Electronic Supplementary Information for

Varying the Microphase Separation Patterns of Alkaline Polymer Electrolytes

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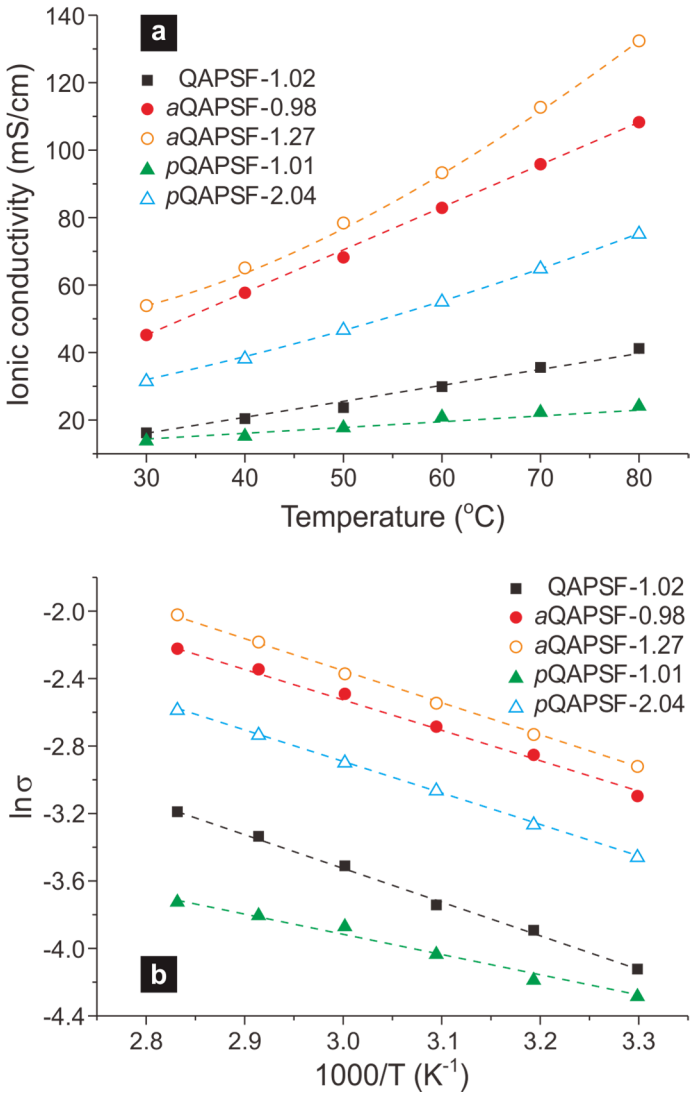

Figure S1. (a) The ionic conductivities of APEs measured at different temperatures. (b) The Arrhenius plots for the calculation of apparent activation energies.

Table S1. Activation energy (E_a) for different APEs.

Sample	E_a (kJ/mol)
QAPSF-1.02	16.7
*a*QAPSF-0.98	15.5
*a*QAPSF-1.27	16.0
*p*QAPSF-1.01	10.5
*p*QAPSF-2.04	15.5

Ionic conductivities at different temperatures (Figure S1a) were collected and the Arrhenius plots (Figure S1b) of the different APEs were used to calculate the activation energy (E_a) of the OH^- transport in such membranes (shown in Table S1). The values of the E_a for QAPSF-1.02, *a*QAPSF-0.98, *a*QAPSF-1.27, and *p*QAPSF-2.04 membranes were close to each other, while the E_a of the *p*QAPSF-1.01 was obviously lower than that of the other samples.

Table S2. Mechanical and thermal properties for different APEs.

Sample	Mechanical strength[a] (MPa)	T_d[b] (°C)
QAPSF-1.02	11.3	216
*a*QAPSF-0.98	22.5	221
*a*QAPSF-1.27	10.4	215
*p*QAPSF-1.01	24.2	223
*p*QAPSF-2.04	18.2	227

[a] Properties measured for hydrated membranes at room temperature; [b] The starting temperature of the thermal degradation for different APEs measure under N_2 atmosphere.

Employing the rigid polysulfone as the backbone ensured the high mechanical strength of these APEs. The *a*QAPSF-0.98, *p*QAPSF-1.01, and *p*QAPSF-2.04 membranes with low swelling degrees showed mechanical strength of 22.5, 24.2, and 18.2 MPa, respectively, and even the QAPSF-1.02 and *a*QAPSF-1.27, which exhibited relatively large water uptakes, showed the mechanical strength higher than 10 MPa.

Thermal stability of the studied APE samples is shown in Table S2. The cationic groups in the membranes were thermally stable at temperatures greater than 200 ºC under N_2 in the Cl^- counterion form. Although the TGA results are not classified as fuel cell stability results, the thermogravimetric analysis demonstrates that the base materials have good thermal stability with no obvious off-gassing at low temperatures.