

Electronic Supplementary Information

UV-Crosslinkable Anthracene-based Ionomer Derived Gas “Expressway” for Anion Exchange Membrane Fuel Cells

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Table S1 BET results of various samples investigated in this work

Sample	BET Surface area (m ² g ⁻¹)	Pore volume (cm ³ g ⁻¹)
QPPO@Pt/C	58.3	0.39
PPOAN@Pt/C	91.3	0.63
CPPOAN@Pt/C	210.0	1.01
Pt/C	743.6	1.23

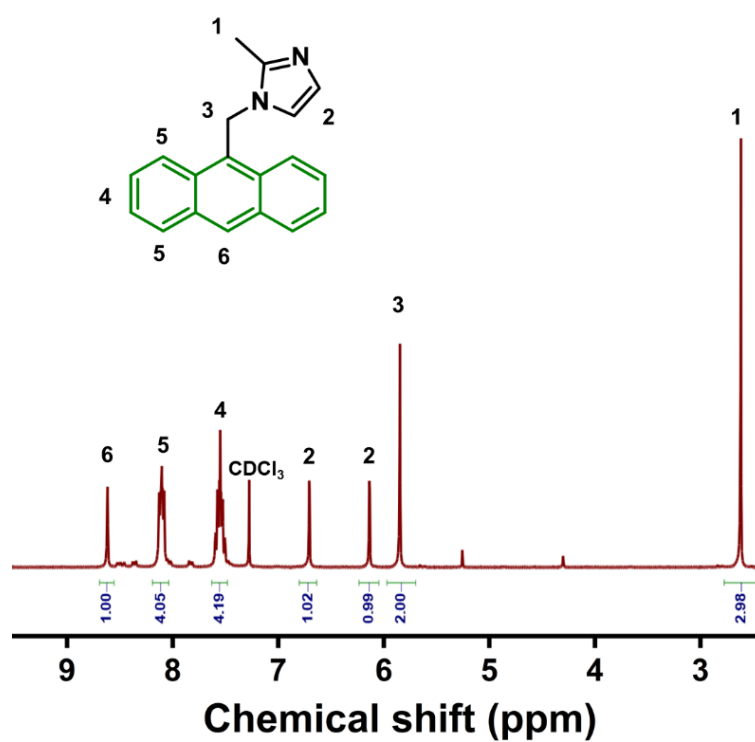


Figure S1. ¹H NMR spectra of ANIM using CDCl₃ as a solvent.

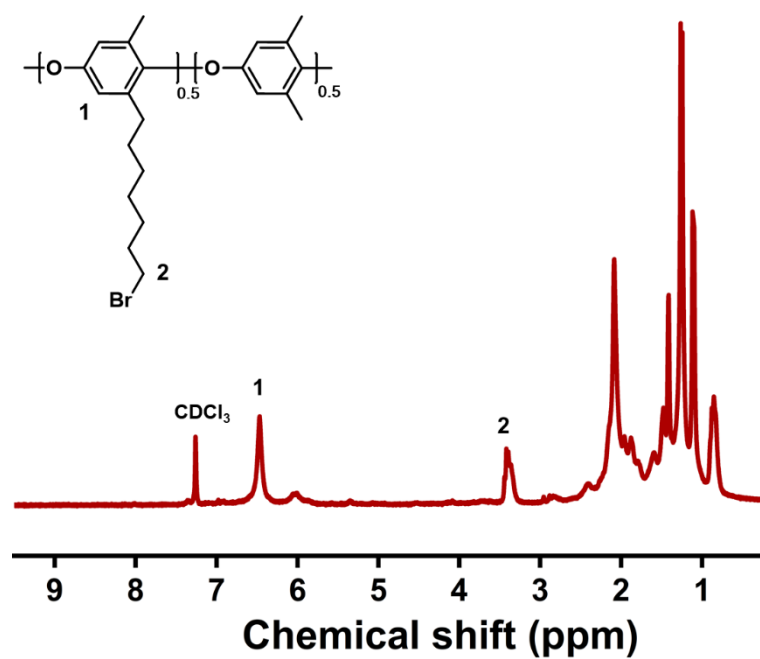


Figure S2. ^1H NMR spectra of Br-PPO using CDCl₃ as a solvent.

