

Supporting Information for

**Improved performance and mitigated internal
concentration polarization of thin-film composite
forward osmosis membrane with
polysulfone/polyaniline substrate**

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Filtration performances of PSf/PANI substrates

The water flux (J_0) and BSA rejection (R_{BSA}) of as-prepared PSf/PANI substrates were evaluated by a dead-end filtration system using DI water and BSA solution ($1.0 \text{ g}\cdot\text{L}^{-1}$) as the feed solution. The teste was conducted at 2.0 bar. The water flux (J_0) and BSA rejection ratio (R_{BSA}) were estimated based on the filtration test with Equation (2):

$$J_0 = \frac{\Delta V}{A_m \Delta t} \quad (1)$$

where ΔV is the volume of permeate water, and Δt is the filtration time.

$$R_{BSA} = \left(1 - \frac{C_{p_BSA}}{C_{f_BSA}}\right) \times 100 \quad (2)$$

where C_{p_BSA} and C_{f_BSA} are the BSA concentrations of the permeate solution and the feed solution respectively, which were measured by UV-vis spectrometer with a wavelength of 280 nm.¹

Table S1. Compositions of casting solutions of substrates.

Membrane	PSf (wt.%)	PANI (wt.%)	PVP (wt.%)	NMP (wt.%)
S-0	17.5	0.0	0.5	82.0
S-0.4	17.5	0.4	0.5	81.6
S-0.6	17.5	0.6	0.5	81.4
S-0.8	17.5	0.8	0.5	81.2

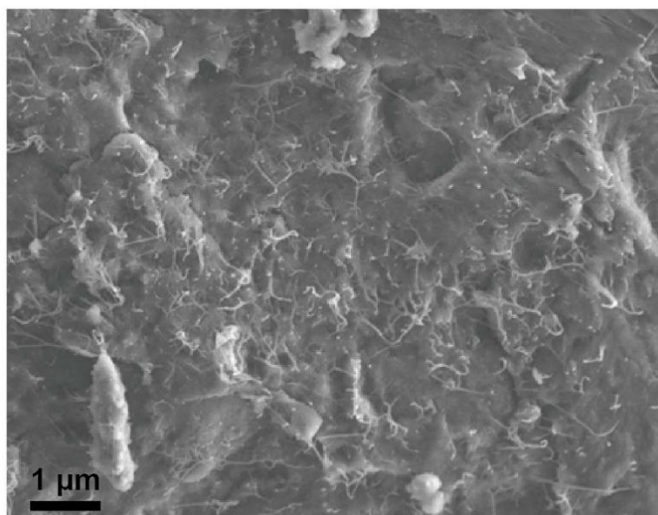


Figure S1. SEM image of PANI.

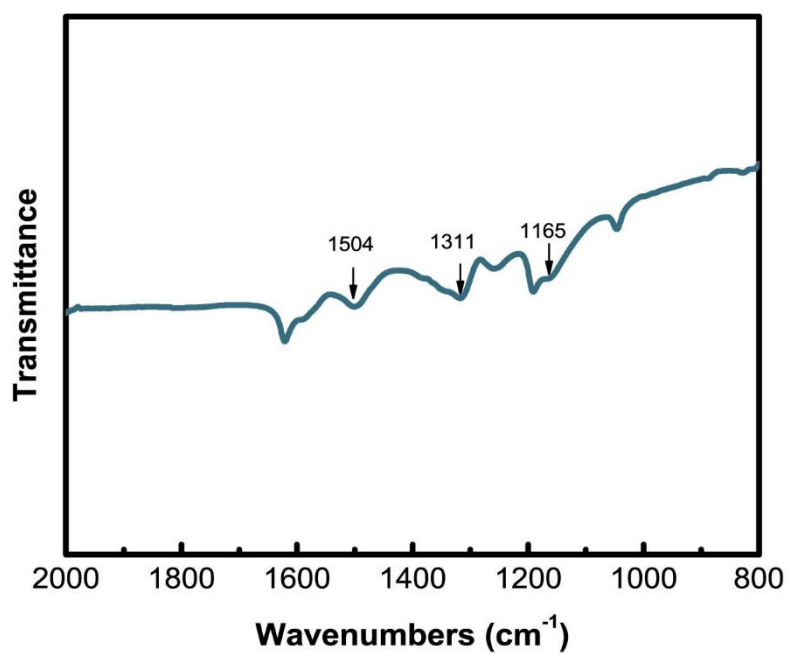


Figure S2. FTIR spectrum of PANI.



Figure S3. Photographs of PANI/NMP and PANI/DI water mixtures.

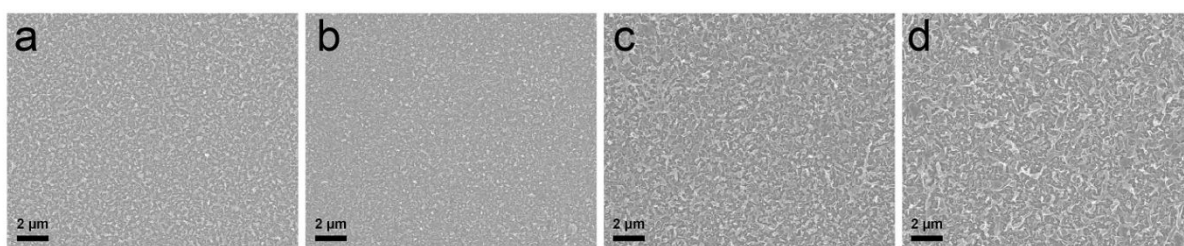


Figure S4. Surface SEM images with a small magnification time of (a) FO-0 membrane, (b) FO-0.4 membrane, (c) FO-0.6 membrane, and (d) FO-0.8 membrane.

Table S2. Pore size of bottom surfaces of PSf and PSf/PANI Substrates.

Membrane	Average pore size (μm)	Maximum pore size (μm)	Minimum pore size (μm)
S-0	0.08	0.25	0.02
S-0.4	0.10	0.38	0.03
S-0.6	0.16	0.57	0.03
S-0.8	0.23	0.76	0.03

REFERENCES

(1) Boributh, S.; Chanachai, A.; Jiratananon, R. Modification of PVDF membrane by chitosan solution for reducing protein fouling. *J. Membr. Sci.* **2009**, 342, (1-2), 97-104.