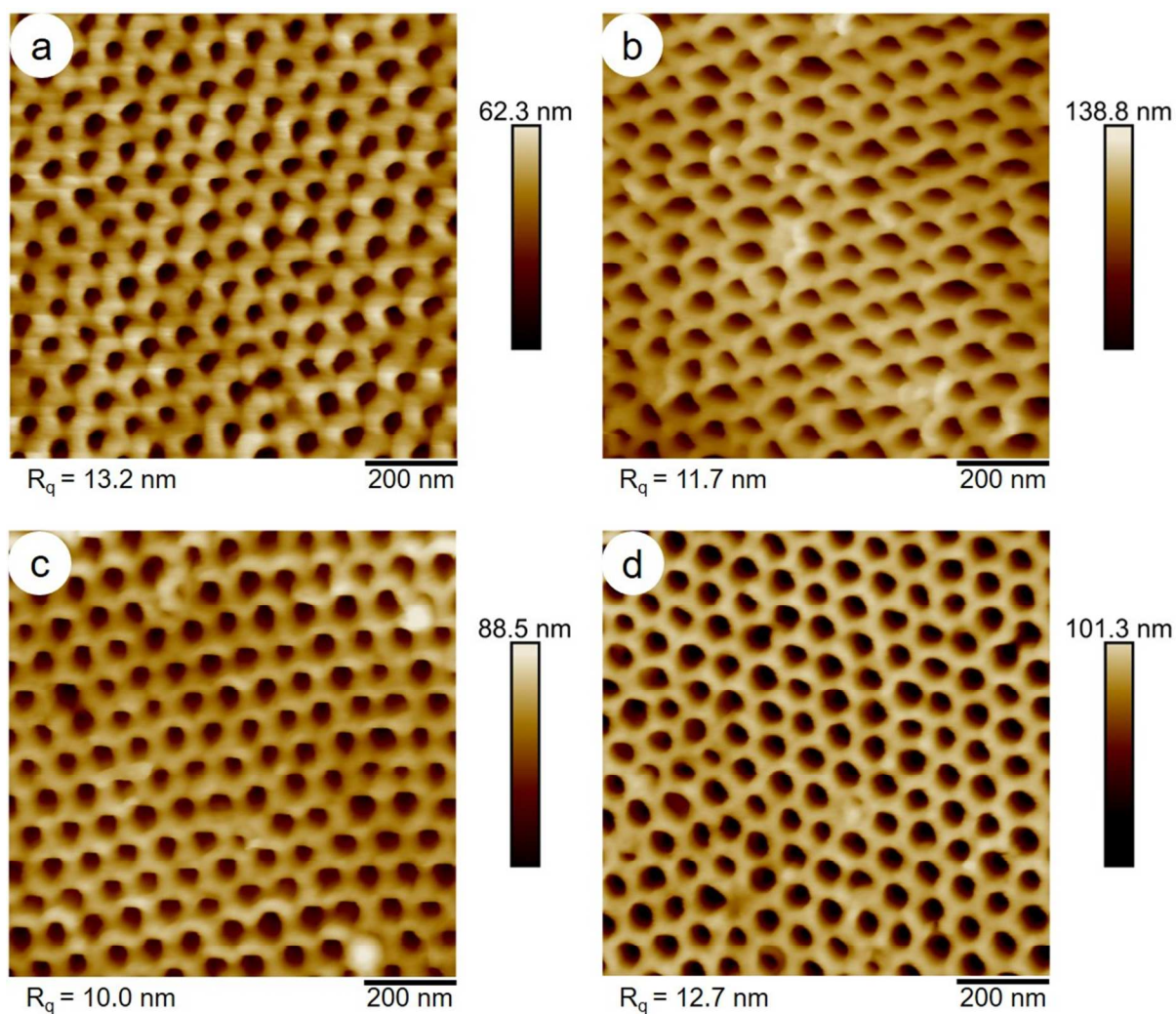


Figure S6. AFM surface height images measured in PBS-buffer (a) pristine PS-*b*-P4VP membrane, (b) PS-*b*-P4VP membrane modified with 50 wt.% dop-N₃ for 2 h, (c) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” 1-nonyne, (d) PS-*b*-P4VP membrane + 50 wt.% dop-N₃ + “Click” PDMAPS

