Supporting information

For

Bionic inspired electrostatic-complexed reduced graphene oxide/covalent organic framework nanosheets for high-performance nanofiltration membranes

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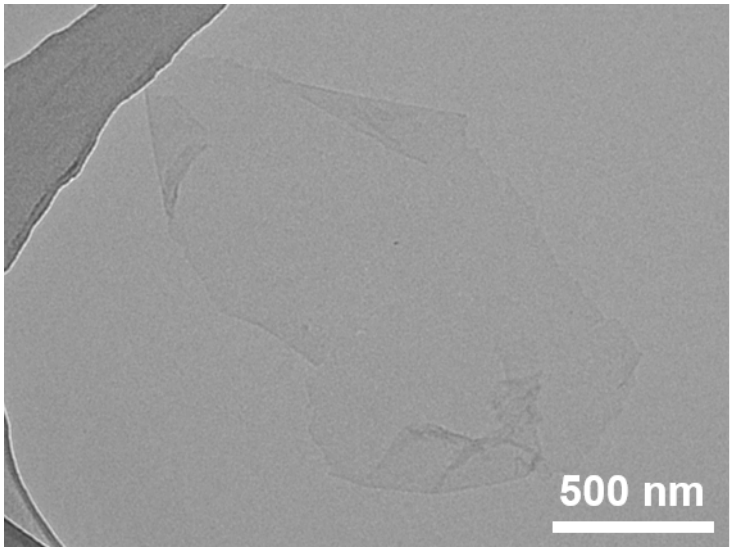

Fig. S1. TEM image of GO.

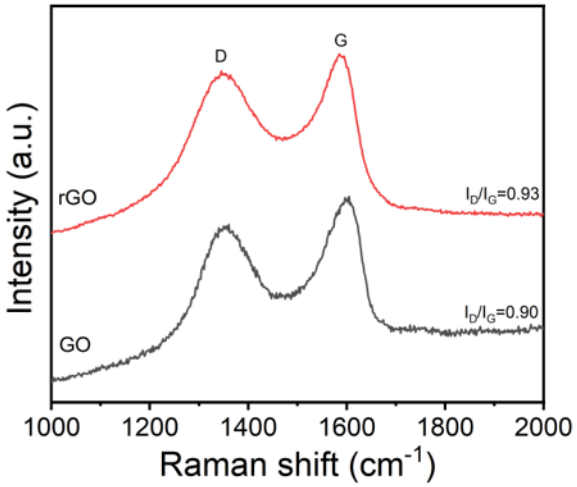

Fig. S2. Raman spectra of GO and rGO.

