Supporting Information

Novel one-step coating hyper-hydrophobic fluorine-free TiO_2 decorated hollow composite membrane in longer-term VMD with enhanced flux, rejection, anti-wetting and anti-fouling performances

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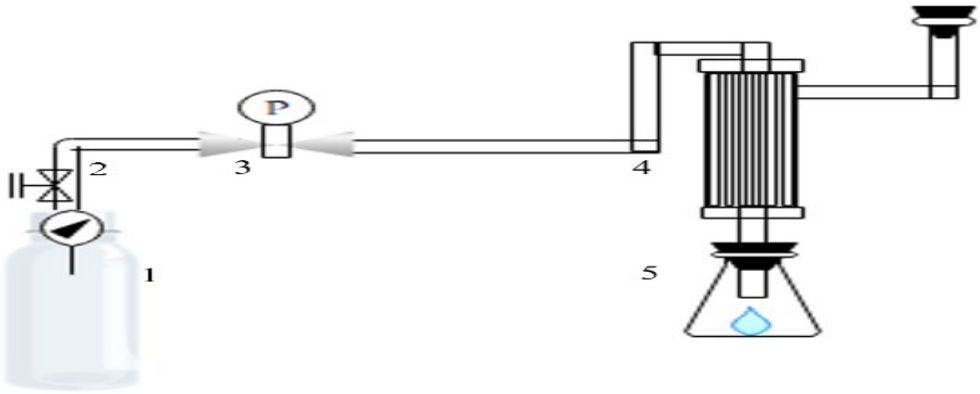

Fig. S1. Simple LEP device: (1) Pressure source, (2) valve, (3) pressure value, (4) membrane device, (5) collector

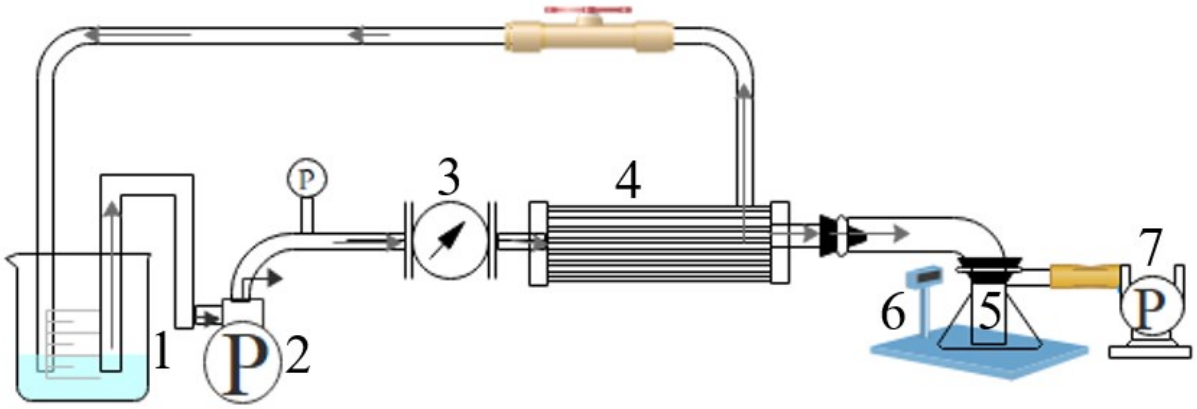

Fig. S2. Flux device of simple membrane distillation. (1) Feed, (2) Circle pump, (3) Flowmeter, (4) membrane device, (5) Permeation solution, (6) Weight meter, (7) vacuum pump.

