

Supporting Information

High-Conductivity Electrolyte Gate Dielectrics Based on Poly(styrene-*co*-methyl methacrylate)/Ionic Liquid

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This information includes:

Supporting Figures S1 – S5

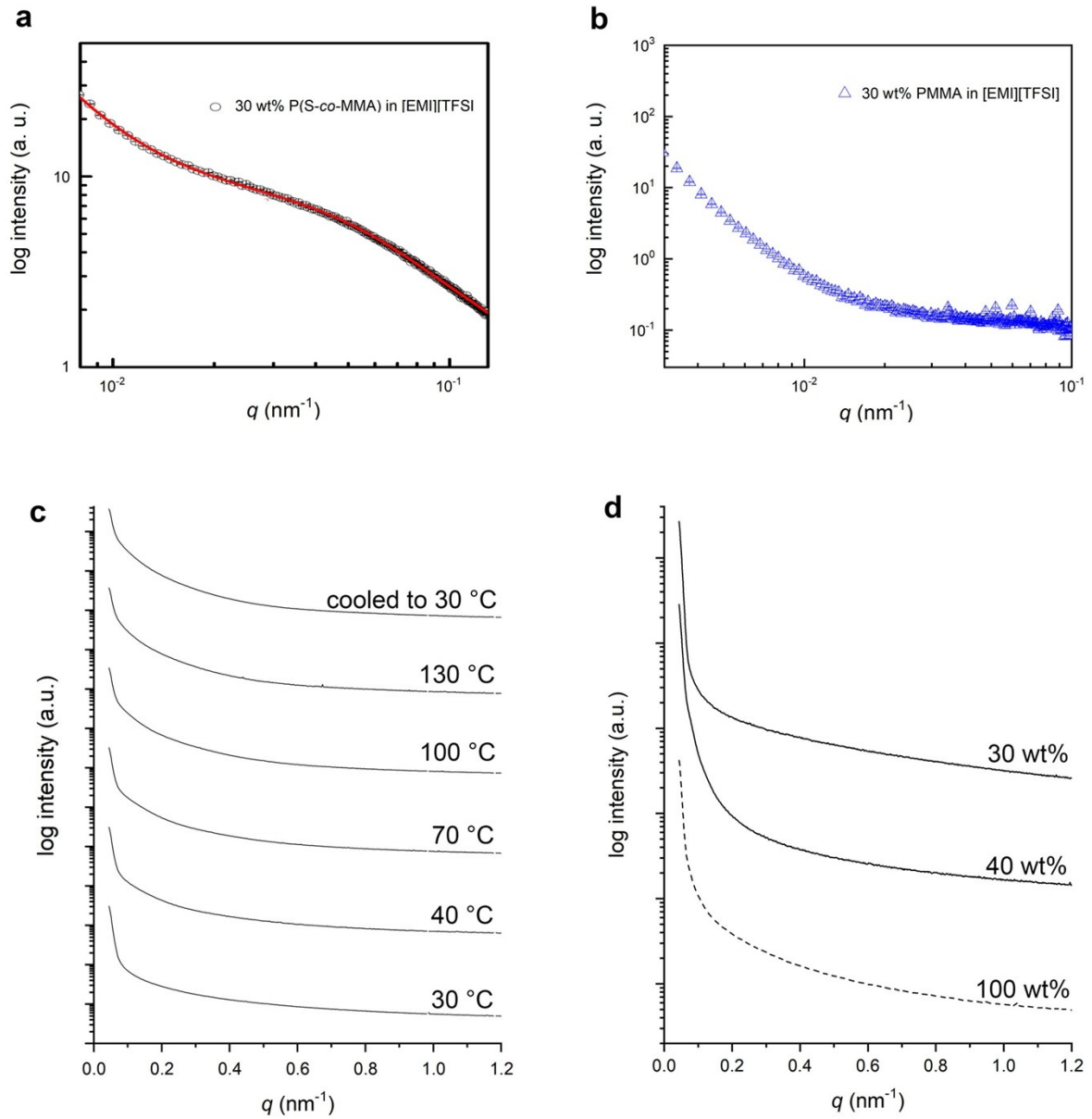


Figure S1. (a) SAXS data of P(S-co-MMA) in [EMI][TFSI] at 30 wt% concentration obtained at 30 °C. The red line shows a unified fit with R_g of 2.51 nm. (b) SAXS data of PMMA in [EMI][TFSI] at 30 wt% concentration obtained at 30 °C. (c) Temperature-dependent SAXS data of P(S-co-MMA) in [EMI][TFSI] at 30 wt% concentration. (d) SAXS data of P(S-co-MMA) in [EMI][TFSI] with different concentrations. The data is vertically shifted for clarity. The SAXS data of bulk P(S-co-MMA) is also shown as a block dashed line (100 wt%) as a reference.