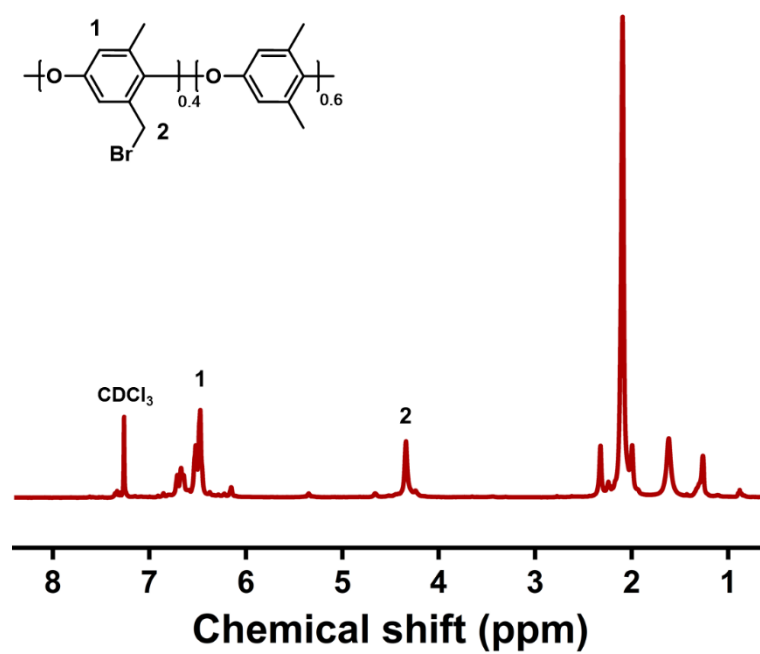


Figure S3. ^1H NMR spectra of BPPO using CDCl₃ as a solvent.

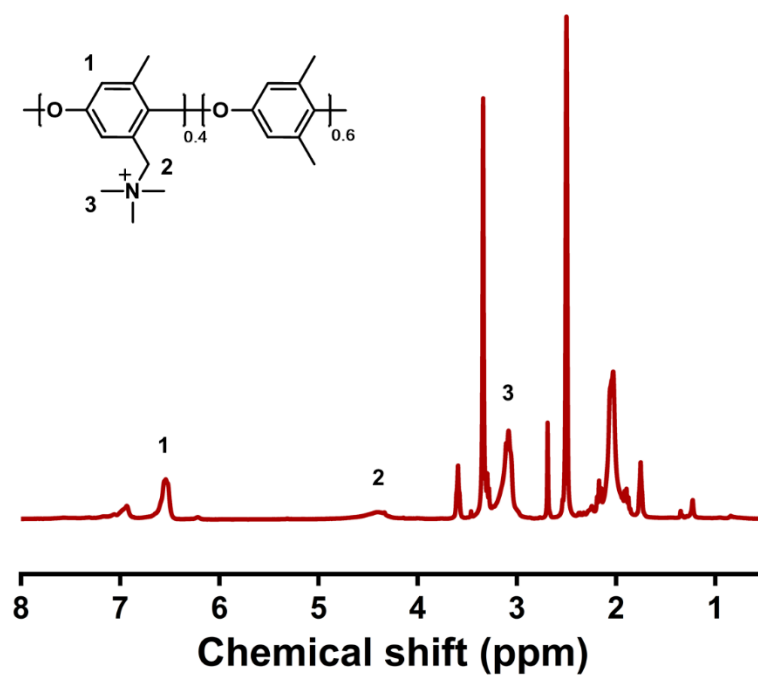


Figure S4. ^1H NMR spectra of QPPO using DMSO-d_6 as a solvent.

