

Supporting Information

**Formation and investigation of dual cross-linked high temperature
proton exchange membranes based on vinylimidazolium-
functionalized poly(2,6-dimethyl-1,4-phenylene oxide) and
polystyrene**

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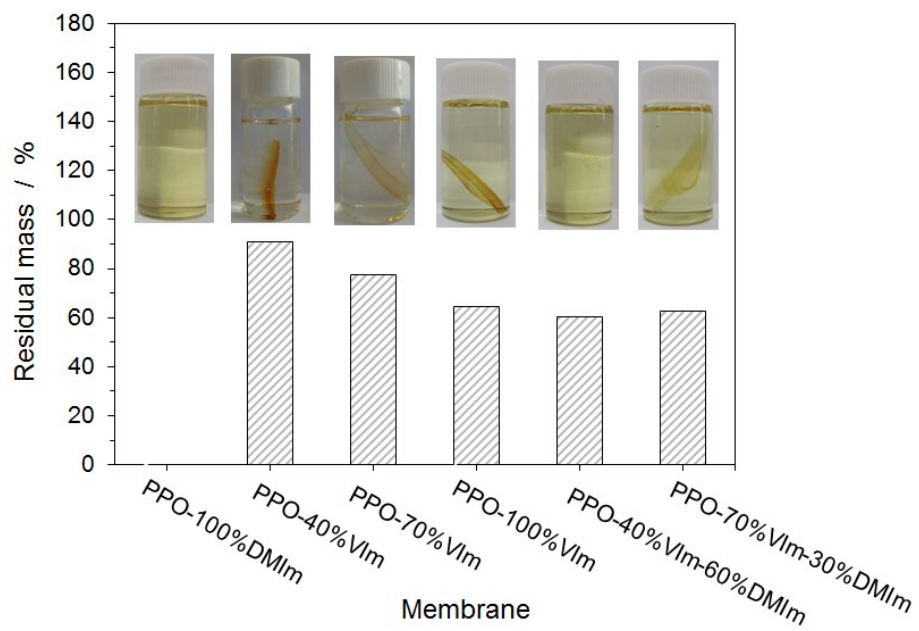


Fig. S1 Residual mass and photographs of the membranes after the solubility test in NMP at 70 °C for 24 h.

Table S1 Comparisons of the ADC, conductivity and tensile strength at break of various membranes

Membrane	ADC%	Conductivity @180°C/ S cm ⁻¹	Tensile strength @RT / MPa
PPO-70%VIm	147.1	0.052	5.9
PPO-100%VIm	139.9	0.045	7.9
PPO-40%VIm-60%DMIm	192.4	0.071	3.3
PPO-70%VIm-30%DMIm	180.1	0.067	5.0
PSf-Im-70* [1]	236	0.048@130°C	4.2
SPVIM-60* [2]	~146	0.017@150°C	~1.9
PPO-BIm-65-15* [3]	438	0.041	2.8

* PSf-Im: poly(arylene ether sulfone) containing pendent imidazole groups; SPVIM:sulfonated polymerizable (styrene, acrylonitrile and vinylimidazole); PPO-BIm: ,4-bis(bromomethyl)benzene crosslinked imidazolium PPO.

Reference

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- 3 Q. Li, L. Liu, S. Liang, Q. Li, B. Jin, R. Bai. Polym. Chem. 2014, **5**, 2425.

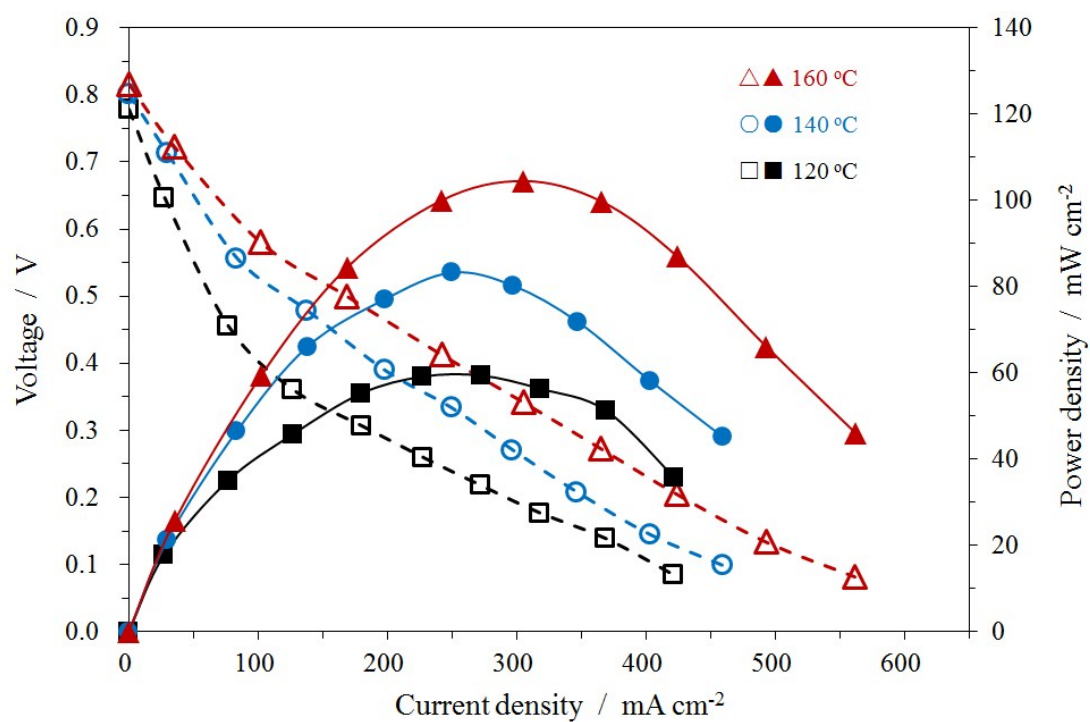


Fig. S2 Polarization curves (open symbols) and power densities (solid symbols) of the fuel cell based on PPO-70%VIm-30%DMIm/180.1%PA membrane supplying un-humidified hydrogen and oxygen at elevated temperatures with a catalyst loading of 0.65 mg Pt cm⁻² for each electrode.