

Supplementary Materials

Table S1. SEM images of the pristine RGM-PSF membranes with different pore sizes. The scale bar for outer surface, inner surface and cross section is 1 μm , 2 μm and 30 μm , respectively.

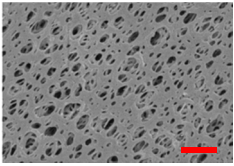
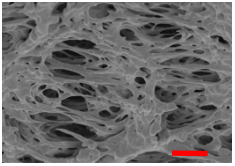
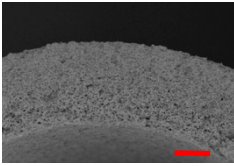
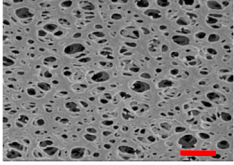
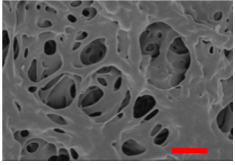
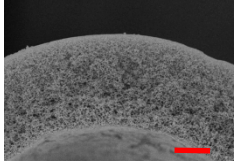
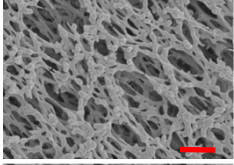
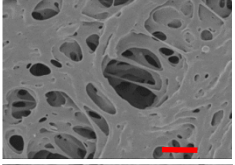
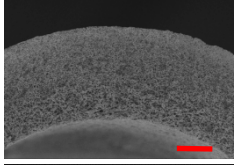
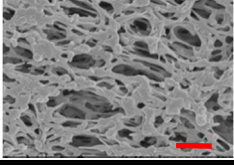
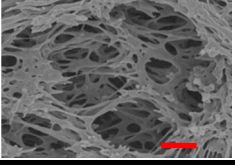
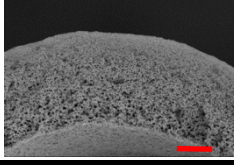
Membrane	Outer surface	Inner surface	Cross section
#1			
#2			
#3			
#4			

Table S2. SEM images of the RGM-PSF membranes with different pore sizes after CRL immobilization. The scale bar for outer surface, inner surface and cross section is 1 μm , 2 μm and 30 μm , respectively.

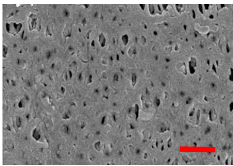
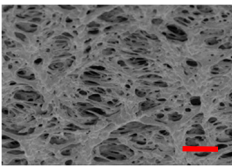
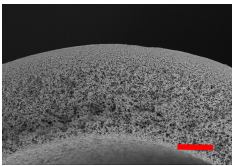
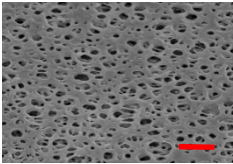
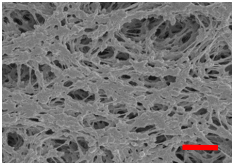
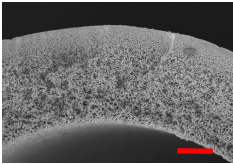
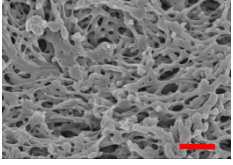
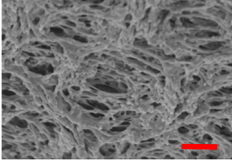
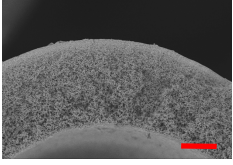
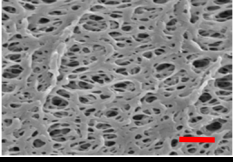
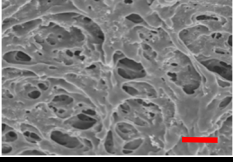
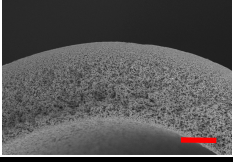
Membrane	Outer Surface	Inner Surface	Cross Section
#1			
#2			
#3			
#4			

Table S3. Bioreactor efficiency under different conditions.