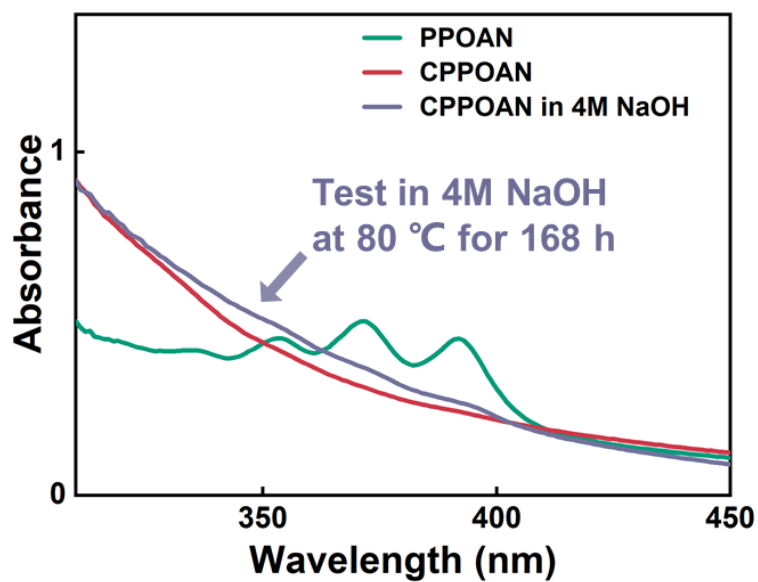


Figure S5. UV-vis spectra of PPOAN and CPPOAN ionomers before and after immersion in 4 M aqueous NaOH at 80 °C for 288 h.

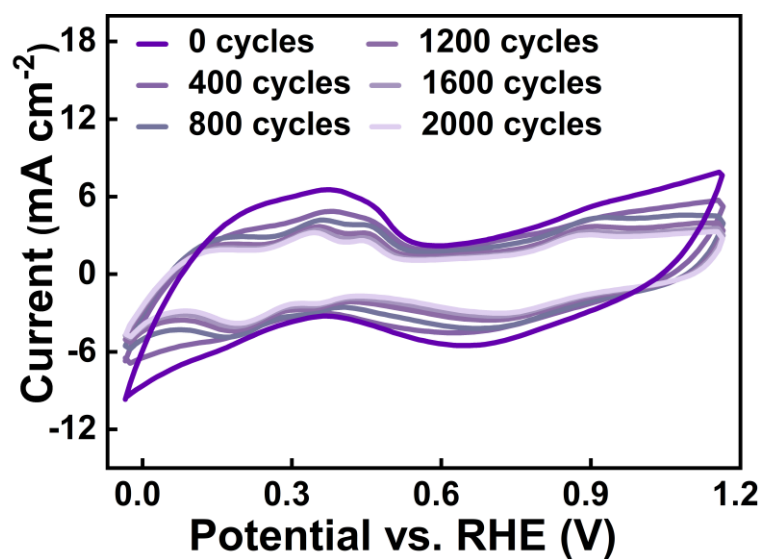


Figure S6. Variation in the CV response of QPPO-modified Pt/C during the accelerated stress test (AST). Measurements were made in O₂-saturated 0.1 M KOH aqueous electrolyte at 25 °C at a scan rate of 50 mV s⁻¹.

