Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.
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Electronic Supplementary Information for

Comb-shaped alkyl imidazolium-functionalized poly(arylene ether sulfone)s as high performance anion-exchange membranes

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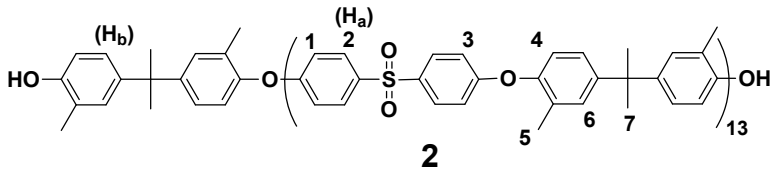
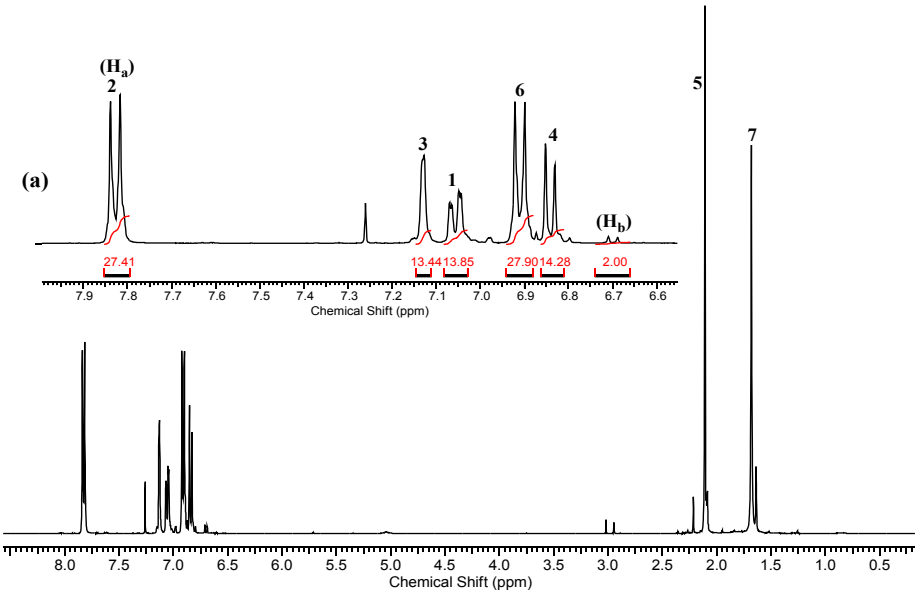
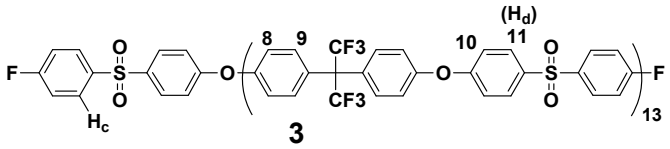
Figure S1. ^{1}H NMR spectra of the OH-terminated oligomer **2** (a) and the F-terminated oligomer **3** in $CDCl_3$



2





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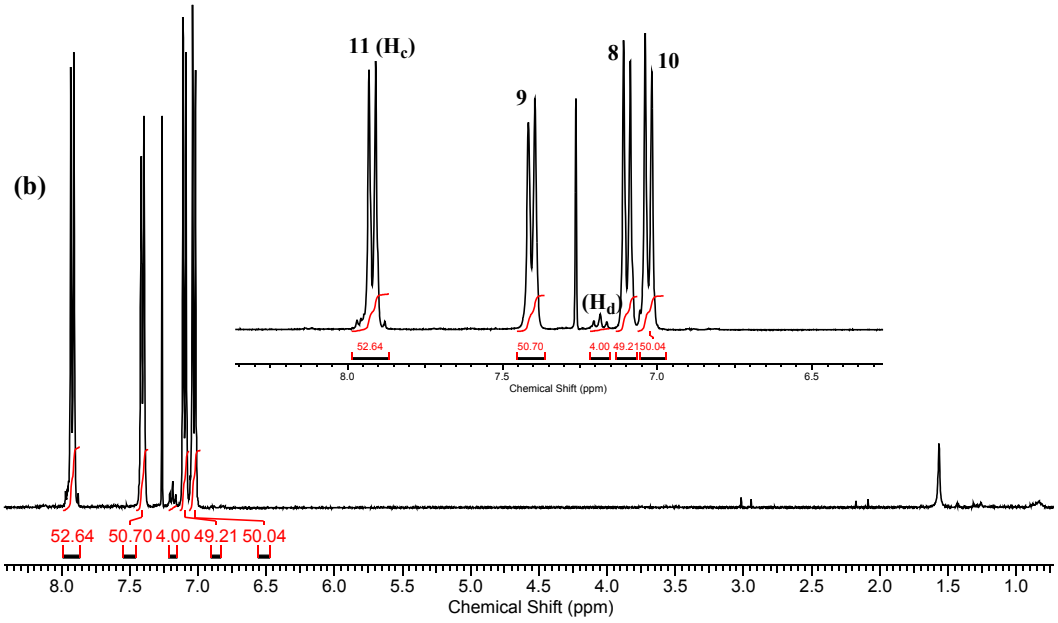

