**Electronic Supplementary Information:**

# Branched comb-shaped poly(arylene ether sulfone)s containing flexible alkyl imidazolium side chains as anion exchange membranes

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**Table S1** Mechanical properties of the linear ImPES and branched ImHBPES-x membrane after aging test (1 M KOH, 550 h).

| Membrane | Tensile strength (MPa) | Elongation at break (%) | Young's modulus (MPa) |
|---|---|---|---|
| ImPES | 25.9 | 10.3 | 461.9 |
| ImHBPES-2 | 24.8 | 8.5 | 406.4 |
| ImHBPES-4 | 22.2 | 8.1 | 449.0 |
| ImHBPES-6 | 20.6 | 7.1 | 477.7 |
| ImHBPES-8 | 20.2 | 6.0 | 428.9 |

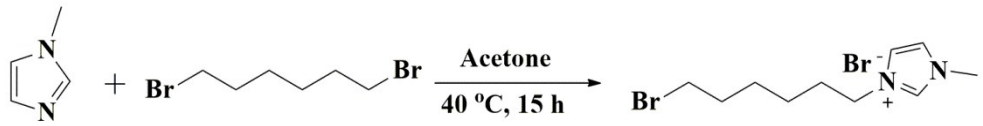


**Fig. S1** Synthesis of 6BrIm.

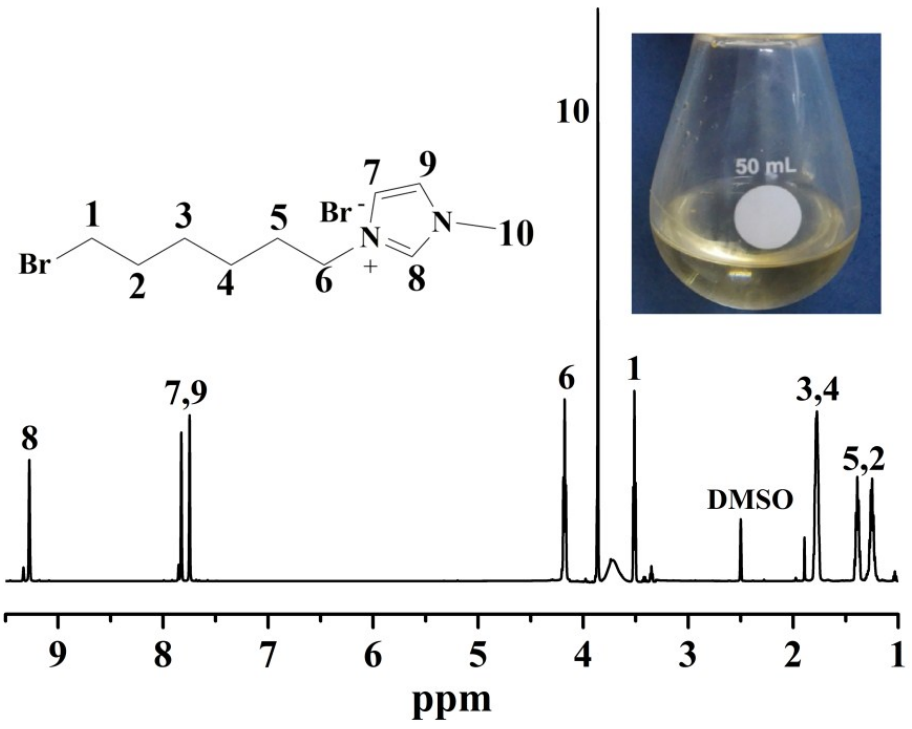


**Fig. S2** The $^{1}$H NMR spectra and the original photographe of 6BrIm.

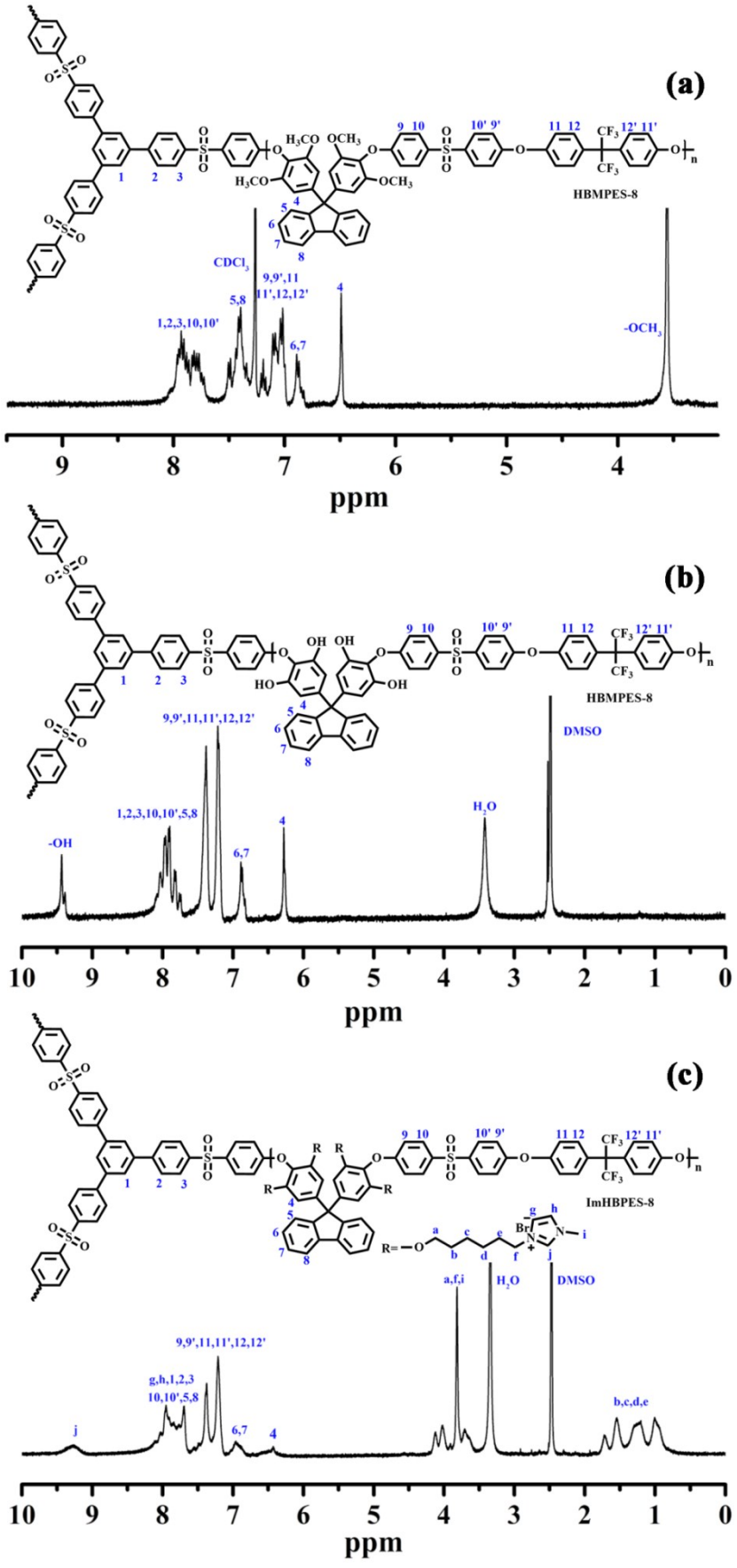


