

Amphiphilic poly(acrylonitrile)-co-poly(2-dimethylamino)ethyl methacrylate conetwork-based anion exchange membrane for water desalination

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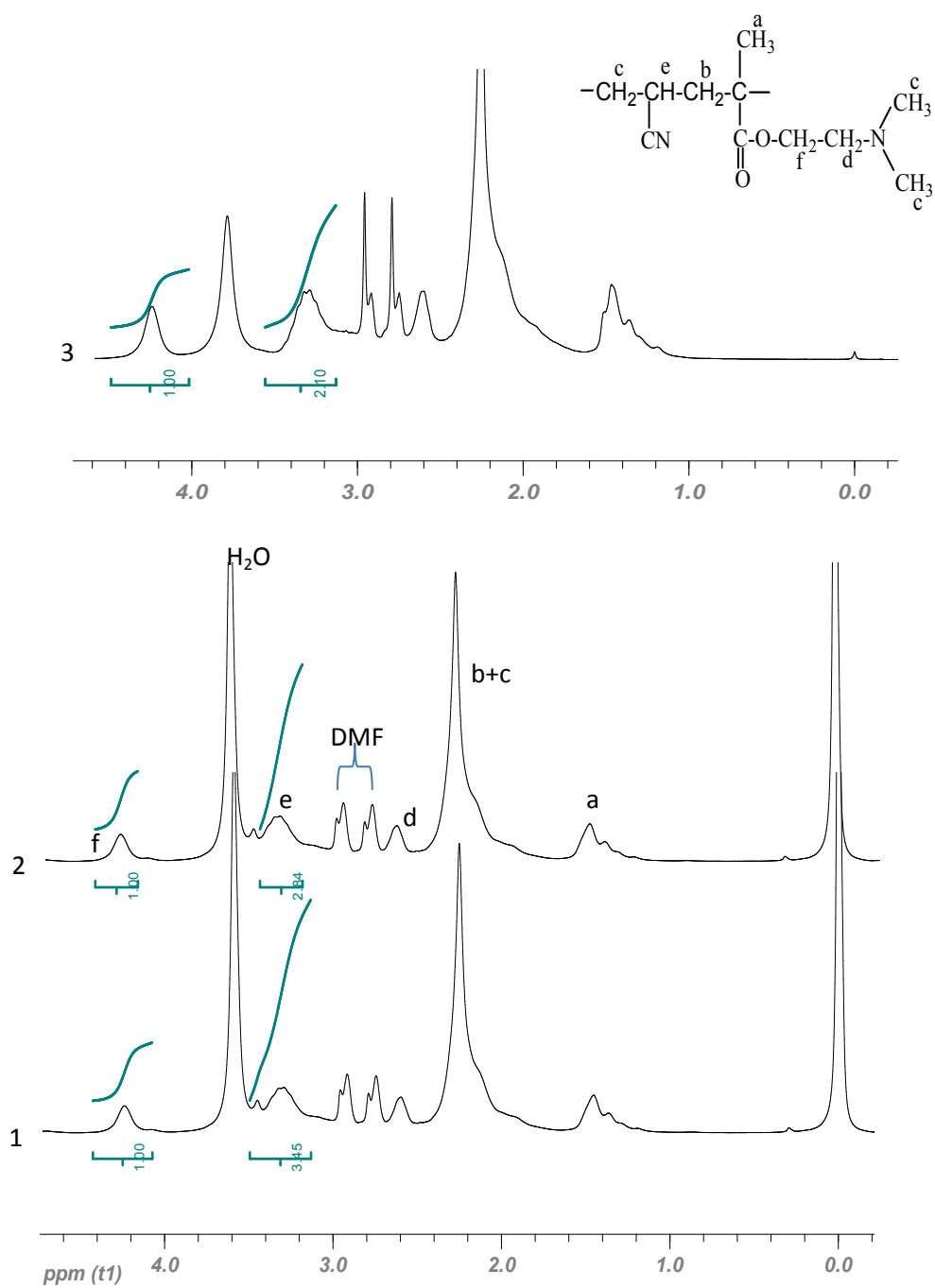


Fig. S1 ^1H NMR spectra of (1) PAN-co-PDMA-2, (2) PAN-co-PDMA-3 and (3) PAN-co-PDMA-4 copolymers.