Figure S2. ^{1}H NMR spectra of the block copolymer **4** and its brominated form **5** in $CDCl_3$

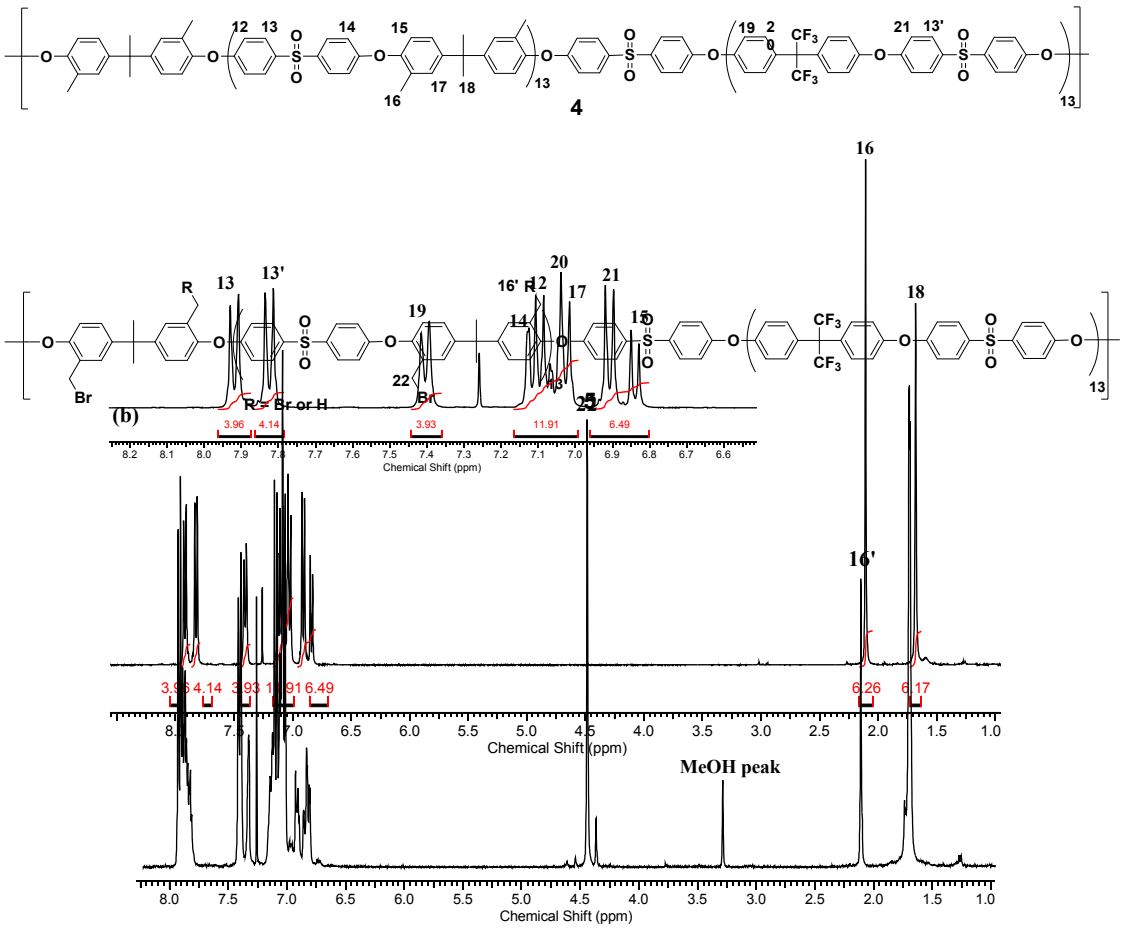

Figure S3. Representative Nyquist plots of Z″ vs. Z′ from AC impedance spectroscopy measurements of AI-PES membranes at 20 °C

