Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information

High flux organic solvent nanofiltration membrane from Kevlar aramid nanofibers with *in-situ* incorporation of microspheres

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Fig. S1 Raw material of Kevlar fiber.

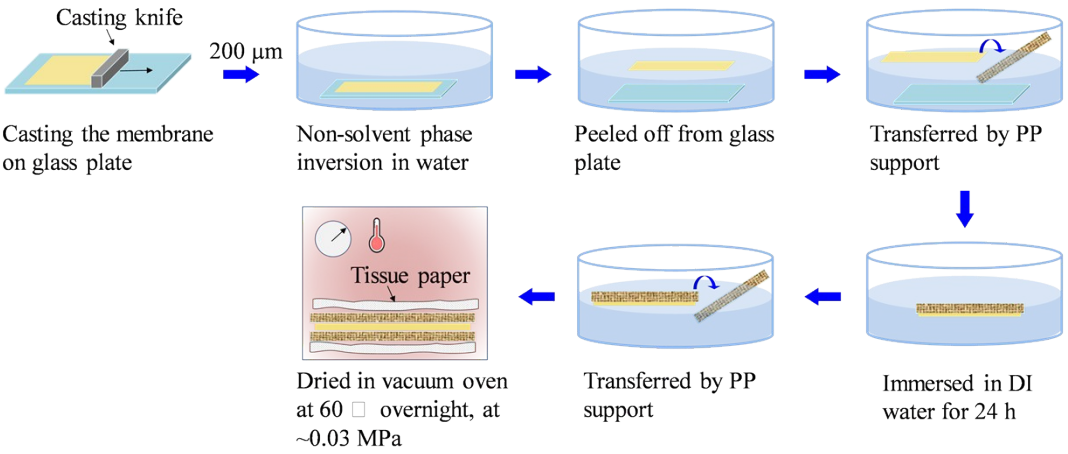


Fig. S2 Schematic presentation of the fabrication of ANF/PEI membrane and post-treatment process.

