

Supporting Information

Formation of ion gels from Polymerization of Block Copolymer/Ionic Liquid/Oil Mesophases

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Table S1. The calculated crystallinity degree from DSC and WAXS measurements.

Sample composition	Crystallinity % (DSC)	Crystallinity % (WAXS)
65/25/10	46	43
55/25/20	44	33
45/25/30	38	30
55/35/10	45	37
45/35/20	21	26

Table S2. Parameters obtained from fitting VTF function to the conductivities in Figure (2) and (3).

Composition (wt%)	σ_0 (S/cm)	B (K)	T ₀ (K)
F127/IL/oil (65/25/10)	0.04	550	203
F127/IL/oil (55/25/20)	0.04	420	201
F127/IL/oil (45/25/30)	0.03	350	200
F127/IL/oil (45/35/20)	0.04	360	198
F127/IL/oil (55/35/10)	0.10	590	199
F127/IL (65/25)	0.50	640	200
F127/IL (45/35)	0.60	630	198
PEO/IL (32/25)	0.55	570	197
PEO/IL (39/25)	0.60	600	197
PEO/IL (46/25)	0.30	580	200
PEO/IL (32/35)	0.55	610	196
PEO/IL (39/35)	0.45	590	197

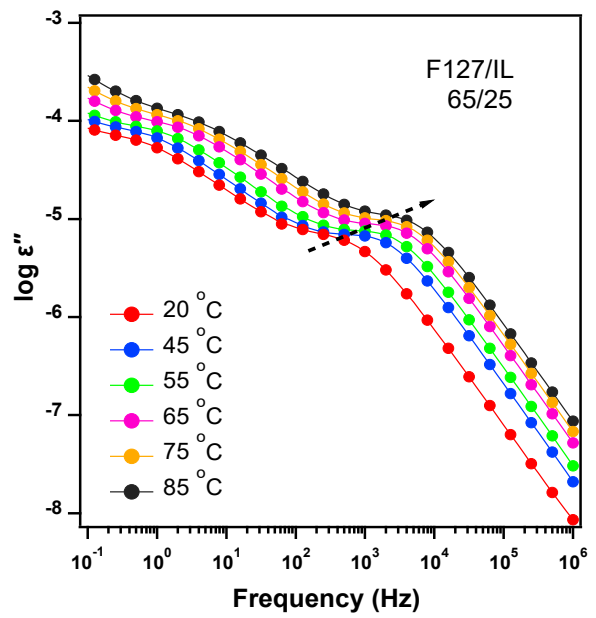
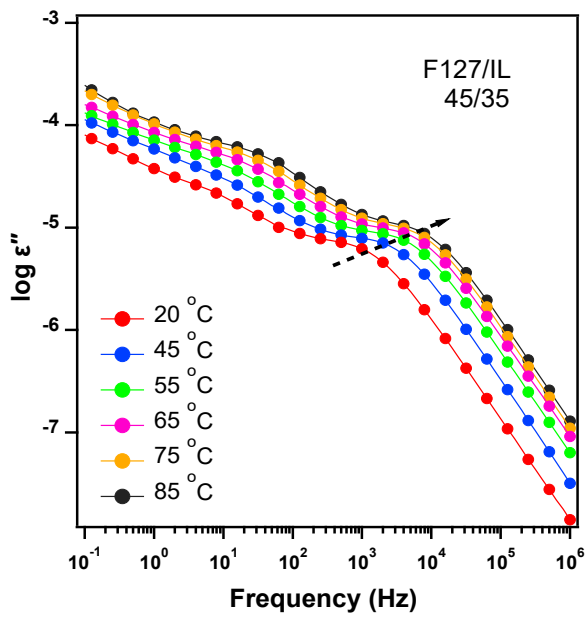
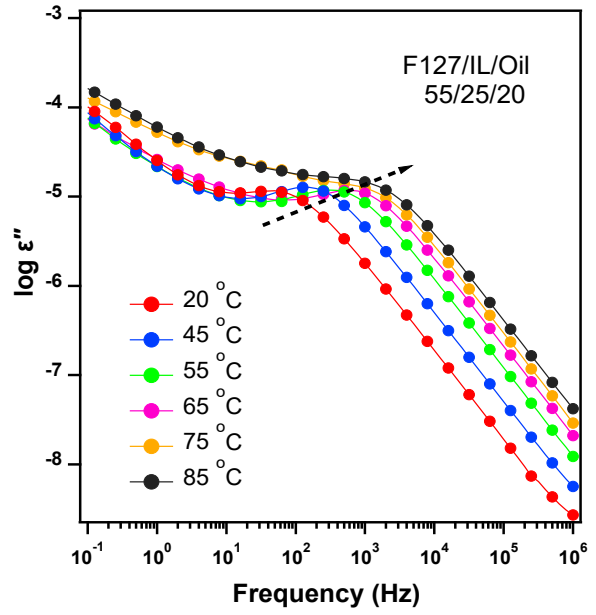
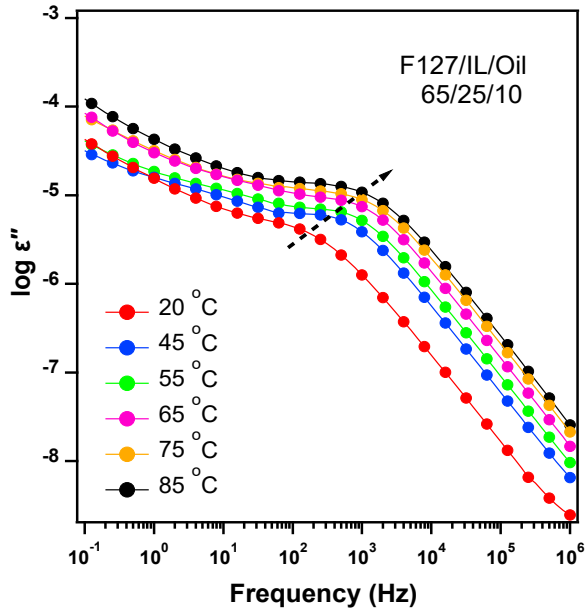


