Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A. This journal is © The Royal Society of Chemistry 2019

Electronic Supplementary Information (ESI)

Ether-free polyfluorenes tethered with quinuclidinium cations

as hydroxide exchange membranes

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Scheme S1. Synthetic pathways to 2,7-diphenyl-9,9-bis(6-bromohexyl)fluorene (DPBHF) and 9,9-dioctyl-2,7-diphenyl-9H-fluorene (DODPF), respectively.



Fig. S1. ¹H NMR spectrum of 2,7-dibromo-9,9-bis(6-bromohexyl)fluorene recorded in CDCl₃.



Fig. S2. ¹H NMR spectrum of DPBHF recorded in CDCl₃.



Fig. S3. ¹H NMR spectrum of DODPF recorded in CDCl₃.



Fig. S4. SEC chromatogram of the precursor PDPF copolymer, including the calculated M_n and PDI values.



Fig. S5. DSC chromatogram of precursor PDPF copolymer, including the evaluated $T_{\rm g}$ value.



Fig. S6. SAXS profiles of dry AEMs functionalized with different QA groups in Br⁻ form. The profiles have been shifted vertically for clarity.



Fig. S7. ¹H NMR spectra of PDPF-TMA (bottom) after storage in 10 M aq. NaOH, at 90 °C for 168 h. respectively, during the time periods indicated. Addition of TFA to the DMSO- d_6 solution resulted in protonation of tertiary amines formed in degradation reactions, and the emergence of a signal at ~9 ppm. Subsequent addition of D₂O resulted in the disappearance of that signal due to an immediate proton-to-deuterium exchange.



Fig. S8. ¹H NMR spectra of PDPF-TMA before (top) and after storage in 2, 5, 7 and 10 M aq. NaOH, respectively, during the time periods indicated. The most prominent signals emerging from degradation have been assigned. Spectra recorded *without* addition of TFA.



Fig. S9. ¹H NMR spectra of PDPF-TMA before (top) and after storage in 2, 5, 7 and 10 M aq. NaOH, respectively, during the time periods indicated. The most prominent signals emerging from degradation have been assigned. Spectra recorded *with* addition of TFA.