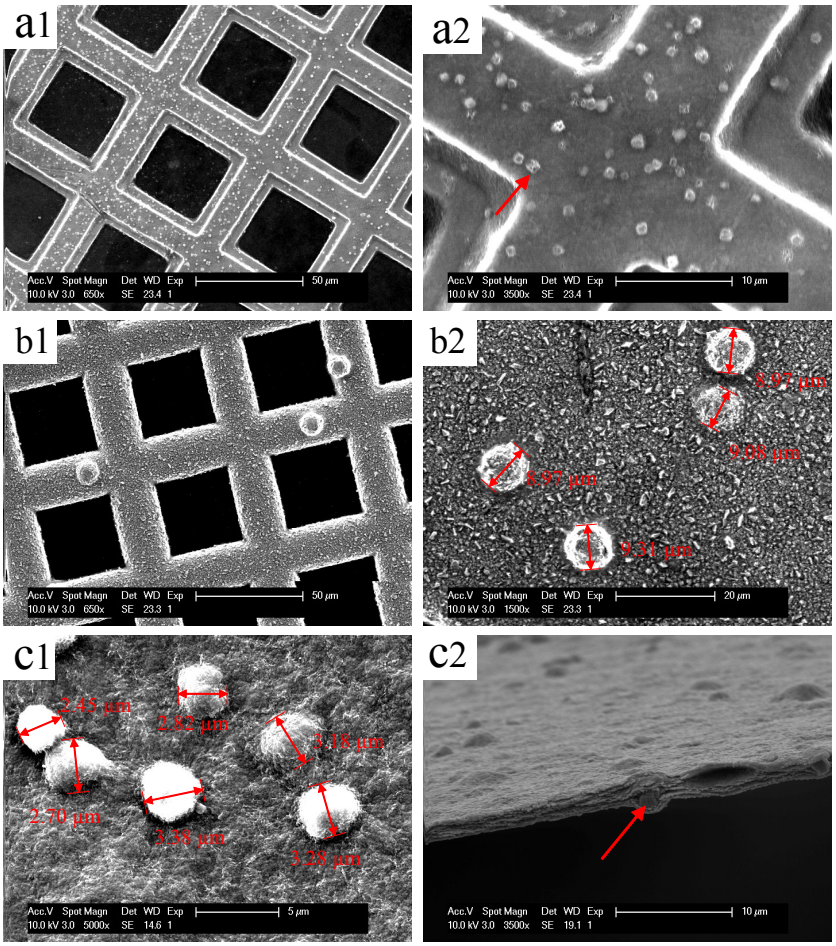


Fig. S3 SEM images of ANF/PEI microparticles in dope solution with ANF concentration of 0.5 % (a1, a2) and 3.0 % (b1, b2) respectively. And the SEM images of ANF/PEI microspheres on membrane surface and in transmembrane position (prepared from ANF/PEI dope solution with ANF concentration of 2.0% (c1, c2).