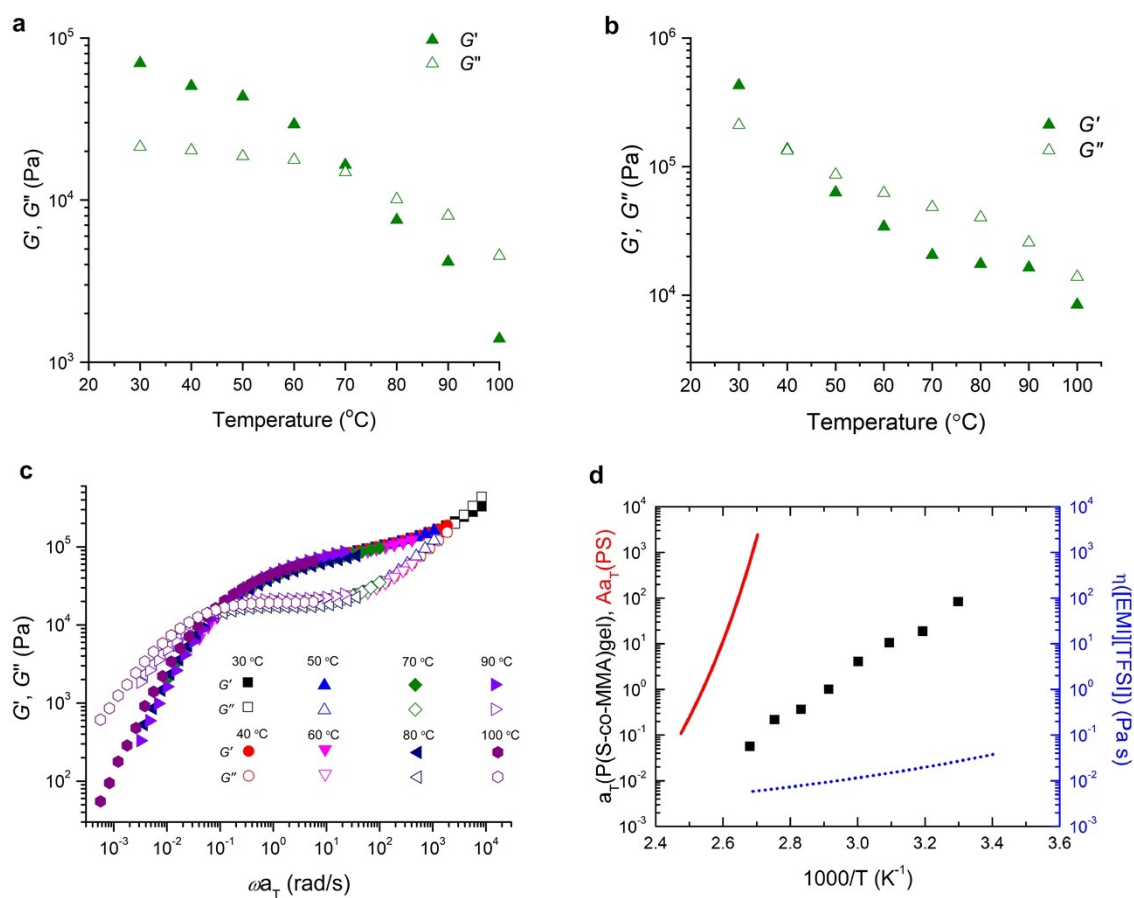


Figure S2. (a) G' and G'' of 40 wt% P(S-co-MMA) in [EMI][TFSI] at different temperatures at $\gamma = 1\%$ and $\omega = 1$ rad/s. (b) G' and G'' values of 40 wt% PMMA in [EMI][TFSI] at different temperatures at $\gamma = 1\%$ and $\omega = 1$ rad/s. (c) tTS curve of 40 wt% P(S-co-MMA) in [EMI][TFSI] constructed with $T_{\text{ref}} = 70^{\circ}\text{C}$. (d) Temperature dependence of the shift factors used in the tTS curve construction.