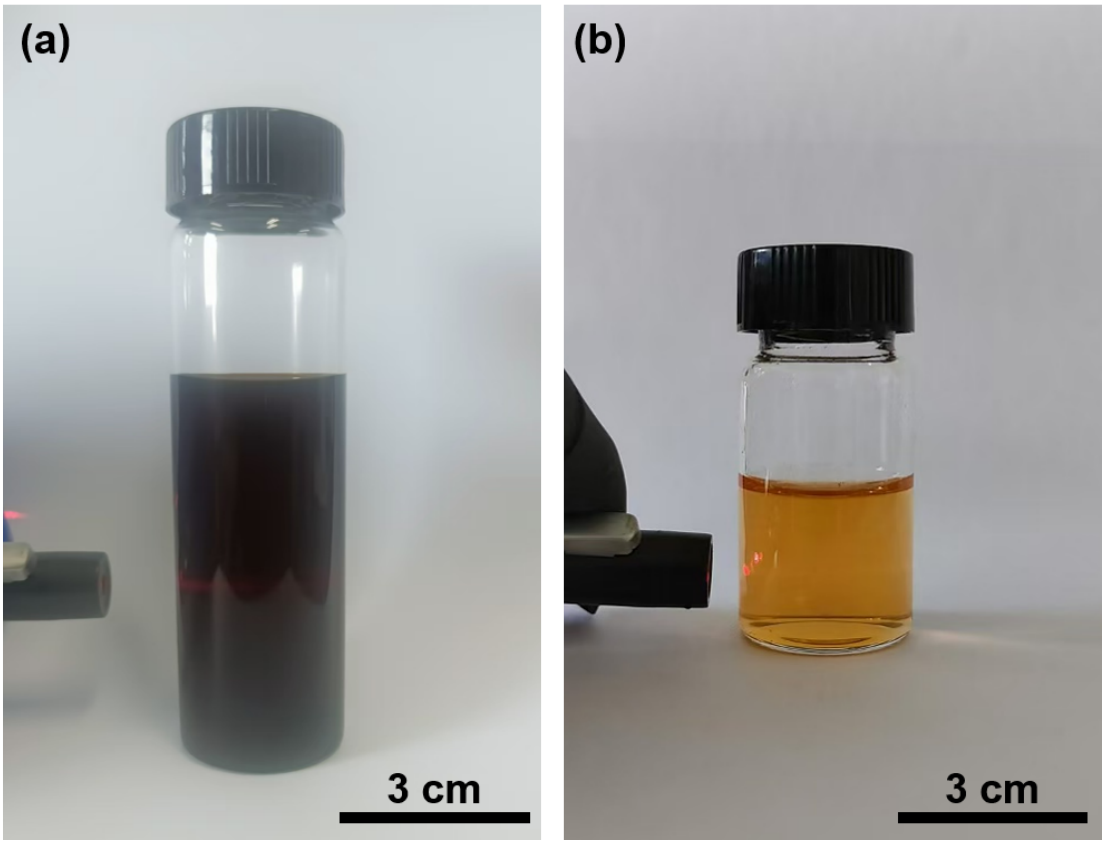

Fig. S3. Photographs of (a) as-prepared CON dispersion (0.273 mg/mL) and (b) water-diluted CON dispersion (0.01 mg/mL).

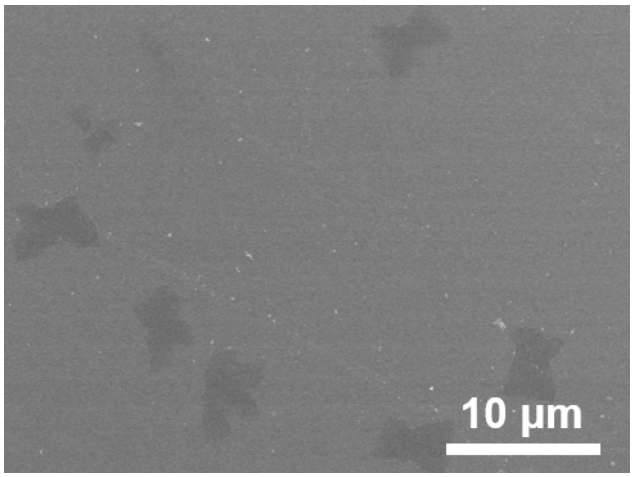

Fig. S4. SEM image of the CONs dispersed on a silica wafer.

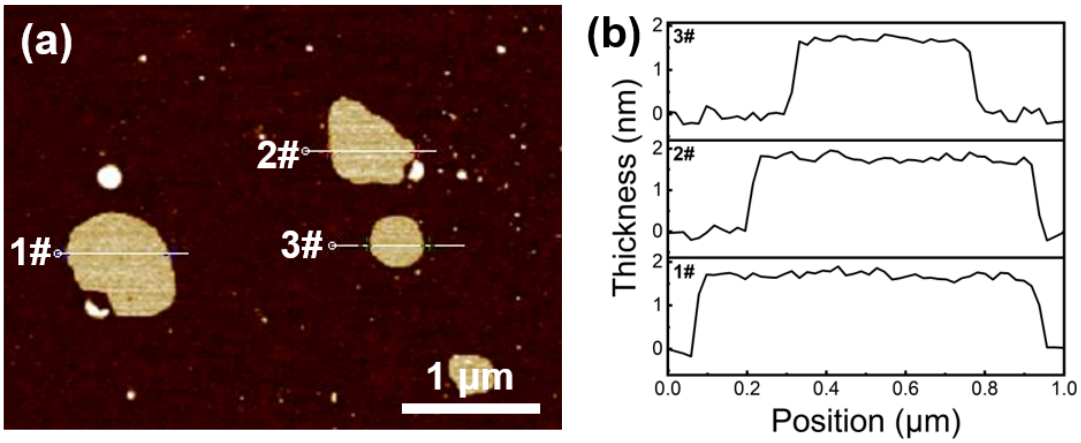

Fig. S5. (a) AFM image and (b) the corresponding height profiles of the CONs.