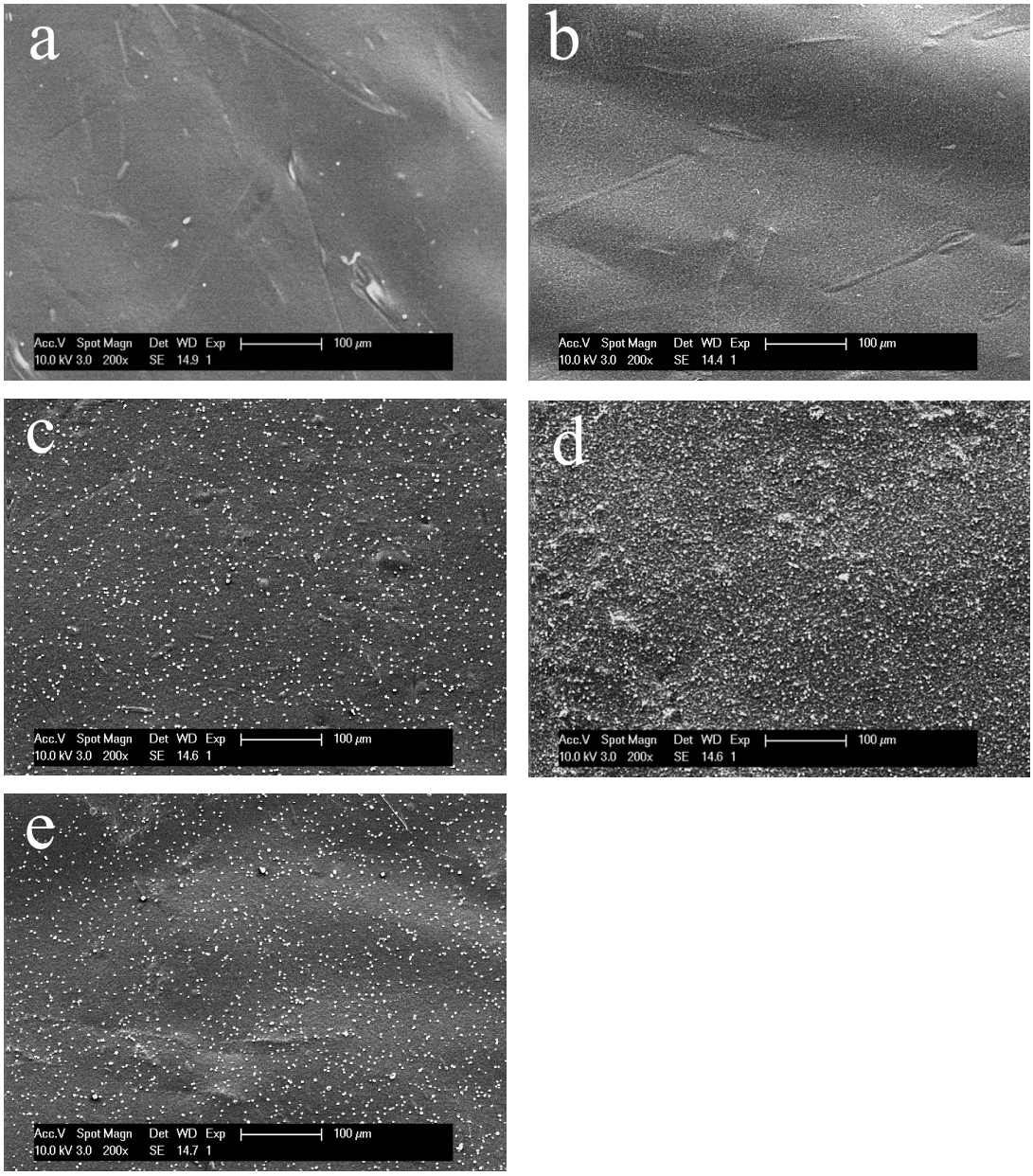


Fig. S4 SEM images of surfaces morphologies ANF membrane (a) and ANF/PEI (b: (2/0.5), c: (2/1.0), d: (2/1.5), e: (2/2.0)) membranes.

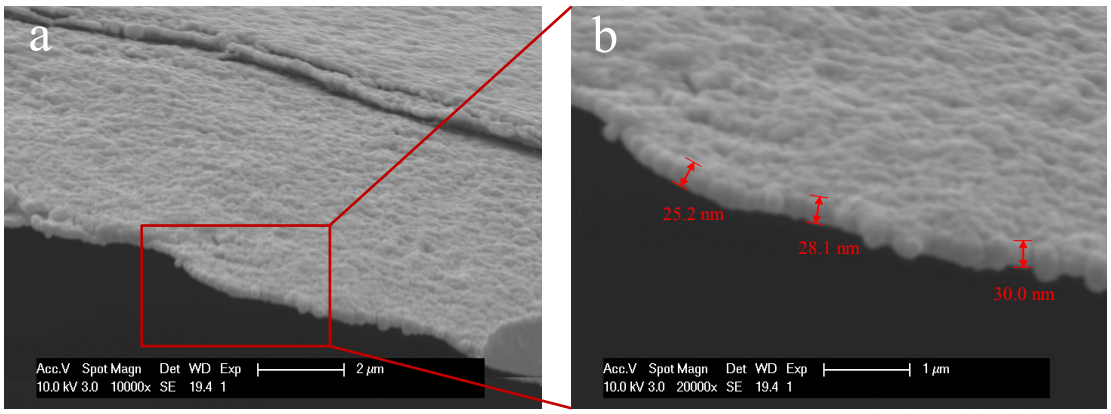


Fig. S5 SEM images of the top surface layer of the ANF membrane (a, b).

