Supplementary Information

Systematic safety evaluation of quasi-solid-state lithium batteries: a case study

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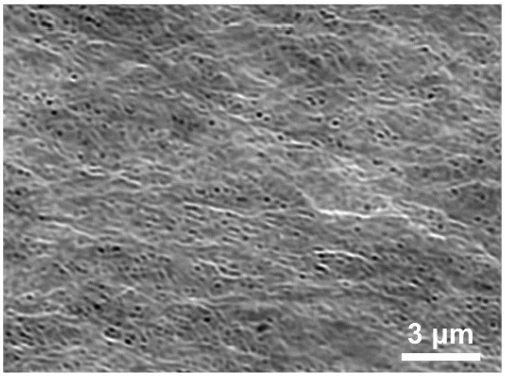

Fig. S1 SEM image of conventional PE separator.

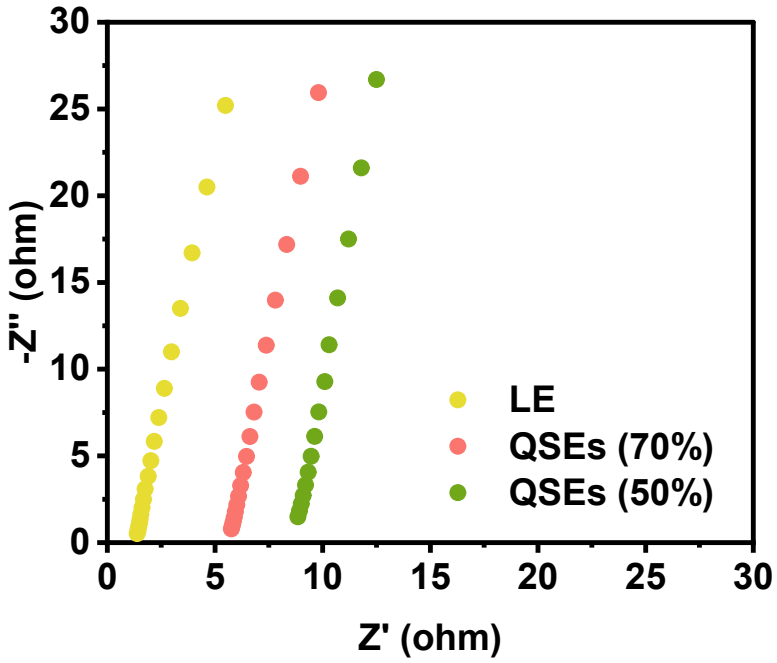

Fig. S2 Nyquist plots of SS || LE || SS and SS || QSEs (70%) || SS and SS || QSEs (50%) || SS.

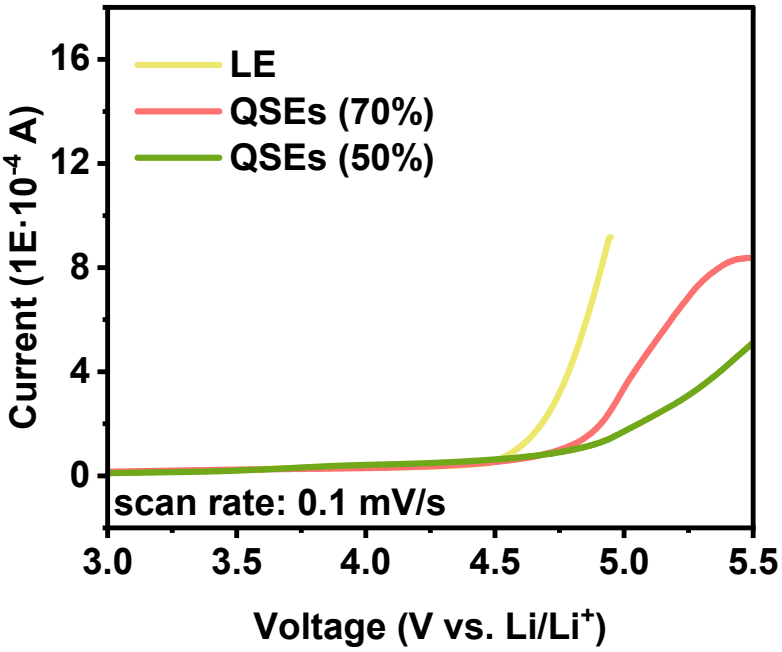

Fig. S3 The LSV plot with Li || LE || SS, Li || QSEs (70%) || SS and Li || QSEs (50%) || SS.