Figure S1 (cont.)

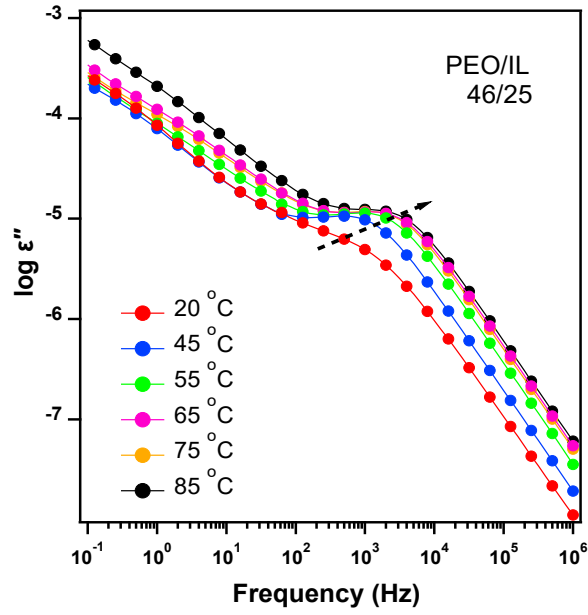


Figure S1. The dependence of dielectric loss spectra $\epsilon''(\omega)$ on temperature for heterogeneous and homogenous ion gels with different composition. The F127/IL/Oil samples are polymerized LLCs.

