Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

CO_2-sourced polycarbonates as solid electrolytes for room temperature operation lithium battery

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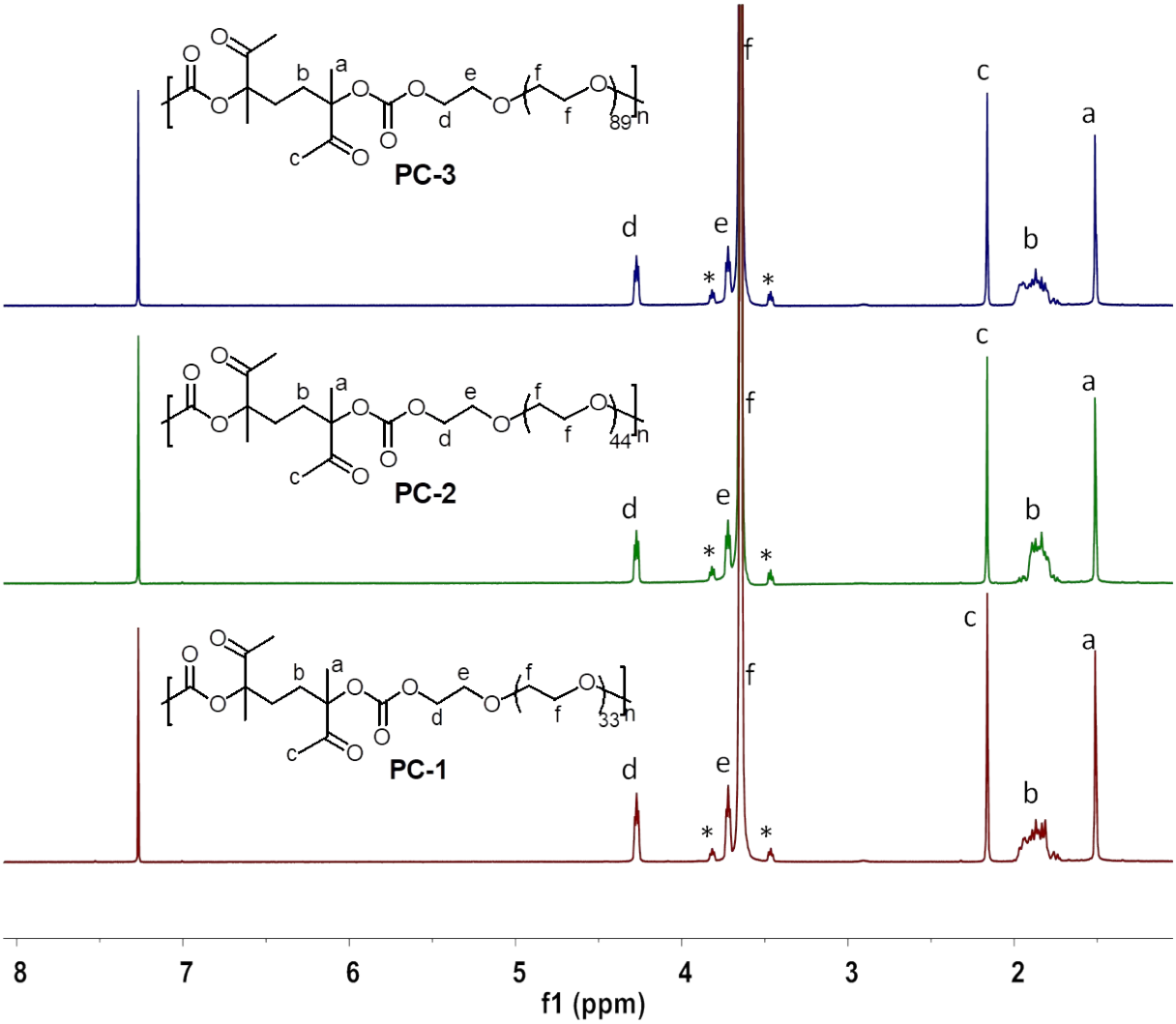

