Electronic Supporting Information

Binder-free and high-loading sulfurized polyacrylonitrile cathode for lithium/sulfur batteries

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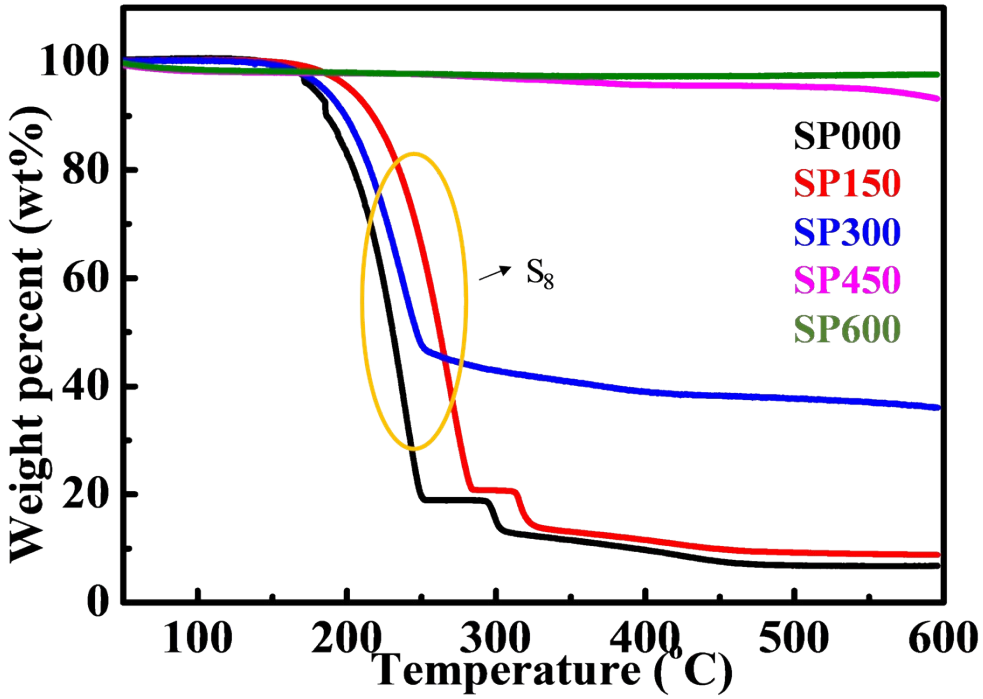
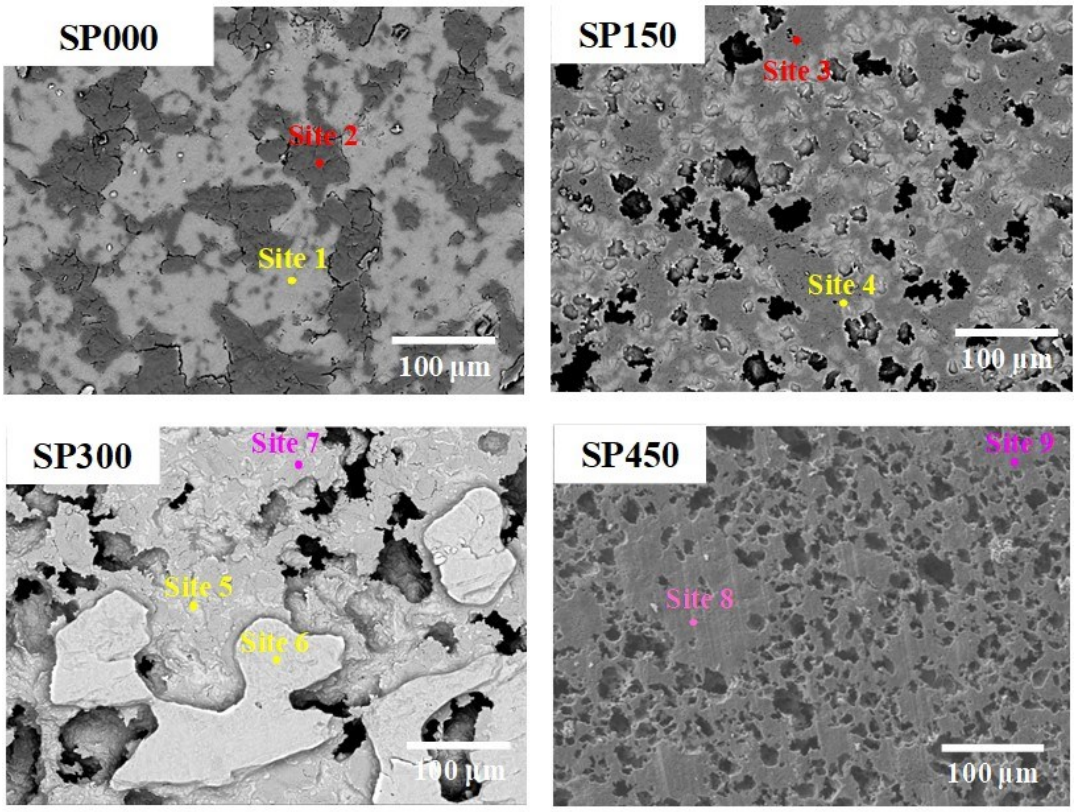


Fig. S1. TGA curves of SPpellet samples.



