Supplementary Data

Filtration by cornstalk as pre-treatment processes to control membrane fouling in concentration of biogas slurry: Performance, Mechanism and Economic analysis

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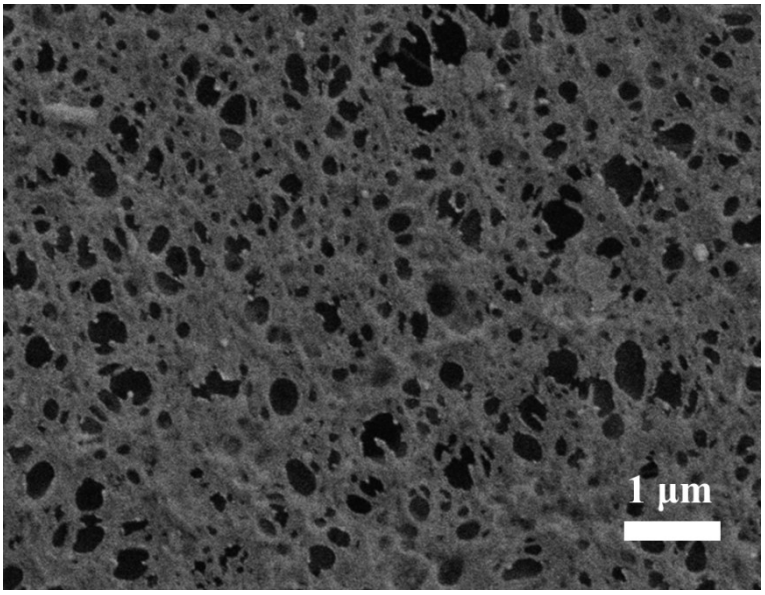

Figure S1 SEM of the active layer of UF membrane before fouling.

