Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Supporting Information

A low cost ultra-microporous carbon scaffold with confined chain-like sulfur molecules as a superior cathode for lithium-sulfur batteries

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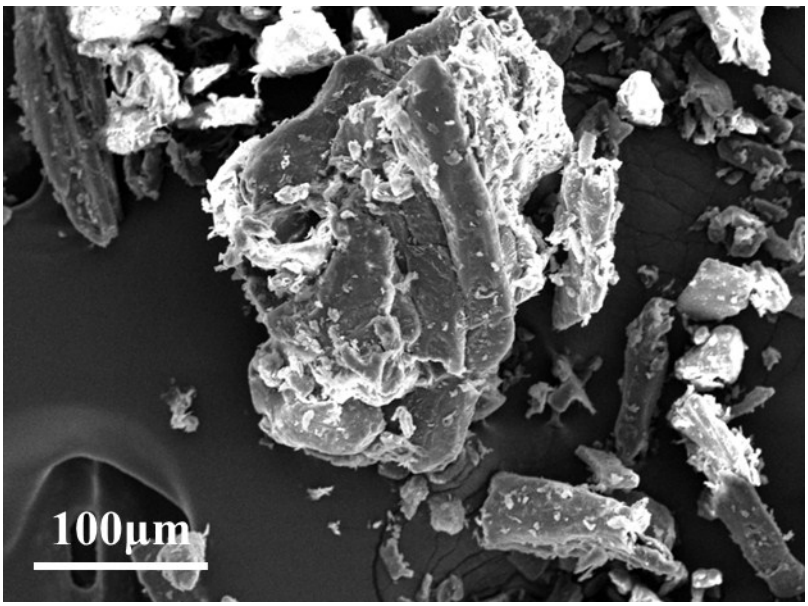

Fig. S1. SEM image of MNS powder

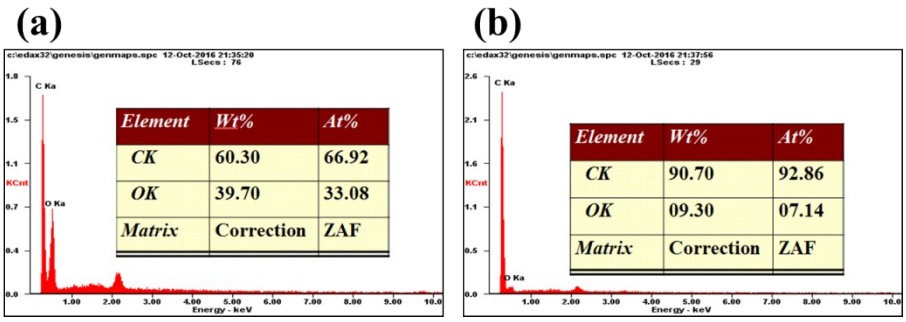

Fig. S2. Element analysis by EDS of (a): MNS, (b): *c*-MNS.

Table S1. Textural parameters of *c*-MNS and *c*-MNS/S composites

Sample	DFT total surface area (m^2g^{-1})	Total pore volume (cm^3g^{-1})	Micropore (< 2 nm) surface area (m^2g^{-1})	Micropore (<2 nm) pore volume (cm^3g^{-1})	Ultra-micropore (<0.6 nm) surface area (m^2g^{-1})	Ultra-micropore (<0.6 nm) pore volume (cm^3g^{-1})
c-MNS	1687	0.57	1604	0.46	1353	0.35
c-MNS/S25	186.4	0.14	73.2	0.067	9.23	0.01
c-MNS/S40	116	0.11	53.4	0.038	0	0
c-MNS/S60	114.82	0.08	7.93	0.037	0	0

