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Supplementary Information

Alkaline Stability of Novel Aminated Polyphenylene-Based Polymers in Bipolar Membranes

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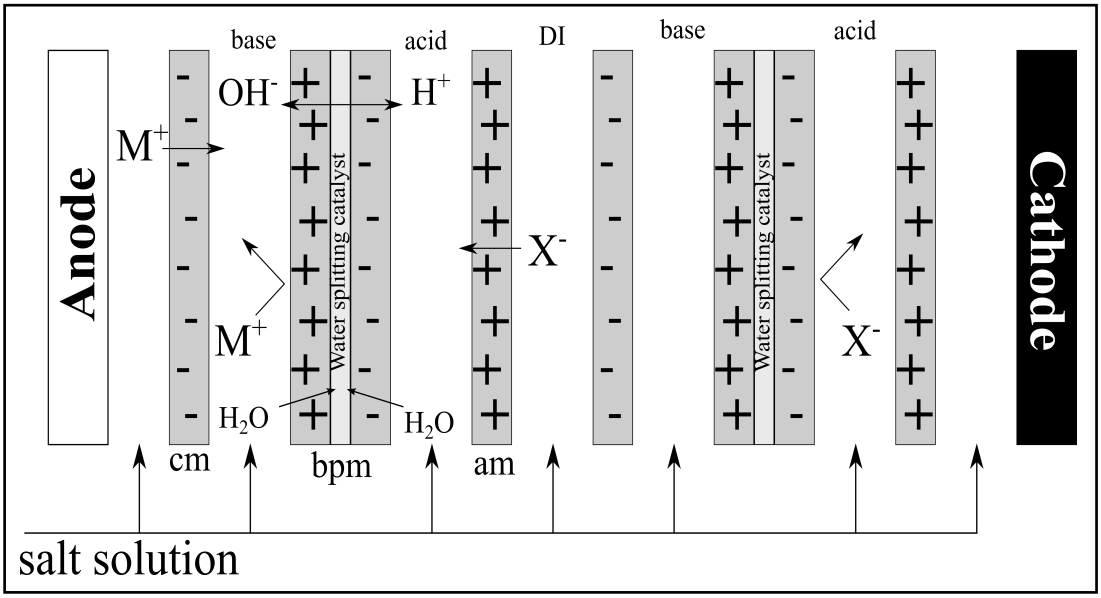

Fig. S1. Schematic diagram illustrating the arrangement of anion exchange membranes (am), cation exchange membranes (cm), and bipolar membranes (bpm) for the production of acids and bases from salt solutions. DI is the deionized water stream.

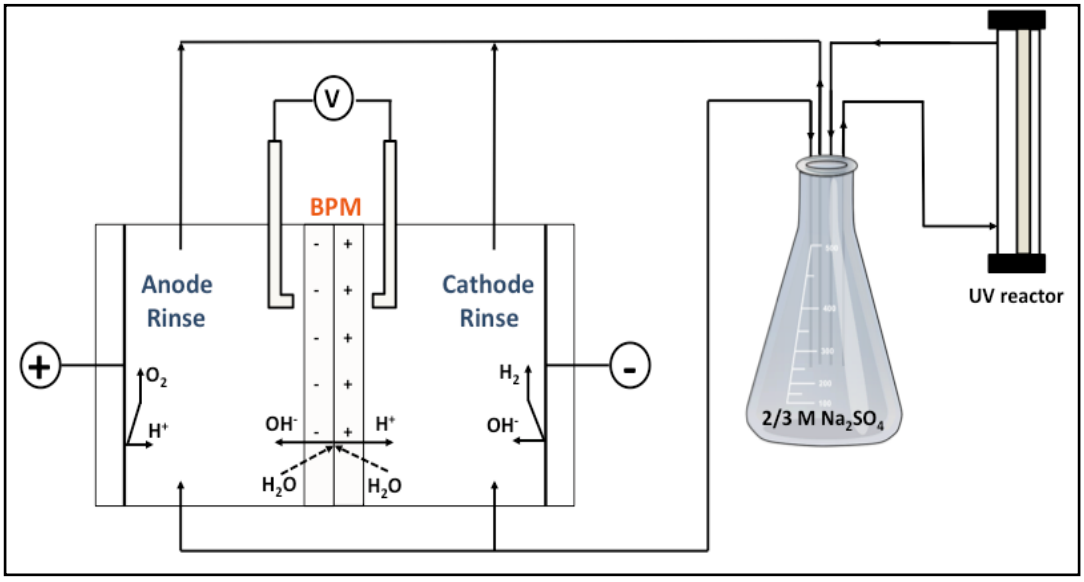

Fig. S2. Schematic diagram of flow cell and recirculation loop for testing BPM stability.