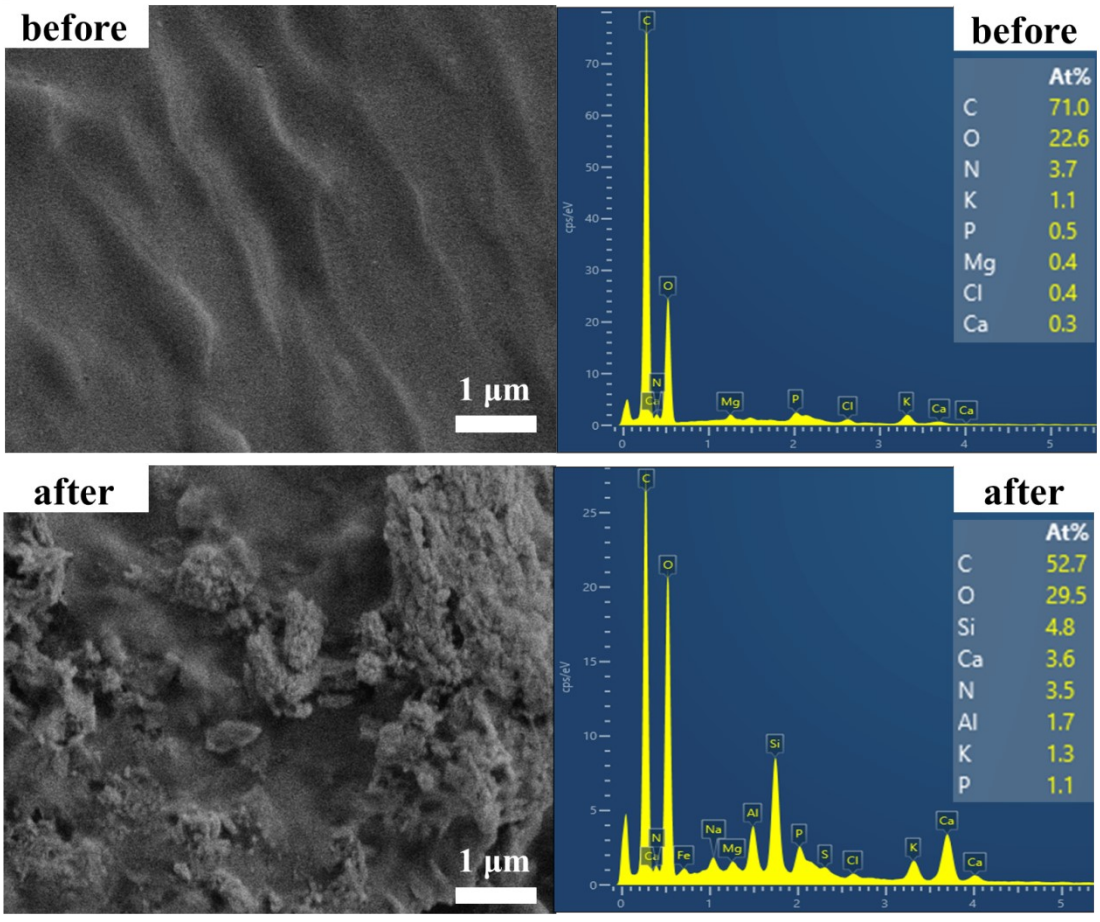

Figure S2 SEM-EDS of the surface of cornstalk before and after filtering the biogas slurry. Cornstalk after filtration is selected in high-density filtration treatment.

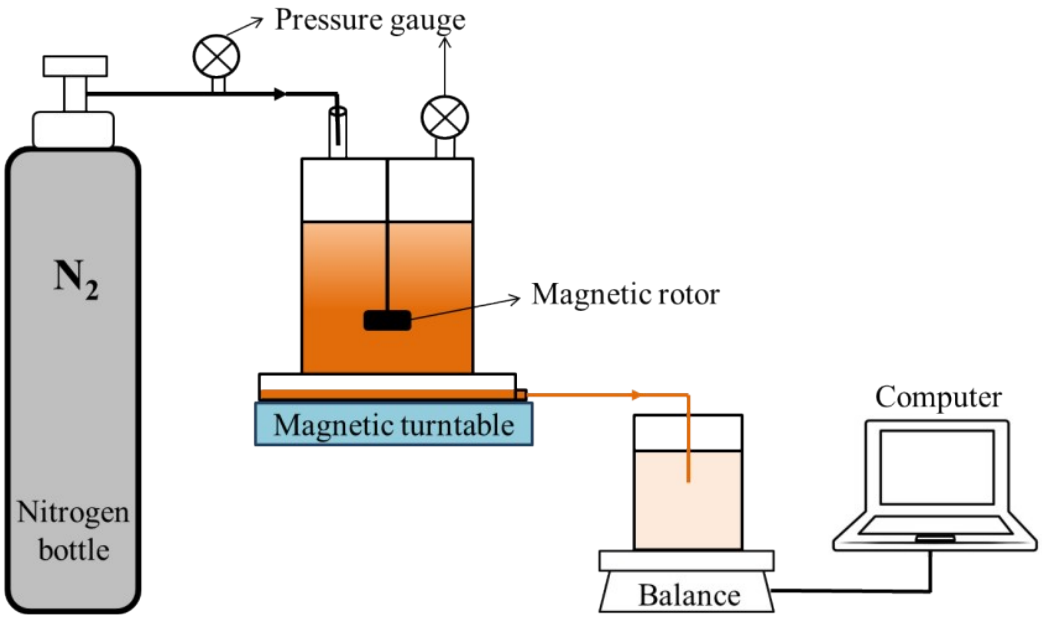

Figure S3 Schematic diagram of the ultrafiltration cup system.