Table S1. Mean square roughness values of the pristine and the modified membranes

	PS- <i>b</i> -P4VP membrane			
	pristine	50 wt.% dop-N ₃	50 wt.% dop-N ₃ + “Click” 1-nonyne	50 wt.% dop-N ₃ + “Click” PDMAPS
Roughness R _q in dry state [nm]	10.4 ± 2.1	9.8 ± 1.7	10.2 ± 1.4	10.6 ± 1.7
Roughness R _q in PBS-buffer [nm]	13.2 ± 2.4	11.7 ± 2.3	10.0 ± 1.8	12.7 ± 1.9

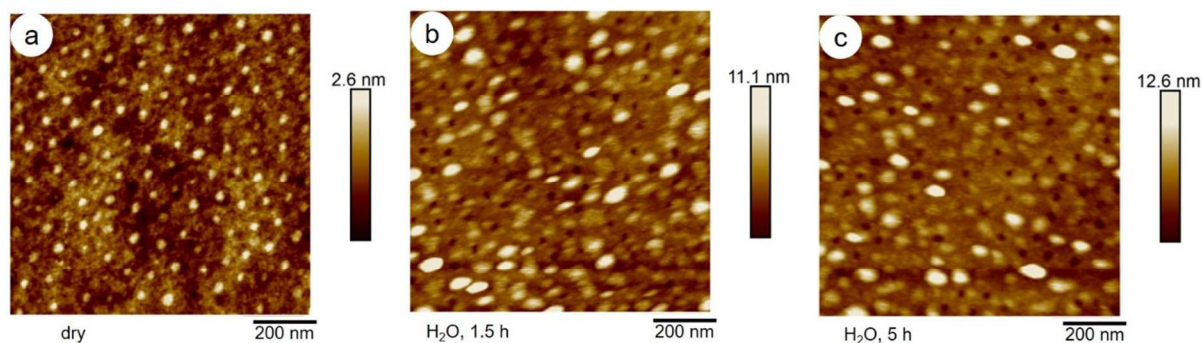


Figure S7. AFM height images of PS₇₆-*b*-P4VP₂₄¹⁹⁷ films (spin-coated film using a solution of 2 wt.% polymer in chloroform) measured (a) in dry state, (b) 1.5 h after applying ultrapure water and (c) 5 h after applying ultrapure water; the deformation of the P4VP domains in (b) and (c) is due to thermal drift

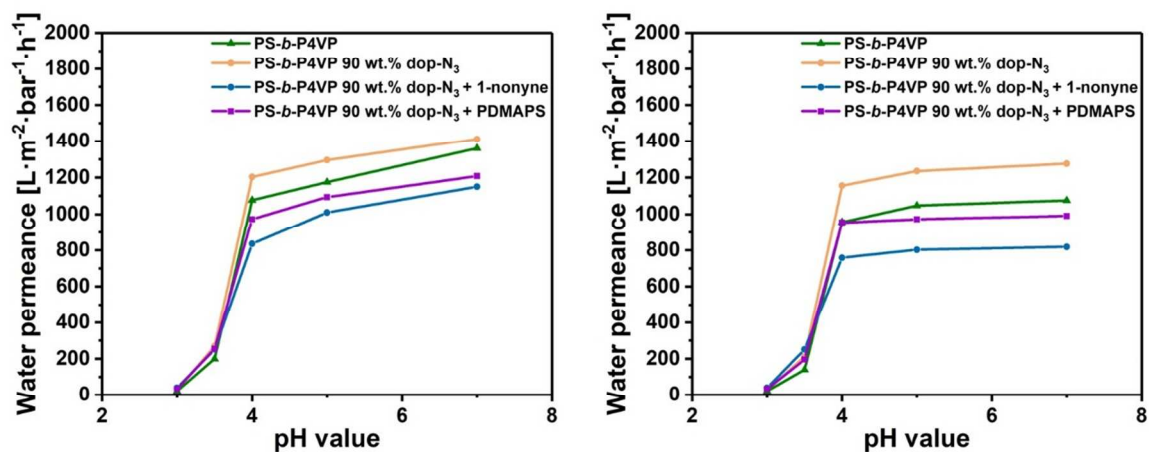


Figure S8. pH dependence of water permeance of the pristine PS-*b*-P4VP membrane and the modified PS-*b*-P4VP membranes; decreasing pH value (left) and increasing pH value (right)