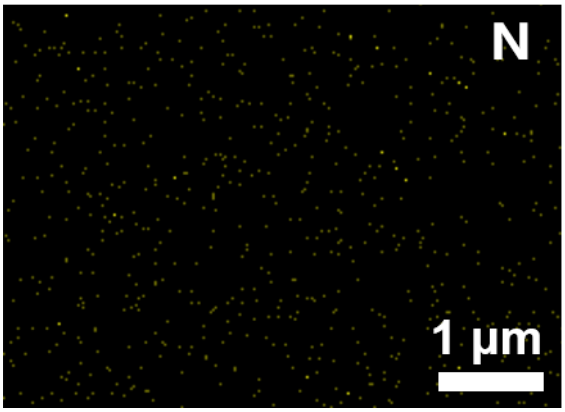

Fig. S6. EDS mapping (N element) of rGO/CON membranes fabricated using 50 mL of mixed dispersion at CON proportion of 50%.

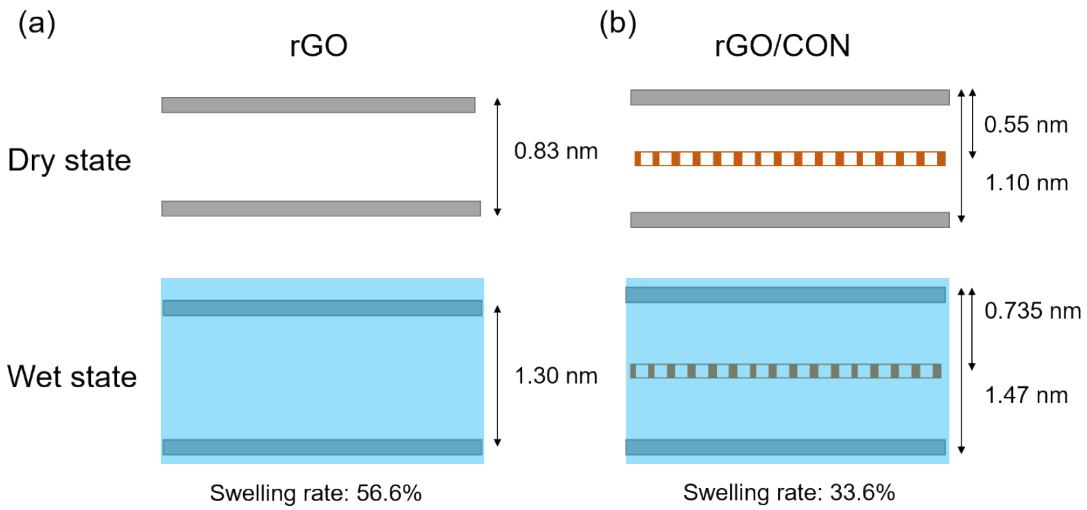

Fig. S7. Schematic diagrams of interlayer structures of (a) pure rGO membrane and (b) rGO/CON membrane in dry and wet state.