Membrane	Pressure (MPa)	TA concentration	V_r (mmol·L ⁻¹ ·min ⁻¹) ^e	Bioreactor activity (U·g ⁻¹)
#1	0.17 (I/O) ^a	0.20 M	2.17×10 ⁻²	5.86×10 ³
	0.17 (O/I) ^a	0.20 M	1.92×10 ⁻²	5.01×10 ³
	0.14 (I/O) ^a	0.20 M	1.44×10 ⁻²	4.05×10 ³
	0.10 (I/O) ^a	0.20 M	1.11×10 ⁻²	3.91×10 ³
	0.17 (I/O) ^a	0.15 M	1.23×10 ⁻²	3.23×10 ³
	0.17 (I/O) ^a	0.10 M	1.13×10 ⁻²	2.82×10 ³
	0.17 (I/O) ^a	0.05 M	6.11×10 ⁻³	1.41×10 ³
	0.17 (I/O) ^a	0.02 M	3.99×10 ⁻³	1.32×10 ³
	0.17 (I/O) ^b	0.2 M	4.06×10 ⁻²	1.07×10 ⁴
	0.17 (I/O) ^c	0.2 M	2.80×10 ⁻²	7.64×10 ³
	0.17 (I/O) ^d	0.2 M	1.78×10 ⁻²	4.55×10 ³
#2	0.07 (I/O) ^a	0.20 M	5.63×10 ⁻³	1.77×10 ³
	0.17 (I/O) ^a	0.20 M	1.82×10 ⁻²	4.82×10 ³
	0.07 (I/O) ^a	0.20 M	6.71×10 ⁻³	2.14×10 ³
#3	0.17 (I/O) ^a	0.20 M	1.60×10 ⁻²	4.54×10 ³
	0.07 (I/O) ^a	0.20 M	9.26×10 ⁻³	2.73×10 ³
#4	0.17 (I/O) ^a	0.20 M	1.02×10 ⁻²	3.14×10 ³
	0.07 (I/O) ^a	0.20 M	1.33×10 ⁻²	3.64×10 ³

^a acetic acid production was operated under the temperature of 25 °C.

^b acetic acid production was operated under the temperature of 45 °C.

^c acetic acid production was operated under the temperature of 35 °C.

^d acetic acid production was operated under the temperature of 15 °C.

^e the related coefficients of the regression results were all >0.995.

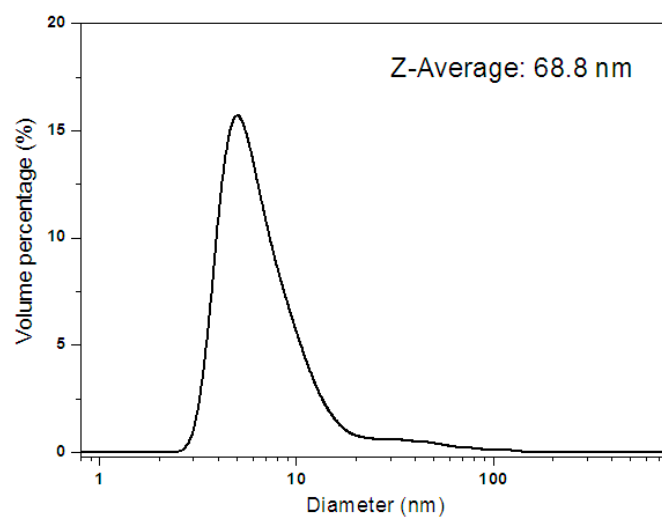


Figure S1. Particle size distribution of CRL dissolved in PBS (0.05 M, pH7.0) measured by dynamic light scattering.

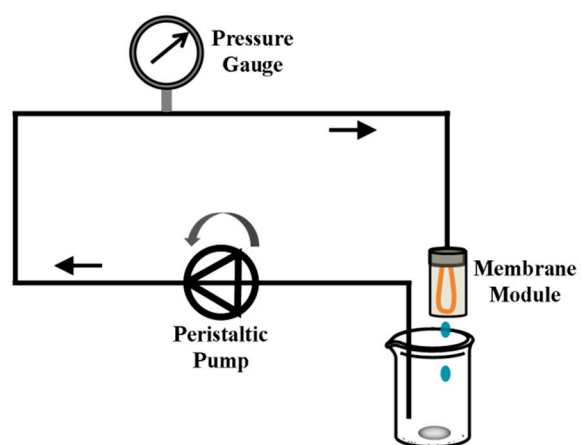


Figure S2 Diagram of the EMBR.