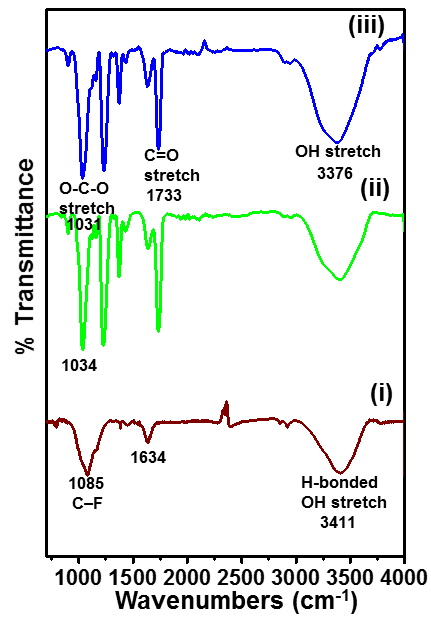
**Supporting Information**

**A fouling-resistant mixed-matrix nanofiltration membrane based on covalently cross-linked Ti3C2TX (MXene)/cellulose acetate**

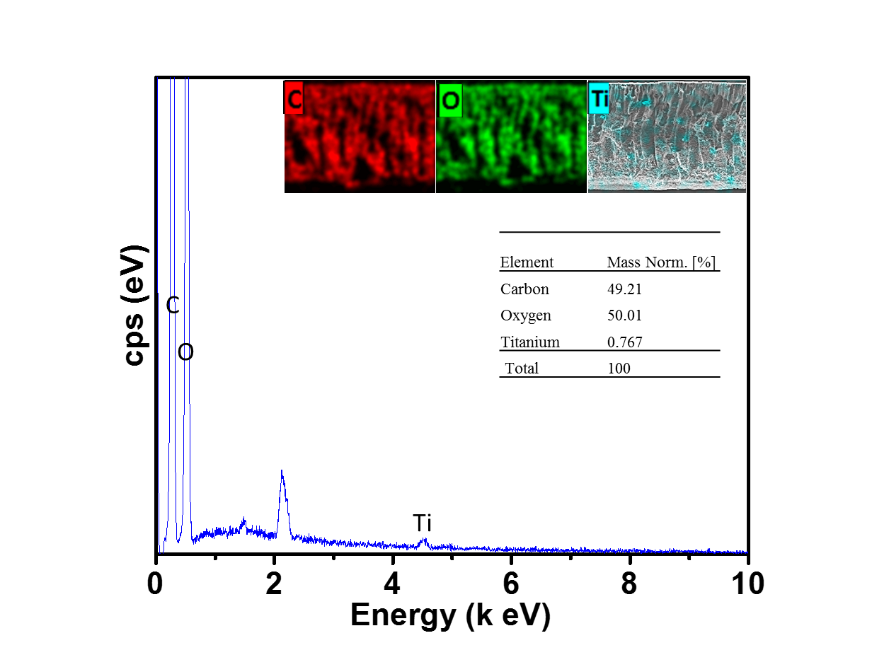
Ravi P. Pandeya, P. Abdul Rasheeda, Tricia Gomeza, Reem S. Azama,b, Khaled A Mahmouda,\*

a *Qatar Environment and Energy Research Institute (QEERI), Hamad Bin Khalifa University (HBKU), P.O. Box 34110, Doha, Qatar*

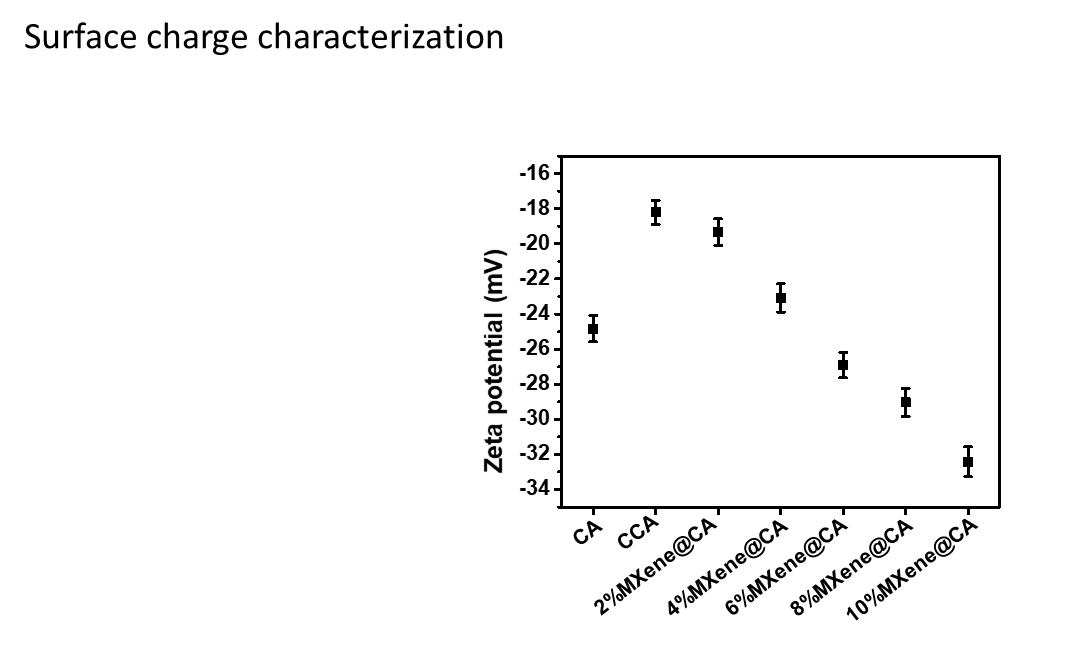
*b* *Materials Science and Technology Program, College of Arts and Sciences, Qatar University, Doha, 2713, Qatar*