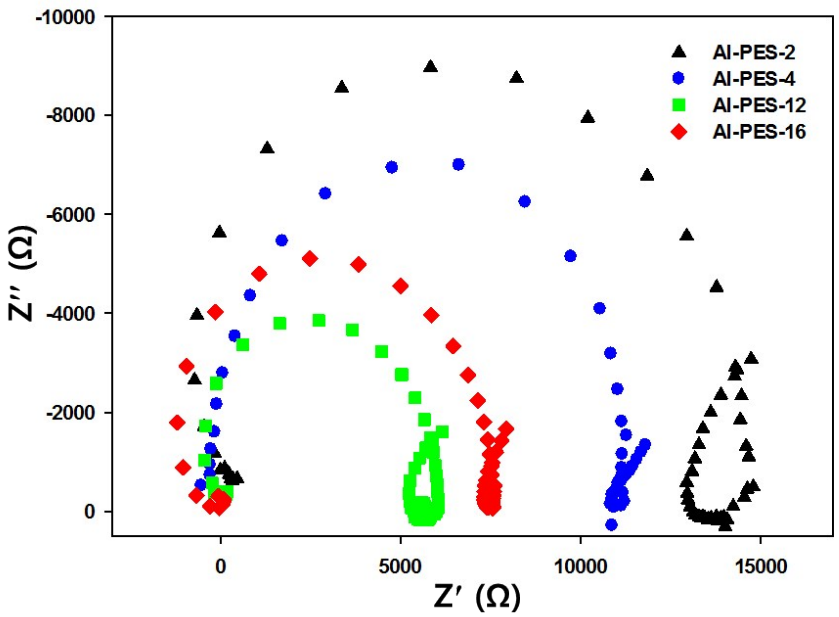

Figure S4. Stress-strain curves of the OH^- forms of the AI-PES membranes in the dry state

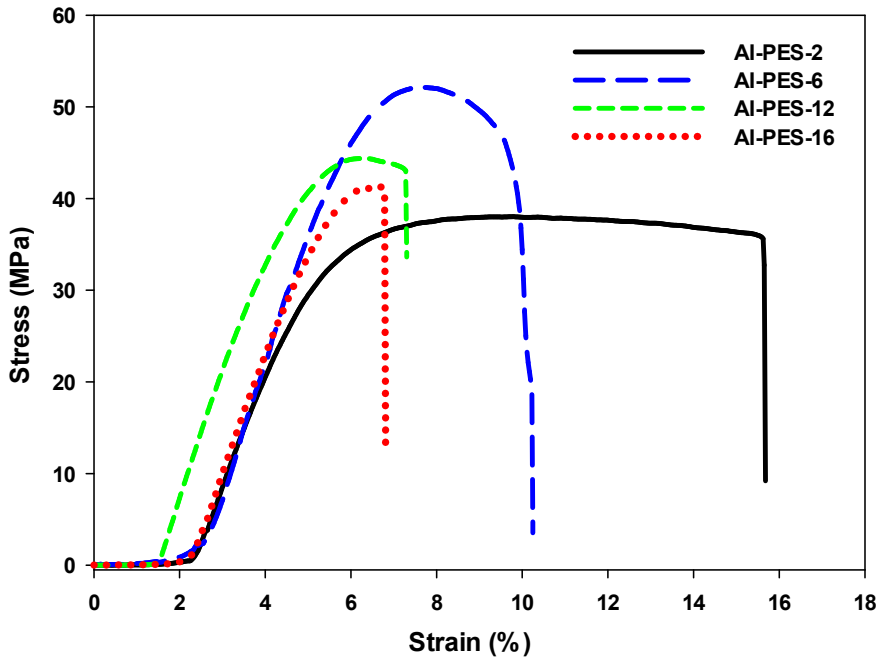

Table S1. Dimensional stability in the in-plane direction for the AI-PES membranes