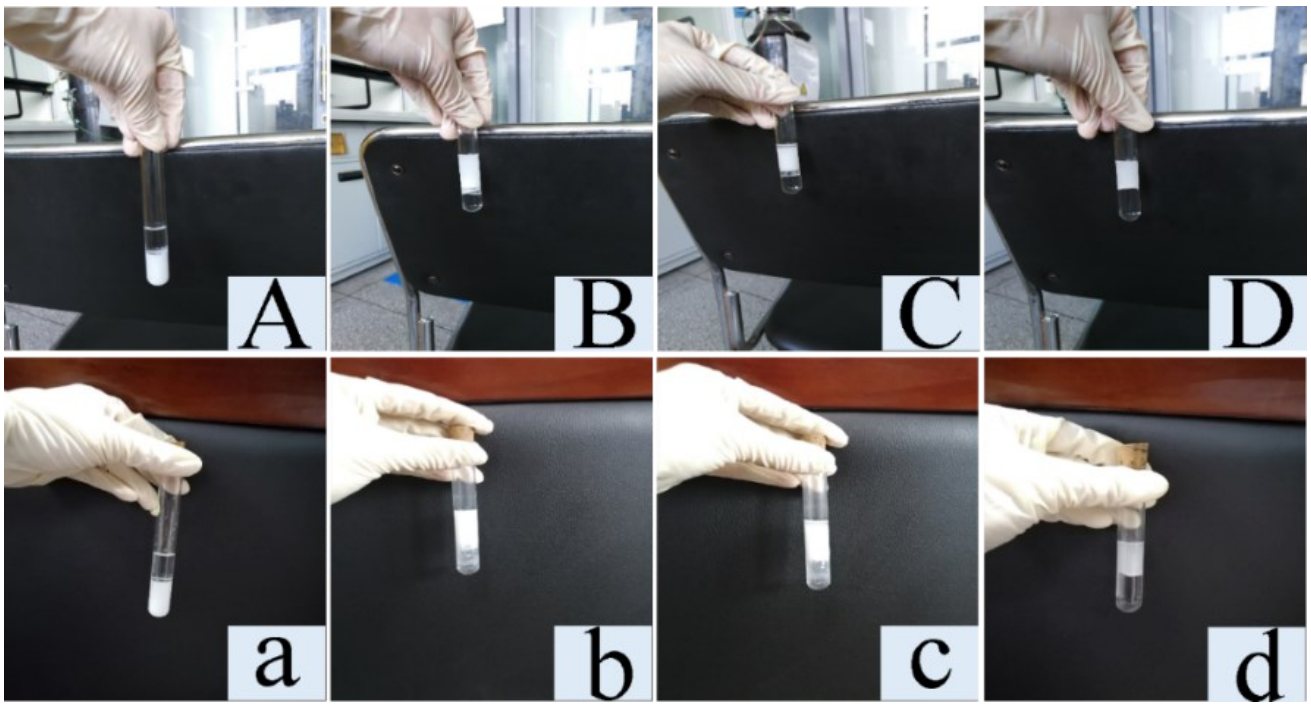

Fig. S3. Nanoparticle dispersion condition. Before ultrasound: (A) TiO_2, (B) M- TiO_2, (C) V- TiO_2, (D) A- TiO_2, after ultrasound: (a) TiO_2, (b) M- TiO_2, (c) V- TiO_2, (d) A- TiO_2.

