

Supporting Information for

Covalently bonded sulfur anchored with thiol-
modified carbon nanotube as a cathode material for
lithium–sulfur batteries

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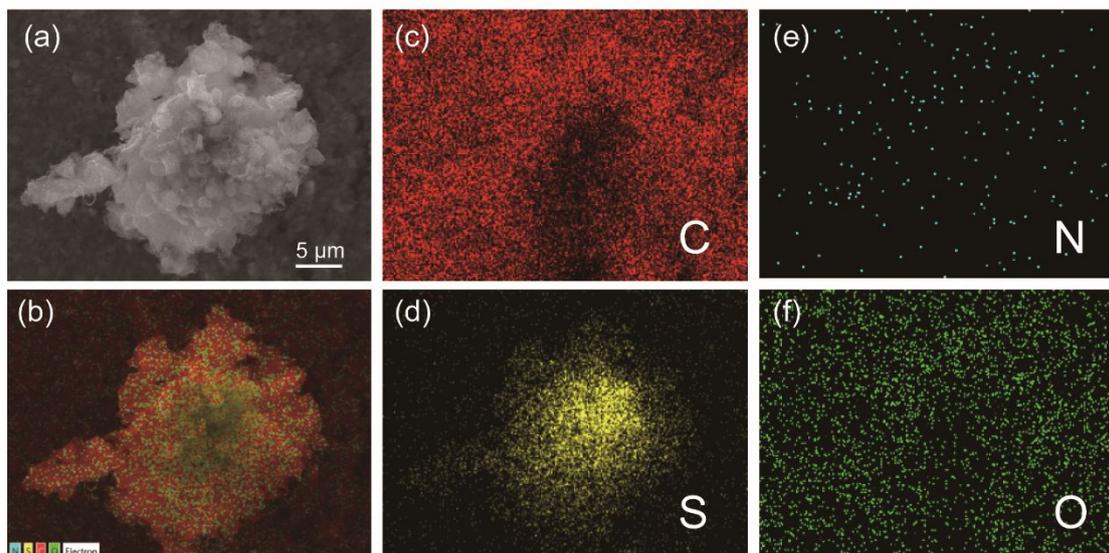


Figure S1 Characterization of the as-prepared CNTSH/S. (a) SEM images of CNTSH/S. Elemental mappings of (b) composite element, (c) C, (d) S, (e) N and (f) O.