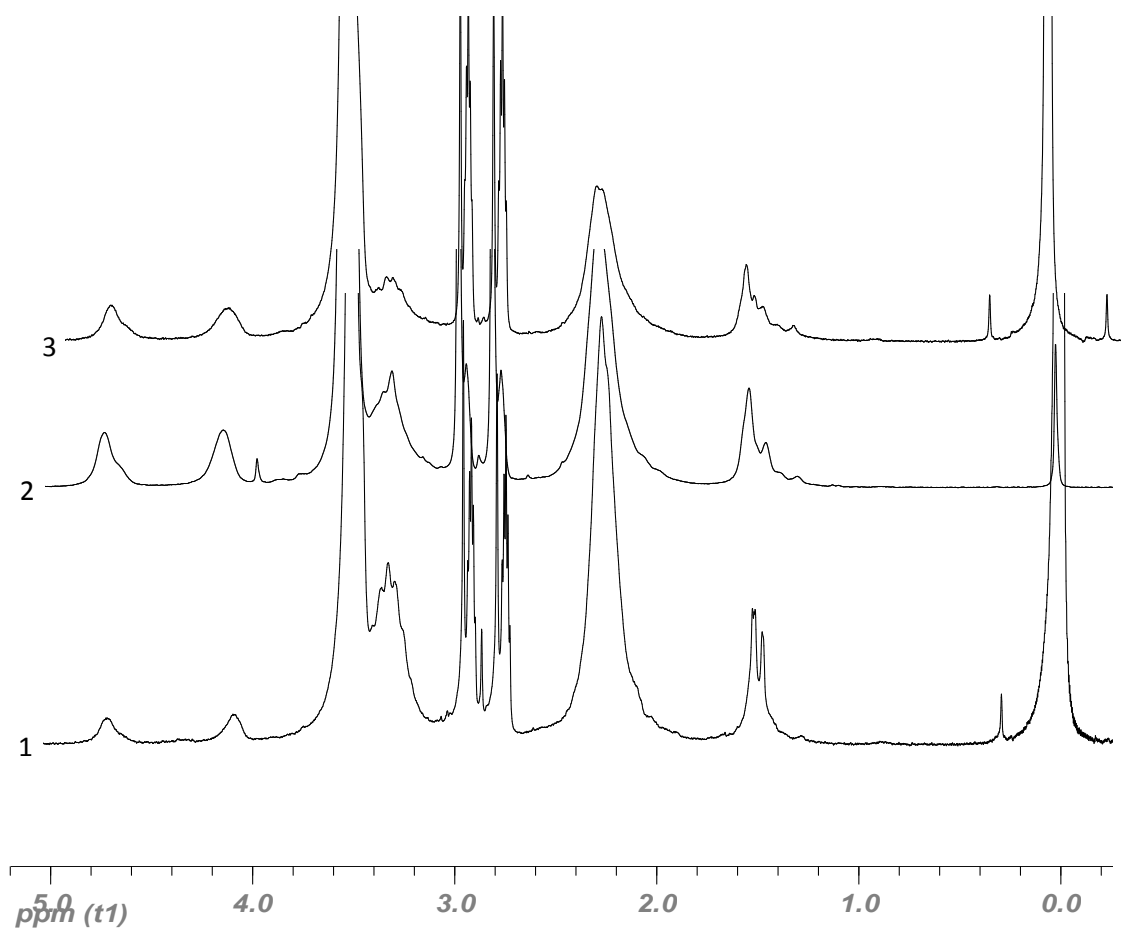


Fig. S2 ¹H NMR spectra of (1) PAN-co-QPDMA-1, (2) PAN-co-QPDMA-2 and (3) PAN-co-QPDMA-4 copolymers.