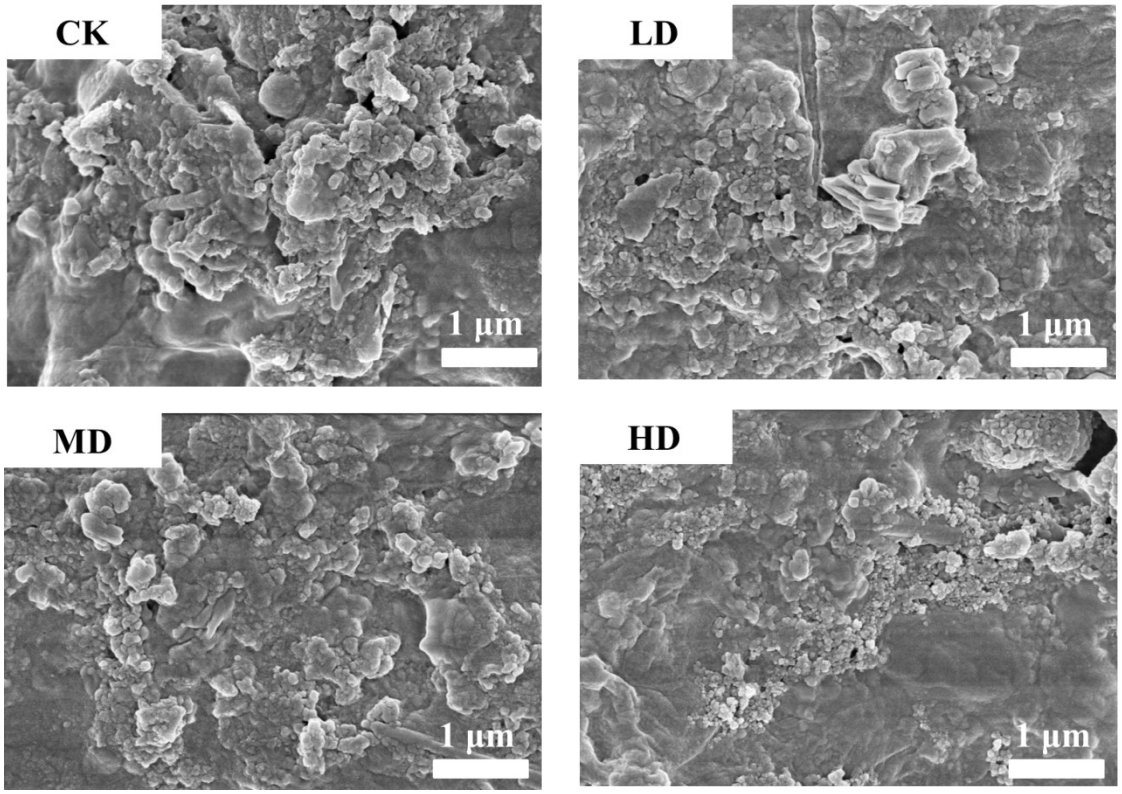

Figure S4 SEM of the active layer of membranes after concentrating biogas slurry. CK was the direct membrane treatment of biogas slurry. LD was the membrane treatment of biogas slurry after filtration of low-density filled cornstalk. MD was the membrane treatment of biogas slurry after

filtration of medium-density filled cornstalk. HD was the membrane treatment of biogas slurry after filtration of high-density filled cornstalk.

Table S1 Key physiochemical characteristics of biogas slurry

Parameter	Biogas slurry
Chemical oxygen demand, COD (g/L)	29.5 ± 1.4
Total nitrogen, TN (g/L)	1.7 ± 0.1
Total phosphorus, TP (g/L)	1.4 ± 0.1
pH (-)	8.76 ± 0.08
Total solids, TS (g/L)	33.8 ± 1.2
Turbidity (-)	17395 ± 715

Table S2 Equation of different fouling mechanism for filtration

Mechanism model	Fitting formula
complete pore blocking	$J_0 - J = AV$
standard pore blocking	$1/t + B = J_0/V$
intermediate pore blocking	$\ln J_0 - \ln J = CV$

The mechanism formula of the same pore plugging model is shown in Table S1, where J is the membrane flux, J_0 is the initial membrane flux, t is the filtration time, V is the filtration volume, A is the complete pore plugging coefficient, and B is the standard pore plugging coefficient, C is the intermediate hole plugging coefficient.