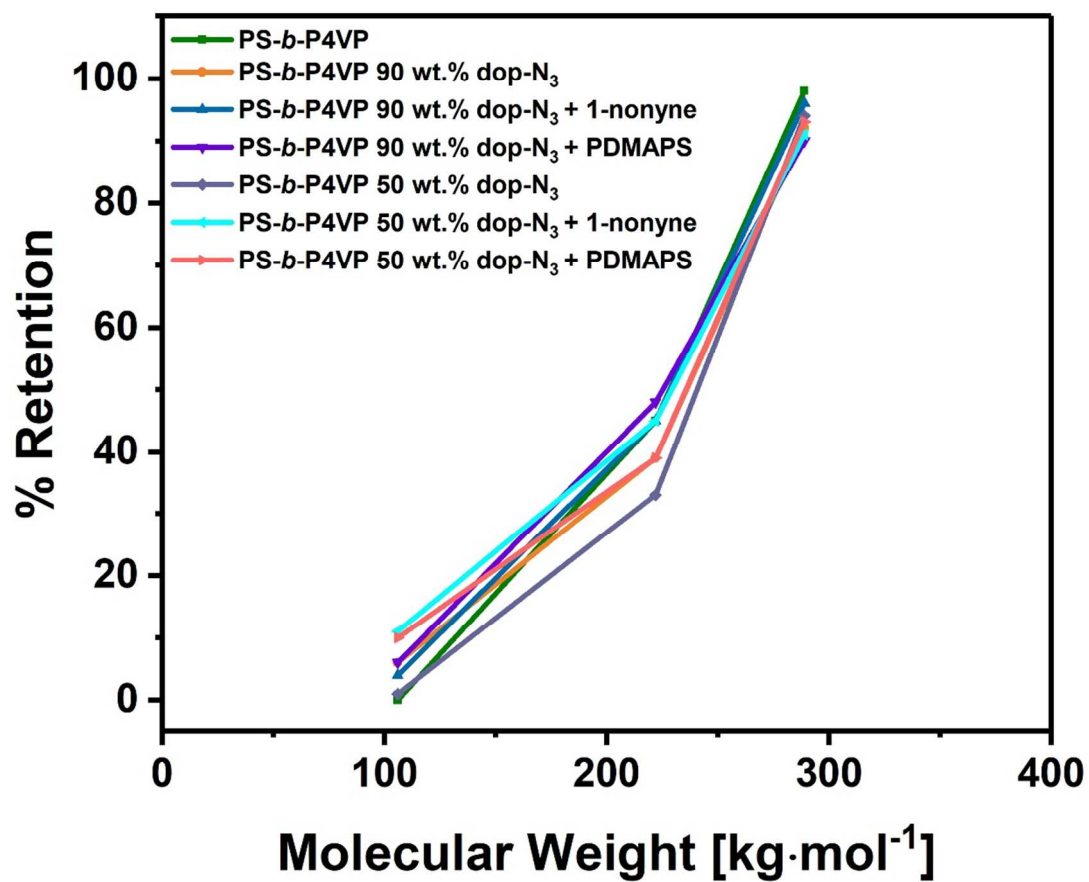


Figure S9. PEG retention characteristics of the pristine PS-*b*-P4VP membrane and the modified PS-*b*-P4VP membranes