**Fig. S3** $^{1}$H NMR spectra of (a) HBMPES-8, (b) HBHPES-8, and (c) ImHBPES-8.

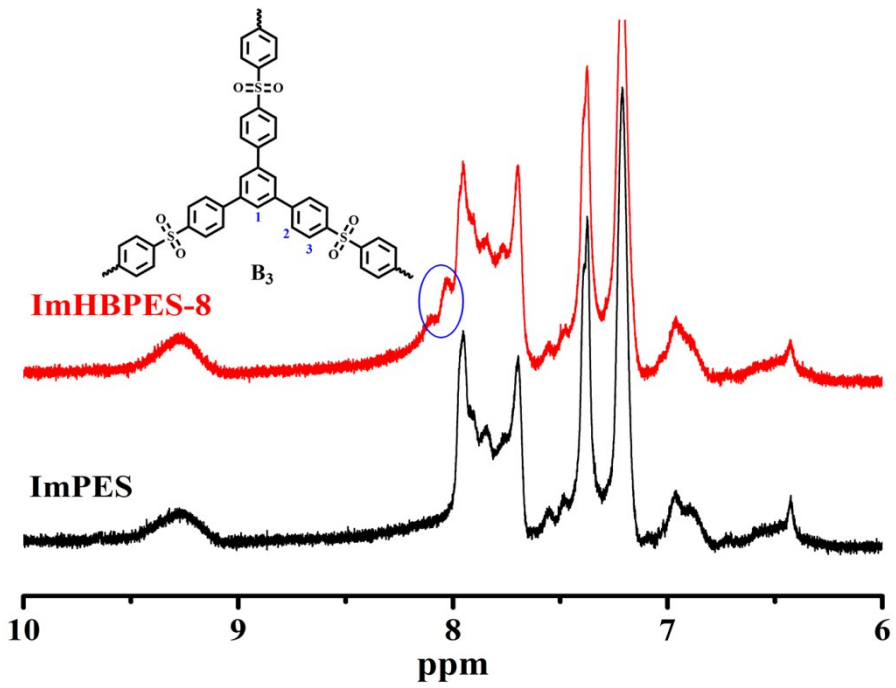


**Fig. S4** $^{1}$H NMR spectra of the linear ImPES and branched ImHBPES-8 polymers.

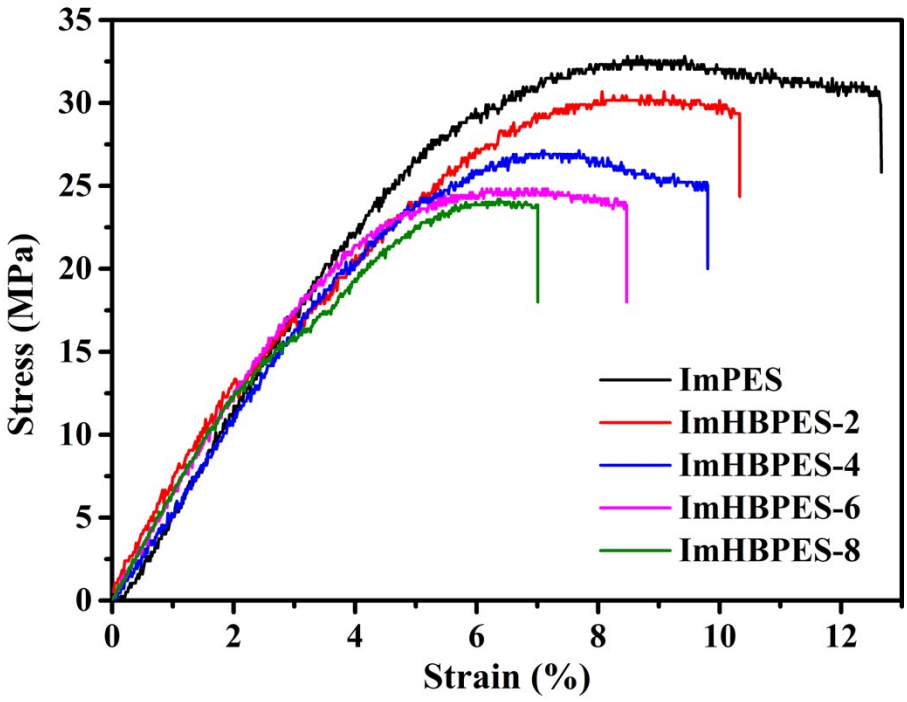


**Fig. S5** Mechanical properties of the linear ImPES and branched ImHBPES-x membranes.

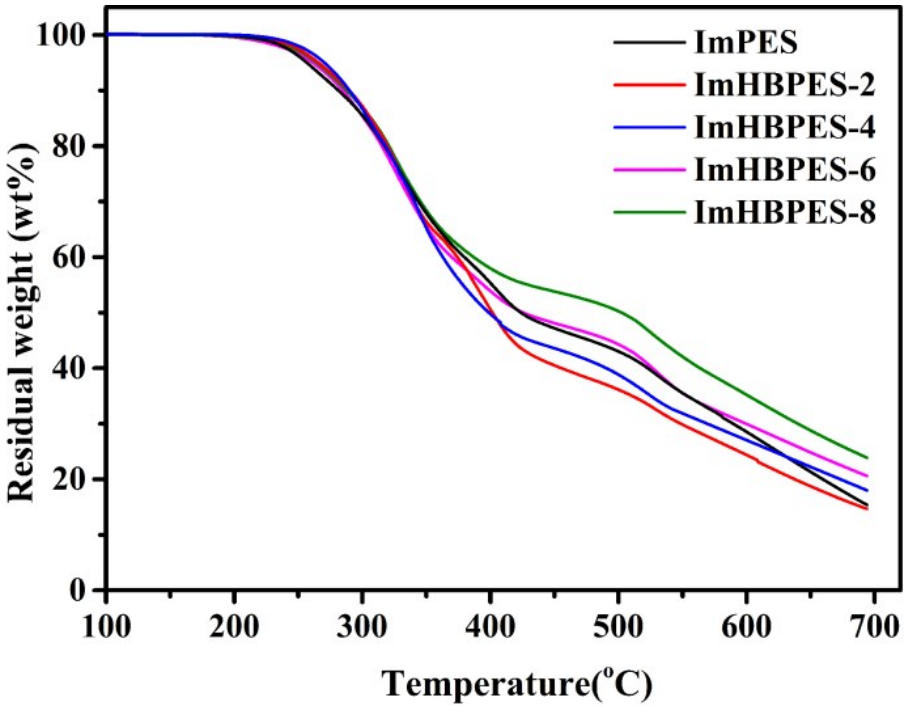


**Fig. S6** TGA curves of the linear ImPES and branched ImHBPES-x membranes.