

*Supporting Information*

**Solid polymer electrolyte based on ionic bond or covalent bond functionalized silica nanoparticles**

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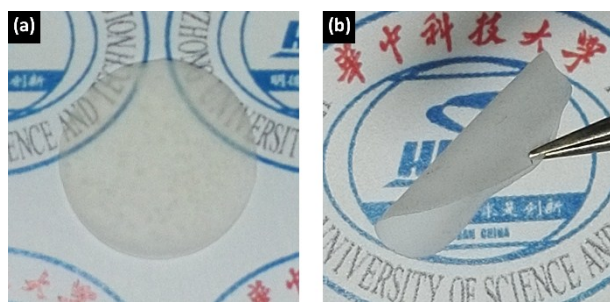


Fig. S1 Digital photographs of CPEs prepared in the study.

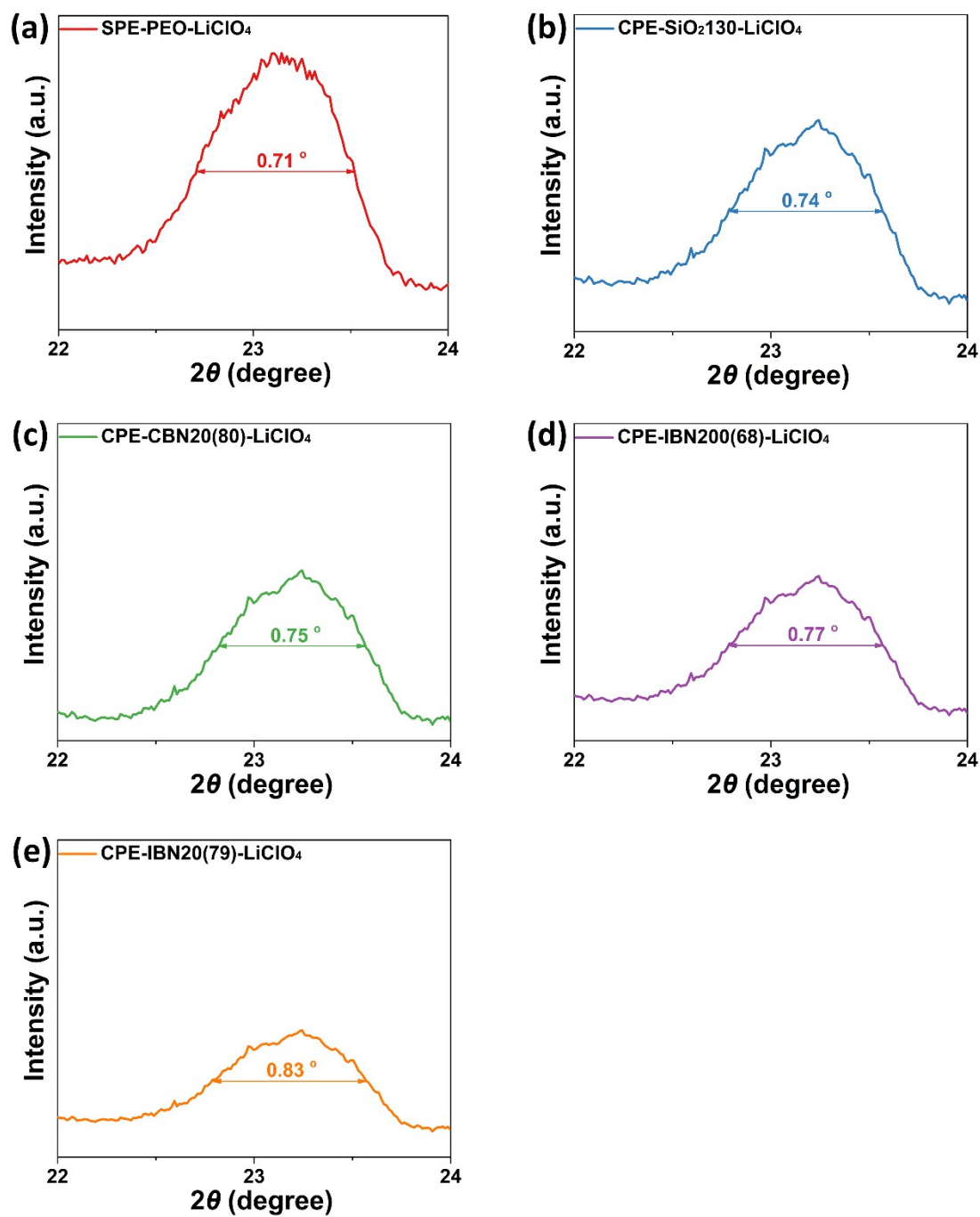


Fig. S2 XRD patterns with FWHM values of the diffraction peak between  $2\theta = 12^\circ$  and  $25^\circ$  shown in inset for (a) SPE-PEO-LiClO<sub>4</sub>, (b) CPE-SiO<sub>2</sub>130-LiClO<sub>4</sub>, (c) CPE-CBN20(80)-LiClO<sub>4</sub>, (d) CPE-IBN200(68)-LiClO<sub>4</sub> and (e) CPE-IBN20(79)-LiClO<sub>4</sub>.