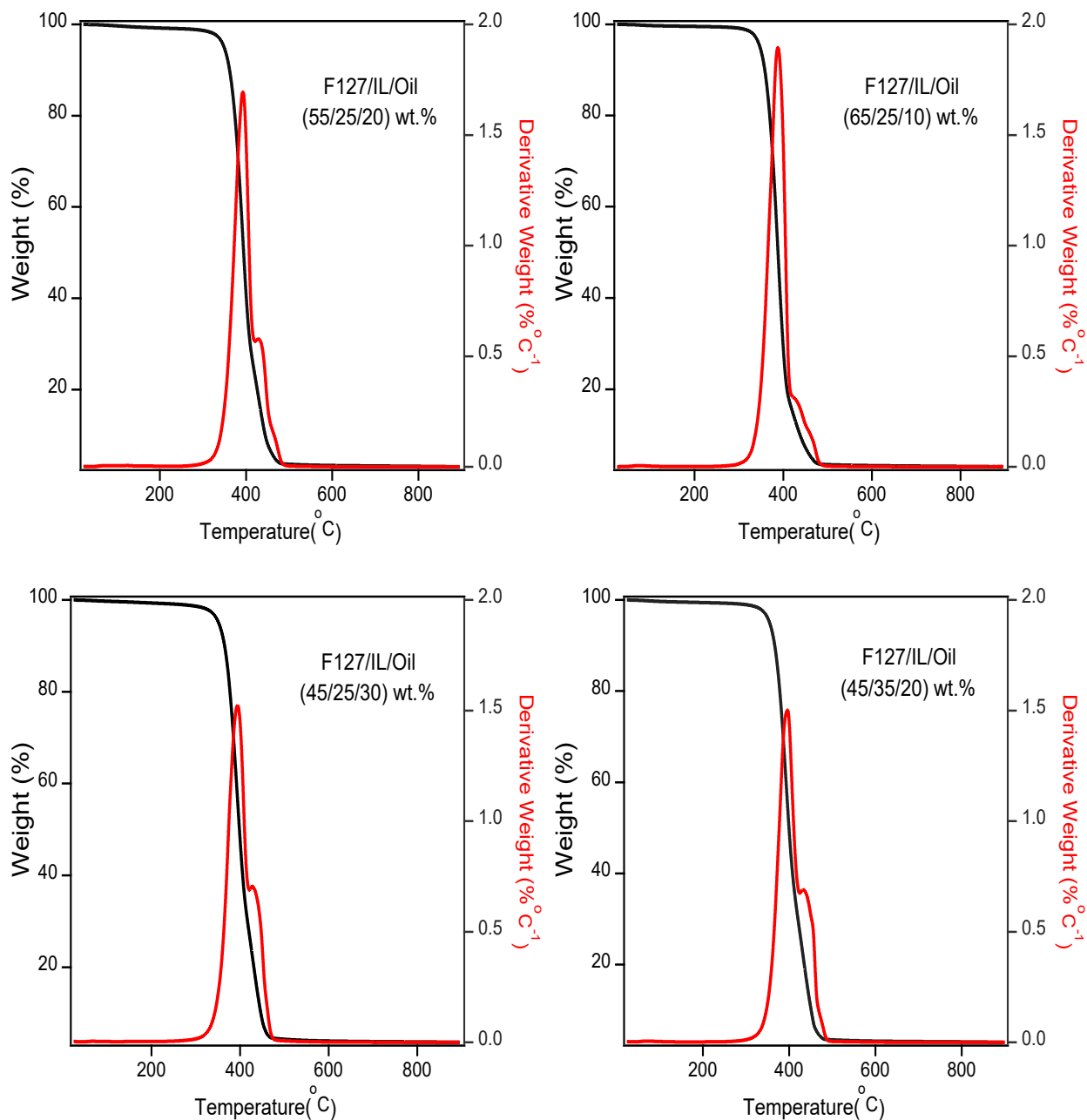


Figure S2. Thermogravimetric analysis (TGA) of the polymerized mesophases with different compositions. TGA was performed on a TA Instruments Q500 under N₂ atmosphere at a heating rate of 10 °C/min from room temperature to 900 °C. The results indicate that the samples are thermally stable up to 350 °C.