Fig. S1 ^{1}H NMR spectra of PC-1, PC-2 and PC-3 in $CDCl_3$

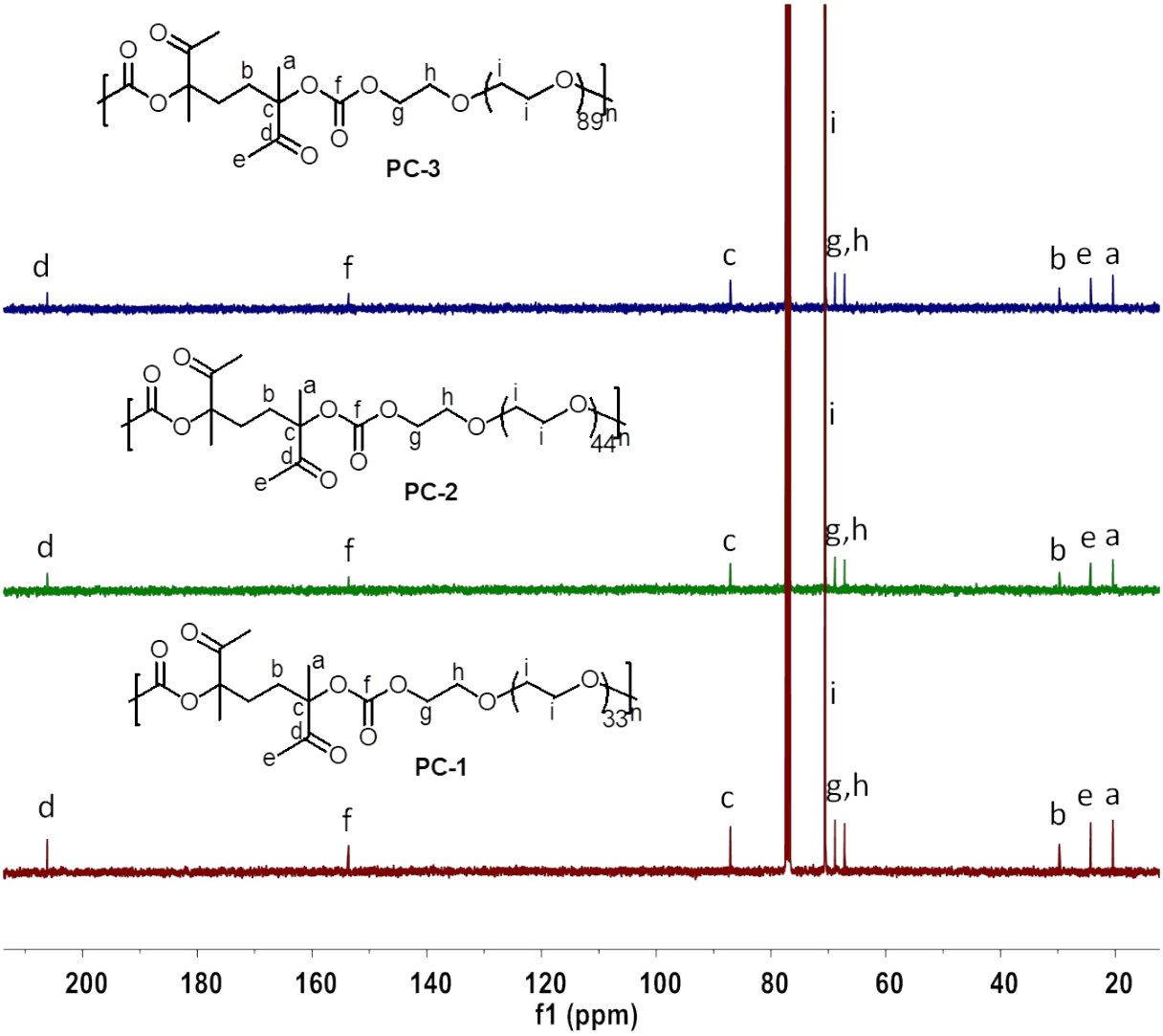

Fig. S2 ^{13}C NMR spectra of PC-1, PC-2 and PC-3 in $CDCl_3$

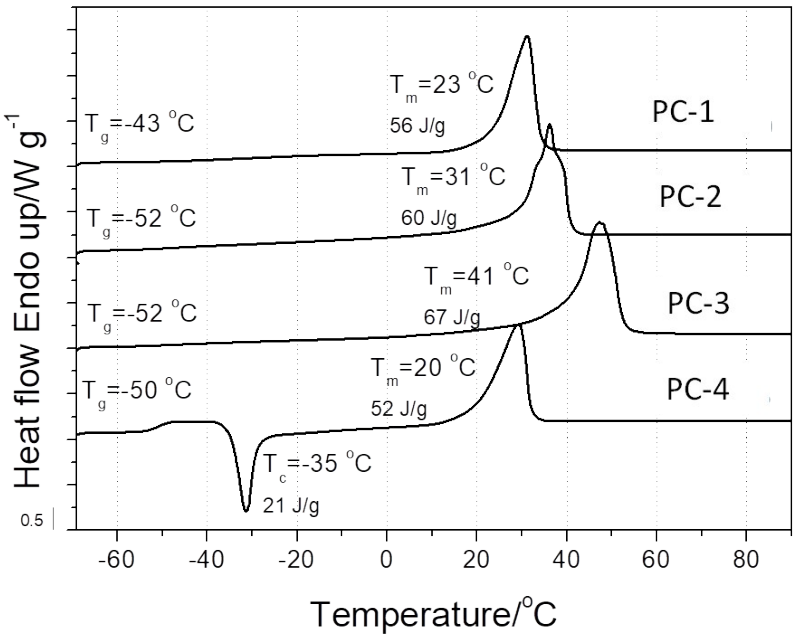

Fig. S3 DSC traces of PC-1, 2 , 3 and PC-4

