Online Electronic Supporting Information for

Titania nanowires coated PEI/P25 membranes for photocatalytic and ultrafiltration applications

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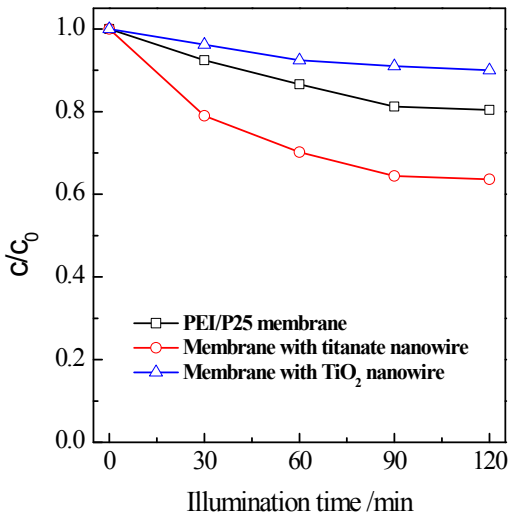

Fig. S1 Dark adsorption curves of rhodamine B in water in the presence of the PEI/P25 membrane (a), that after precipitations of titanate nanowires (b) and that after surface functionalization with TiO_2 nanowires (c).

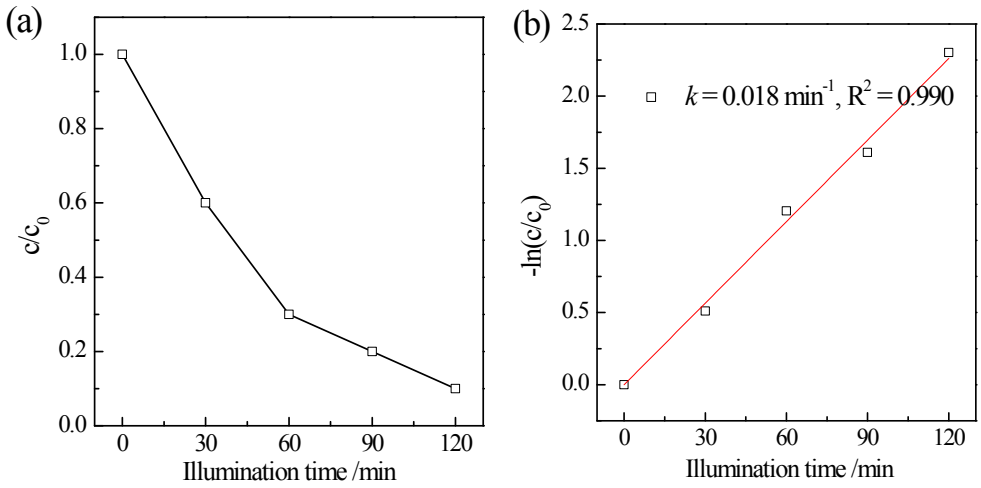

Fig. S2 Photodegradation curve (a) and the corresponding fitting result (b) using the pseudo-first-order reaction of rhodamine B in water in the presence of the PEI/P25/TiO_2 nanowire membrane under the simulated solar light illumination. The light source is a 500 W Xe-lamp. The intensity of UV and visible irradiance reaching the sample was measured to be ca. 5.0 and 100 mW/cm^2, respectively, using irradiance meters UV-A and FZ-A, Beijing Normal University, China. The light intensity was measured for the wavelength range of 320-400 nm with a peak wavelength of 365 nm for UV light, and 400-1000 nm for visible light.

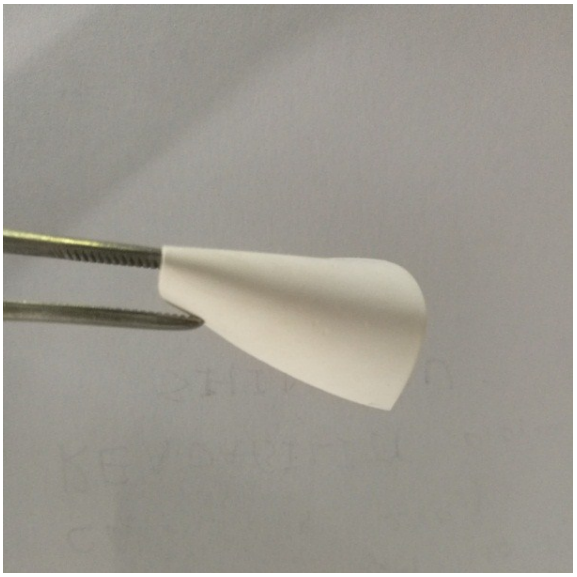

Fig. S3 Photograph of the PEI/P25 hybrid membrane surface functionalized with TiO_2 nanowires.