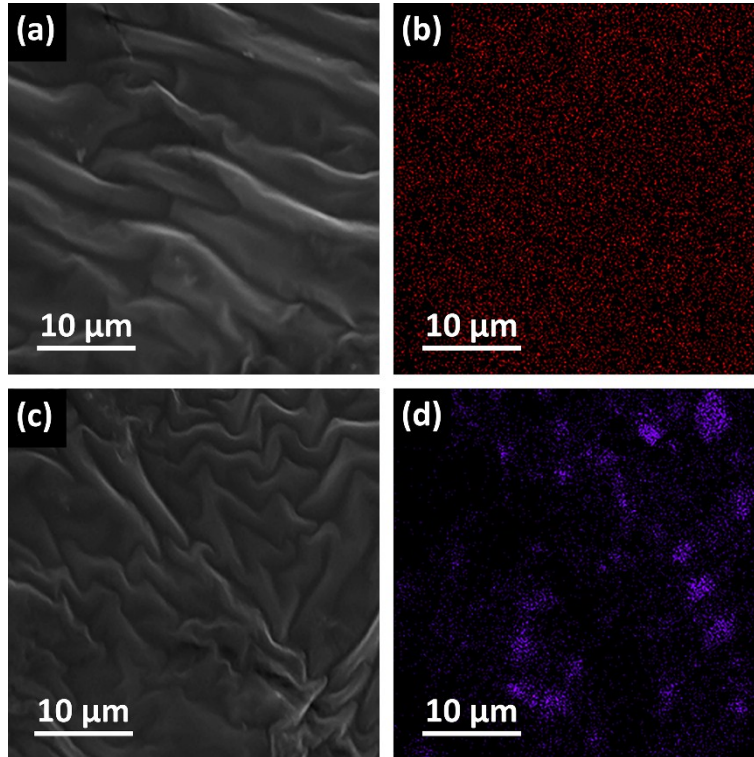


Fig. S3 (a) SEM image of CPE-IBN200(68)-LiClO<sub>4</sub>, (b) EDX map for the Si atom in CPE-IBN200(68)-LiClO<sub>4</sub>, (c) SEM image of CPE-SiO<sub>2</sub>130-LiClO<sub>4</sub> and (d) EDX map for the Si atom in CPE-SiO<sub>2</sub>130-LiClO<sub>4</sub>.