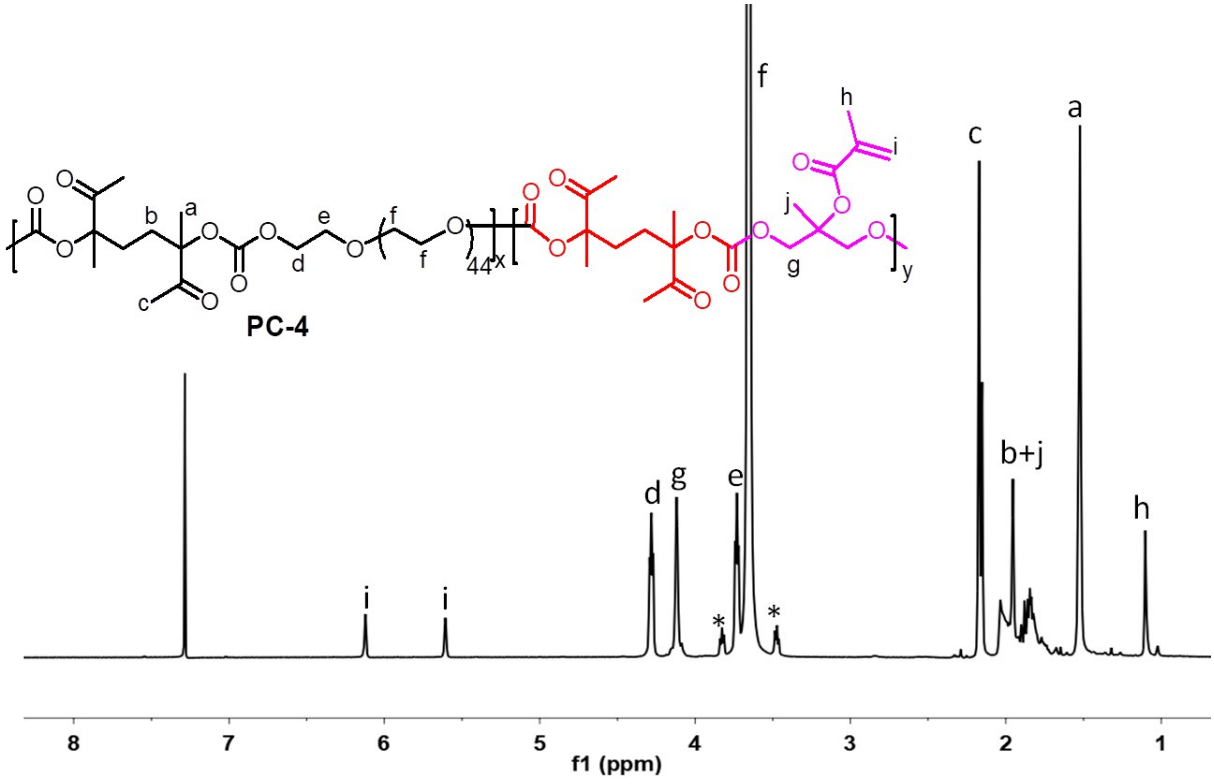

Fig. S4 ^{1}H NMR spectrum of PC-4 in $CDCl_3$

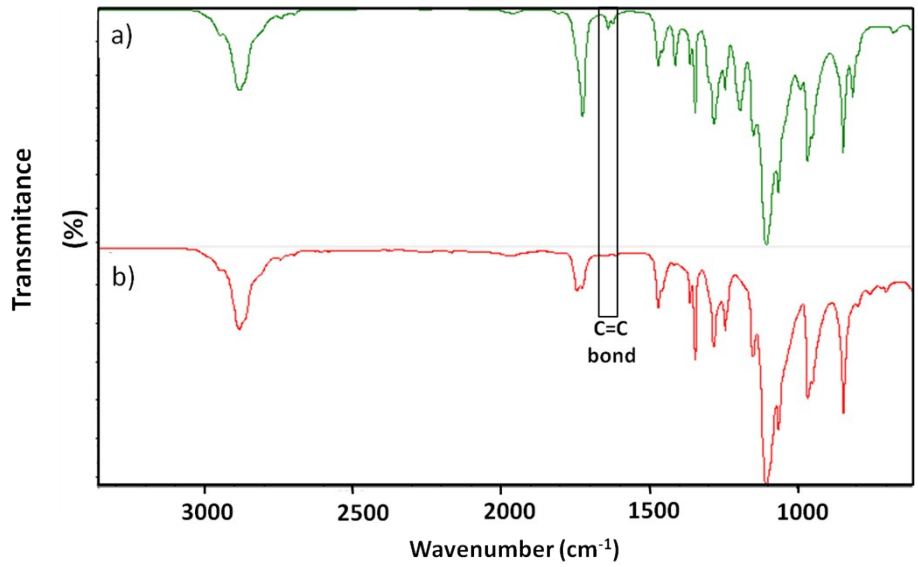

Fig. S5 FTIR spectra of SIP-PC-3 a) before and b) after UV-irradiation.

