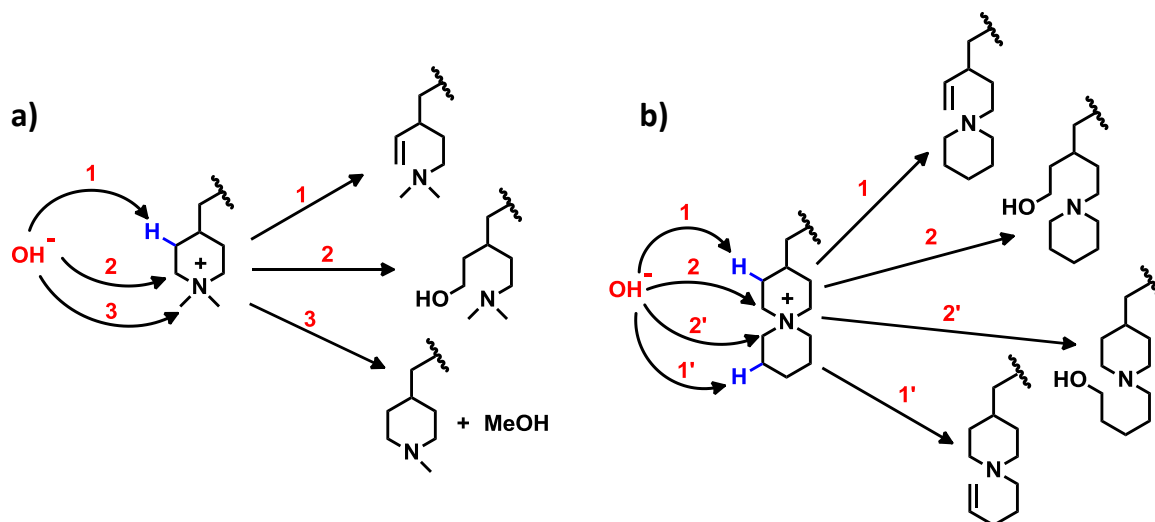


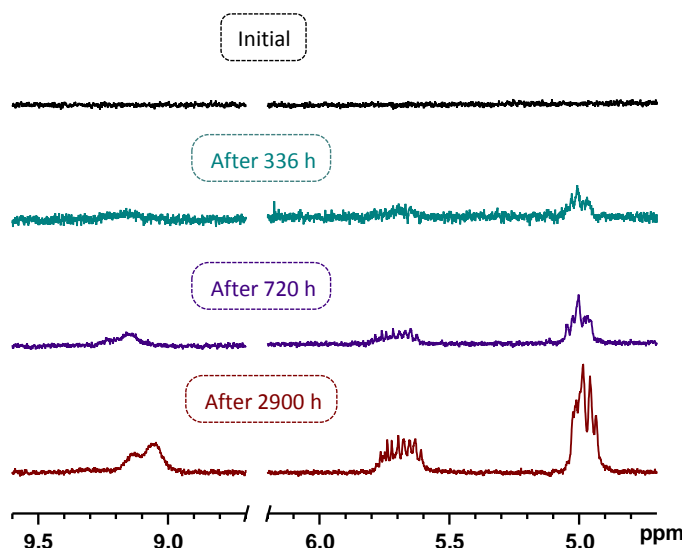
## Effects of the *N*-alicyclic cation and backbone structures on the performance of poly(terphenyl)-based hydroxide exchange membranes

Thanh Huong Pham, Joel S. Olsson and Patric Jannasch\*

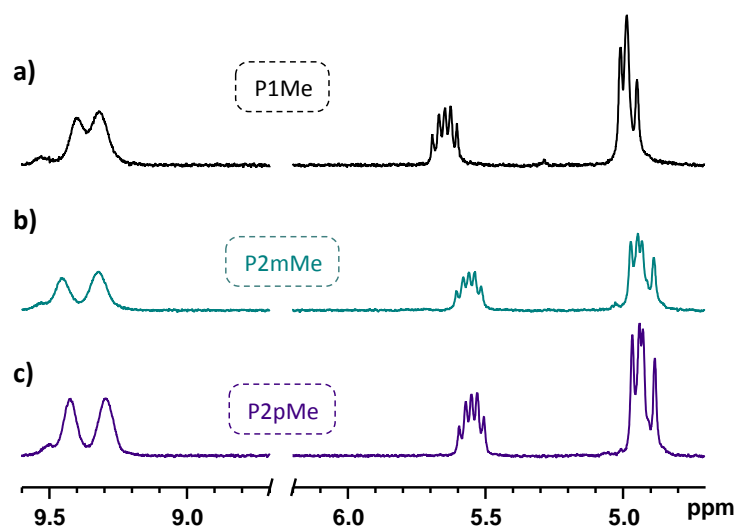
*Polymer & Materials Chemistry, Department of Chemistry, Lund University*



**Figure S1.** Degradation mechanisms of a) DMP and b) ASU cations: Hofmann ring-opening  $\beta$ -elimination (pathways 1 and 1'); nucleophilic ring-opening substitution (pathway 2 and 2'); nucleophilic substitution at methyl group (pathway 3).



**Figure S2.** Expansion of the region between 4.7–6.2 and 8.7–9.6 ppm in the spectra displayed in Figure 8a, showing the signals originating from degradation products (protonated tertiary ammonium protons at 9–9.3 ppm and vinyl protons at 4.9–5.8 ppm) of P1Pi after storage in 2 M aq. NaOH at 90 °C during different periods of time.



**Figure S3.** Expansion of the regions 4.7–6.2 and 8.7–9.6 ppm in the  $^1\text{H}$  NMR spectra depicted in Figure 9, showing the signals originating from degradation products (tertiary ammonium protons at 9.2–9.6 ppm and vinyl protons at 4.8–5.7 ppm) of a) **P1Me**, b) **P2mMe** and c) **P2pMe** after storage in 2 M aq. NaOH at 120 °C during 168 h.