Supplementary information

Multi-block copolymers with fluorene-containing hydrophilic segments densely functionalized by side-chain quaternary ammonium groups as anion exchange membranes

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I. Figures and tables

II. Experimental section
I. Figures and tables

**Fig. S1** $^1$H NMR spectra of the oligomer-$Fs$ (a) $X = 5$ and (b) $X = 7$.

**Fig. S2** $^1$H NMR spectra of oligomer-$OHs$ (a) $Y = 10$, (b) $Y = 13$ and (c) $Y = 17$.

**Fig. S3** $^1$H NMR spectra of (a) BrMPAES-$X5Y10$, (b) BrMPAES-$X5Y13$, (c) BrMPAES-$X5Y17$, (d) BrMPAES-$X7Y10$, (e) BrMPAES-$X7Y13$ and (f) BrMPAES-$X7Y17$.

**Fig. S4** AFM pattern of QMPAES-$X5Y10$

**Table S1** $\text{IEC}_{\text{in}}, \text{IEC}_{\text{wet}}, \sigma, \sigma/\text{IEC}_{\text{in}}, \sigma/\text{IEC}_{\text{wet}}$ of the QMPAESs membranes and some reported AEMs.
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Fig. S4 AFM pattern of QMPAES-X5Y10
Table S1  IEC<sub>m</sub>, IEC<sub>v,wet</sub>, σ, σ/IEC<sub>m</sub>, σ/IEC<sub>v,wet</sub> of the QMPAESs membranes and some reported AEMs

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<th>Membrane</th>
<th>IEC&lt;sub&gt;m&lt;/sub&gt; (meq g&lt;sup&gt;-1&lt;/sup&gt;)</th>
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<th>σ (mS cm&lt;sup&gt;-1&lt;/sup&gt;)</th>
<th>σ/IEC&lt;sub&gt;m&lt;/sub&gt; (mS g/(cm mmol))</th>
<th>σ/IEC&lt;sub&gt;v,wet&lt;/sub&gt; (mS cm&lt;sup&gt;2&lt;/sup&gt;/mmol)</th>
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<sup>a</sup> Determined at 20 °C. <sup>b</sup> Determined at 25 °C. <sup>c</sup> Determined at 60 °C. <sup>d</sup> Not reported in the literature.

II. Experimental section

<sup>1</sup>H NMR characterization.

<sup>1</sup>H NMR spectra were recorded on a Bruker AVANCE 400S with tetramethylsilane (TMS) as the standard and CDCl<sub>3</sub> or DMSO-d<sub>6</sub> as the solvent.

Atomic Force Microscopy (AFM) characterization.

Tapping mode Atomic Force Microscopy (AFM) was performed on a Bruker Multimode 8 scanning probe microscopy with a probe of MPP-11100-10 (40 N/m, 300 kHz). The scanning frequency is 1 Hz. The sample was equilibrated at 60% RH for more than 24 h before test.
References