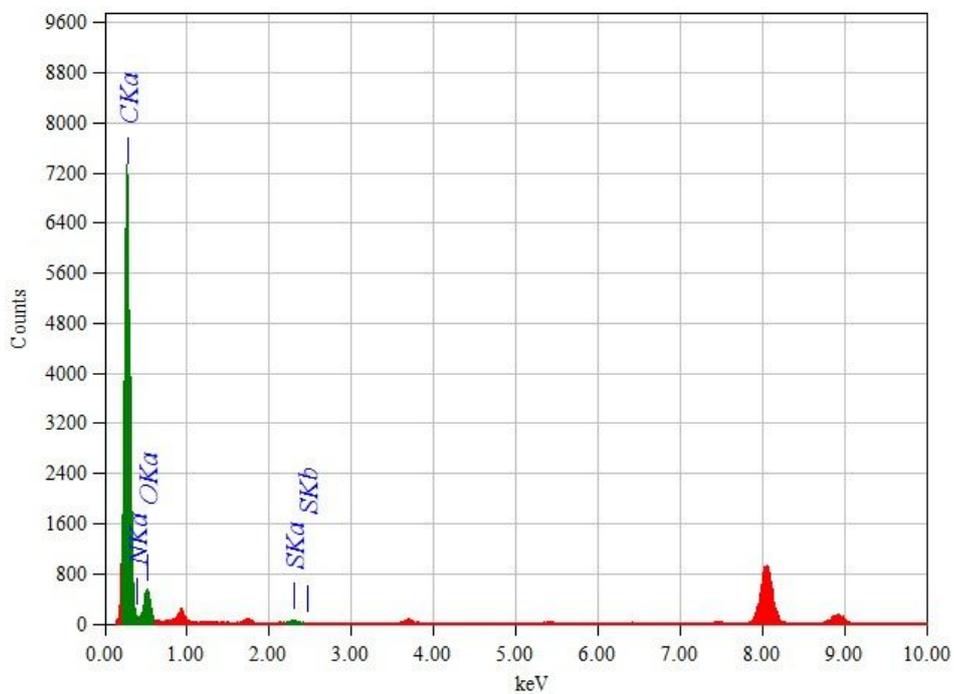


Figure S2 Energy dispersive spectroscopy result of the CNTSH

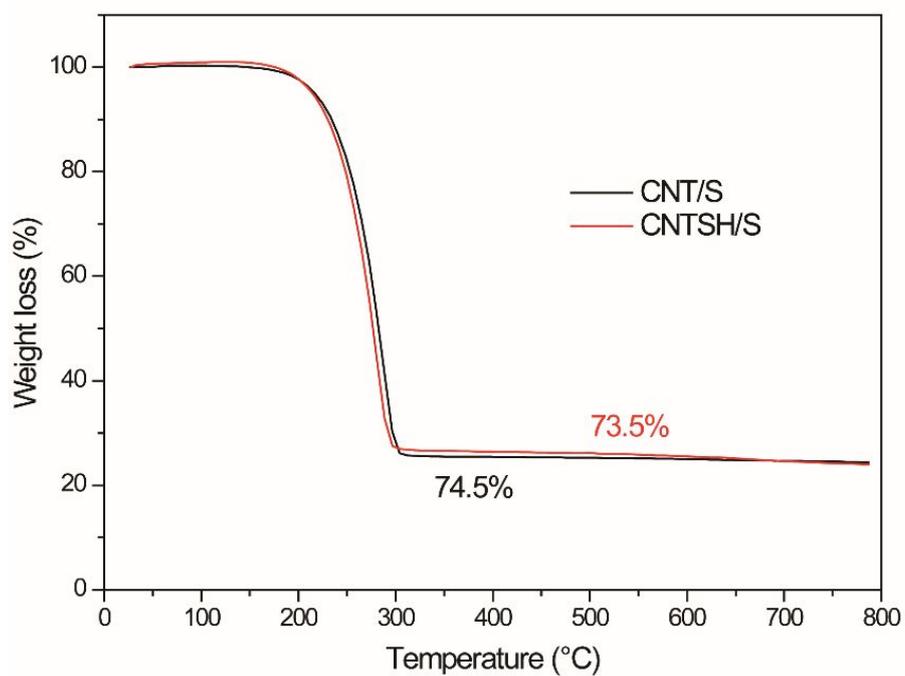


Figure S3 TG profiles of the as-prepared CNTSH/S and CNT/S composite.