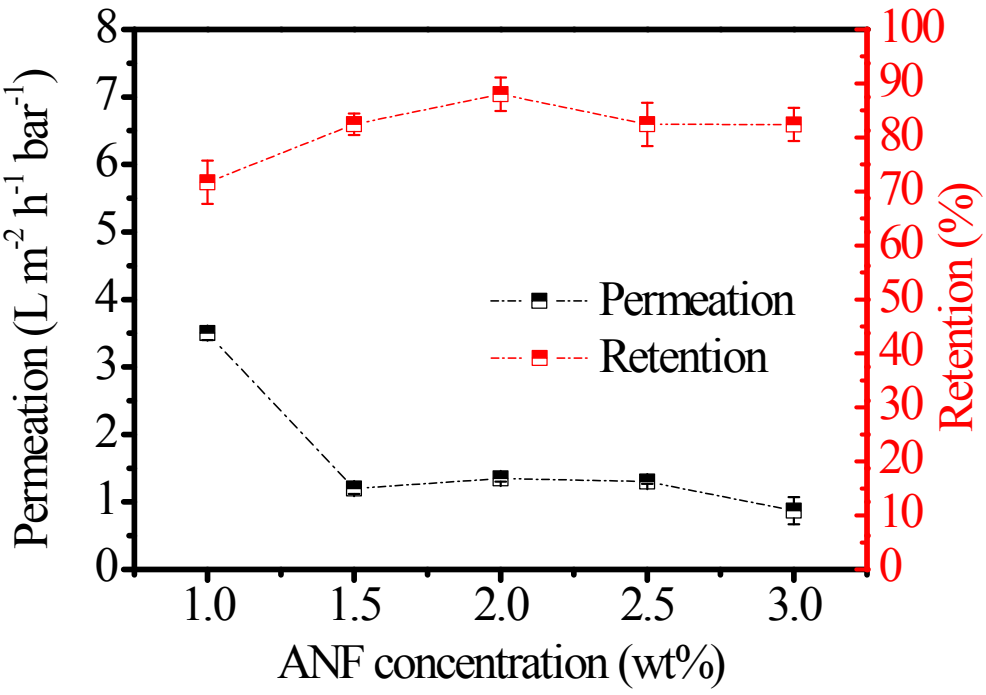


Fig. S6 Influence of ANF concentration (without PEI addition) on ethanol permeability and RB retention of ANF based OSN membrane (Testing conditions: 40 μmol L^{-1} RB in ethanol, 4 bar, 200 rpm, 25 ℃)

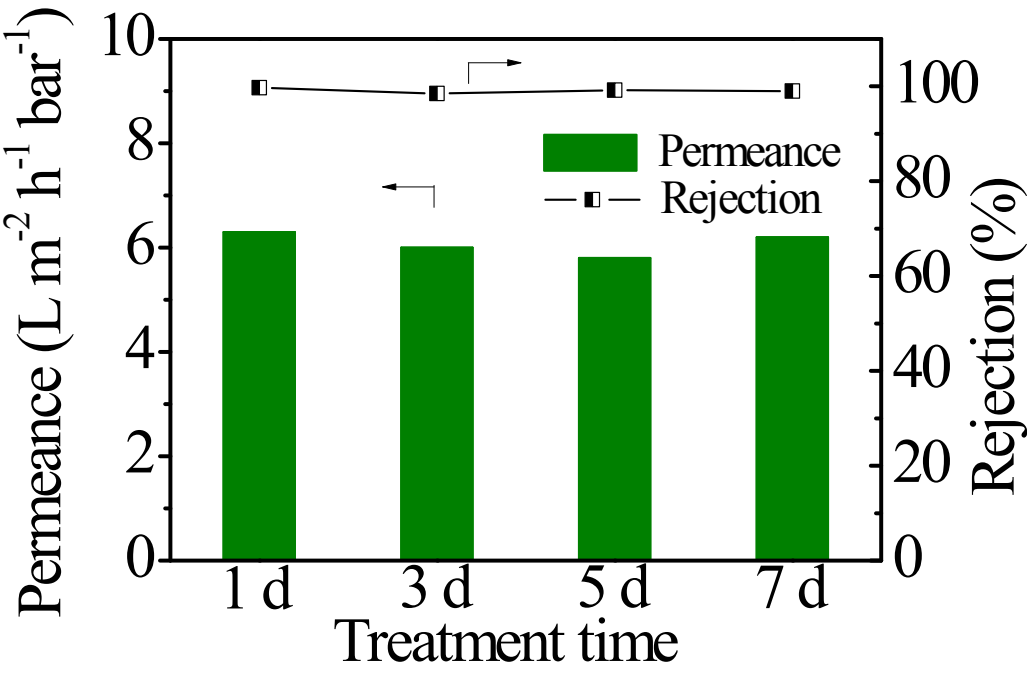


Fig. S7 OSN performances of ANF/PEI (2/1.5) membranes immersed in water for 1, 3, 5, 7 d, respectively. (Testing conditions: 40 μmol L^{-1} RB in ethanol, 4 bar, 200 rpm, 25 ℃)