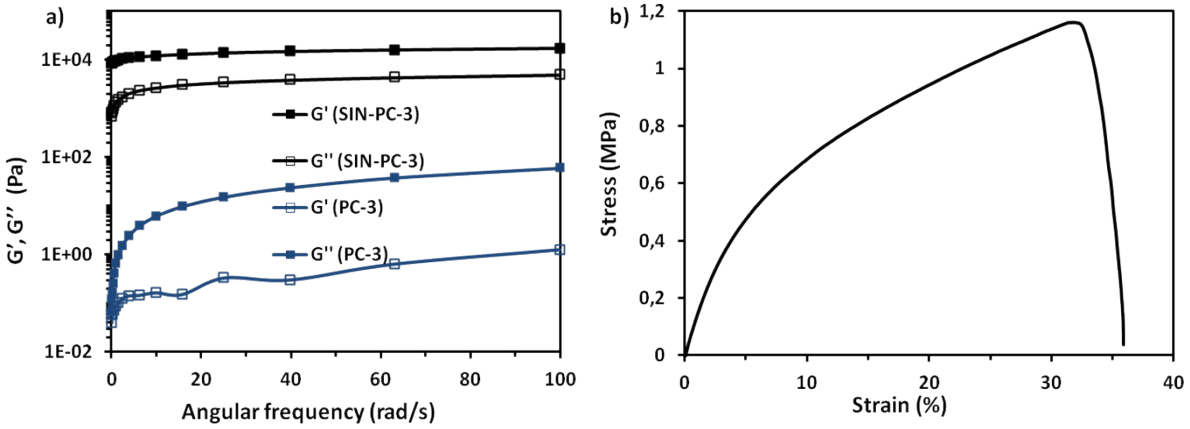

Fig. S6 (a) Elastic modulus (G') and Storage modulus (G'') of PC-3 based SPE and SIN-PC-3 based SPE, (b) stress-strain curves at room temperature of SIN-PC-3 based SPE (deformation rate: 2 mm min^{-1}).