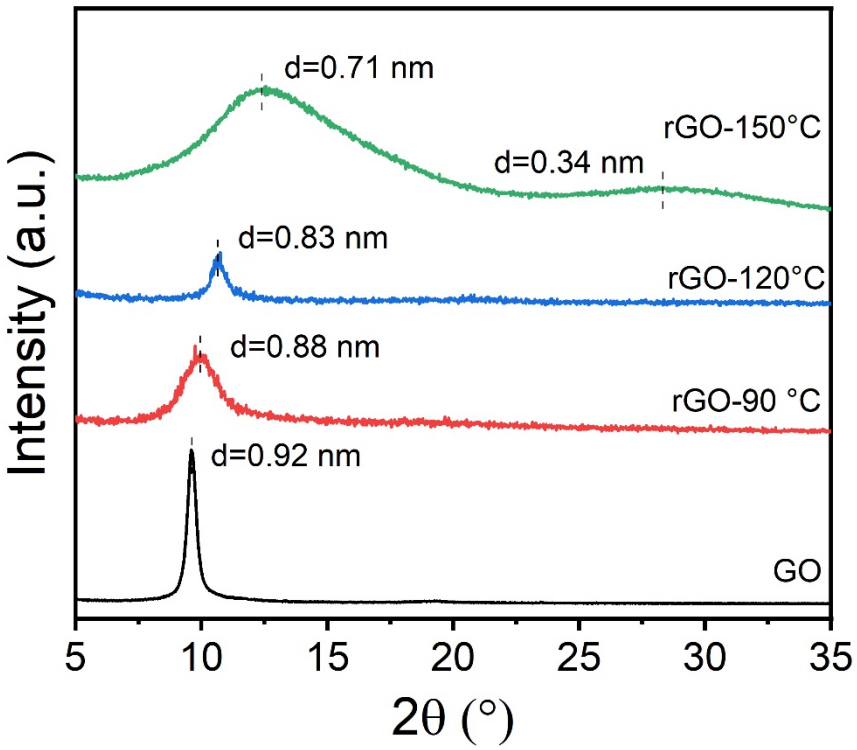

Fig. S8. XRD patterns of GO and rGO reduced at different temperatures.

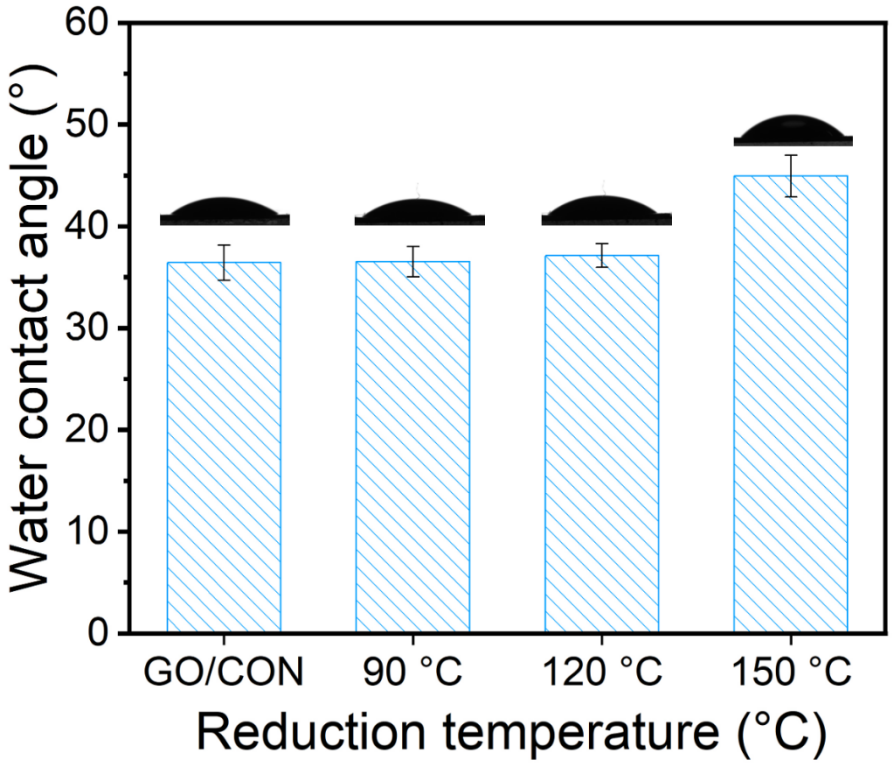

Fig. S9. Water contact angles of GO/CON and rGO/CON membranes fabricated using rGO reduced at different temperatures.