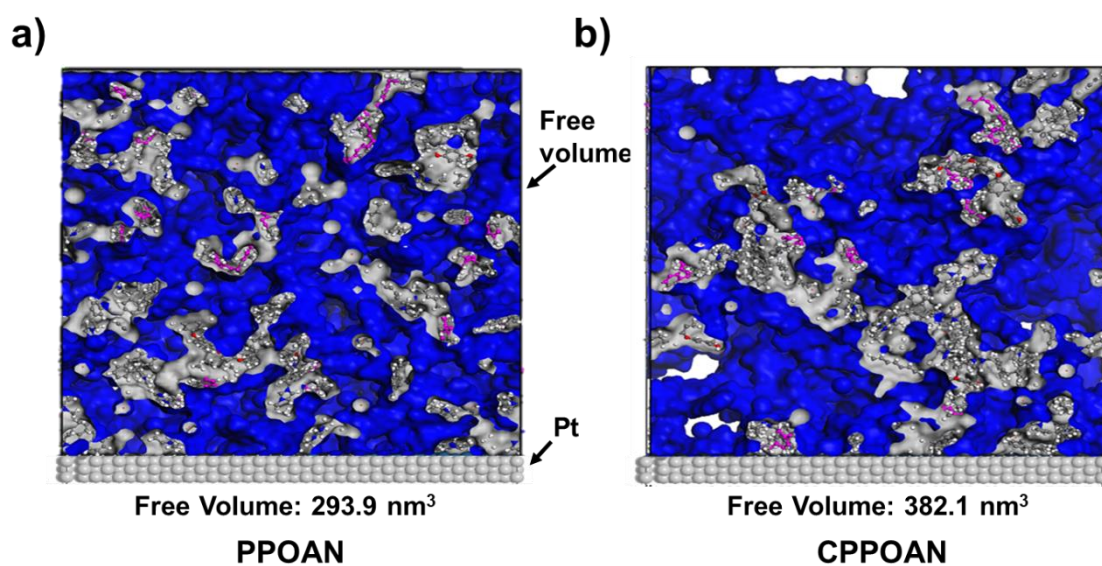


Figure S7. Three-dimensional free volume distributions determined by MD simulation: a) PPOAN, and b) CPPOAN. The area of the free volume distribution is shown in blue.

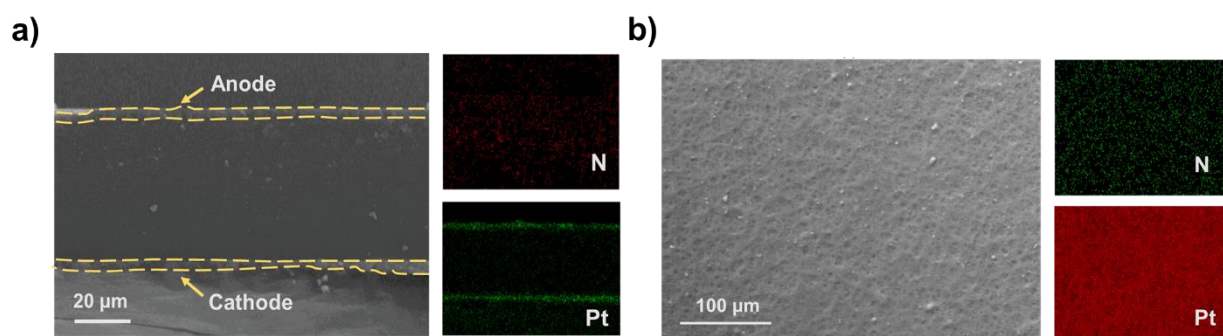


Figure S8. SEM and EDX analysis of the PPOAN-based MEA, a) cross-section and b) surface.

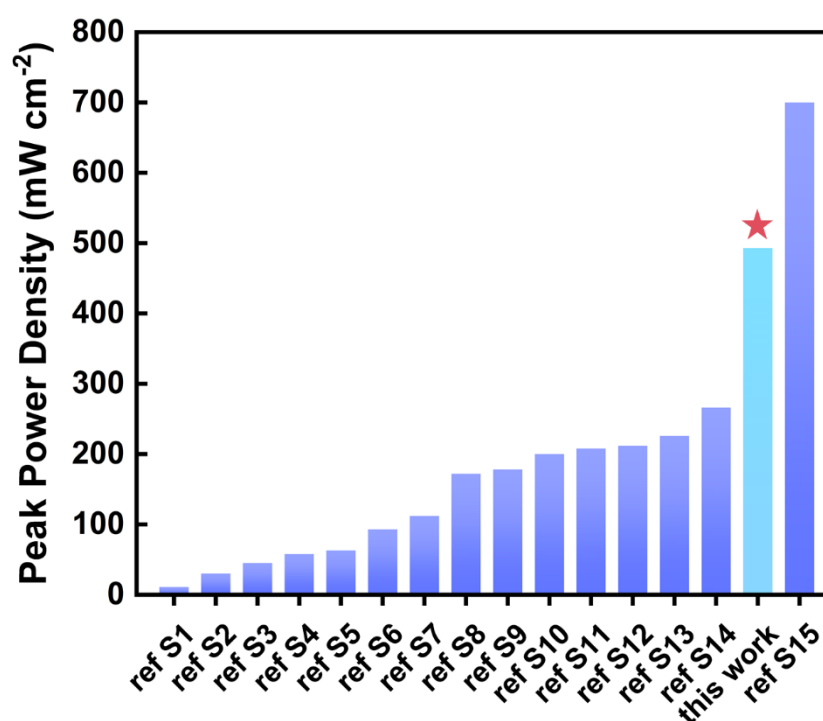


Figure S9. Comparison of peak power density in published studies using FAA-3-50 membrane for AEMFC testing.

