

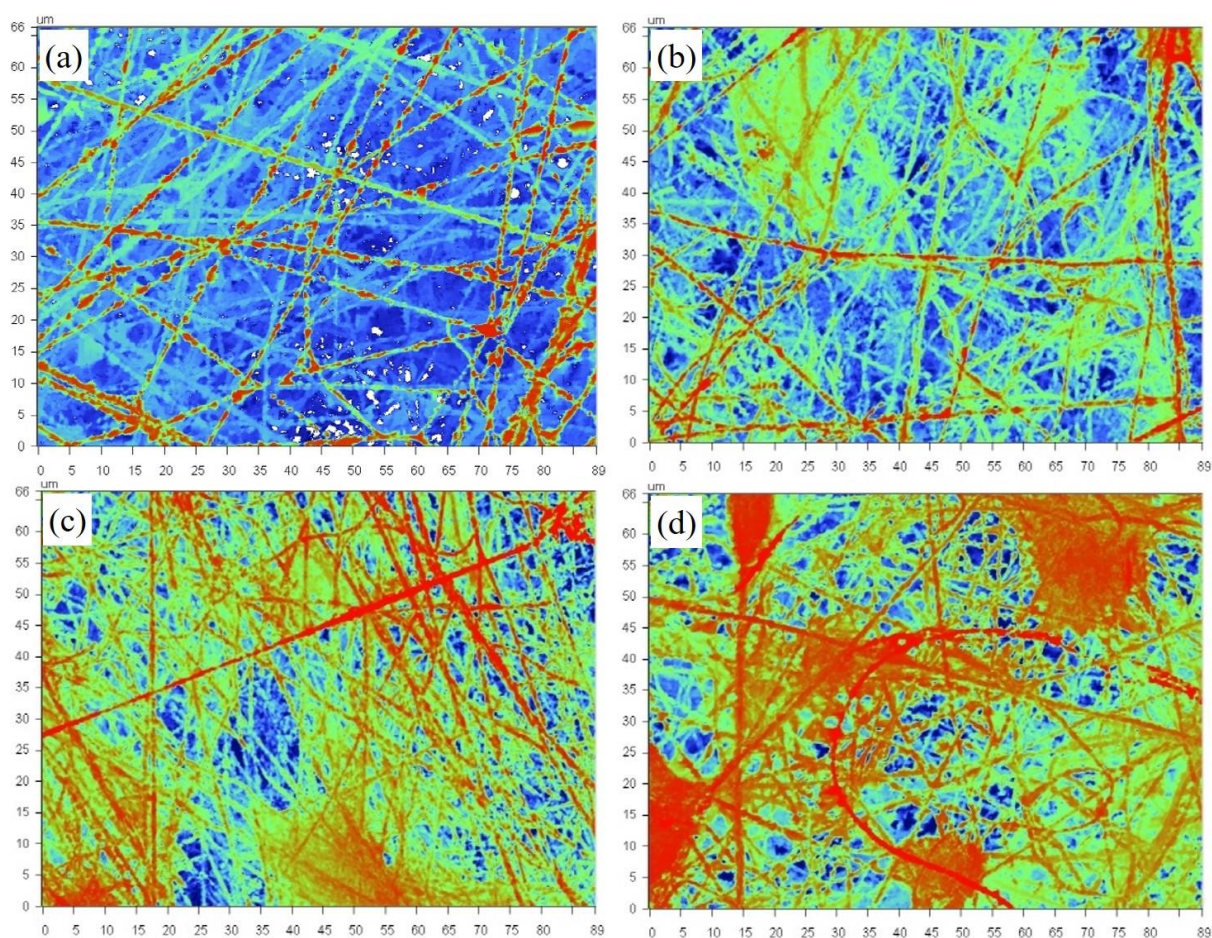
Enhanced vapor transport in membrane distillation via functionalized carbon nanotube anchored into electrospun nanofibers