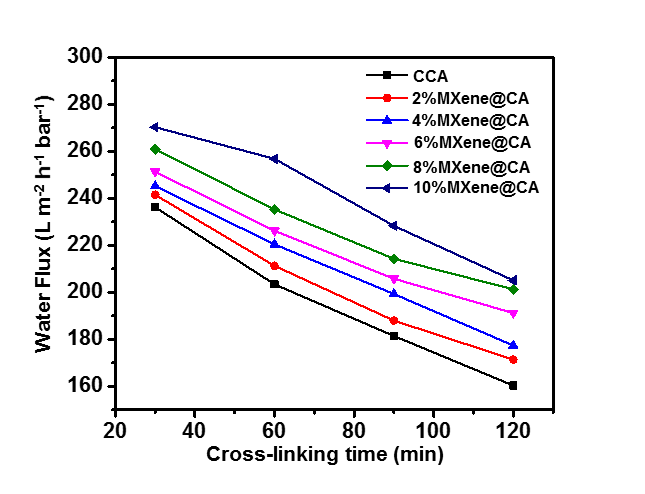
**Fig. S1.** FT-IR spectra for: (i) MXene, (ii) CA and (iii) 10%MXene@CA Membranes.



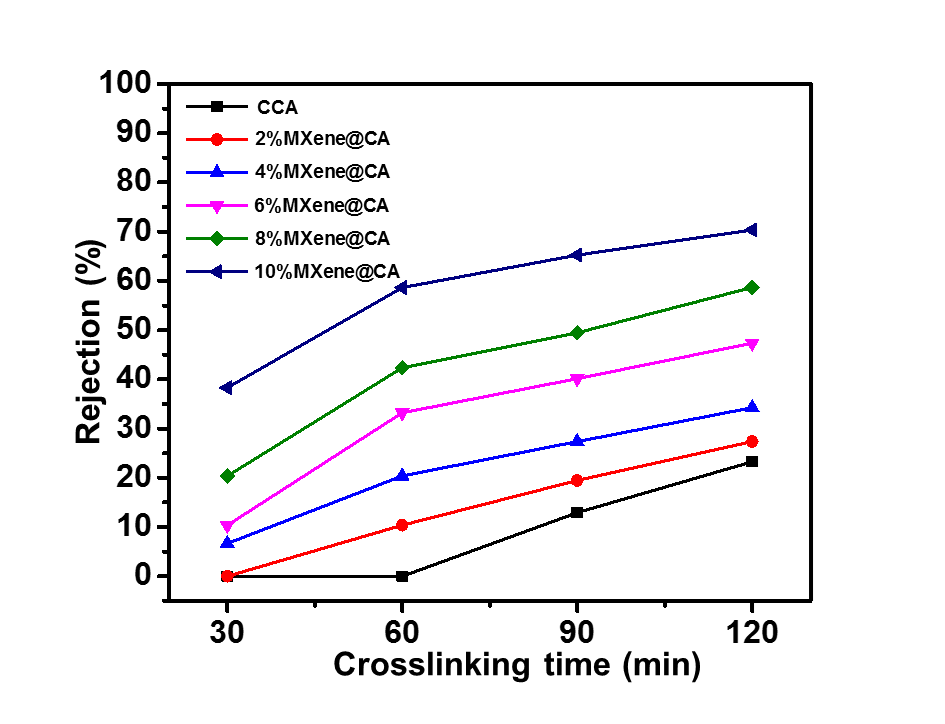
**Fig. S2.** Elemental mapping images (inserts), and energy-dispersive spectroscopy (EDS) spectrum of 10%MXene@CA Membrane.