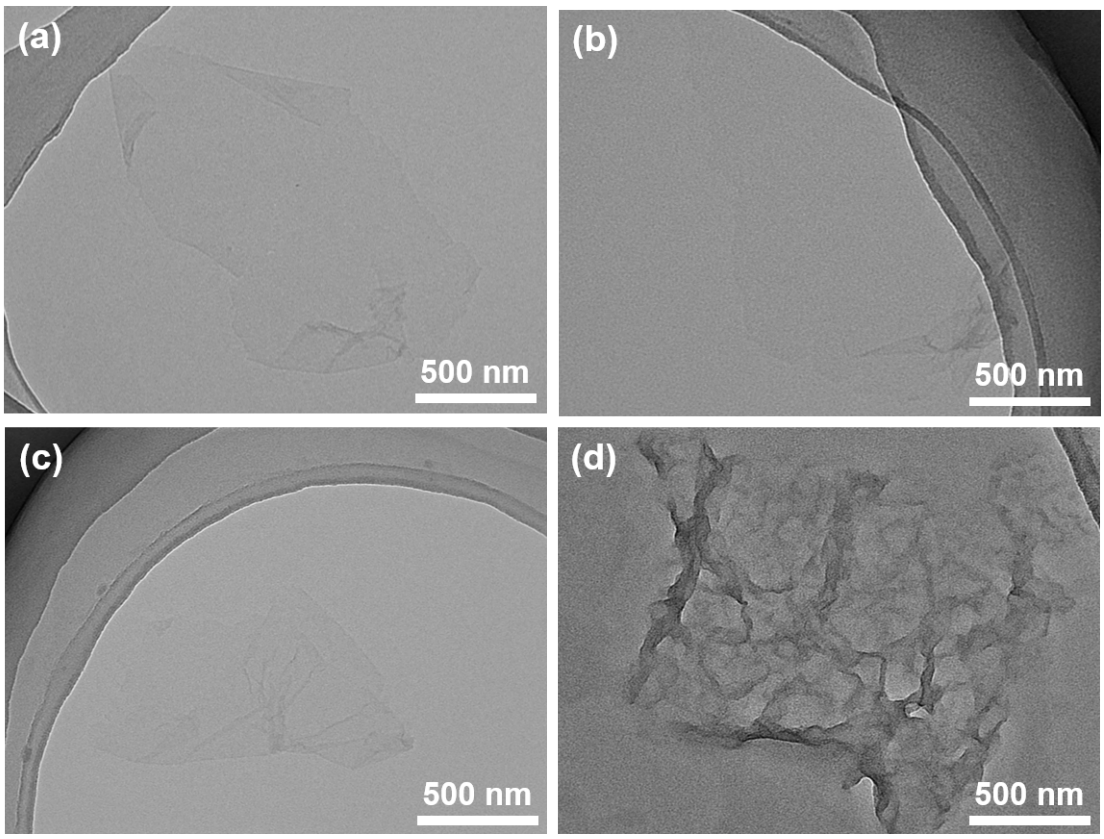

Fig. S10. TEM images of (a) GO and rGO reduced at (b) 90 °C, (c) 120 °C and (d) 150 °C.