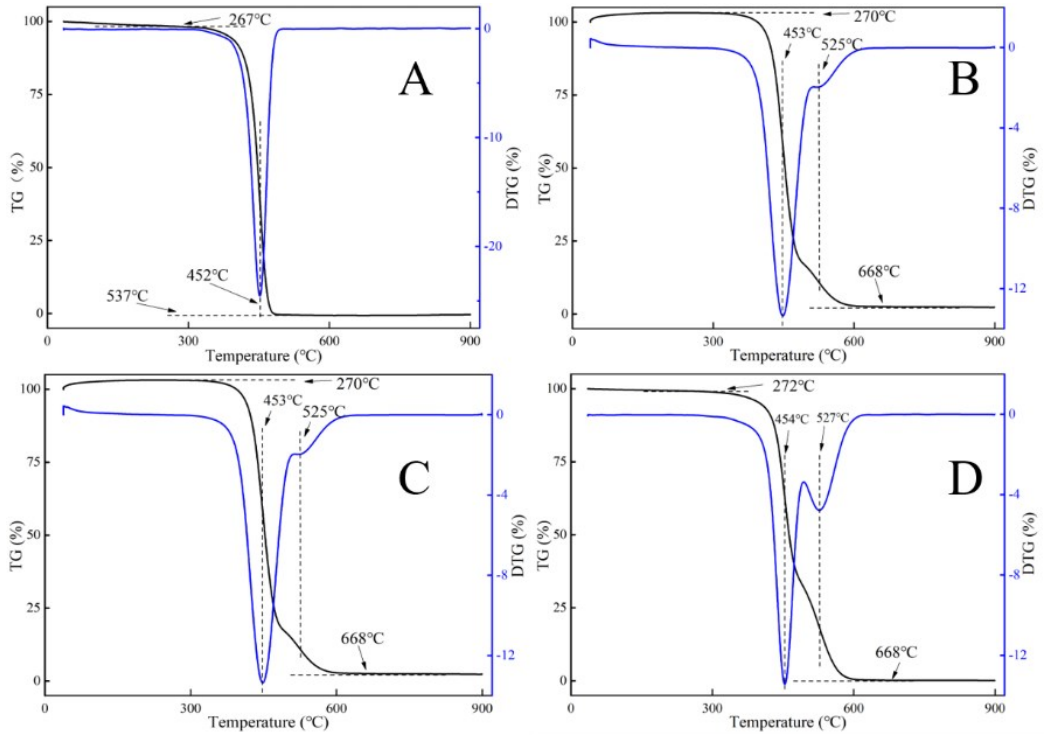

Fig. S4. Membrane TG after ultrasound was shown. (A) PPHFM, (B) MTPPM, (C) VTPPM and (D) ATPPM.

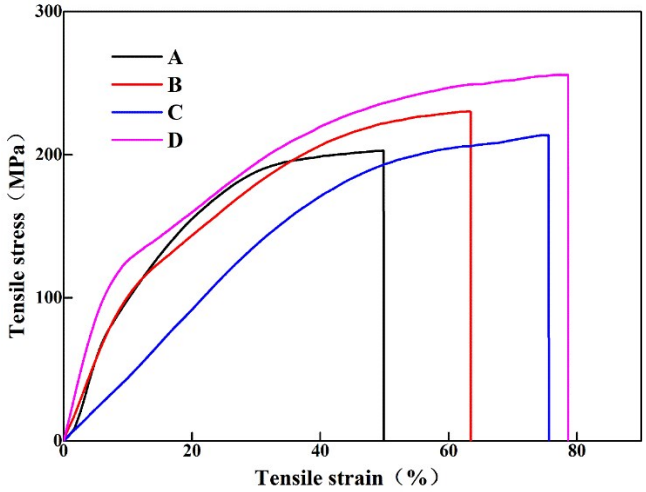

Fig. S5. Membrane mechanical after ultrasound. (A) PPHFM, (B) MTPPM, (C) VTPPM and (D) ATPPM.

