

Supplementary materials

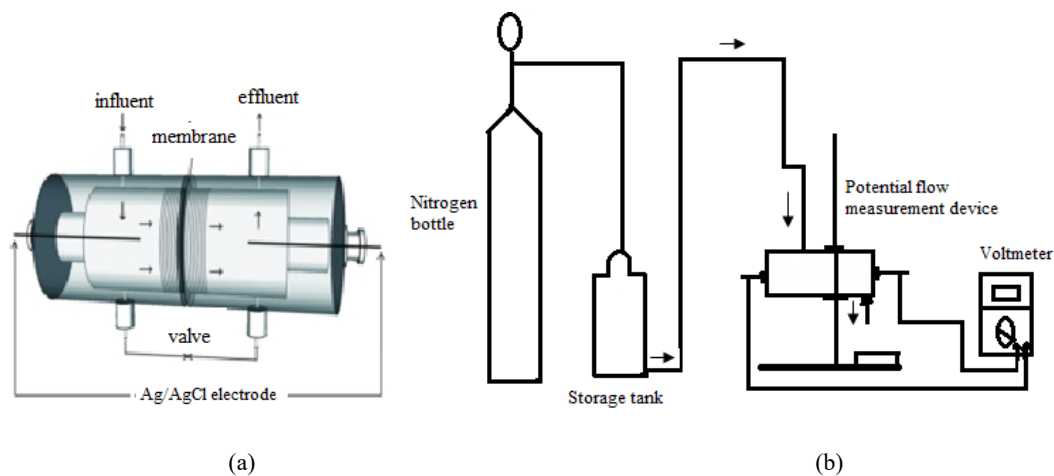


Fig. S1 Streaming potential measurement device (a) across streaming potential measurement devices, (b) flow chart of streaming potential experimental determination

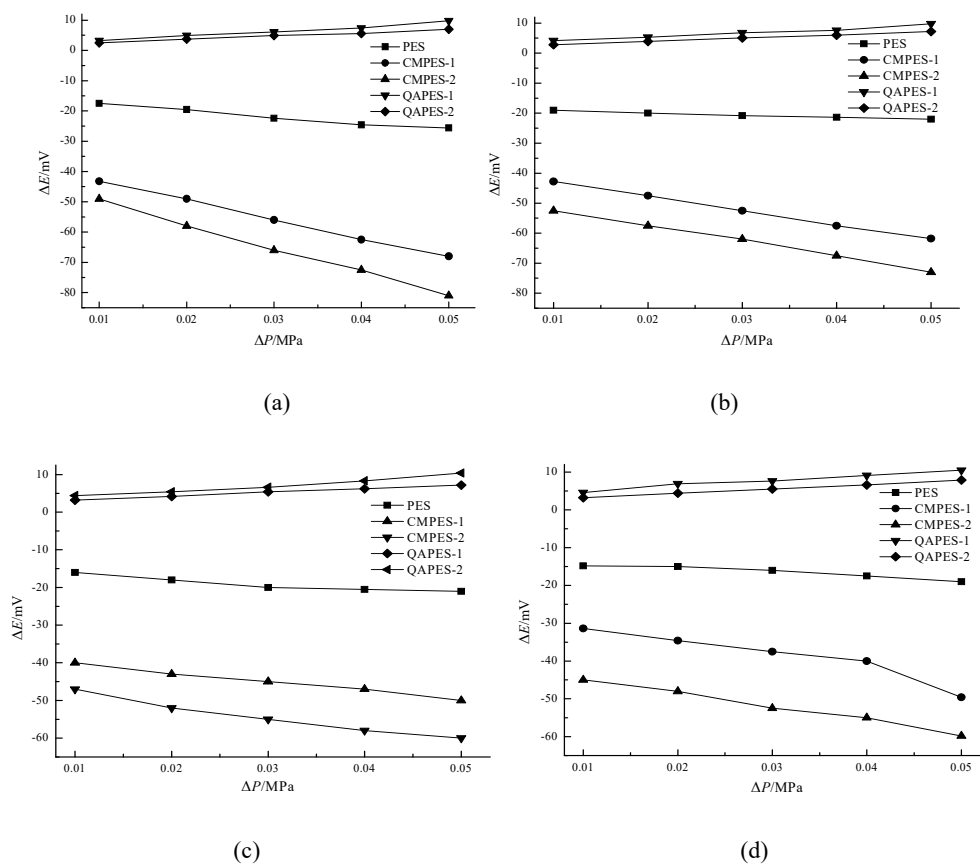


Fig. S2 Streaming potential of five membranes as a function of pressure (KCl concentration: (a) $1 \text{ mmol}\cdot\text{L}^{-1}$, (b) $2 \text{ mmol}\cdot\text{L}^{-1}$, (c) $3 \text{ mmol}\cdot\text{L}^{-1}$, (d) $5 \text{ mmol}\cdot\text{L}^{-1}$, $T = 25^\circ\text{C}$, $\text{pH} = 3$, $\Delta P = 0.03 \text{ MPa}$)

Table S1 Compositions of five PES membranes (w/w)

types	PES	CMPEs-1	CMPEs-2	QAPES-1	QAPES-2
PES	22	17	5	17	5
CMPEs	0	5	17	0	0
CCPEs	0	0	0	5	17
LiCl	3	3	3	3	3
PVP	1	1	1	1	1
NMP	74	74	74	74	74