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Electronic Supplementary Information for

Tunable Pore Size Micro/Submicron-sieve Membranes by Soft Lithography

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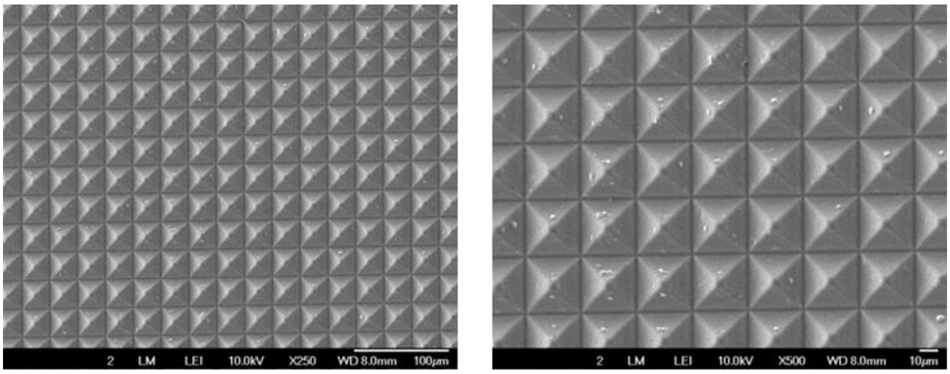


Figure S1. SEM images of master mold with a pyramid pattern. The base length and height of the pyramids are 28 μm and 10 μm, respectively.

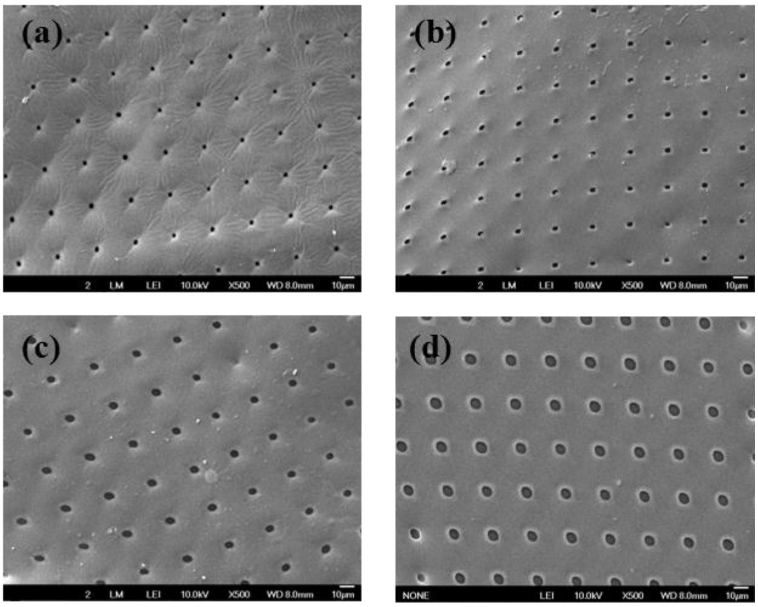


Figure S2. SEM images of soft-lithographically fabricated micro-sieve membranes. The height of the casting knife was varied (manually) to obtain isopore micro-sieve membranes with different pore sizes, (a) ~2.7 μm, (b) ~3.5 μm, (c) ~5.9 μm and (d) ~6.4 μm, respectively. The pyramid-patterned Si master mold was used for these membranes. The final thicknesses of the micro-sieve membrane layer on the porous polyester support varied as well, from ~1 μm for (a) up to ~2.3 μm for (d).