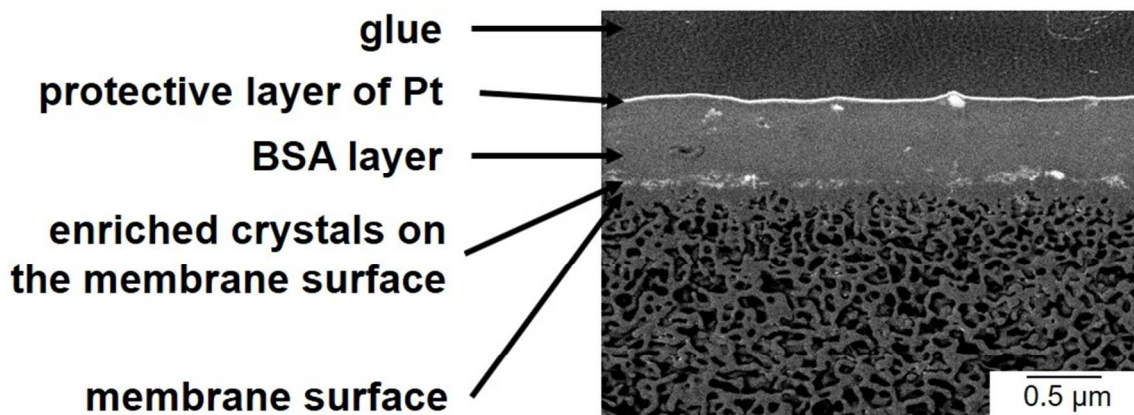


Figure S10. SEM image of a PS-*b*-P4VP membrane cross-section after pre-treatment with PBS-buffer (10mM, pH= 7.4) and BSA fouling experiment. The cross-section was prepared via argon ion milling and imaged by detecting backscattered electrons

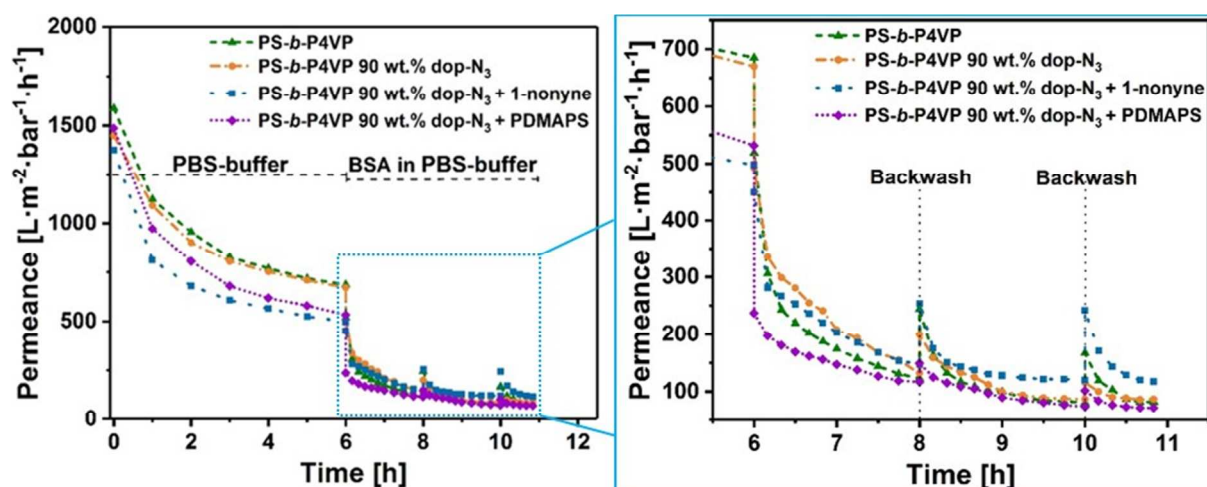


Figure S11. PBS-buffer permeance and foulant solution (50 ppm BSA in PBS-buffer) permeance of the pristine PS-*b*-P4VP membrane and the modified PS-*b*-P4VP membranes

Table S2. Fouling parameters of the pristine PS-*b*-P4VP membrane and the modified PS-*b*-P4VP membranes determined by cross-flow measurements with BSA foulant solution

	PS- <i>b</i> -P4VP membrane							
	Pristine		90 wt.% dop-N ₃		90 wt.% dop-N ₃ + “Click” 1-nonyne		90 wt.% dop-N ₃ + “Click” PDMAPS	
	Cycle 1	Cycle 2	Cycle 1	Cycle 2	Cycle 1	Cycle 2	Cycle 1	Cycle 2
FRR [%]	36 ± 2	24 ± 3	30 ± 2	17 ± 2	51 ± 3	49 ± 3	28 ± 2	19 ± 2
R _t [%]	82 ± 3	88 ± 3	80 ± 3	87 ± 3	70 ± 3	73 ± 3	78 ± 3	86 ± 3
R _r [%]	18 ± 2	13 ± 3	10 ± 2	4 ± 1	21 ± 2	22 ± 2	6 ± 2	5 ± 1
R _{ir} [%]	64 ± 3	76 ± 3	70 ± 3	83 ± 3	49 ± 3	51 ± 2	72 ± 3	81 ± 3