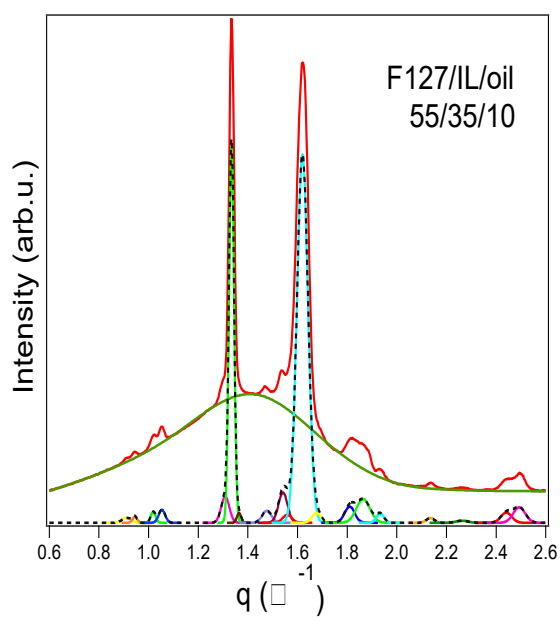
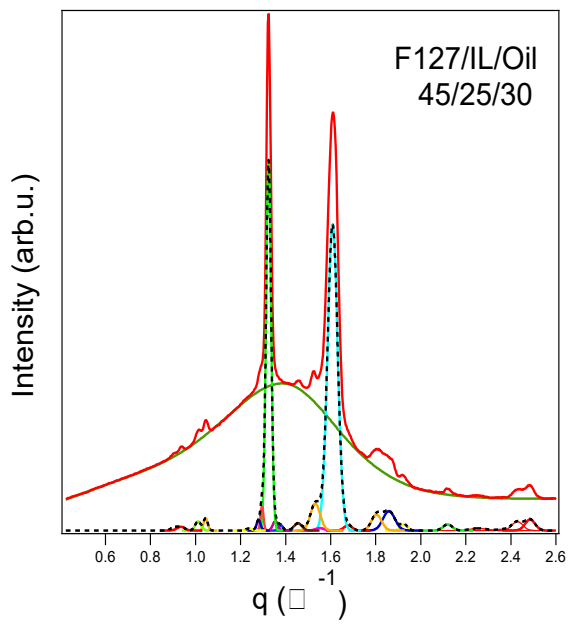
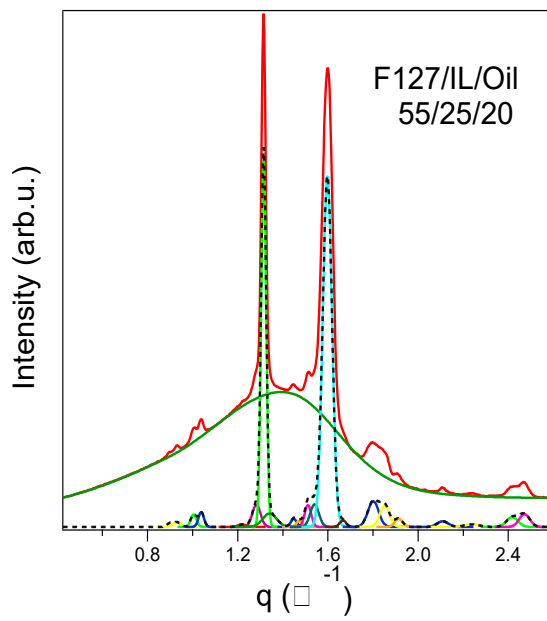
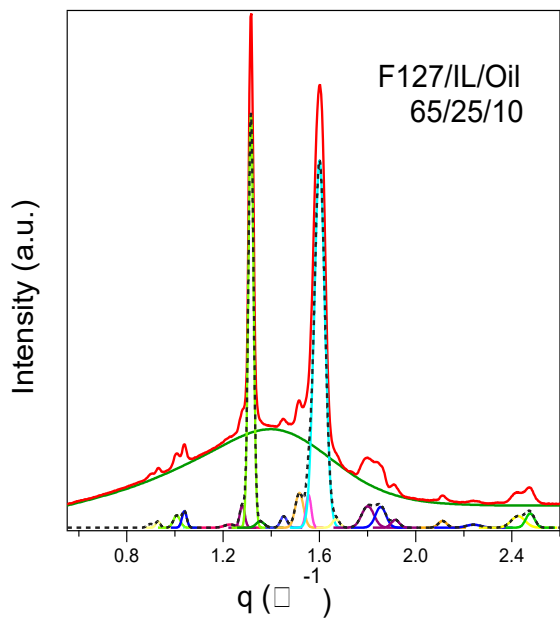


Figure S3 (cont.)