Membrane	Δl	
	20 °C	80 °C
AI-PES-2	6.3	15.0
AI-PES-6	3.3	8.3
AI-PES-12	--[a]	5.0
AI-PES-16	--[a]	4.0

[a]In-plane swelling was not observed

Table S2. Conductivity and IEC of the AI-PES membranes before and after soaking in 2M NaOH at 60 °C for 500 h

Membrane	Conductivity at 20 °C (mS/cm)		IEC values (meq/g)	
	Before stability test	After stability test	Before stability test	After stability test
AI-PES-2	18	-[a]	1.20	-[a]
AI-PES-6	30	25	1.14	1.03 (±0.03)
AI-PES-12	37	31	1.02	0.88 (±0.03)
AI-PES-16	32	25	0.92	0.78 (±0.03)

a: Membrane was broken into pieces
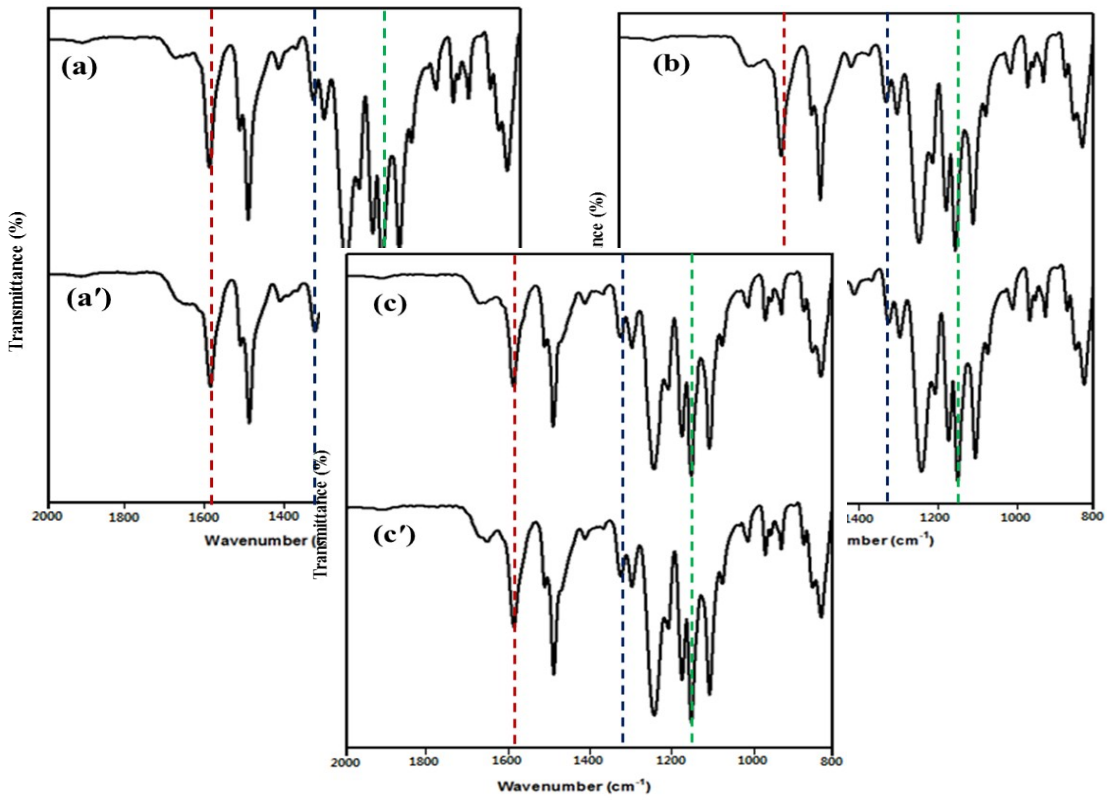
Figure S5. FT-IR spectra of the AI-PES-6 before (a) and after (a'), AI-PES-12 before (b) and after (b'), and AI-PES-16 before (c) and after (c') soaking in 2 M NaOH at 60 °C for 500 h