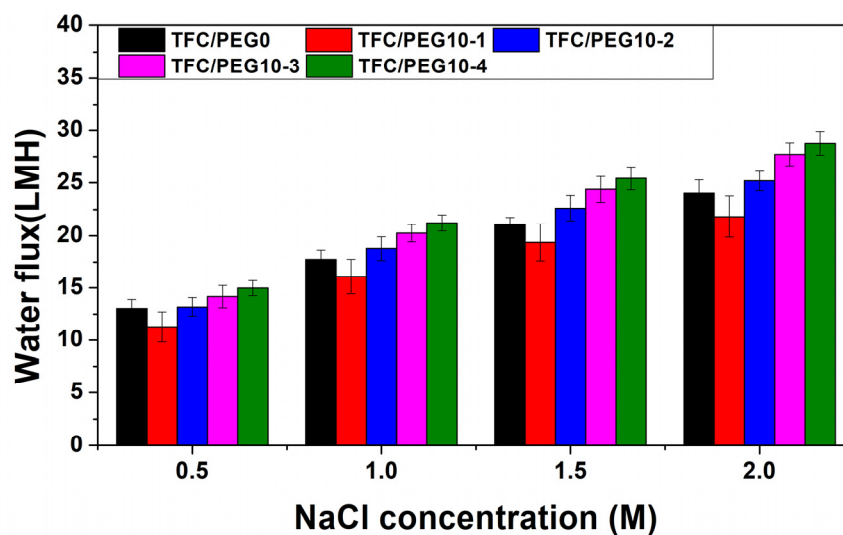
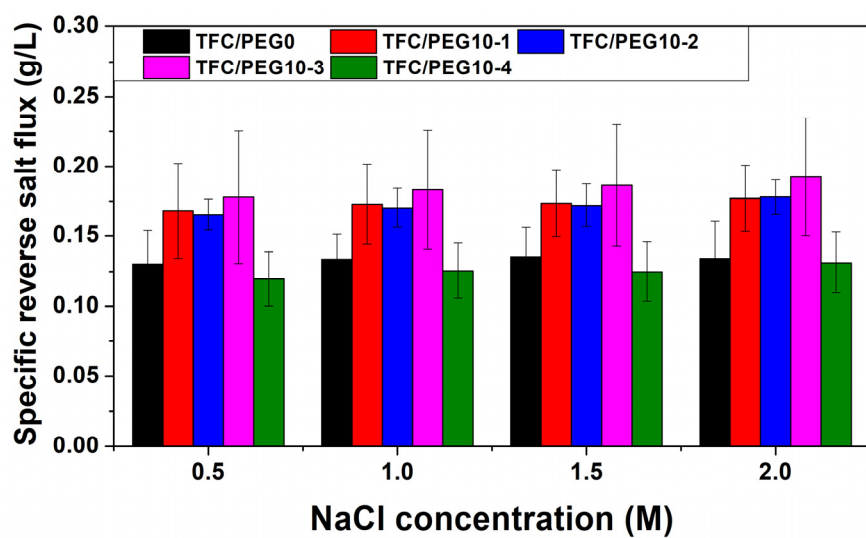


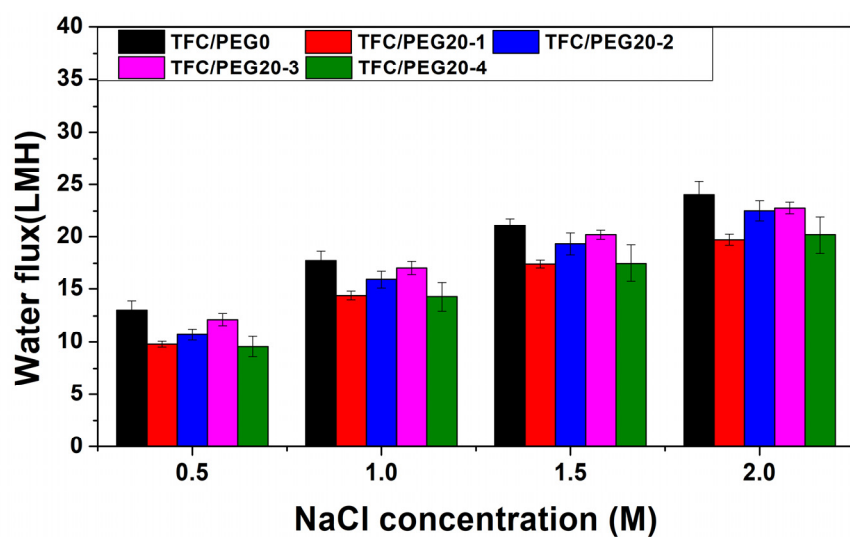
**Table S1.** Intrinsic properties of PSU/PEG supported TFC-FO membranes.