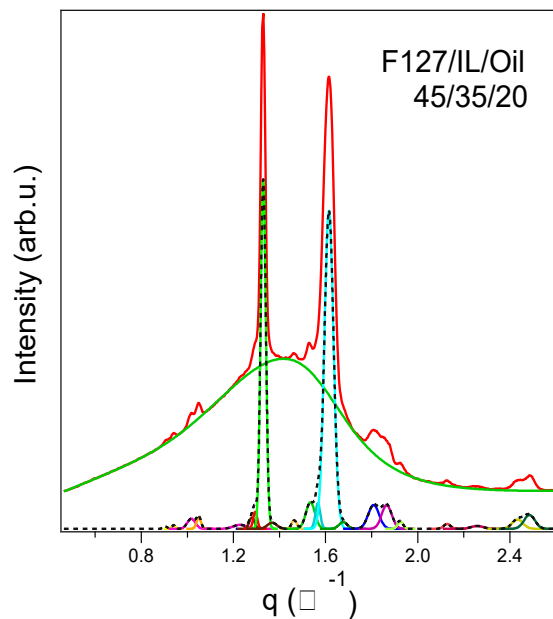


Figure S3. Peak fitting of Wide angle X-ray scattering (WAXS) data for polymer electrolytes with different composition. Igor Pro software was used for peak fitting. The “Baseline Spline Fit” package is used to remove the baseline and calculate the area under the crystalline peaks. The peaks were fitted with Lorentzian and Gaussian functions. The crystallinity from isotropic WAXS was calculated using eqn (S1):

$$X_C = \frac{\sum_i I_i^c}{\sum_i I_i^c + \sum_j I_j^a}$$

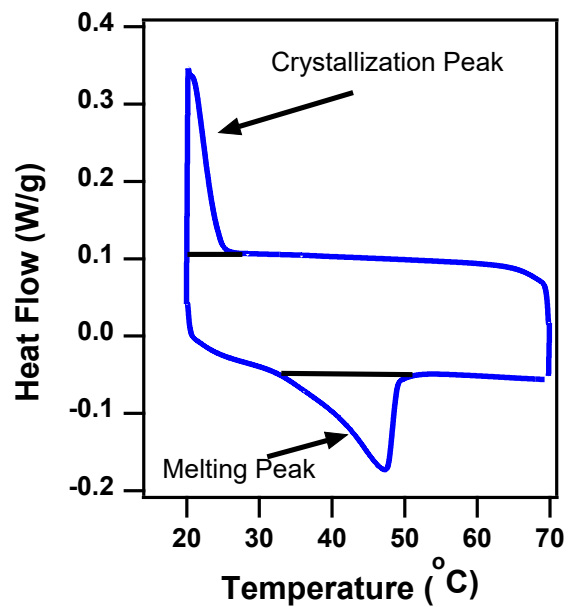


Figure S4. Typical DSC thermograph for measuring the crystallinity degree and melting point of the ion gels for F127/IL/Oil 65/25/10 wt.% sample.

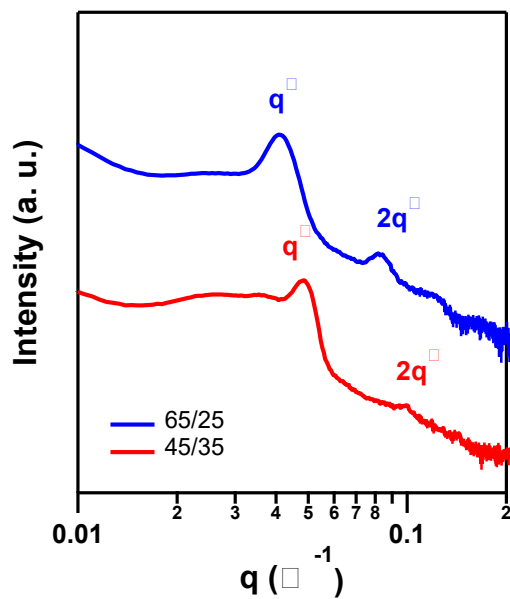


Figure S5. SAXS profiles for the ion gels with formulation of F127/IL wt% at room temperature (25 °C).

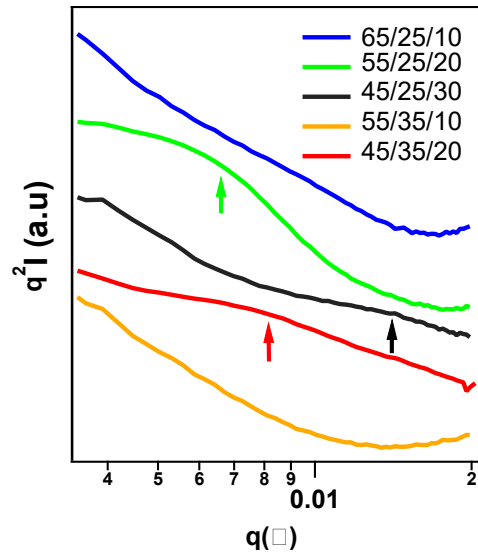


Figure S6. Lorentzian corrected plot for ion gels in low q -range.