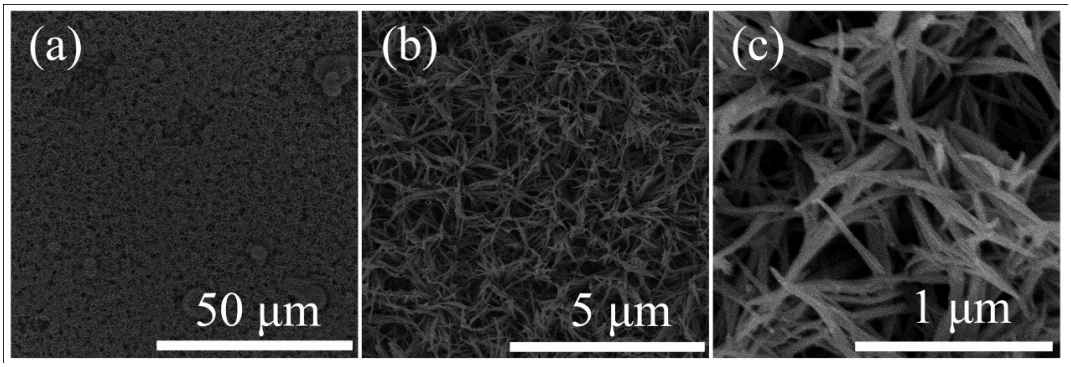

Fig. S4 FESEM morphologies of TiO_2 nanowires precipitated on the PEI/P25 membrane, after ultrasonic cleaning for 30 min.

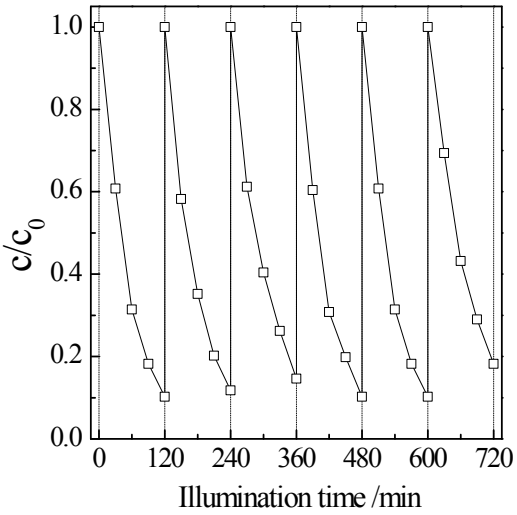

Fig. S5 Photodegradation curves of rhodamine B in water in the presence of the PEI/P25 hybrid membrane surface functionalized with TiO_2 nanowires, after ultrasonic cleaning for 30 min. The photodegradation evaluations were repeated for six cycles.

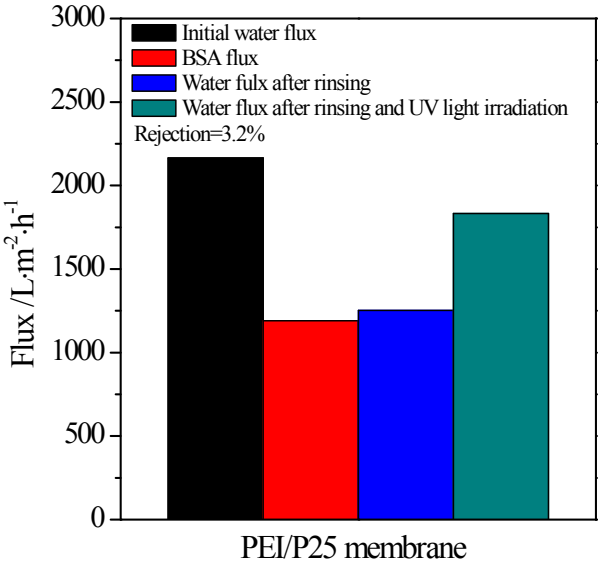

Fig. S6 Flux value of the surface roughened PEI/P25 membrane.

Table S1 Comparison of the comprehensive performance for TiO_2-containing hybrid polymeric ultrafiltration membranes reported in the literatures.

Membrane	Water flux ($L\ m^{-2}\ h^{-1}$)	BSA concentration ($g\ L^{-1}$)	BSA flux ($L\ m^{-2}\ h^{-1}$)	BSA Rejection (%)	Water flux recovery (%) UV	References
PES[a]-TiO_2	1046[h]	0.3	260	75	82.3	[1]
PSF[b]-TiO_2/HEMA[c]	148.77[h]	0.1	/	93	83.37	[2]
PVDF[d]-GO/TiO_2	487.8[h]	1.0	320	92.5	82.1	[3]
PSF-NRG[e]/TiO_2	233.7[h]	0.5	121.9	92.5	92.9	[4]
PVC[f]-TiO_2	317.84[i]	1.0	220	99.21	94.2	[5]
PVDF-TiO_2	103.5[h]	1.0	50	85.6	96.9	[6]
PVDF/rGO[g]/TiO_2	221[j]	0.5	/	99	94.9	[7]
PEI-TiO_2	595	1.0	414	93.3	88.3	This work

[a] polyethersulfone; [b] polysulfone; [c] 2-hydroxyethylmethacrylate; [d] polyvinylidene fluoride; [e] N-doped graphene oxide; [f] Polyvinyl chloride; [g] reduced graphene oxide; [h] operational pressure 0.1 MPa; [i] operational pressure 0.15 MPa; [j] operational pressure is 3.0 MPa.

References

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