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Bis-imidazolium based poly(phenylene oxide) anion exchange membranes for fuel cells: the effect of cross-linking

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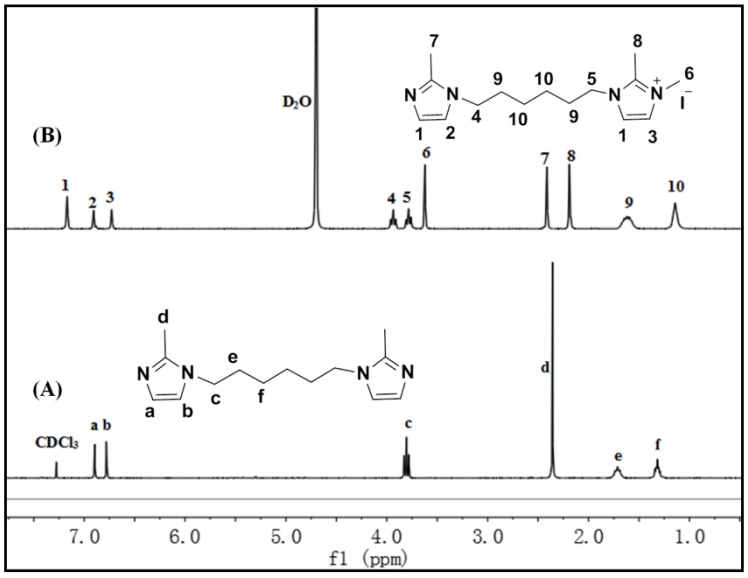

Figure S1. [1]H NMR spectra of 1, 6-bis(2-methylimidazol-1-yl) hexane (A) and 2, 3-dimethyl-1-(6-(2-methylimidazol-1-yl)hexyl)-imidazolium iodide (B).

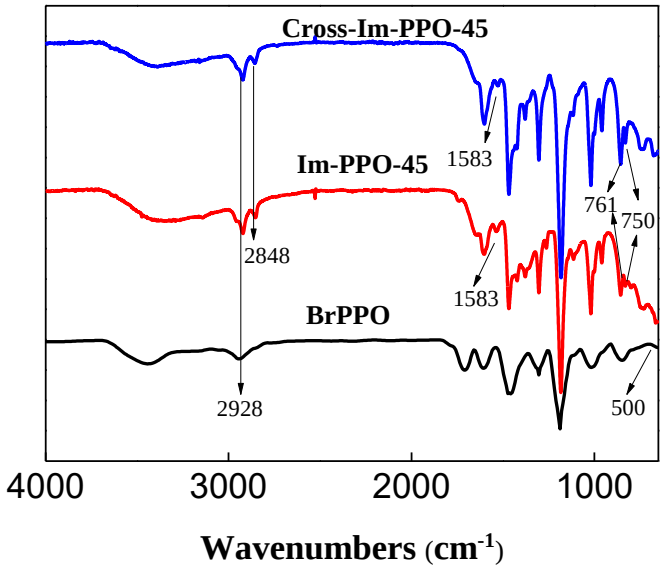

Figure S2. FT-IR spectra of BrPPO, Im-PPO-45 and cross-Im-PPO-45.

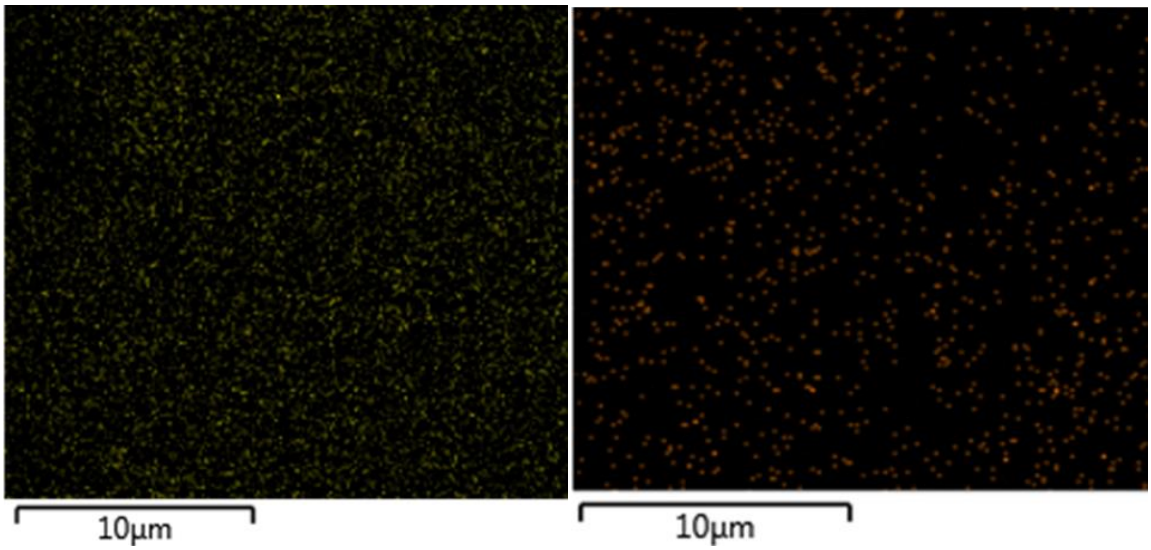

Figure S3. Distribution of nitrogen elements in the Im-PPO-45 (A) and Cross-Im-PPO-45 (B), as obtained by using SEM and EDS mapping.

Table S1. The degradation of PPO-based membranes in Fenton's reagent (4 ppm Fe^{2+} and 3 % H_2O_2) at 60 ºC for 120 h.

Membranes	Loss weight (%)
Im-PPO-25	19.27
Im-PPO-35	28.18
Im-PPO-45	39.44
Cross-Im-PPO-45	12.86
Cross-Im-PPO-60	16.05
Cross-Im-PPO-75	20.13