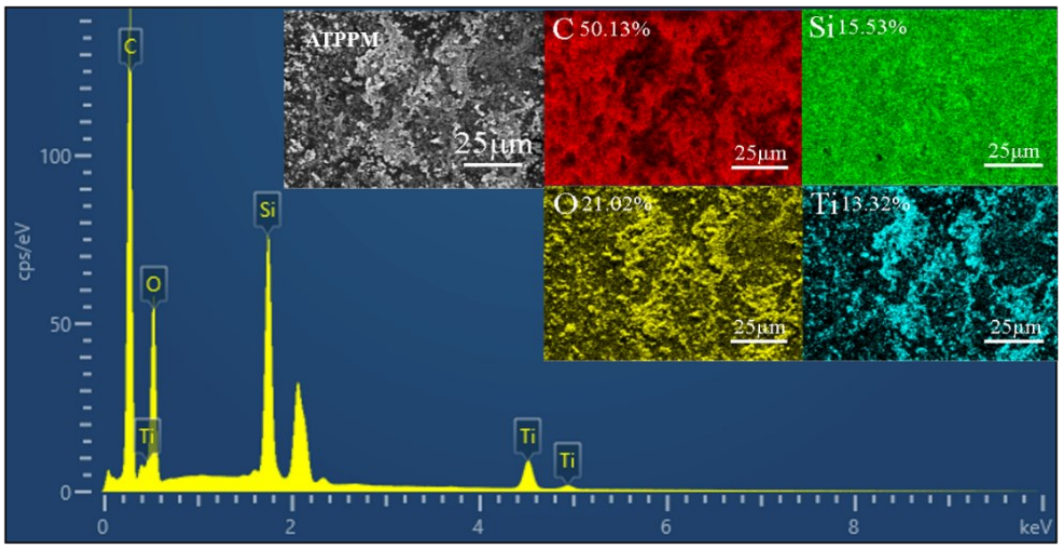

Fig. S6. EDX mapping of ATPPM membrane cross section was shown.

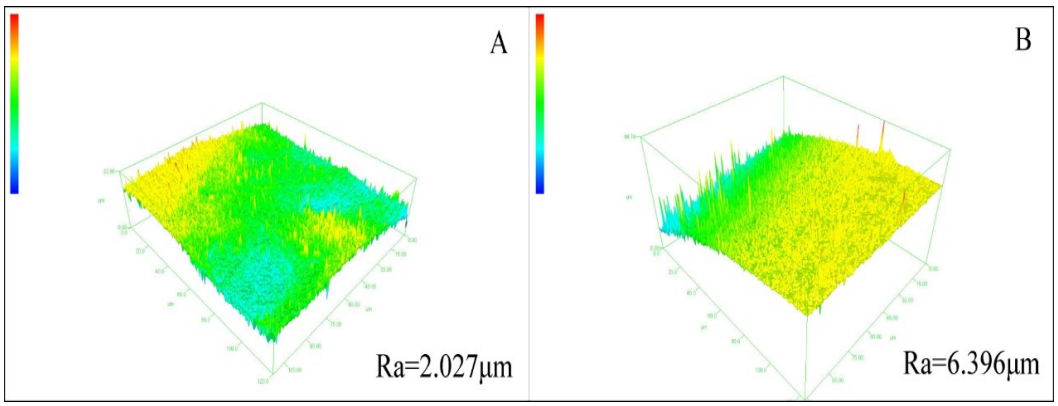

Fig. S7. CSM images of membranes and the roughness (Ra) value. (A) PPHFM, (B) ATPPM.

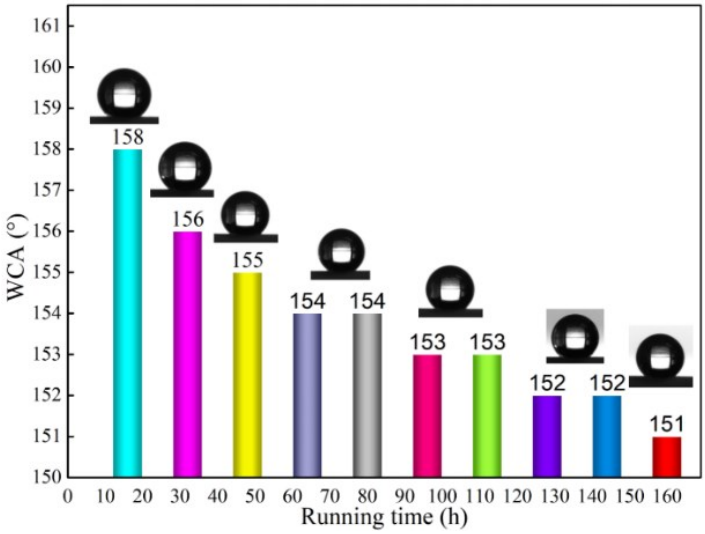

Fig. S8. Membrane ATPPM static WCA after VMD under various periods were obtained.

Table S1 Surface compositions (element content %) of unmodified and modified membranes

Membranes	Si	C	O	N	Ti
Pristine M	1.21	90.88	6.02	1.89	-
MTPPM	10.89	76.70	11.39	-	1.02
VTPPM	17.6	63.52	17.87	-	1.01
ATPPM	26.36	48.51	22.67	1.42	1.04

Video 1

Video 1dynamic
WCA of SH memb