

Supplementary Information

**Self cross-linked quaternary phosphonium based anion exchange
membranes: Assessing the influence of quaternary phosphonium
groups on alkaline stability**

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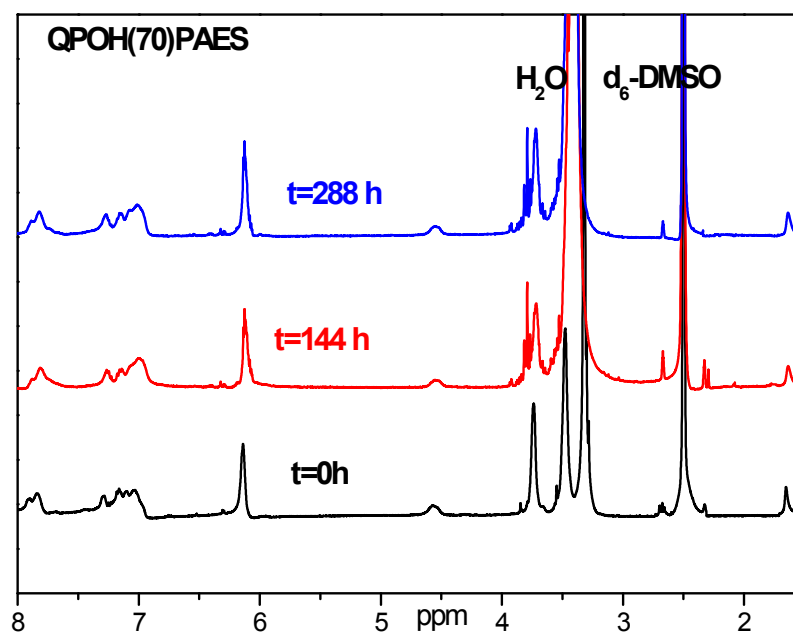


Figure S1. ^1H NMR spectra of QPOH(70)PAES before and after exposure to 1M KOH solution at 25°C for 144 and 288 hours.

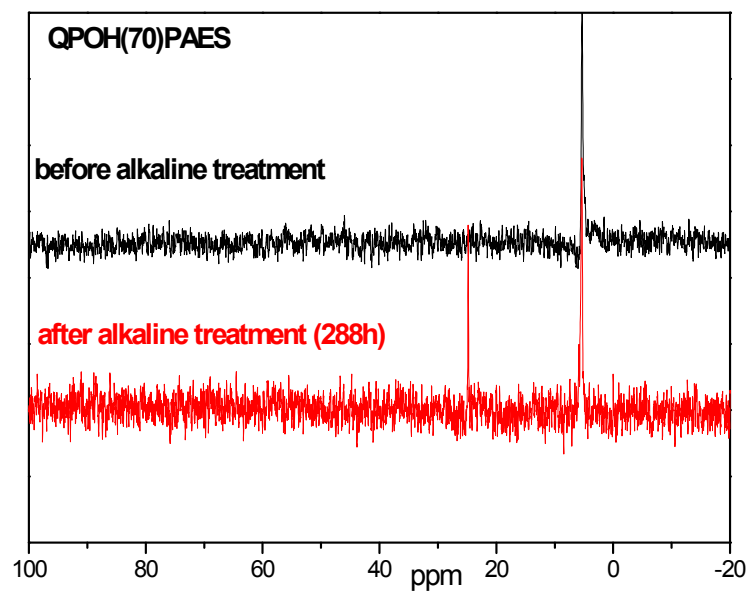


Figure S2. ^{31}P NMR spectra of QPOH(70)PAES before and after 288 hours alkaline exposure to 1M KOH solution at 25°C.

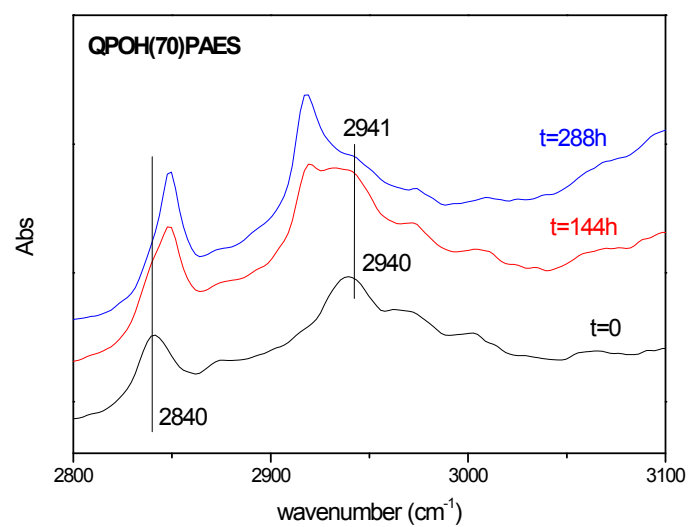


Figure S3. ATR-FT-IR spectra of QPOH(70)PAES before and after alkaline exposure to 1M KOH solution at 25°C for 144 and 288 hours.

Table S1. Integral ratios of $I_{QP(-CH_2)}/I_{BisA(-CH_3)}$, percentage (%) of the remaining quaternary phosphonium groups for different samples before and after exposure to 1M KOH at different temperatures and time periods, calculated by 1H NMR.

<i>Sample</i>	<i>Treatment</i>	$\frac{I_{QP(-CH_2)}}{I_{BisA(-CH_3)}}$	<i>Percentage of the remaining QP groups (%)</i>	<i>Time (h)</i>	<i>Temperature (°C)</i>
QPOH(70)PAES	No	0.98	100	-	-
QPOH(70)PAES	1M KOH	0.96	98	144	RT
QPOH(70)PAES	1M KOH	0.89	91	144	60
QPOH(70)PAES	1M KOH	0.87	89	288	RT
QPOH(70)PAES	1M KOH	0.54	55	288	60
QPOH(80)PAES	No	0.98	100	-	-
QPOH(80)PAES	1M KOH	0.92	94	144	60
QPOH(80)PAES	1M KOH	0.70	71	288	60