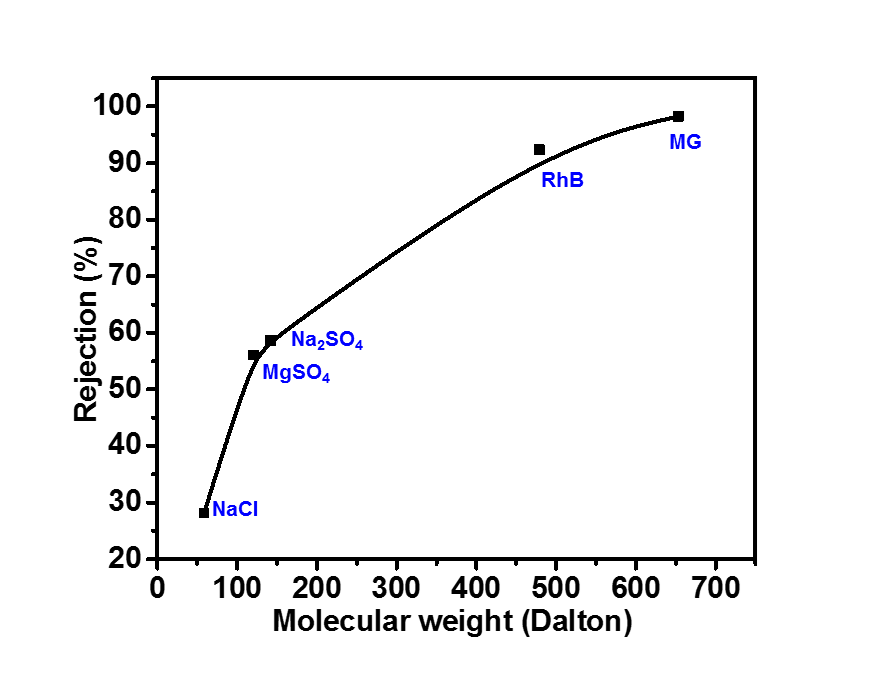
**Fig. S3.** Zeta potential curves of CA, CCA, and MXene@CA membranes at pH 7.



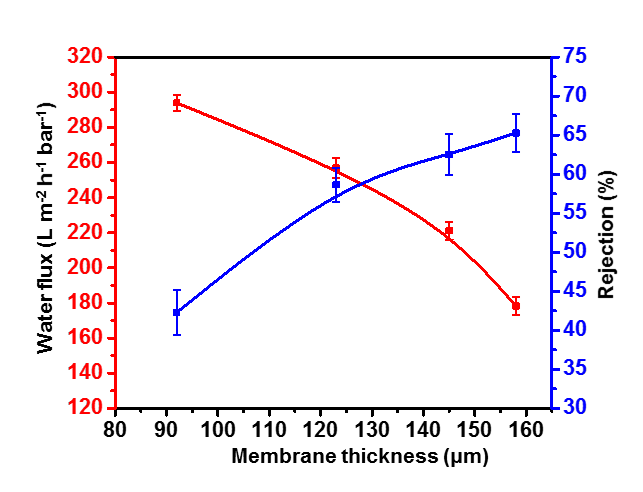
**Fig. S4.** Effect of crosslinking time on pure water flux of CCA, 2%MXene@CA, 4%MXene@CA, 6%MXene@CA, 8%MXene@CA, 10%MXene@CA composite membranes.



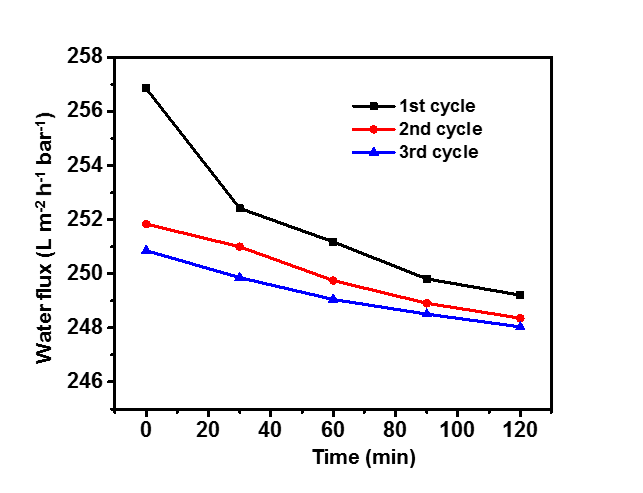
**Fig. S5.** Effect of crosslinking time on rejection performance of different MXene@CA composite membranes crosslinked for 30, 60, 90, 120 min. Aqueous solution of Na2SO4 (2000 ppm) were used as feed.



**Fig. S6.** Molecular weight cut-off (MWCO) profile of 10%MXene@CA membrane.



**Fig. S7.** The effect of membrane thickness on the pure water flux and rejection of Na2SO4 (10%MXene@CA membrane). Aqueous solution of Na2SO4 (2000 ppm) were used as feed.



**Fig. S8.** Durability and flux recovery test of 10%MXene@CA membrane during three cycles filtration of 0.1 g/L RhB solution at 1 bar pressure.