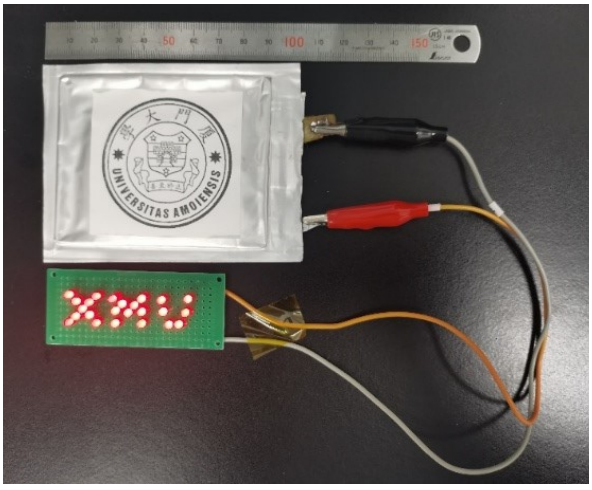

Fig. S4 Optical images of the LED lamp powered by the pouch battery.

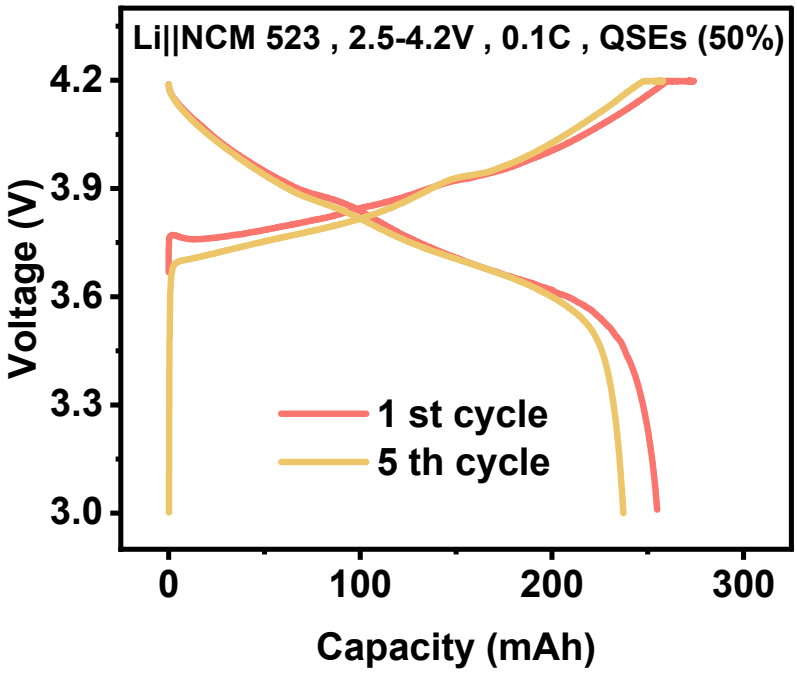

Fig. S5 The cycle performance of Li || QSEs (50%) || NCM523 pouch battery (10 mg cm^{-2}) at 0.1 C cycle rates in the voltage range 3.0 - 4.2 V.