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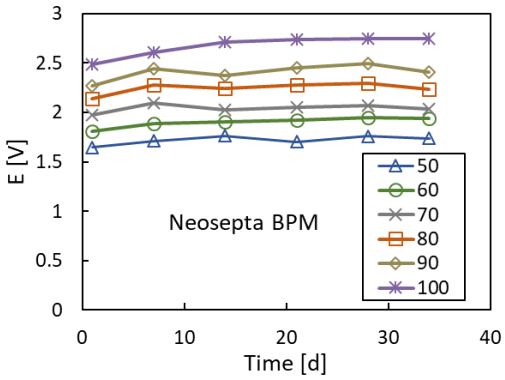


Fig. S3. Operating voltage versus elapsed time soaking in room temperature (~22 °C) 1 M NaOH for Neosepta BP-1 membrane for current densities ranging from 50 to 100 mA/cm^2.

Table S1
Linear regression slope as a function of current density (*i*) for Neosepta BP-1 bipolar membrane for the data in Figure S3. Average slope = 0.0035 V/d.

i [mA/cm^2]	Slope [V/d]	R^2
50	0.0023	0.4238
60	0.0035	0.7907
70	0.0011	0.1147
80	0.0025	0.2821
90	0.0039	0.3878
100	0.0074	0.7900

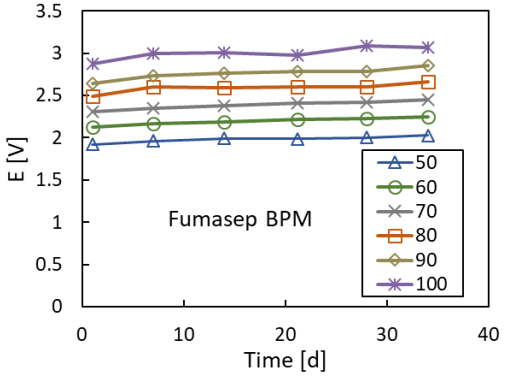


Fig. S4. Operating voltage versus elapsed time soaking in room temperature (~22 °C) 1 M NaOH for Fumasep FBM membrane for current densities ranging from 50 to 100 mA/cm^2.

Table S2
Linear regression slope as a function of current density (*i*) for Fumasep FBM bipolar membrane for the data in Figure S4. Average slope = 0.0032 V/d.

i [mA/cm^2]	Slope [V/d]	R^2
50	0.0027	0.8748
60	0.0034	0.9651
70	0.004	0.9488
80	0.0036	0.6451
90	0.0051	0.8451
100	0.005	0.7174

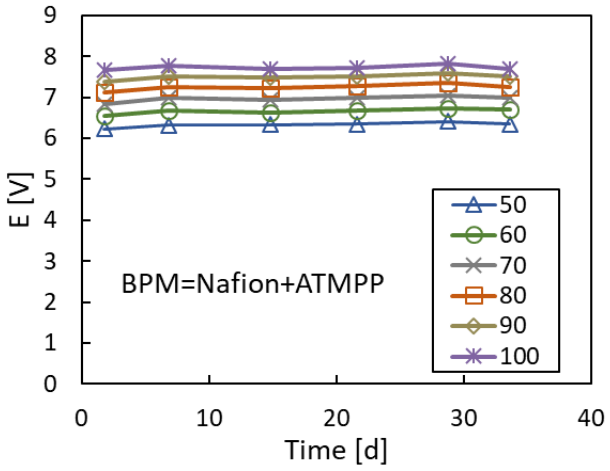


Fig. S5. Operating voltage versus elapsed time soaking in room temperature (~22 °C) 1 M NaOH for the ATMPP membrane for current densities ranging from 50 to 100 mA/cm^2. Higher voltages compared to Figure 2 result from the absence of the graphene oxide water splitting catalyst.

