

Supporting Information for

## Engineering Leaf-like UiO-66-SO<sub>3</sub>H Membranes for Selective Transport of Cations

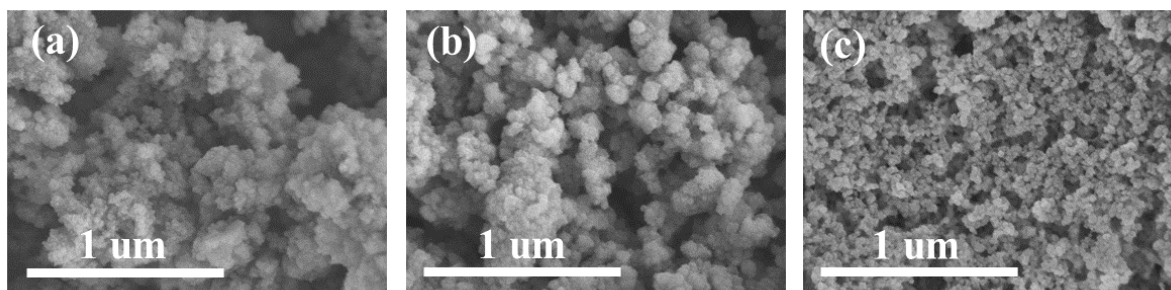
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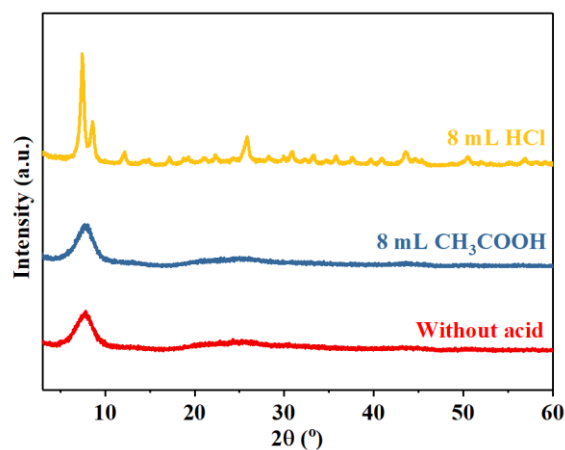
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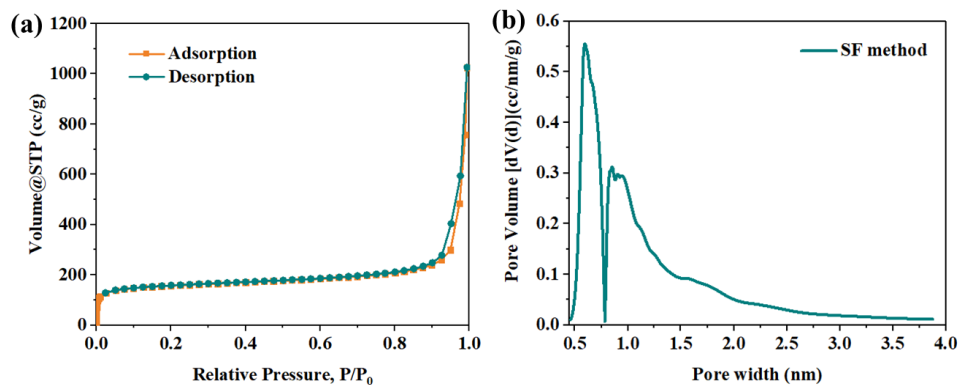
### Supplementary Figures and Tables



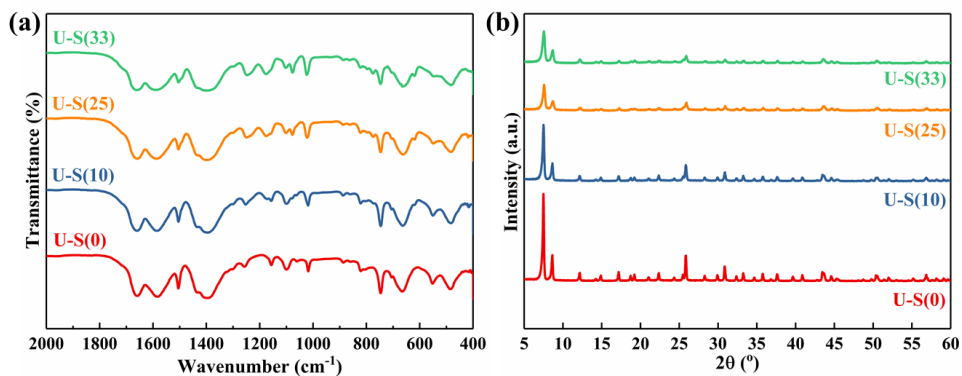
**Fig. S1** SEM images of different growth acid environments for UiO-66-SO<sub>3</sub>H, **a** without acid, **b** with 8 mL CH<sub>3</sub>COOH, **c** with 8 mL HCl



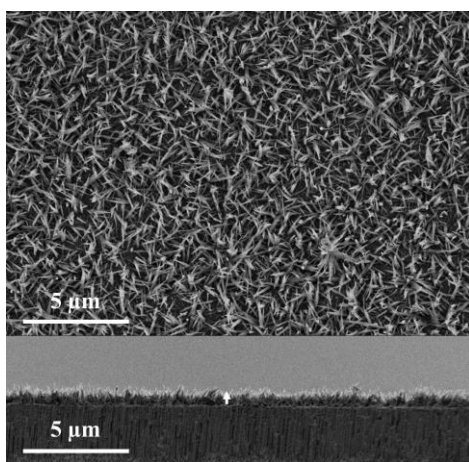
**Fig. S2** XRD patterns of different growth acid environments for UiO-66-SO<sub>3</sub>H