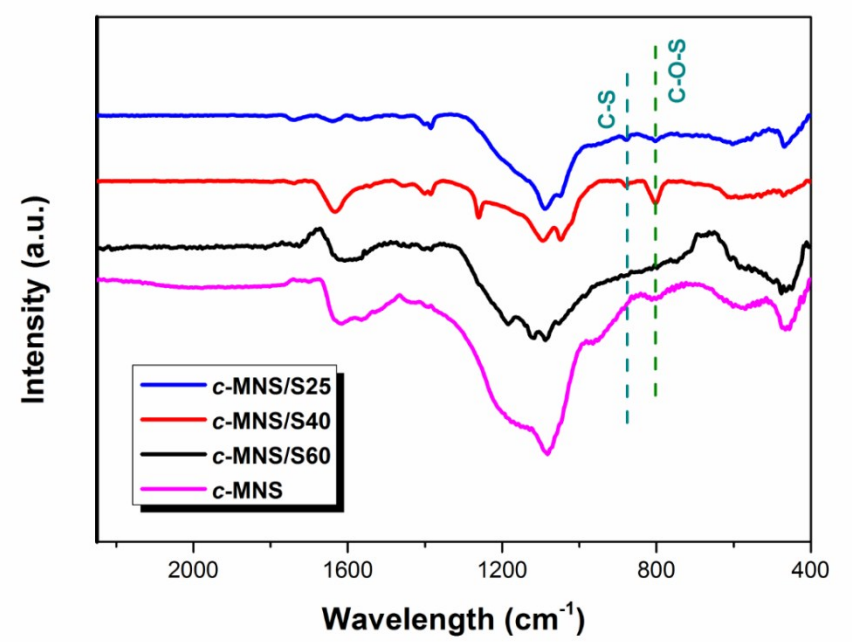

Fig. S3. FT-IR spectra of *c*-MNS and *c*-MNS/S composites

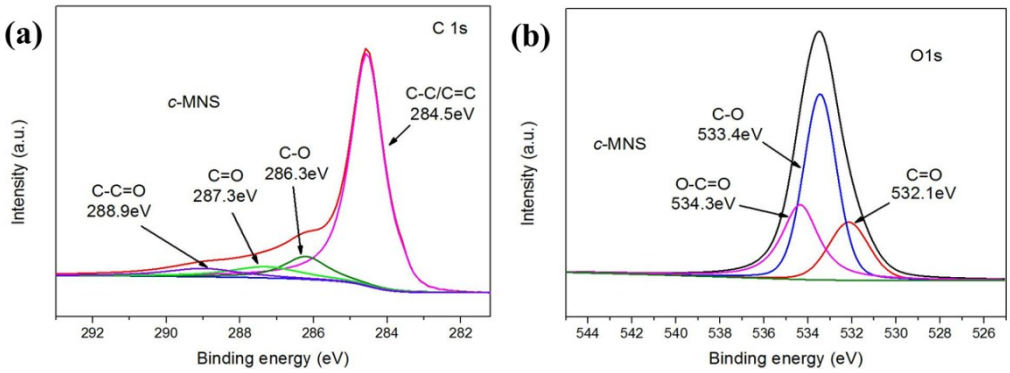

Fig. S4. XPS spectra of the *c*-MNS: (a) C 1s, (b) O 1s

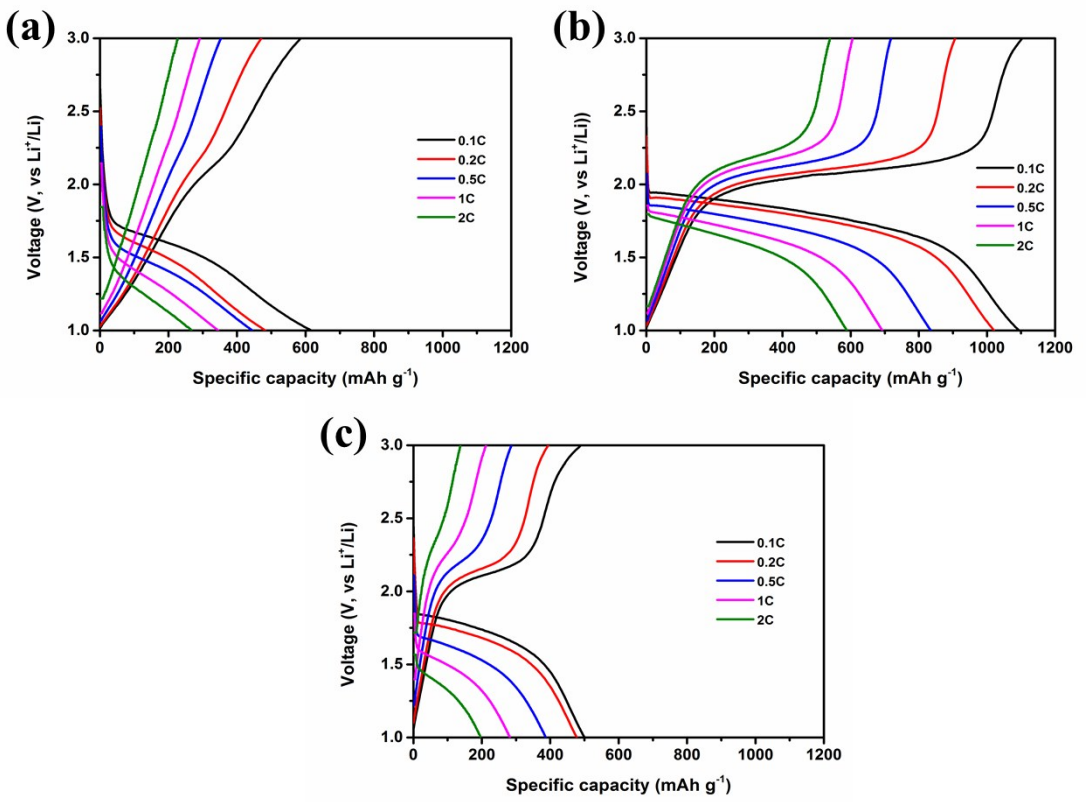

Fig. S5. Charging-discharging profiles of the composite electrodes in various current rates: (a) *c*-MNS/S25, (b) *c*-MNS/S40, (c) *c*-MNS/S60,

Table S2. Textural parameters and electrochemical performance comparisons of biomass derived carbonaceous hosts reported previously with this work.

Carbon materials	**Surface area (m^2g^{-1})**	**Pore volume (cm^3g^{-1})**	**Average pore size (nm)**	**Sulfur Content (wt%)**	**Rate**	**Initial capacity (mAh g^{-1})**	**Cycle capacity (mAh g^{-1})**	**Ref**
