Supporting information

Oligo-ethylene-glycol based thin-film composite nanofiltration membranes for effective separation of mono-/divalent anions

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Fig. S1 SEM images of PA@N-PEG TFC membranes. (a) Surface morphologies and (b) cross-morphologies. The thickness is 400 nm for PA@N-PEG.
Fig. S2 (a) The membranes without support layer for BET adsorption. The solution of DCA 0.2 wt.% and TMC 0.10 wt.% was poured in a glass dish and stirred quickly with a glass rod for 6 min until a great deal of polyamide was synthesized and wrapped around the glass rod. Then the polyamide was washed with plenty of n-hexane. (b) After washing, the polyamide was moved to a vacuum oven and baked at 60°C for 24 hours and then transferred to BET.
Fig. S3 The adsorption–desorption isotherms of PA@EDA and PA@DCA0.2% membranes. The gas adsorption increased rapidly in the low relative pressure area, which indicated that it was micropore filling from the nitrogen adsorption–desorption isotherm of the membrane samples.
Fig. S4 The magnified spectra of H-NMR to observe chemical shift in different ion interaction. (a) and (b) The pure EDA, EDA and different ions with the molar ratio EDA : ion=40:1 in 1.5 ml D$_2$O. (c) and (d) The pure DCA, DCA and different ions with the molar ratio DCA : ion=40:1 in 1.5 ml D$_2$O.
Fig. S5 The wide scan of XPS for PA@DCA membranes surface.
Fig. S6 (a),(b),(c),(d) the 2D images of AFM. (b) The height distribution image for the roughness of membranes surface based on AFM. The line is marked on the 2D images to obtain the data. It shows the surface roughness of four membranes were around 4 nm, and slightly increased from PA@DCA0.15% to PA@DCA1.0%.
Fig. S7 Pure water flux, rejection to NaCl and rejection to Na\(_2\)SO\(_4\) of PA@N-PEG with TMC concentration 0.1 wt.% and different N-PEG concentrations (0.2 to 2.0 wt.%). The filtration was tested at 25 °C and 0.6 MPa by using the feed solutions of 2 g/L Na\(_2\)SO\(_4\) or 2 g/L NaCl.