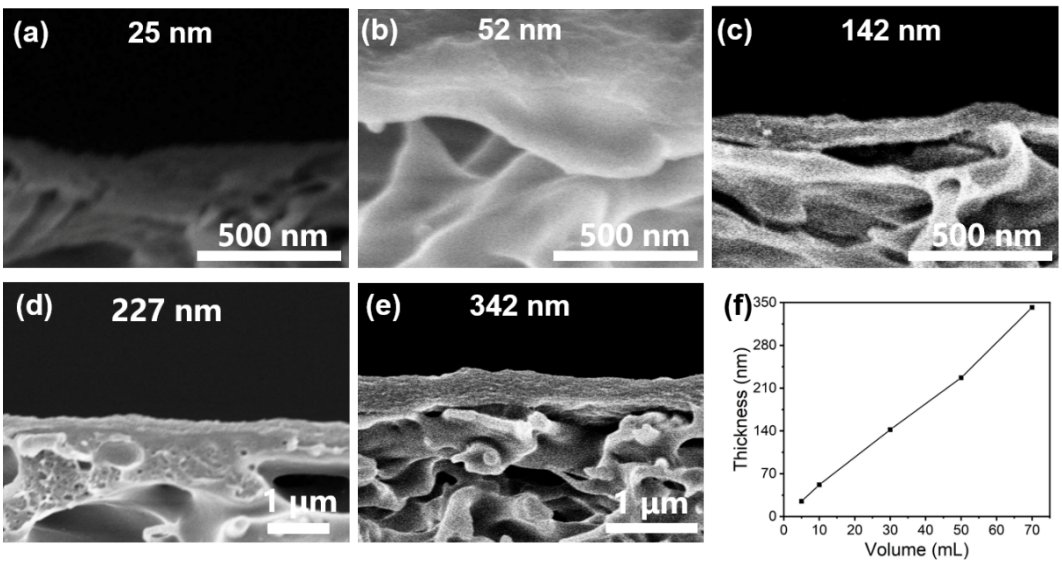

Fig. S11. Cross-sectional SEM images of the rGO/CON membranes fabricated using (a) 5 mL, (b) 10 mL, (c) 30 mL, (d) 50 mL and (e) 70 mL of mixed dispersion at CON proportion of 50%. (f) Thicknesses of the rGO/CON membranes fabricated using different volumes of mixed dispersion.

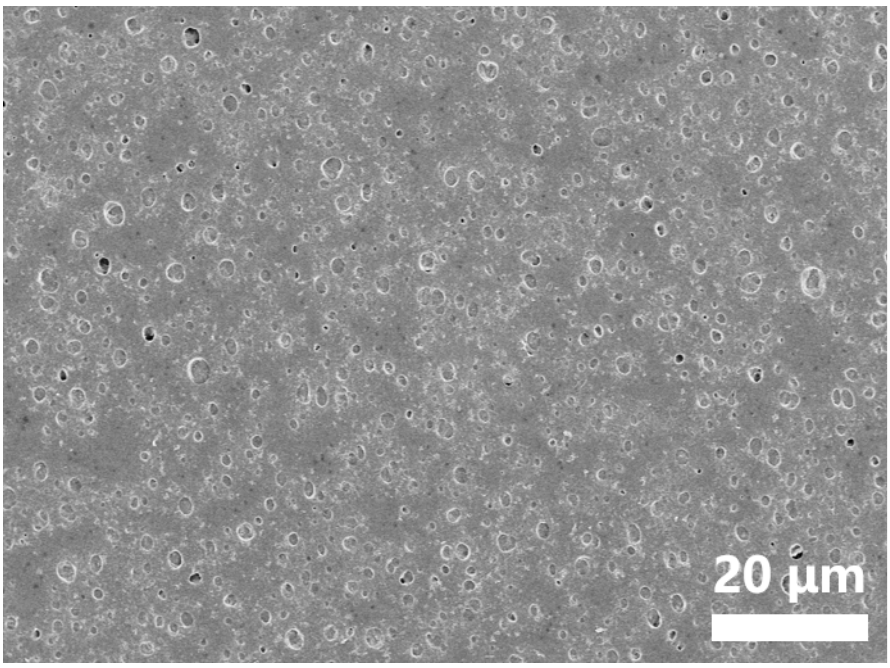

Fig. S12. Surface SEM image of the rGO/CON membrane fabricated using 5 mL of mixed dispersion.

Table S1. Comparison of the rGO/CON membrane in this work and other reported graphene-based membranes.