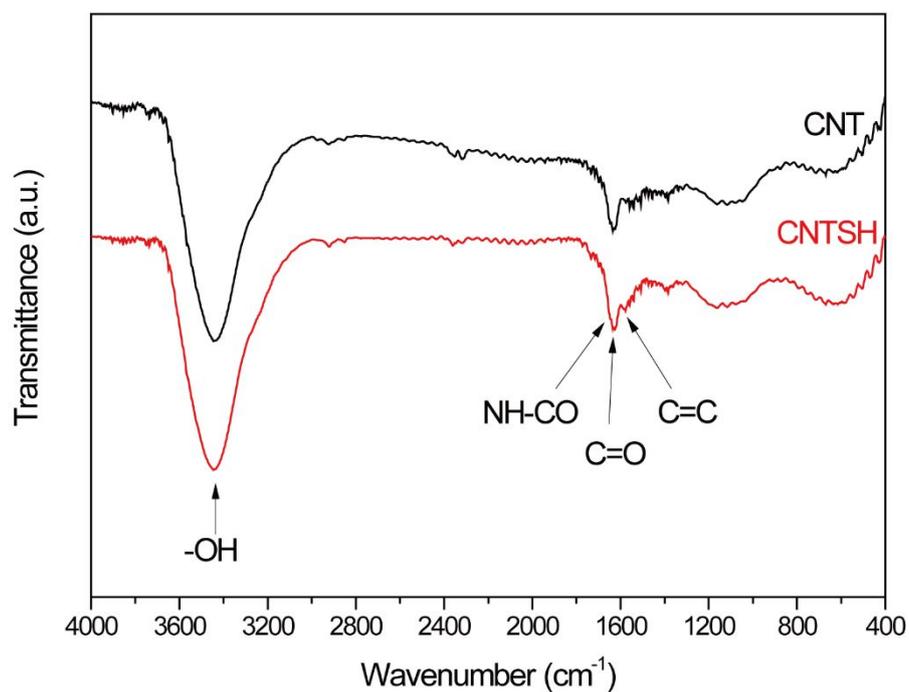


Figure S4 FTIR spectra for the CNTSH and CNT

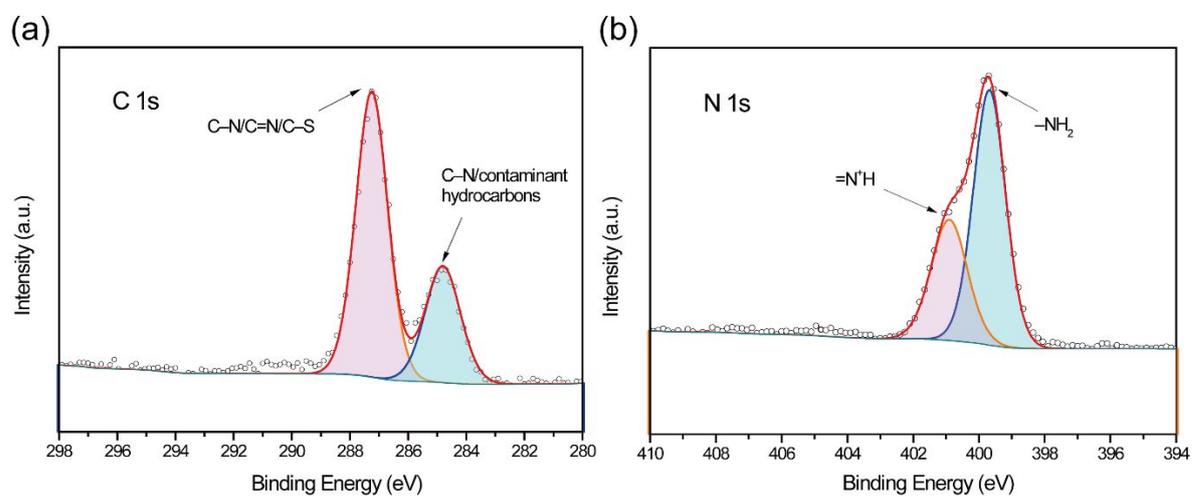


Figure S5 XPS spectra of 5-amino-1,3,4-thiadiazole-2-thiol: (a) C 1s region, (b) N 1s region