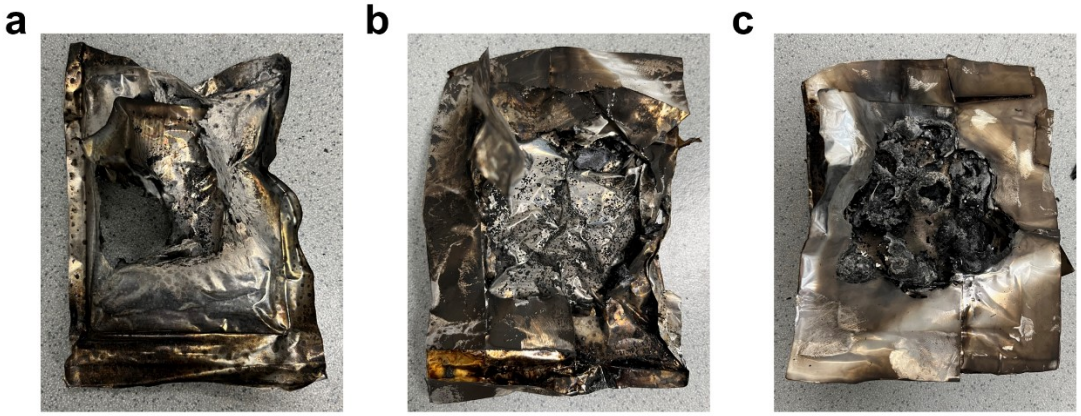

Fig. S6 Optical images of battery after ARC test: (a) LE, (b) QSEs (70%), (c) QSEs (50%).

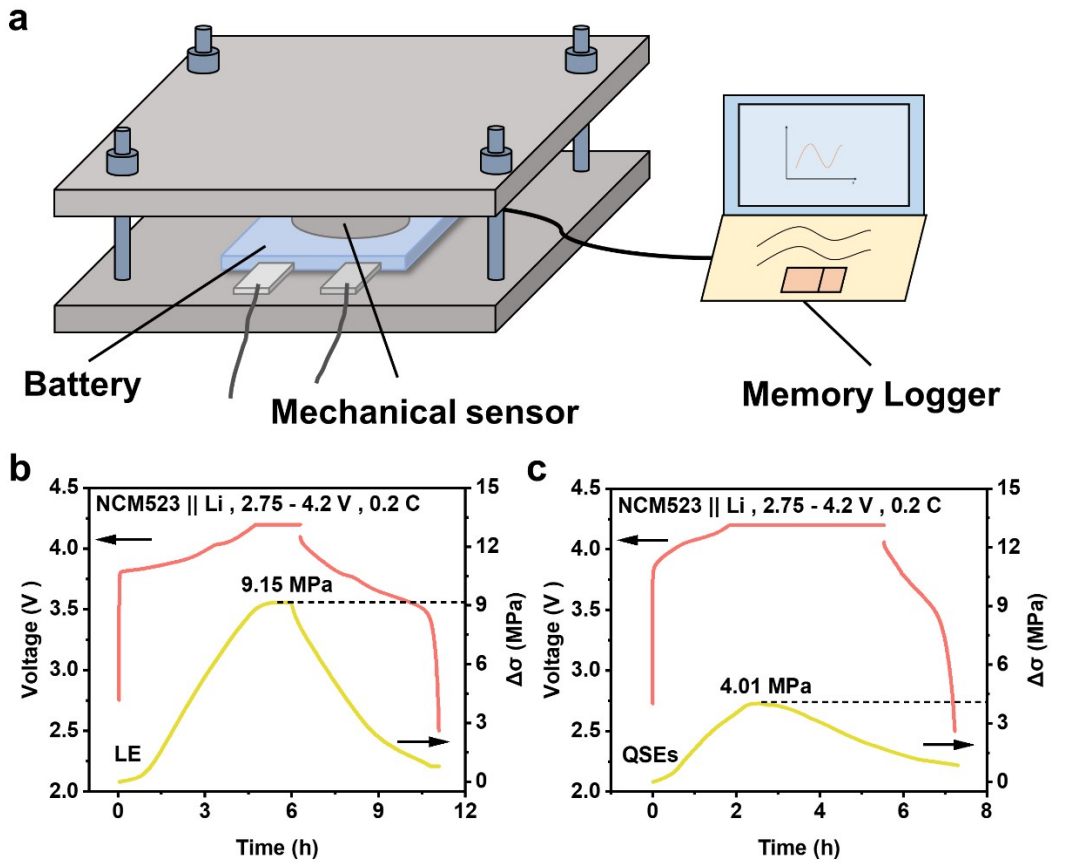

Fig. S7 (a) Diagram of battery stress test; (b) Liquid battery stress test results and voltage curve with time; (c) Quasi-solid-state battery (QSEs (50%)) stress test results and voltage curve with time.