Membrane	$A$ (L m <sup>-2</sup> h <sup>-1</sup> bar <sup>-1</sup> )	$B$ (L m <sup>-2</sup> h <sup>-1</sup> )	$A/B$ (bar <sup>-1</sup> )	$S$ (×10 <sup>-6</sup> m)
TFC/PEG10-1	0.93±0.22	0.14±0.04	6.85±0.95	342.3±37.3
TFC/PEG10-2	1.08±0.21	0.16±0.05	6.95±0.35	296.0±21.7
TFC/PEG10-3	1.12±0.11	0.17±0.02	6.56±1.42	263.3±2.5
TFC/PEG10-4	1.16±0.07	0.12±0.01	9.43±1.43	253.0±9.0
TFC/PEG20-1	0.78±0.04	0.13±0.04	6.66±2.23	368.0±22.1
TFC/PEG20-2	0.71±0.06	0.10±0.00	7.33±0.38	268.0±4.2
TFC/PEG20-3	0.75±0.05	0.09±0.03	8.03±0.57	265.2±7.8
TFC/PEG20-4	0.61±0.07	0.09±0.02	6.98±2.18	286.7±23.1

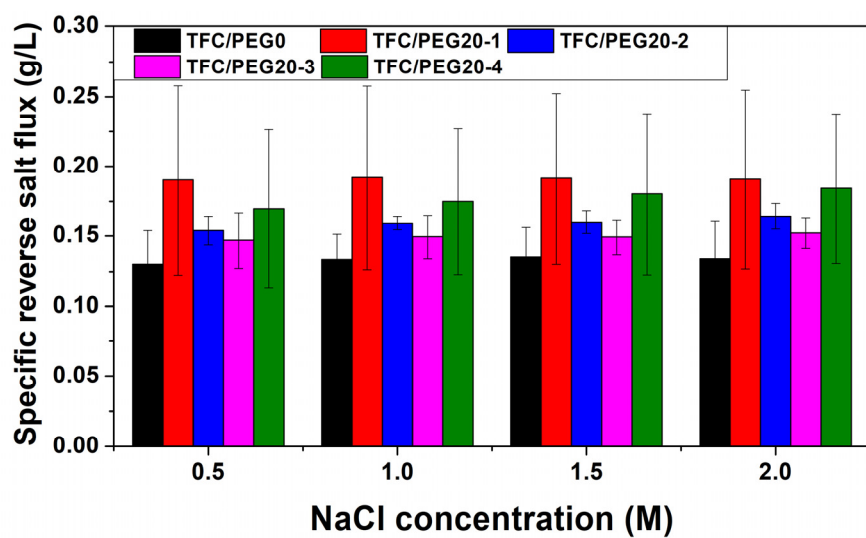
**Figure S1.** Water flux of PSU/PEG10 supported TFC-FO membranes.



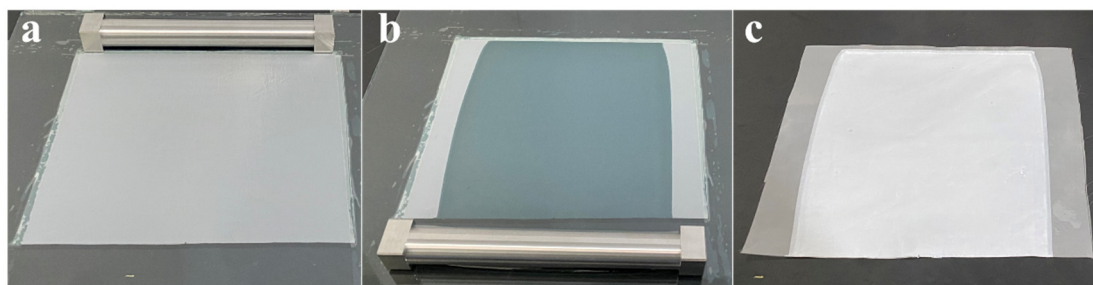
**Figure S2.** Specific reverse salt flux of PSU/PEG10 supported TFC-FO membranes.



**Figure S3.** Water flux of PSU/PEG20 supported TFC-FO membranes.



**Figure S4.** Specific reverse salt flux of PSU/PEG20 supported TFC-FO membranes.



**Figure S5.** The preparation process images including: (a) before casting, (b) after casting, (c) after phase inversion.