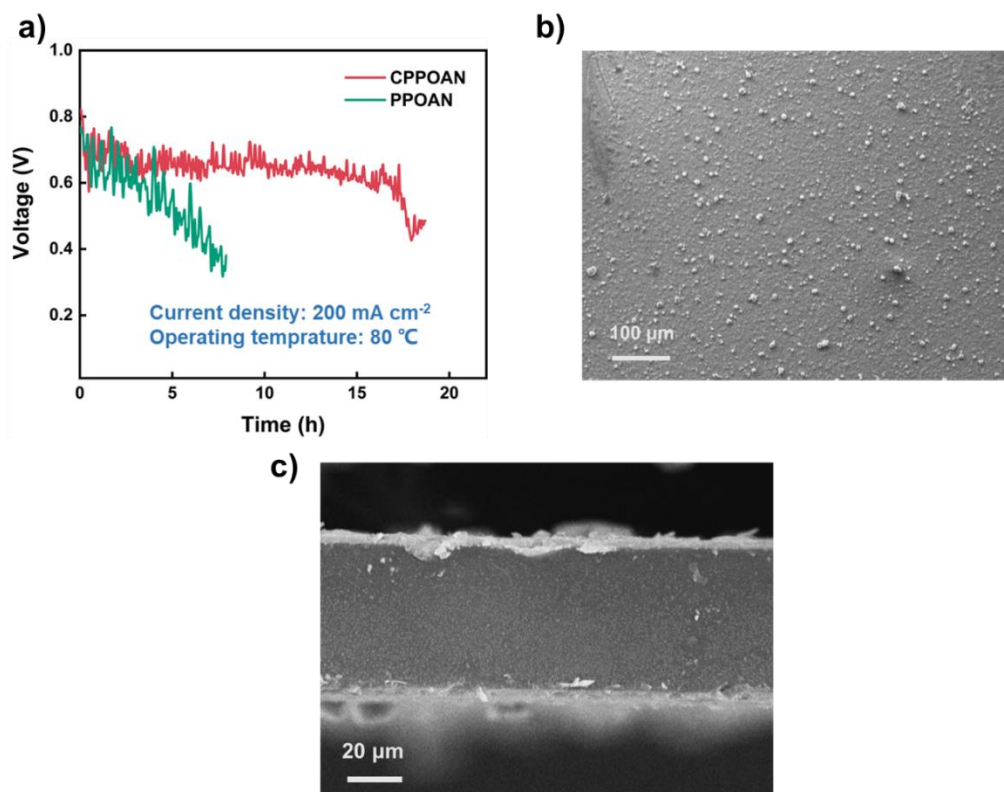


Figure S10 (a) Durabilities of the MEAs based on the CPPOAN and PPOAN ionomer, operating at 200 mA cm⁻² and 80 °C with 0.2 L min⁻¹ of gas flow under 100% RH; (b-c) SEM images of the CPPOAN-based MEA after durability test, b) surface and c) cross-section.

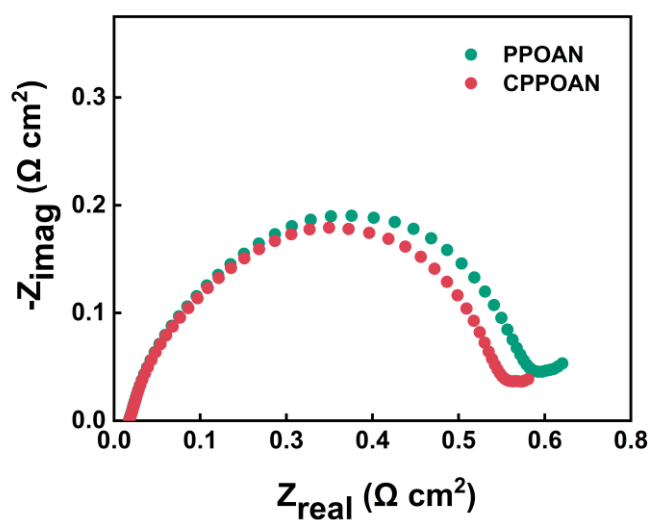


Figure S11 Comparison of EIS curves for MEAs with PPOAN and CPPOAN ionomer. The reaction gas, RH and temperature are H₂/O₂, 100%, and 80 °C.

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