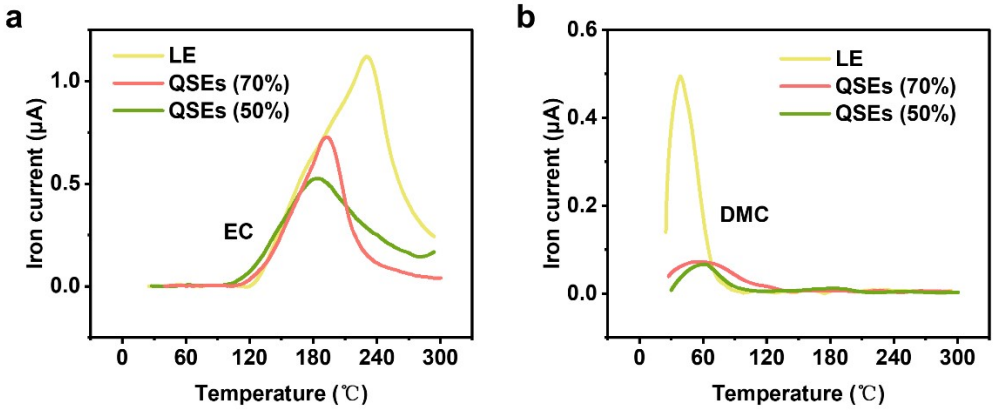

Fig. S8 Mass spectrometry profiles of (a) DMC, (b) EC were collected simultaneously during DSC tests.

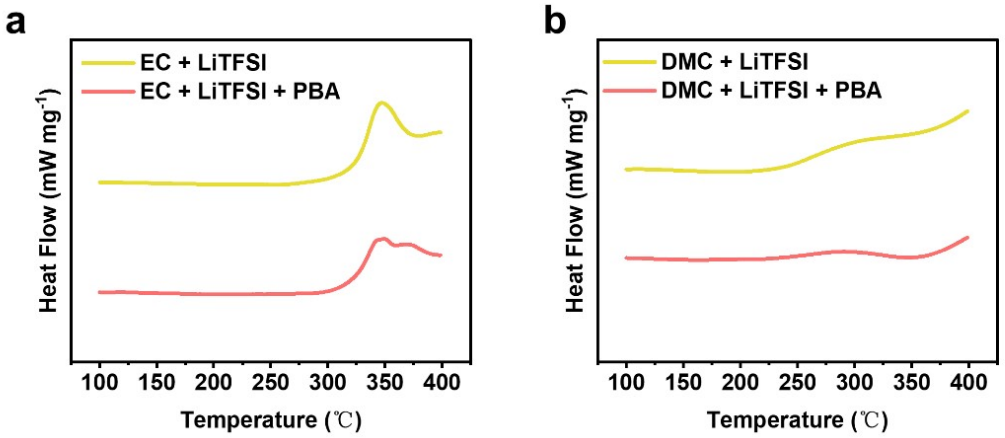

Fig. S9 (a) Heat flow for the EC + LiTFSI system and the EC + LiTFSI + BA polymerization system. (b) Heat flow for the DMC + LiTFSI system and the DMC + LiTFSI + BA polymerization system.