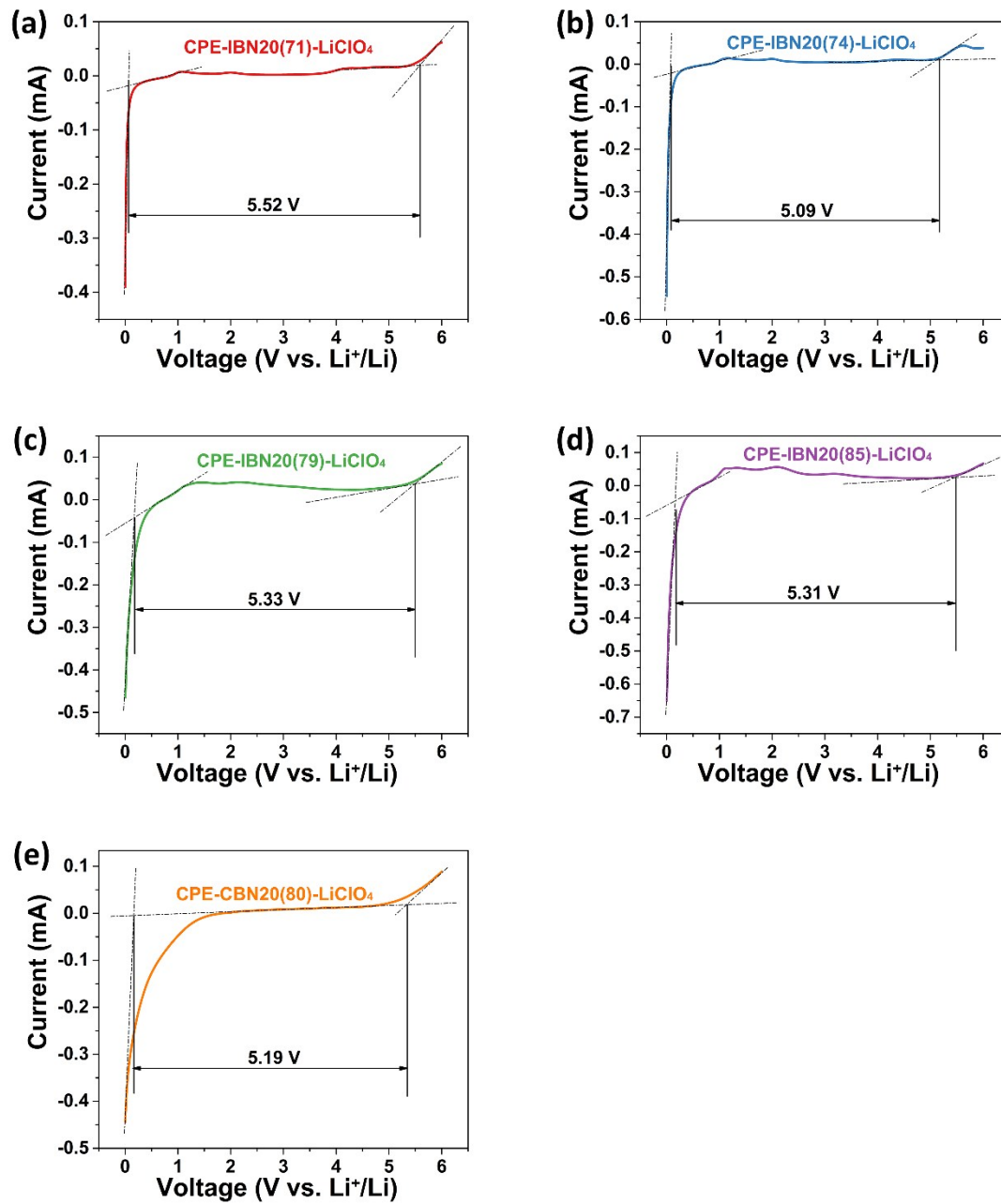


Fig. S4 Line Scans Voltammetry of CPEs (Li|CPE|SS) with a scan rate of 10 mV s<sup>-1</sup> at 50 °C.

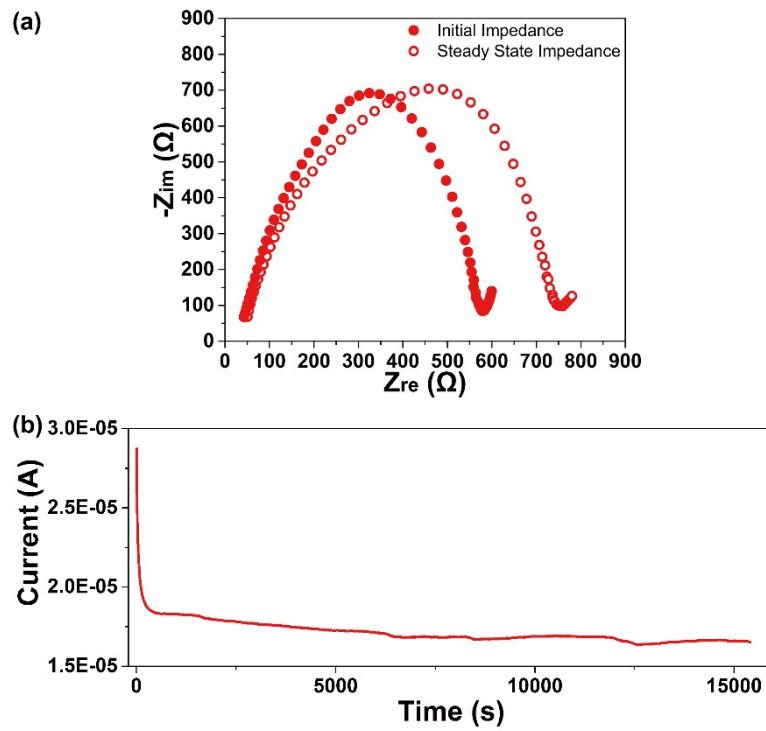


Fig. S5 Measurement of the lithium ion transference number of CPE-IBN20(79)-LiTFSI. (a) Typical Nyquist plot of the AC impedance of a Li|CPE-IBN20(79)-LiTFSI|Li cell at 60 °C; (b) Current variation with time during polarization of the symmetrical lithium cell.