Table S3
Linear regression slope as a function of current density (*i*) for ATMPP bipolar membrane for the data in Figure S5. Average slope = 0.0036 V/d.

i [mA/cm^2]	Slope [V/d]	R^2
50	0.0037	0.622
60	0.0043	0.6327
70	0.0036	0.4794
80	0.0046	0.5864
90	0.0038	0.512
100	0.0017	0.1223

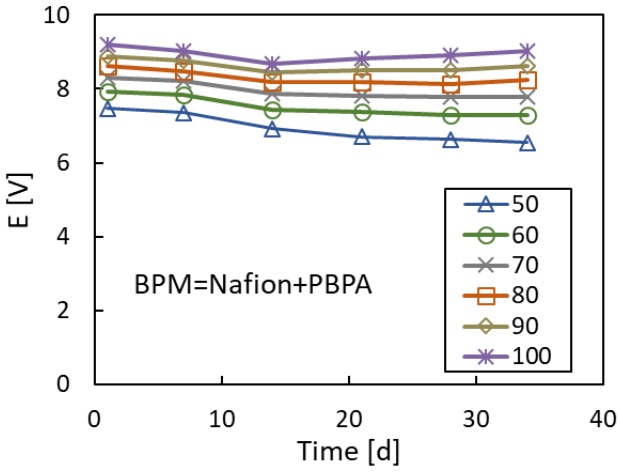
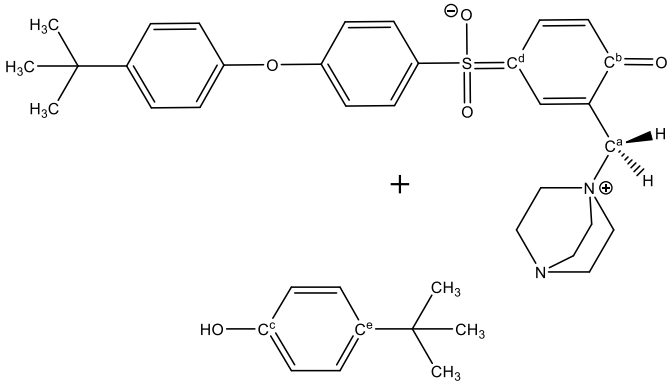


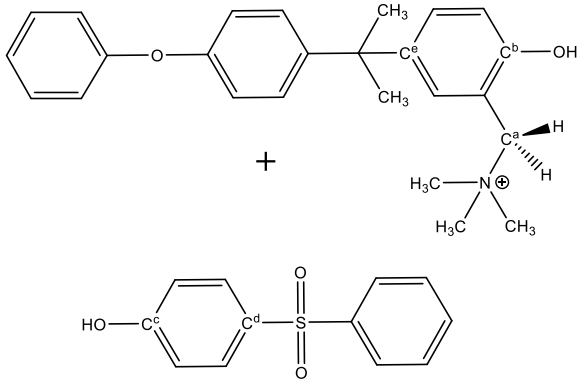
Fig. S6. Operating voltage versus elapsed time soaking in room temperature (~22 °C) 1 M NaOH for the PBPA membrane for current densities ranging from 50 to 100 mA/cm^2. Higher voltages compared to Figure 2 result from the absence of the graphene oxide water splitting catalyst.

Table S4
Linear regression slope as a function of current density (*i*) for ATMPP bipolar membrane for the data in Figure S6. Average slope = -0.0157 V/d.

***i* [mA/cm^2]**	**Slope [V/d]**	**R^2**
50	-0.0301	0.9302
60	-0.0211	0.8534
70	-0.017	0.7989
80	-0.0123	0.6182
90	-0.009	0.413
100	-0.0047	0.1155

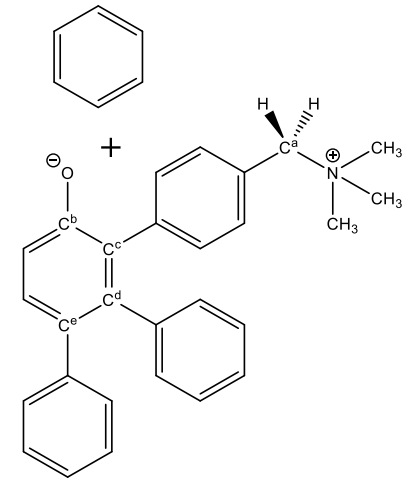


PSF-DABCO

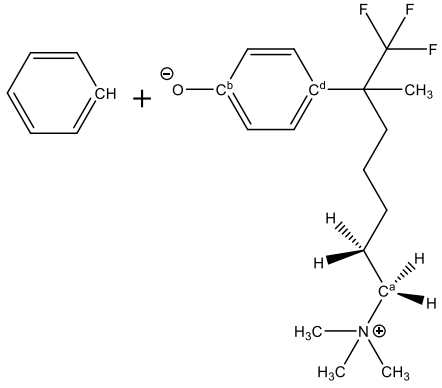


PSF-TMA

Fig. S7. Products of the aryl-ether cleavage reaction for PSF-DABCO and PSF-TMA.



ATMPP



PBPA

Fig. S8. Products of aryl-aryl bond cleavage for ATMPP and PBPA.