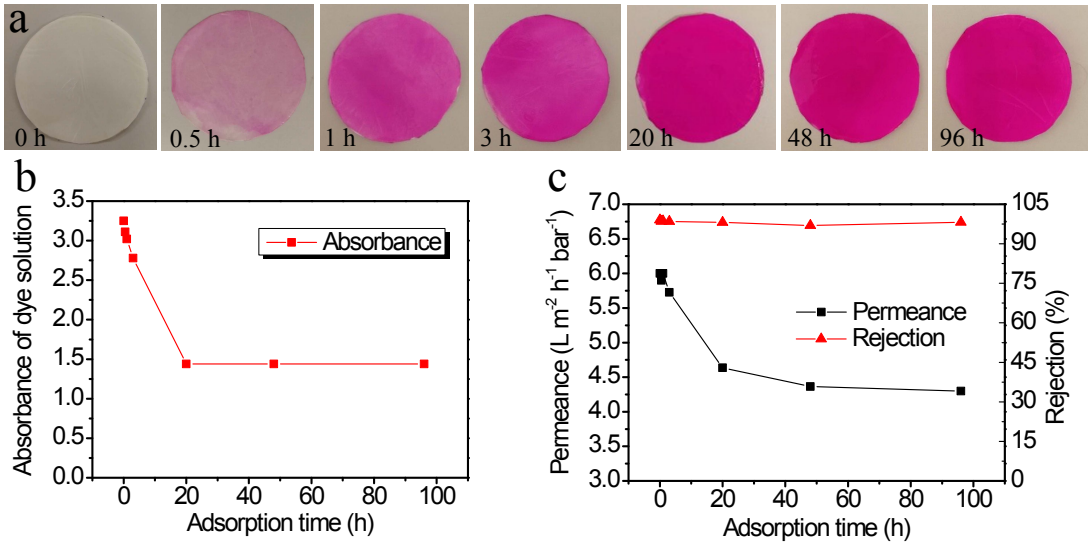
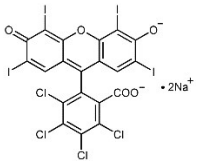
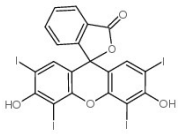
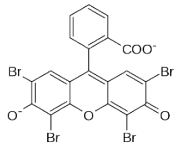
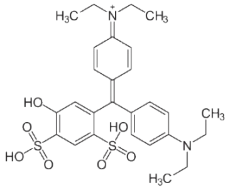
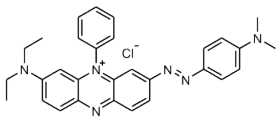
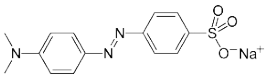


Fig. S8 (a) The adsorption of ANF/PEI membrane in 40 μmol L^{-1} RB/ethanol solution against different time; (b) The absorbance variations of RB/ethanol solutions with ANF/PEI membrane immersed; (c) Influence of adsorption on ANF/PEI membrane permeance and rejection (Testing conditions: 40 μmol L^{-1} RB in ethanol, 4 bar, 200 rpm, 25 ℃)

Table S1

Information of dyes used in this study.

Dye	Structure	Charge	Molecular weight (g mol^{-1})	λ_{max}[a] (nm)
Rose Bengal (RB)		-	1018	559
Erythrosin B (EB)		0	836	535
Eosin Y (EY)		-	648	524
Patent Blue VF (PB VF)		-	567	635
Janus Green B		+	511	647
Methyl Orange (MO)		-	327	422

[a] Maximum absorption wavelength in ethanol.

Table S2

Surface roughness parameters of ANF membrane and ANF/PEI membranes.

Membranes	Surface roughness parameters		
	R_q (nm)	R_{max} (nm)	R_a (nm)
ANF membrane	20.1	151	16.3
ANF/PEI (2/0.5)	26.1	284	18.8
ANF/PEI (2/1.0)	26.7	183	21.6
ANF/PEI (2/1.5)	25.8	196	20.2
ANF/PEI (2/2.0)	40.3	292	31.9