Membrane	loading amount (mg/cm^2)	Thickness (nm)	Fabrication	Dead-end filtration	Cross-flow filtration	Dye	Pressure (bar)	Permeance ($L\ m^{-2}\ h^{-1}\ bar^{-1}$)	Rejection (%)	Reference
GO	-	-	Layer-by-layer	YES	-	Methylene blue	3.4	27.6	66	[1]
Small-flake GO	0.0144	~70	Pressure-assisted filtration	YES	-	MO	1	30	95	[2]
GO/COF-1	0.021	~200	Pressure-assisted filtration	-	YES	Congo red	4	31	99	[3]
eZIF-8/GO	0.0325	-	Vacuum filtration	-	YES	Congo red	1	45.4	99	[4]
ZIF-8@GO	-	~105	Pressure-assisted filtration and in situ crystallization	-	YES	Methyl blue	1	49.8	100	[5]
COF-LZU1	-	~400	Solvothermal reaction	-	YES	Congo red	5	53.43	98.6	[6]
Cell wall-GO	0.3304	~1448	Vacuum filtration	YES	-	Evens blue	2	56.5	96	[7]
GO/COF	-	~2700	Vacuum filtration	YES	-	Congo red	1	59	99.8	[8]
COO^--GO@PILTf_2N-AT	-	~132	Pressure-assisted filtration	-	YES	Evens blue	1	96.4	99.8	[9]
GO/β-CD/TMC	-	~85	Vacuum filtration	YES	-	Crystal violet	1	82	99.98	[10]
PAA@UiO/GO	-	~550	Vacuum filtration	YES	-	Congo red	0.9	125	96	[11]
rGO/CON	0.0058	~52	Vacuum filtration	YES	YES	Congo red	1	110.6	99.8	This work

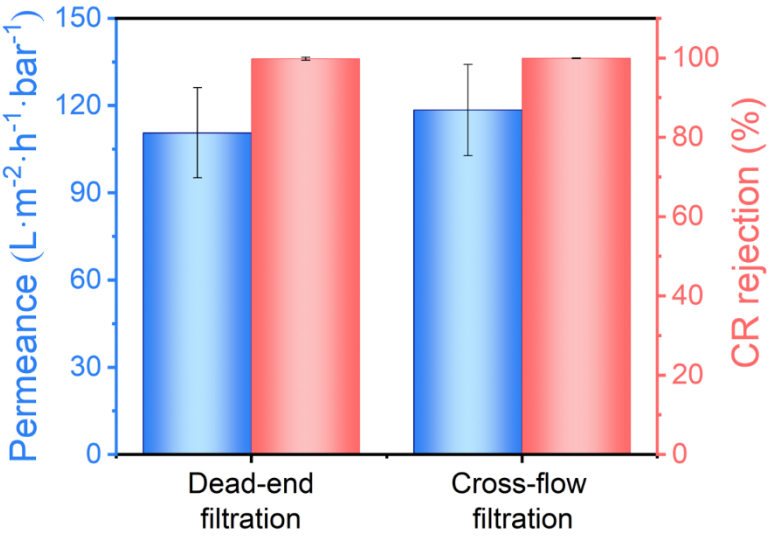

Fig. S13. Permeances and CR rejections of rGO/CON membranes in dead-end and cross-flow filtration.

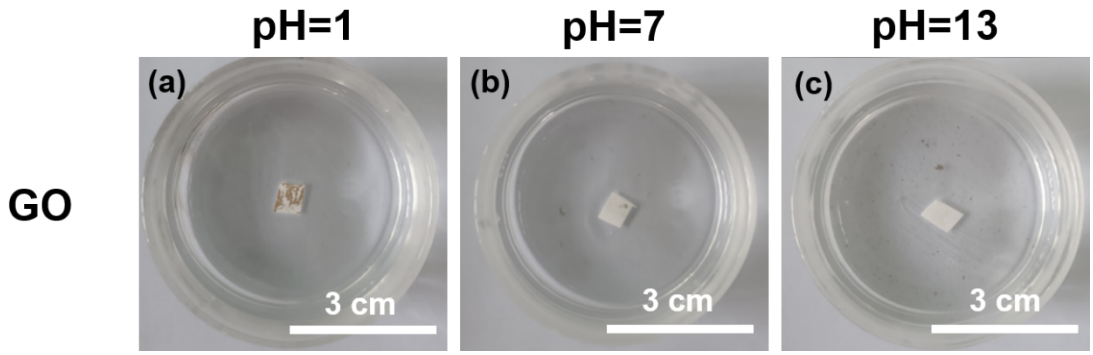

Fig. S14. Photographs of pure GO membranes immersed in aqueous solutions with (a) pH =1, (b) pH=7 and (c) pH =13 for 7 days.