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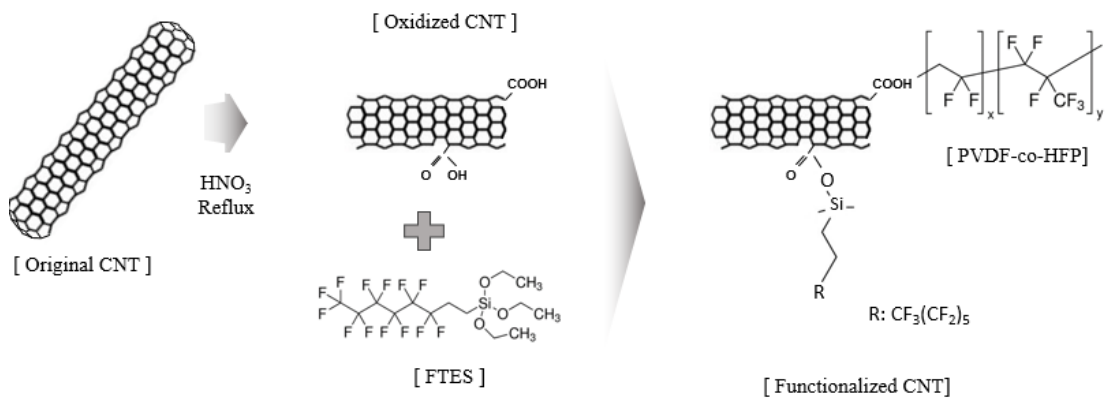
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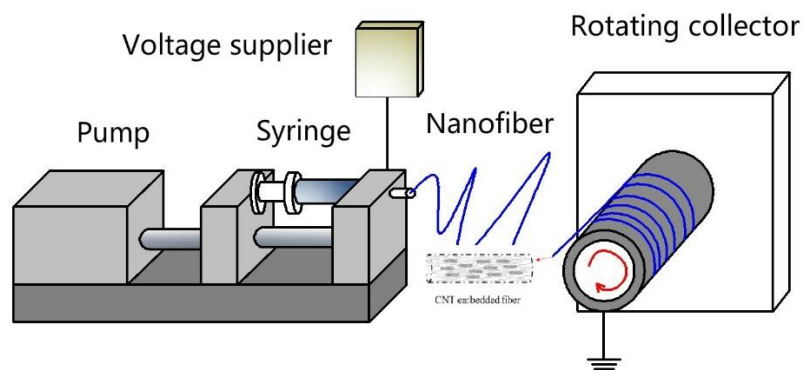
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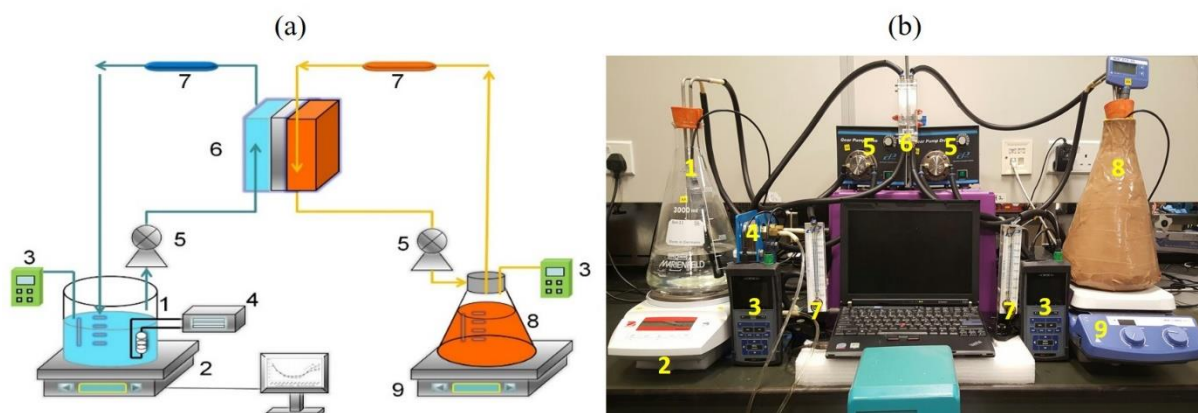
Supplementary Figure S1. Optical profiler images ($88.8 \mu\text{m} \times 66.4 \mu\text{m}$) of (a) E-PH (R_a : $1.35 \mu\text{m}$), (b) E-CNT1 (R_a : $2.04 \mu\text{m}$), (c) E-CNT2 (R_a : $2.43 \mu\text{m}$), and (d) E-CNT3 (R_a : $2.53 \mu\text{m}$).



Supplementary Figure S2. A schematic diagram of CNT functionalization steps.



Supplementary Figure S3. A schematic drawing of the electrospinner.



Supplementary Figure S4. (a) A schematic diagram of the DCMD test unit (1: Permeate tank, 2: Digital balance connected to a computer, 3: Thermometers, 4: Cooling unit, 5: Pumps, 6: Flat sheet membrane module, 7: Flow meters, 8: Feed reservoir, and 9: Hotplate). (b) A picture of experimental set-up of the DCMD test unit.

Table S1. Properties and DCMD performance using various types of electrospun membranes. Feed/permeate temperature: 60/20°C. 3.5 wt% NaCl feed solutions.

Material	Mean pore Size (μm)	Porosity (%)	Thickness (μm)	Contact angle ($^\circ$)	Initial flux ($\text{kg}/\text{m}^2/\text{h}$)	Rejection (%)
^a 67% clay-PVDF ²⁸	0.64	81.0	300	154.2	5.5	99.95
222% SiO ₂ -PVDF ³³	0.61	79.7	100	152.3	43.0	99.99
50% TiO ₂ -PVDF-HFP ₃₂	0.75	91.6	100	149.0	40.0	99.99
^b Fluorinated polytriazole ₃₀	2.70	-	-	162.0	42.0	99.95
^c Polystyrene ³¹	1.15	77.5	120	150.2	63.2	99.99
E-CNT3 of this study	1.20	89.4	88	150.4	48.5	99.98

^a Feed/permeate temperature: 80/17°C.

^b Feed/permeate temperature: 60/22°C. Feed: real sea water.

^c Feed/permeate temperature difference (ΔT): 55°C.

* Concentration of particles was based on weight of polymer.

Supplementary Table S2. Compositions of dope solutions for the electrospun membranes fabricated in this study.

Electrospun membranes	PH (wt%)	DMF (wt%)	Acetone (wt%)	CNTs (wt% to PH) ⁽¹⁾
E-PH	20	64	16	0
E-CNT0.5	20	64	16	0.5
E-CNT1	20	64	16	1
E-CNT2	20	64	16	2
E-CNT3	20	64	16	3

⁽¹⁾ Weight percentage (wt%) of CNTs to polymer (PH).