Unit : at%

Sample/position		N	C	S
SP000	Site 1	-	-	100
	Site 2	23.37	76.63	-
SP150	Site 3	-	-	100
	Site 4	21.45	78.55	-
SP300	Site 5	-	-	100
	Site 6	-	-	100
	Site7	6.21	72.7	21.5
SP450	Site 8	14.9	65.8	19.3
	Site 9	14.7	64.5	20.8

Fig. S2. SEM images and EDS point mapping results for SPAN electrodes

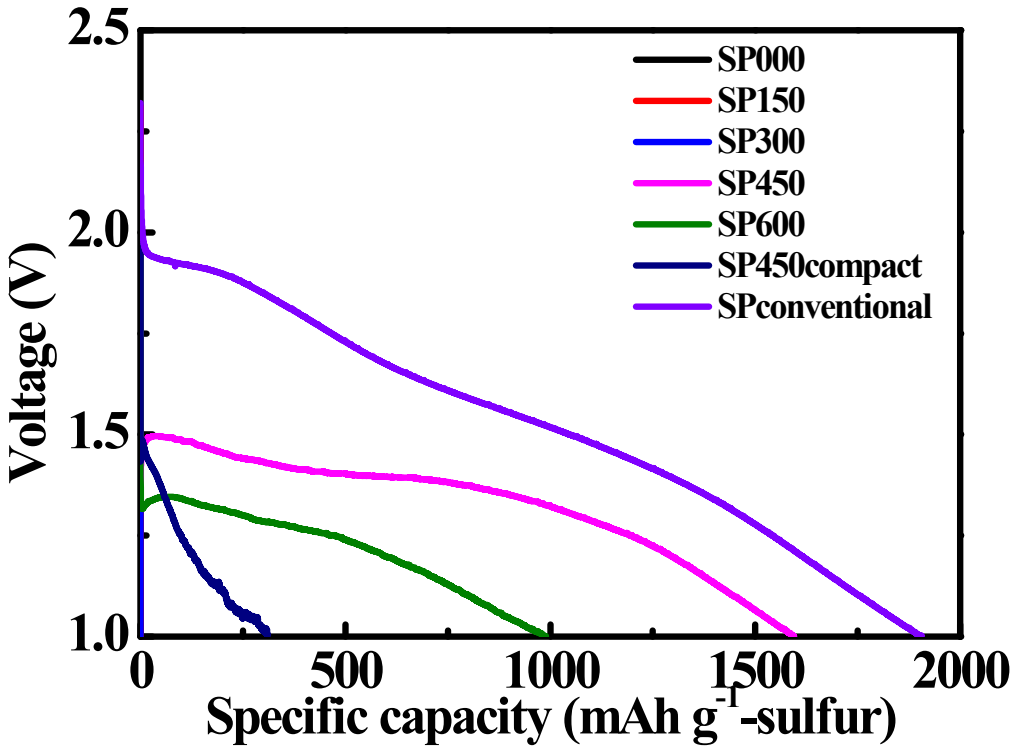


Fig. S3. Discharge–charge curves of various Li/SPAN cells at current density of 15 mA g^{-1}.

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Table S1. Components of Li/SPAN cells.

Sample name	Cathode				Current collector	Electrolyte	Separator	Anode	Capacity	Capacity	Capacity
	Active material (SP450)	Binder (β – cyclodextrin)	conducting agent (MWCNT)	Total cathode	Al foil	1 M $LiPF_6$ + EC/DEC	Celgard 2400	Lithium foil	Based on sulfur	Based on electrode without current collector	Based on electrode with current collector
SP450compact	24.1 mg	-	-	24.1 mg	-	30 mg	2.1 mg	12.6 mg	321 mAh g^{-1}	132 mAh g^{-1}	132 mAh g^{-1}
SP450conventional	0.776 mg	0.097 mg	0.097 mg	0.97 mg	3.83 mg	10 mg	2.1 mg	12.6 mg	1931 mAh g^{-1}	649 mAh g^{-1}	131 mAh g^{-1}
SP450	16.37 mg	-	-	16.37 mg	-	30 mg	2.1 mg	12.6 mg	1656 mAh g^{-1}	679 mAh g^{-1}	679 mAh g^{-1}

Table S2. Comparison of previous high loading sulfur with this report.

Sulfur loading mg cm^{-2}	**E/S ratio uL/mg**	**Reversible capacity mAh g^{-1}-sulfur (mAh cm^{-2})**	**Ref.**
10.2	20	600	1
8	15	1000 (8)	2
13.2	15	791 (7)	3
9.1	9	400	4
10	5.7	1000	5
13.5	3	600	6
6.87	3.7	1230	This work

E/S ratio: Electrolyte/sulfur ratio

Reference

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