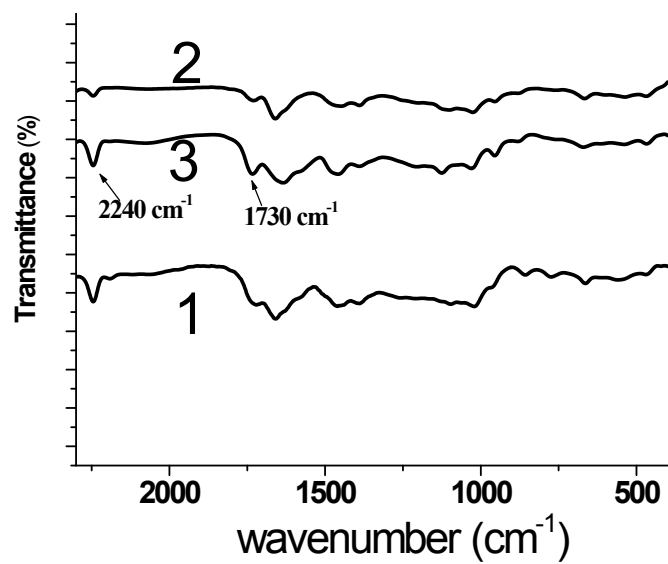


Fig. S3 FT-IR spectra of (1) PAN-co-PDMA-2 copolymer (2), PAN-co-QPDMA-2 copolymer and (3) AEM-2.

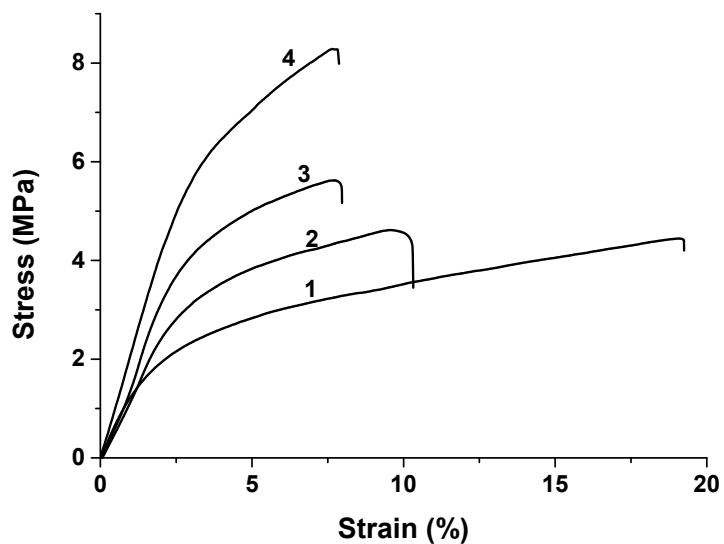


Fig. S4 Stress-strain curves of membranes prepared from PAN-QPDMA-2 copolymer by cross-linking with hydrazine hydrate (varying amount). Curves (1) PAN to hydrazine ratio 90:10 wt/wt, (2) PAN to hydrazine ratio 80:20 wt/wt, (3) PAN to hydrazine ratio 70:30 wt/wt and (4) PAN to hydrazine ratio 60:40 wt/wt (for AEM-2).