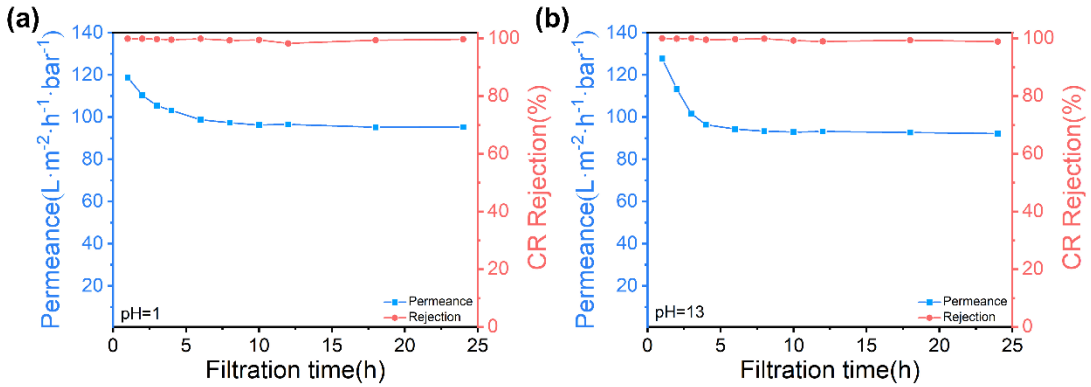

Fig. S15. Permeances and CR rejections of rGO/CON membranes at (a) pH=1 and (b) pH=13 under long-term operations.

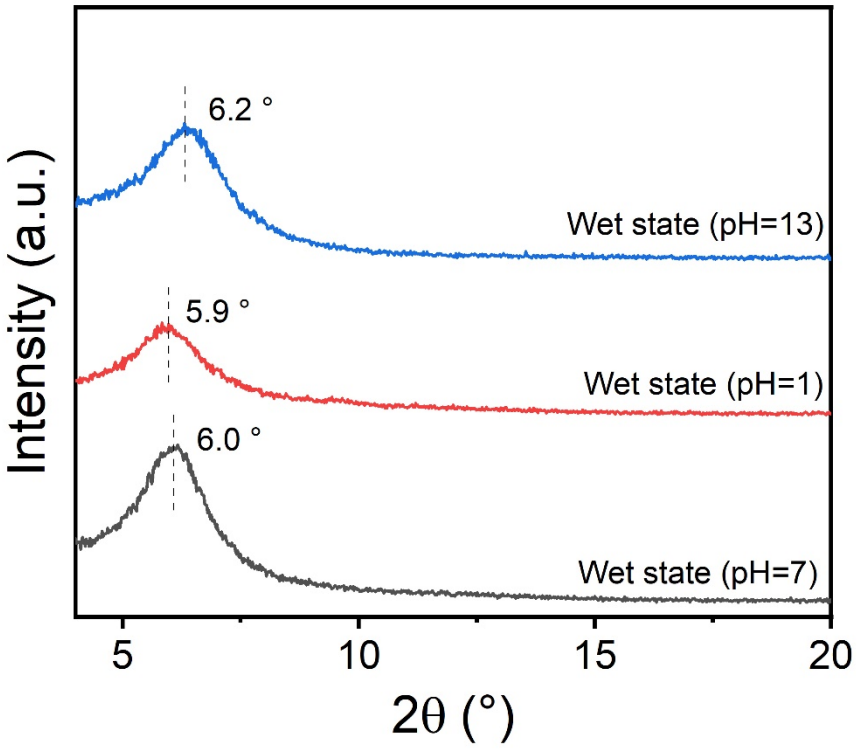

Fig. S16. XRD patterns of rGO/CON membranes immersed in aqueous solutions with pH =1, pH=7 and pH =13.

References

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