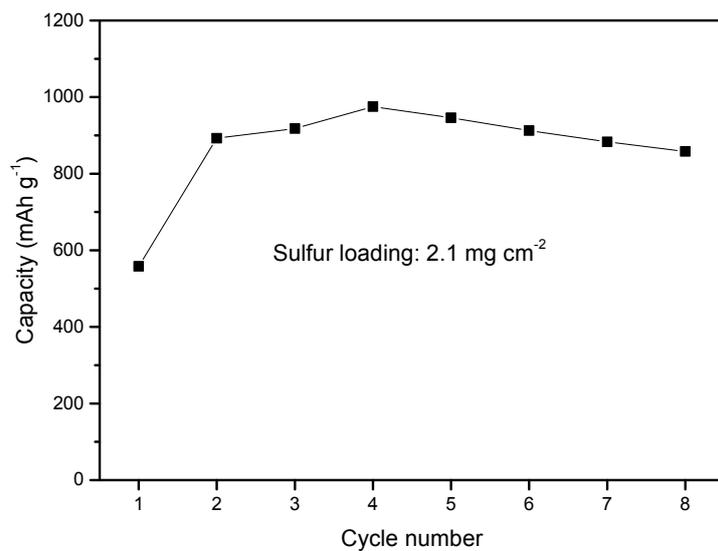


Figure S6 Electrochemical performance of the CNTSH/S cathode with sulfur loading of 2.1 mg cm⁻² at 0.1 C rate.

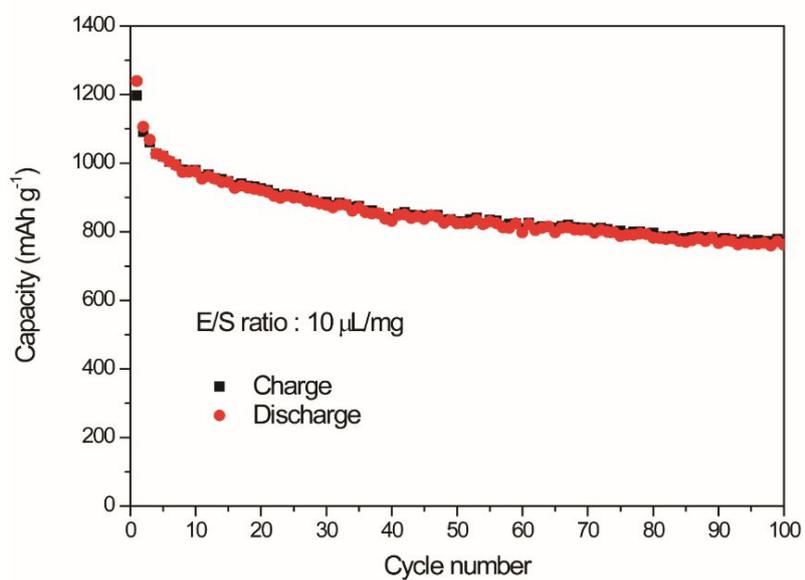


Figure S7 The cycling performance of the CNTSH/S electrode with low electrolyte/sulfur ratios (E/S) at 0.1 C rate

Table S1 Energy dispersive spectroscopy result of the CNTSH

Element	(keV)	Mass%	Counts	Sigma	Atom%
C K (Ref.)	0.277	94.28	66411.39	0.35	95.55
N K	0.392	2.20	2291.62	0.07	1.91
O K	0.525	3.16	4356.28	0.08	2.40
S K	2.307	0.36	444.02	0.04	0.14
Total		100.00			100.00

Table S2 The comparison of electrochemical performance between CNTSH/S cathode and related reported works.

Sample	Current density	Initial capacity	Cycle number	Capacity (final cycle)	Ref.
CNTSH/S	0.1 C	1337.6 mA h g ⁻¹	300	669.2 mA h g ⁻¹	This work
S/MWNT-OH25	–	1274 mA h g ⁻¹	100	721.0 mA h g ⁻¹	[1]
Sulfur electrode with MWNT	–	485 mA h g ⁻¹	50	300 mA h g ⁻¹	[2]
S@CNT-g-Gr	0.2 C	1200 mA h g ⁻¹	350	800 mA h g ⁻¹	[3]
S/CPS-70	0.5 C	950 mA h g ⁻¹	300	750 mA h g ⁻¹	[4]

S with CNTOH-coated separator	0.5 C	1056 mA h g ⁻¹	400	570 mA h g ⁻¹	[5]
EFG-S nanocomposite	0.5 C	812.5 mA h g ⁻¹	350	650 mA h g ⁻¹	[6]

Supplementary References

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