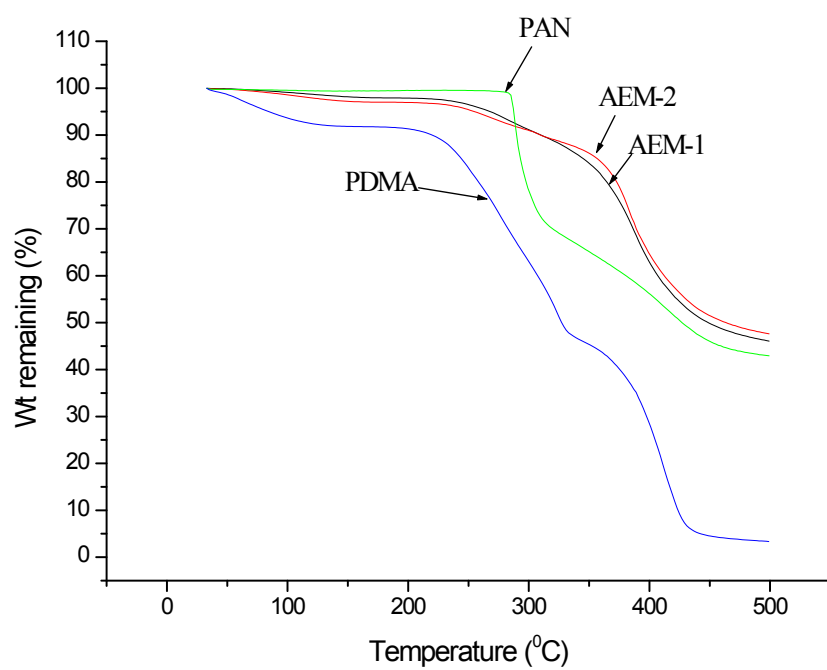


Fig. S5 TGA thermograms of PAN homopolymer, PDMA homopolymer, AEM-1 and AEM-2. The TGA experiments were performed after drying the samples at 150 °C for 72 h.

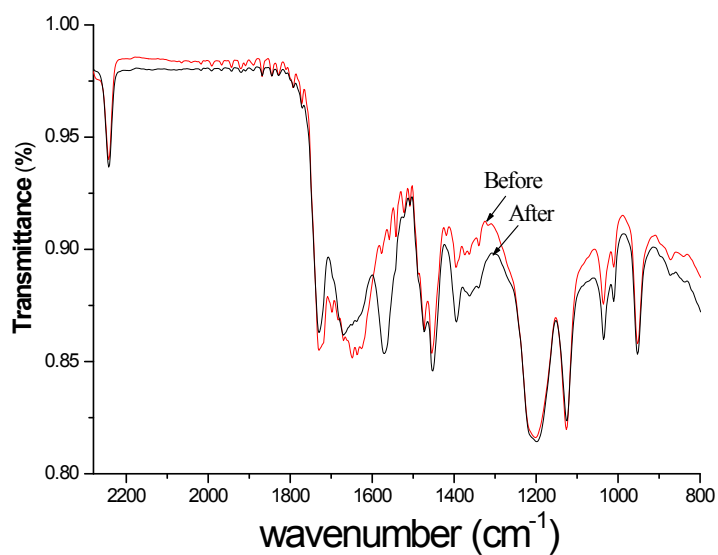


Fig. S6 ATR-IR spectra of AEM-2 before and after subjected to Fenton's reagent oxidation stability test

Table S1. S(%) and E(%) of AEM-2 prepared with varying wt% of hydrazine hydrate

Hydrazine hydrate (wt%)	% S (water)	% E (water)	% S (DMF)	% E (DMF)
10	58	23	190	24
20	44	15	170	19
30	32	10	150	15
40	21	6	130	12

Table S2. ED Unit results for AEM-2 (containing 28 wt% PDMA) with NaCl solution of concentration 2000 mg/L at various pHs at an applied V 2 volts per cell pair.

pH of water	Final TDS	Time (min)	% reduction	W (KW.h/Kg)	CE (%)	(J×10 ⁴) (Kg/m ² s)
5	547	55	74	0.97	94	2.48
7	538	60	73	1.15	80	2.02
8	340	90	83	1.14	81	1.90
10	498	85	76	1.13	82	1.85