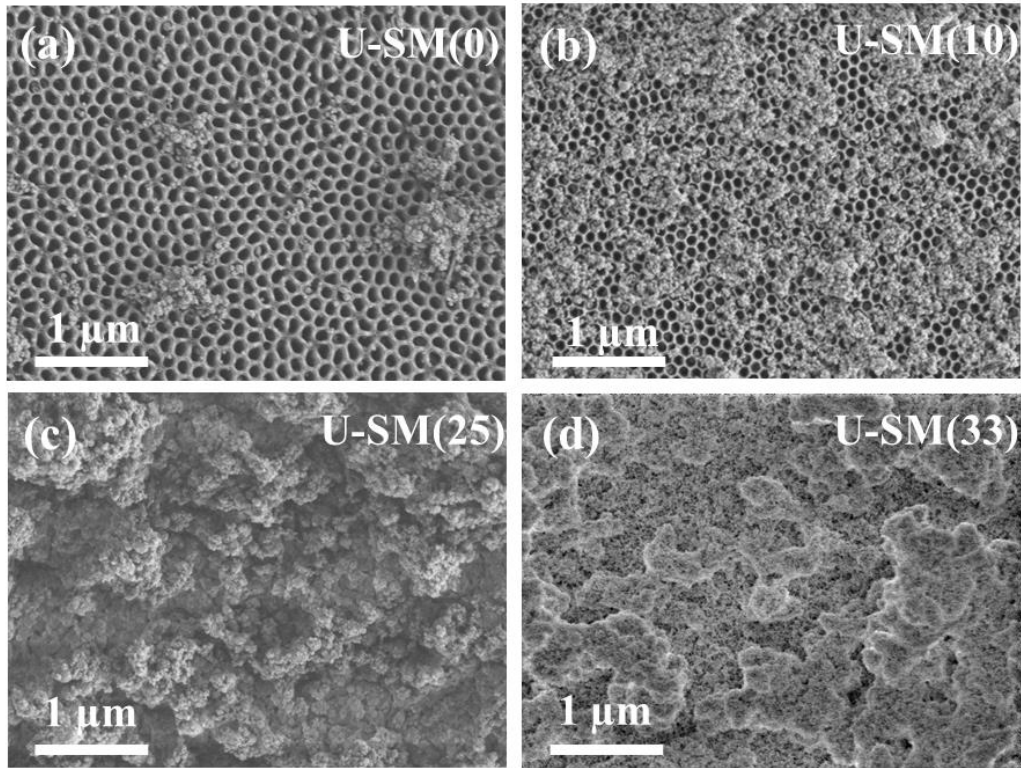
**Fig. S3** **a** N<sub>2</sub> adsorption measurement and **b** pore size distribution of for UiO-66-SO<sub>3</sub>H prepared with 8 mL HCl



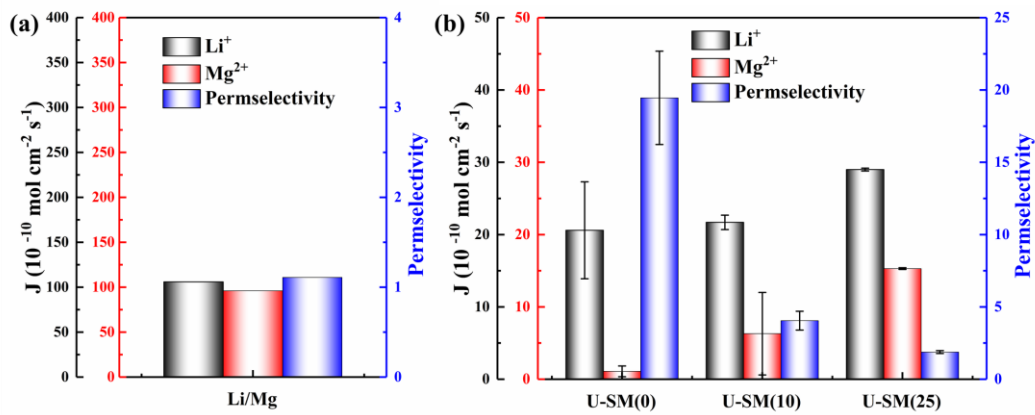
**Fig. S4** **a** FTIR, **b** XRD patterns for 120 h stability test of U-S(X)s



**Fig. S5** SEM image of the surface and cross section of U-SM (25) membrane at low magnification. The SEM micrographs confirm good coverage of the AAO surface with UiO-66-SO<sub>3</sub>H leaves



**Fig. S6** SEM surface images facing to salt solution side of **a** U-SM(0), **b** U-SM(10), **c** U-SM(25), and **d** U-SM(33)



**Fig. S7**  $\text{Li}^+/\text{Mg}^{2+}$  separation performance of **a** blank AAO, **b** U-SM(X)s

**Table S1** BET surface area of U-S(X) nanoparticles

U-S(X)	U-S(0)	U-S(10)	U-S(25)	U-S(33)
<b>surface area (m<sup>2</sup>/g)</b>	1118	1094	837	806

**Table S2** Recipe for UiO-66-SO<sub>3</sub>H membranes prepared with different sulfonate content

Membranes	Reaction time (h)	Reaction concentration of 2-NaSO <sub>3</sub> -H <sub>2</sub> BDC (g L <sup>-1</sup> )	Reaction concentration of H <sub>2</sub> BDC (g L <sup>-1</sup> )	Reaction concentration of ZrCl <sub>4</sub> (g L <sup>-1</sup> )
U-SM(0)	24	0	8.3	11.65
U-SM(10)	24	1.34	7.47	11.65
U-SM(25)	24	3.35	6.23	11.65
U-SM(33)	24	4.49	5.52	11.65