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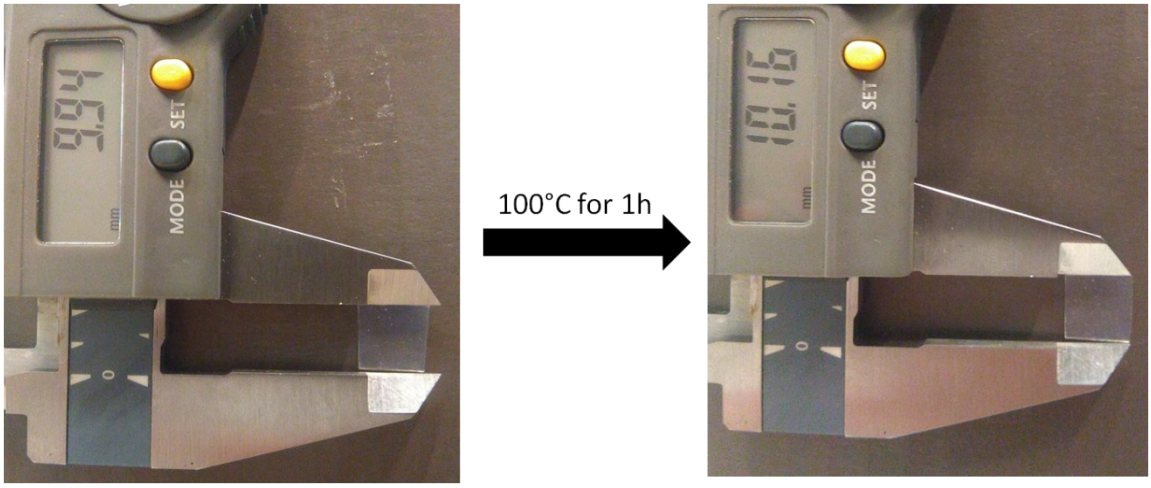

Fig. S7 Pictures of SIN-PC-3 membrane after and before heating at 100°C for 1 hour.

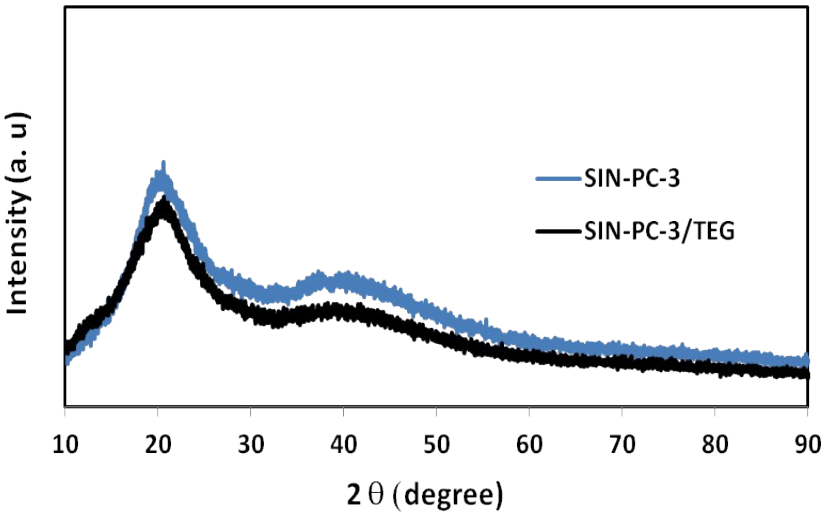

Fig. S8 XRD spectrum of SIN-PC-3 and SIN-PC-3/TEG membranes.