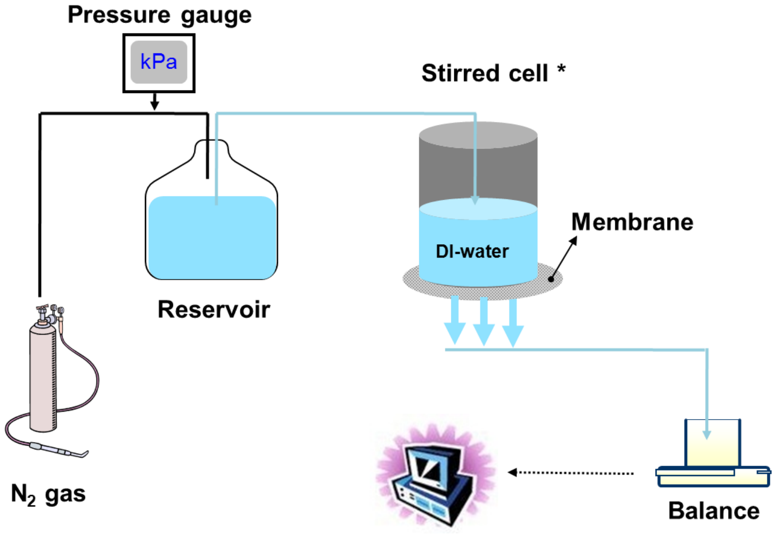
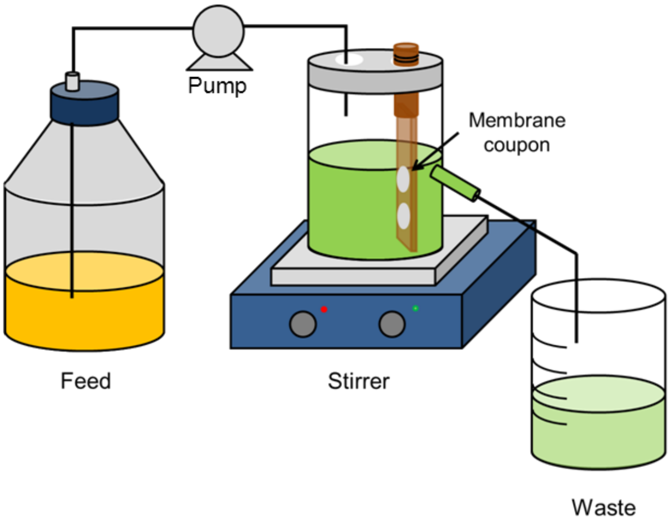


Figure S3. Schematic diagram of the stirred cell for water flux measurements. To measure the flux of each membrane, membranes were installed in the stirred cell and the reservoir was filled with distilled water. Then, pressurized N_2 gas was used to deliver water to the stirred cell. The weight of the effluent was measured using a balance.



Operating condition

Feed	**Diluted tryptic soy broth (1/300)**
Temperature	**37 ℃**
Stirring rate	**100 rmp**
Operating time	**48 hrs**
Microorganism	***P. Aeruginosa*** **GFP tagged**

Figure S4. Schematic diagram and operating conditions of the biofouling test with the CDC reactor.

Red : Known values (water, diiodomethane)
Blue : Unknown values (sum of two unknown values is surface E)
Green : Measured value (contact angle)

Measured contact angle

$$\frac{\sigma_L(Cos\theta+1)}{2} = \sqrt{\sigma_S^P}\sqrt{\sigma_L^P} + \sqrt{\sigma_S^D}\sqrt{\sigma_L^D}$$

P : Polar Component
D : Dispersive Component
S : Solid
L : Liquid

Known values: σ_L, σ_L^D, σ_L^P

Liquid	Total Surface Tension (mN/m)	Dispersive Component (mN/m)	Polar Component (mN/m)
Diiodomethane	50.8	50.8	0
Water	72.8	26.4	46.4

Surface energy of polymer

$$\sigma_S = \sigma_S^P + \sigma_S^D$$

Sum of two unknown values is surface energy

Figure S5. Calculation of surface energy based on Fowkes theory. Contact angle of PUA was measured by using diiodomethane and water. Measured θ, and the known values of total surface tension, dispersive component, and polar component for diiodomethane and water, were inserted into the Fowkes equation, which results in 2 equations with 2 unknowns (polar and dispersive surface energies). Solving the coupled equations yields the polar and dispersive compnents of surface energy. Then, the surface energy of PUA membrane material is simply given as the sum of polar and non-polar (dispersive) surface energies.