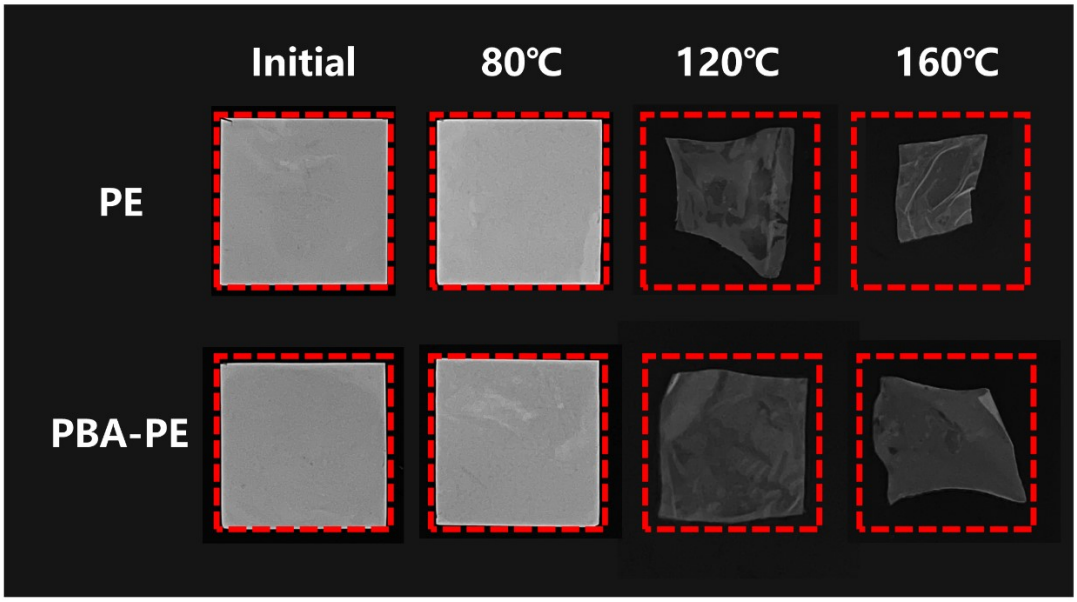

Fig. S10. Photographs of the PE, PBA@PE separators after the thermal shrinkage test at various temperatures for 30 mins.

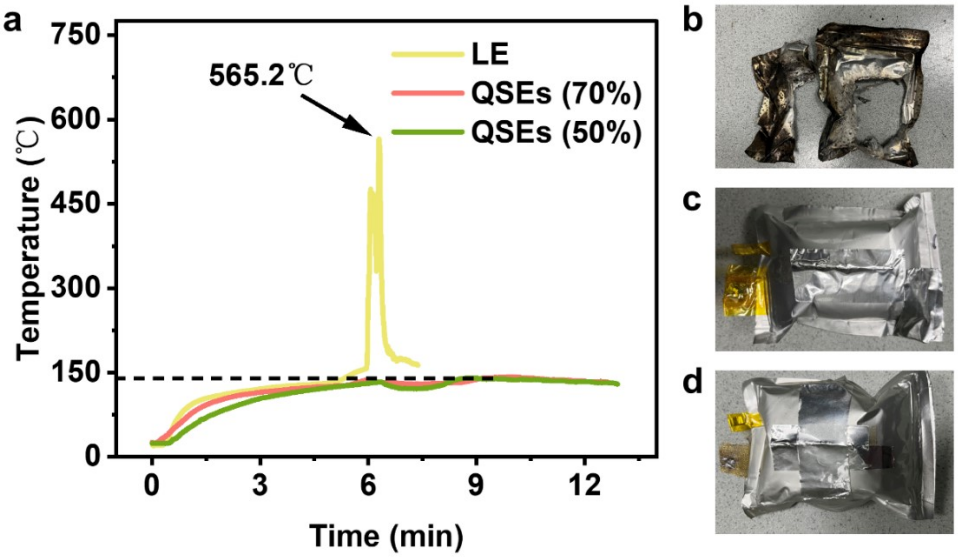

Fig. S11 (a) Real-time temperature change of battery in heat abuse experiment; Optical picture of battery after heat abuse test: (b) LE, (c) QSEs (70%), (d) QSEs (50%).

Table S1. The volume of the plasticizer in the LE and QSEs in all cells.

Battery name	Plasticizer volume ratio	Polymer volume ratio	Volume ratio of prepolymer in battery	Mass ratio of plasticizer in prepolymer	Mass ratio of plasticizer in battery
LE	100.0%	0%	30.0%	100.0%	30.0%
QSEs(70%)	70.0%	30.0%	30.0%	78.0%	23.4%
QSEs(50%)	50.0%	50.0%	30.0%	60.3%	18.1%

Table S2. Information about the pouch battery.

Electrode	**NCM523**	**Lithium metal**
Piece	4	5
Length	65 [mm]	69 [mm]
Width	45 [mm]	49 [mm]
Area Capacity	1.76 [mAh cm^{-2}]	-