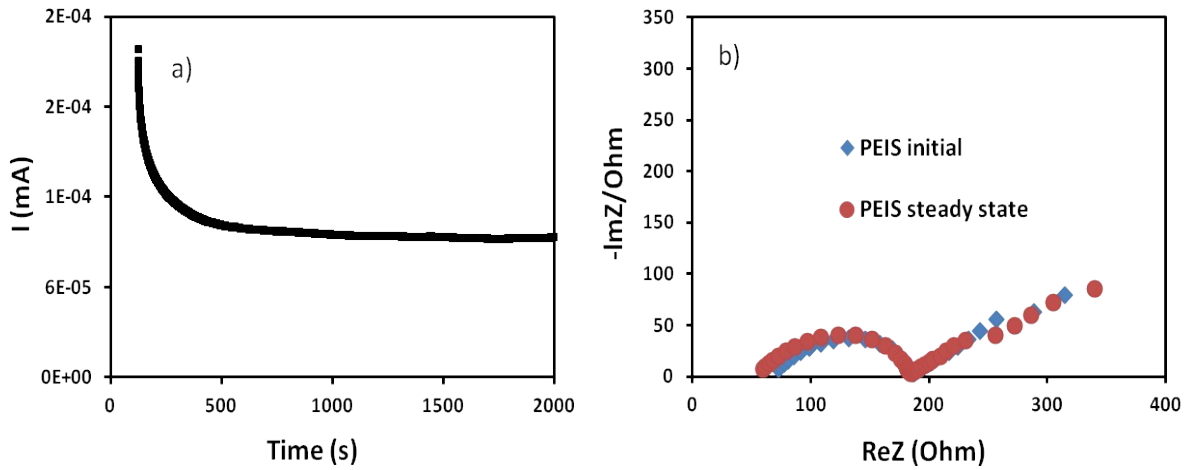

Fig. S9 (a) The chronoamperometry profile of a symmetric Li/SIN-PC-3/Li battery under a polarization potential of 10 mV, (b) the EIS before and after the polarization.

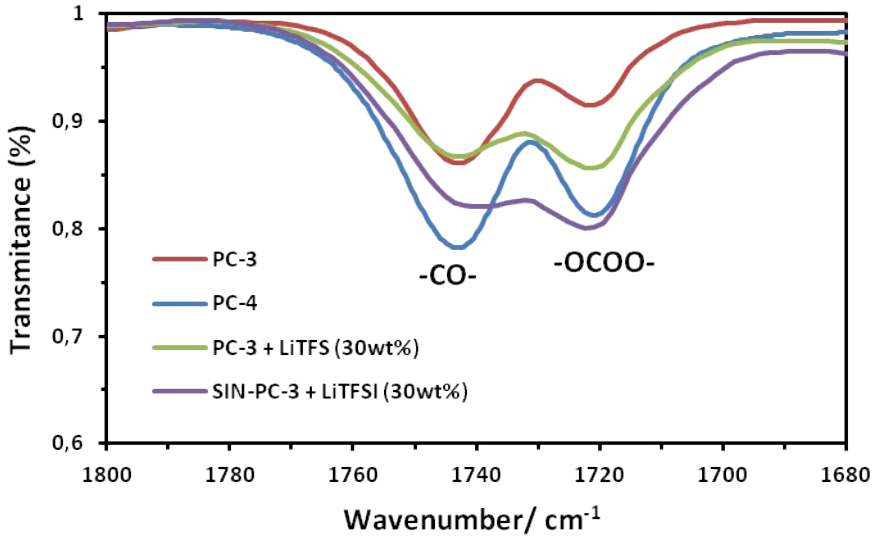

Fig. S10 FTIR-ATR. Coordination of LiTFSI with carbonyl group.

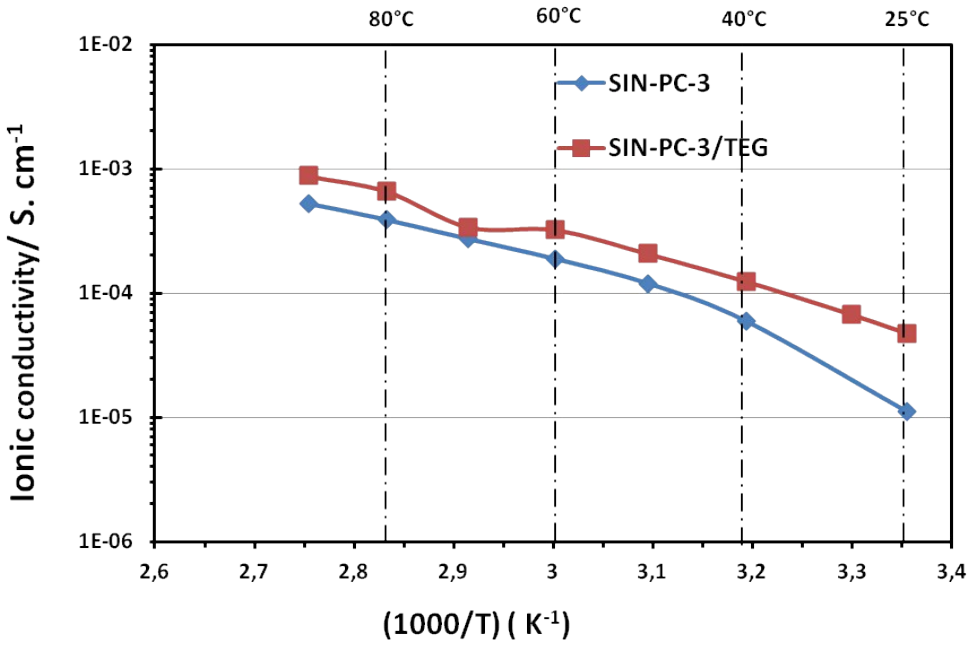

Fig. S11 Temperature dependence of ionic conductivity of SIN-PC-3 and SIN-PC-3/TEG.

