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**SUPPORTING INFORMATION**

![Figure S1. 1H NMR of PEO₃₄-PC 10 wt% MA](image)

**Figure S1.** 1H NMR of PEO₃₄-PC 10 wt% MA

![Figure S2. DSC traces of non-cross-linked and cross-linked PEO₃₄-PC 10 wt% MA during the second heating scan at 20 K min⁻¹.](image)

**Figure S2.** DSC traces of non-cross-linked and cross-linked PEO₃₄-PC 10 wt% MA during the second heating scan at 20 K min⁻¹.
**Figure S3.** Thermogravimetric analysis of cross-linked PEO\textsubscript{34}-PC 10 wt% MA containing 30 wt% LiTFSI.

**Figure S4.** Lithium transference number analysis at 70 °C. Impedance spectroscopy and chronoamperometry analysis for PEO\textsubscript{34}-PC 10 wt% MA containing 30 wt% LiTFSI.