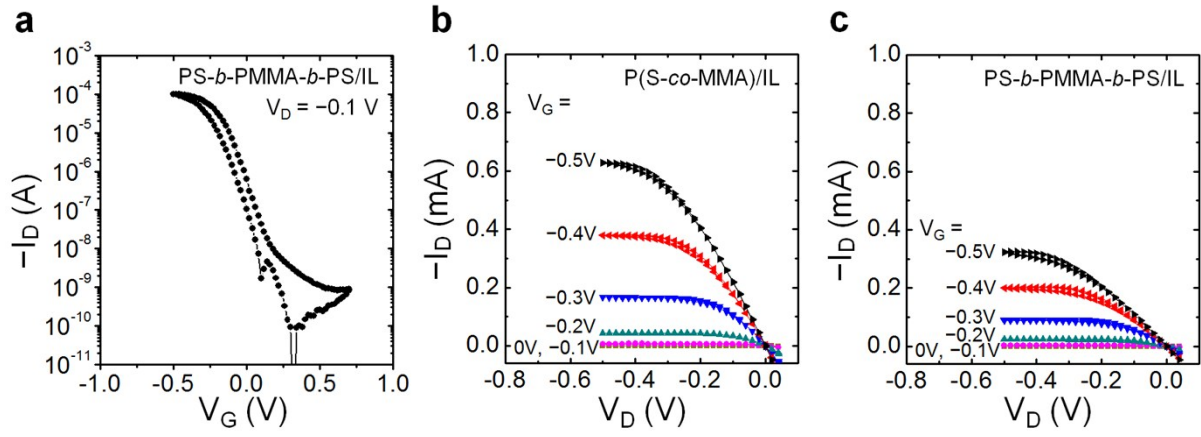


Figure S3. (a) I_D - V_G transfer curve obtained from a P3HT transistor gated with a PS-*b*-PMMA-*b*-PS ion gel at a V_G sweep rate of 20 mV/s. (b-c) Representative output I_D - V_D curves for P3HT thin-film transistors gated with (b) P(S-*co*-MMA)/[EMI][TFSI] and (c) PS-*b*-PMMA-*b*-PS/[EMI][TFSI].

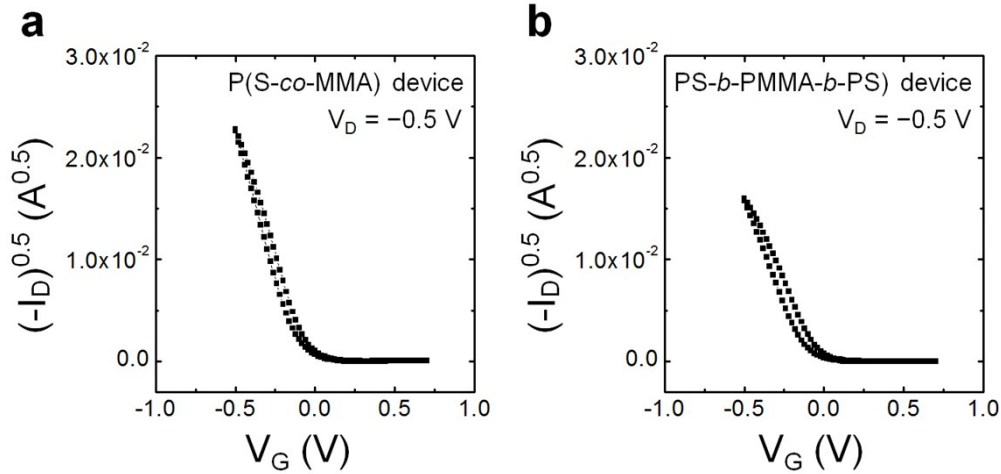


Figure S4. Representative $I_D^{0.5}$ - V_G transfer curves obtained in the saturation regime of $V_D = -0.5$ V for P3HT thin-film transistors gated with (a) P(S-*co*-MMA)/[EMI][TFSI] and (b) PS-*b*-PMMA-*b*-PS/[EMI][TFSI].

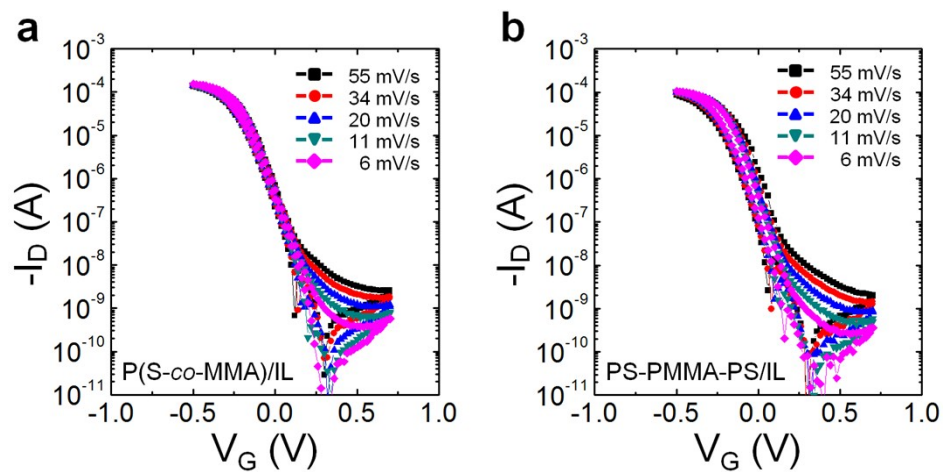


Figure S5. Overlay of I_D - V_G transfer curves obtained from the P3HT thin-film transistors gated with two different electrolyte gate dielectrics based on (a) P(S-*co*-MMA)/[EMI][TFSI] and (b) PS-*b*-PMMA-*b*-PS/[EMI][TFSI] at five different V_G sweep rates.