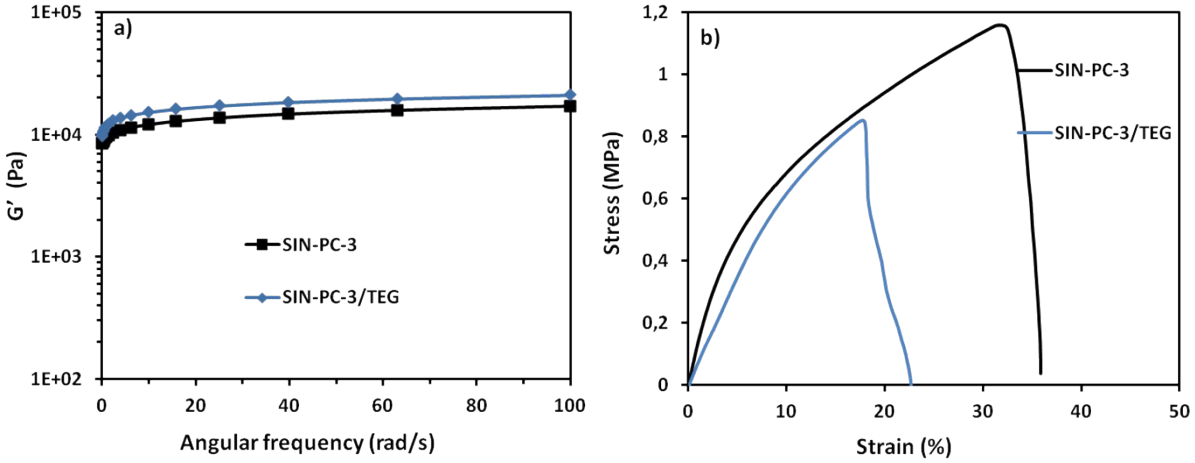

Fig. S12 (a) Elastic modulus (G') of SIP-PC-3 and SIP-PC-3/TEG (b). stress-strain curves at room temperature of SIN-PC-3 and SIP-PC-3/TEG based SPE (deformation rate: 2 mm min^{-1}).

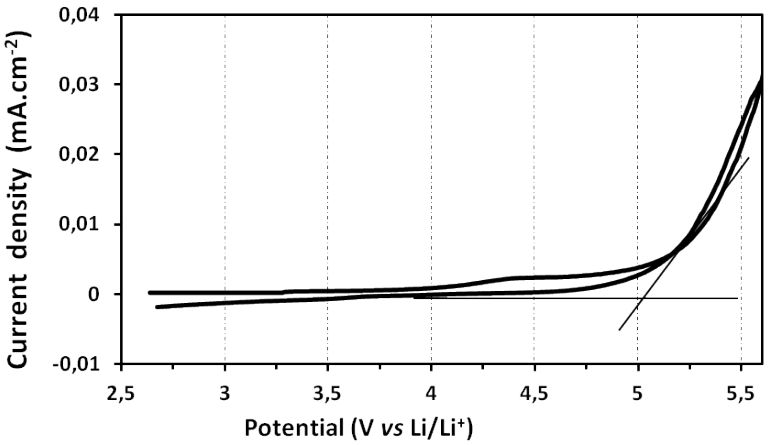

Fig. S13 Electrochemical stability window of SIN-PC-3 SPE/TEG obtained by CV at a scan rate of 0.5 mV s^{-1} at r.t.

Table S1. Mechanical properties of SIN-PC-3 and SIN-PC-3/TEG.

Samples	Young Modulus [MPa]	Elongation at break [%]	Stress at break [MPa]
SIN-PC-3	13 ± 2.1	33 ± 4 %	1.1± 0.2
SIN-PC-3 /TEG	7.7 ± 0.5	18 ± 5 %	0.8± 0.3