Bamboo	791.8	0.38	0.6-0.75	50	160 mA g^{-1}	1295 (1^{st})	756 (50^{th})	S1
Shrimp shell	1917	0.88	5.12	63	500 mA g^{-1}	~560 (1^{st})	~380 (100^{th})	S2
Wheat straw	1066	0.62	2.33	74	0.1C	1213 (1^{st})	870 (100^{th})	S3
Olive stones	587	0.33	1.5-3	80	100 mA g^{-1}	930 (1^{st})	670 (50^{th})	25
Starch	949.85	3.14	20-30	81	0.5C	922 (1^{st})	683 (100^{th})	S4
Coir pith	1952	0.86	0.7	50	0.1C	1350 (1^{st})	695 (50^{th})	22
Silk cocoon	3234	2.1	2.6	48	0.5C	1443 (1^{st})	886 (50^{th})	18
c-MNS	1687	0.57	0.52	41	0.1C	1254(2^{nd})	998 (100^{th})	This work

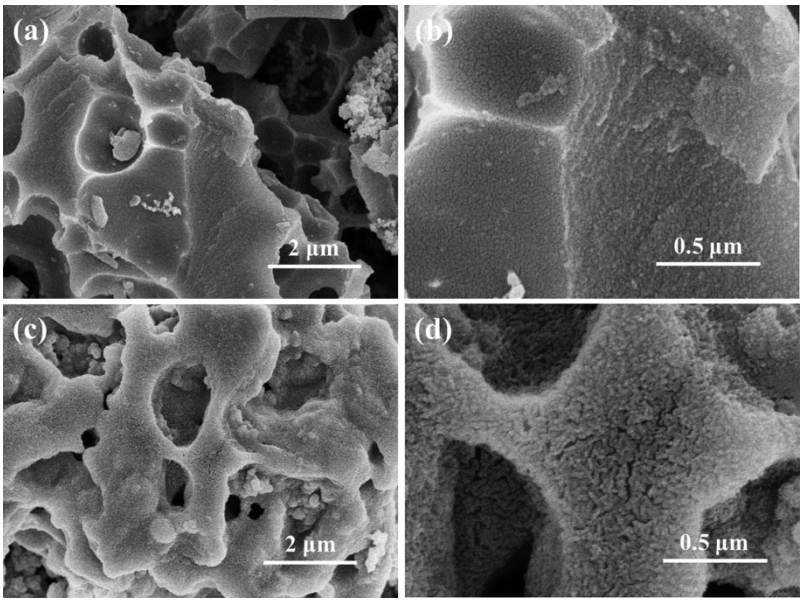

Fig. S6. SEM images of *c*-MNS/S40 cathode before (a, b) and after (c, d) 100 discharge-charge cycles at 0.1C with different magnifications.

References

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