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Support information

Conductive Molybdenum Carbide as the Polysulfide Reservoir for Lithium Sulfur Batteries

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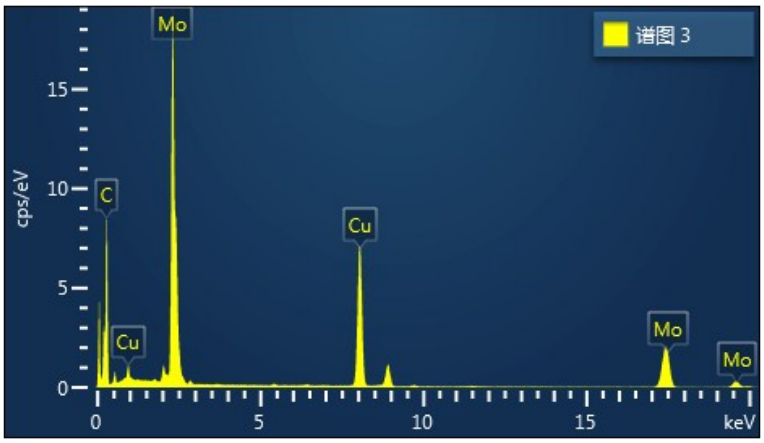

Fig. S1 EDS result of Mo_2C nanosheets.

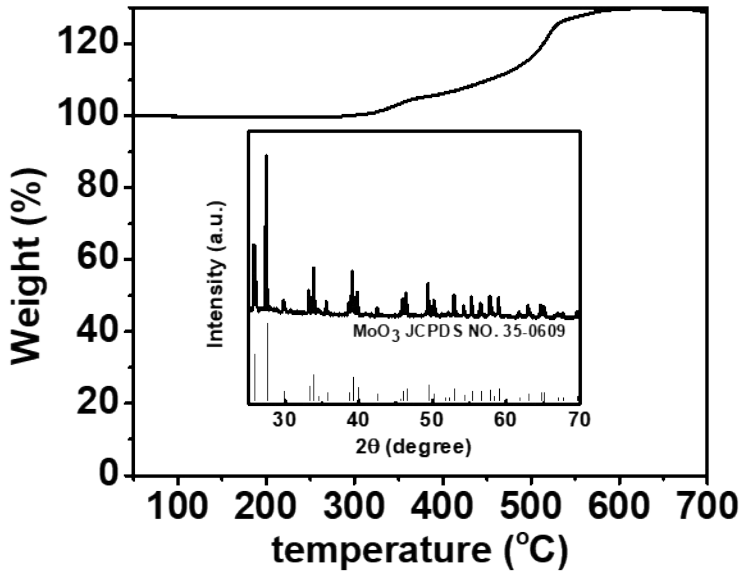

Fig. S2 TGA curves of Mo_2C in air atmosphere with a heating rate of 10 ^{o}C min^{-1} and XRD pattern of MoO_3.

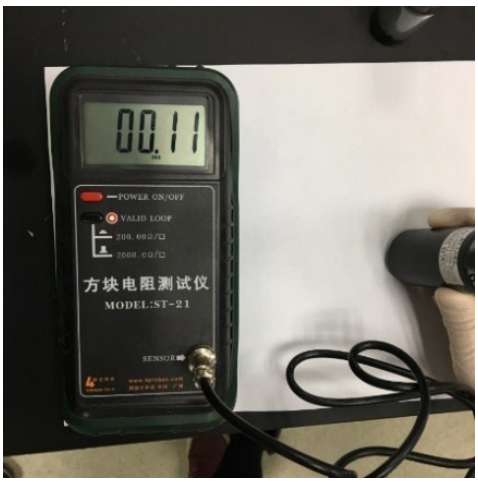

Fig. S3 A custom-built 4-point probe measurement of the electronic conductivity for Mo_2C.

The sheet resistance (Rs) of the Mo_2C sample is 0.11Ω/□, which tested by the four-point probe technique at room temperature. The thickness (t) of the Mo_2C sample determined by a micrometer is 3 mm. The electronic conductivity (C) of the sample is calculated by the following formula:

$$C = \frac{1}{Rs \times t \times 10^{-3}} = \frac{1}{0.11 \times 3 \times 10^{-3}} = 3 \times 10^{3} \ \text{S m}^{-1}$$

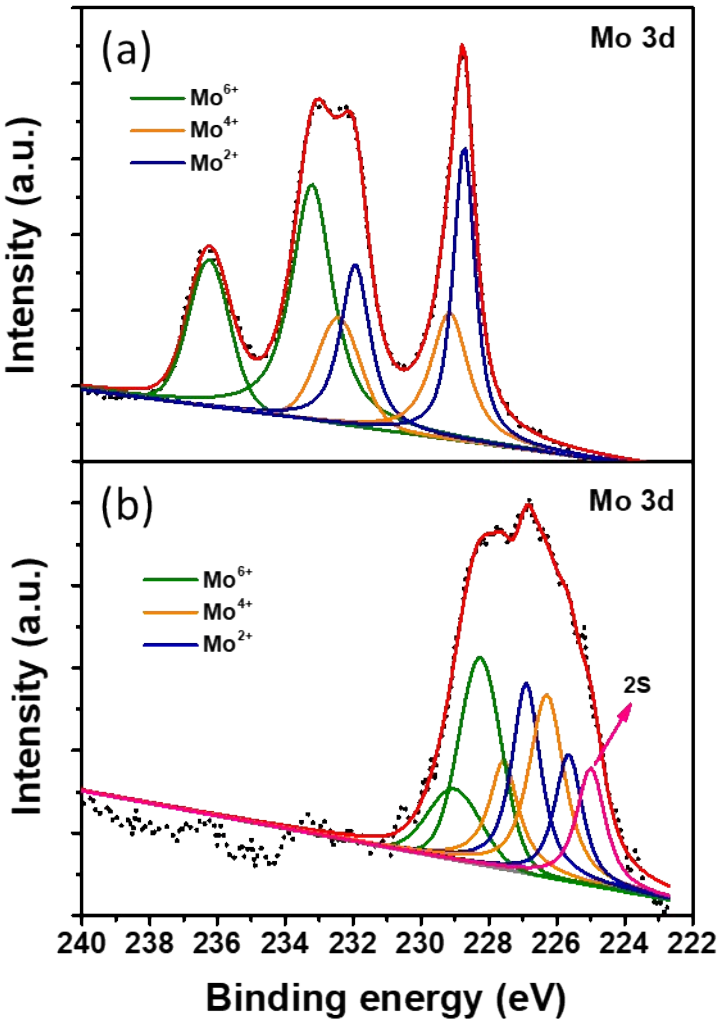

Fig. S4 Comparison of XPS spectra of element Mo in (a) pure Mo_2C and (b) Mo_2C /Li_2S_6 composites.

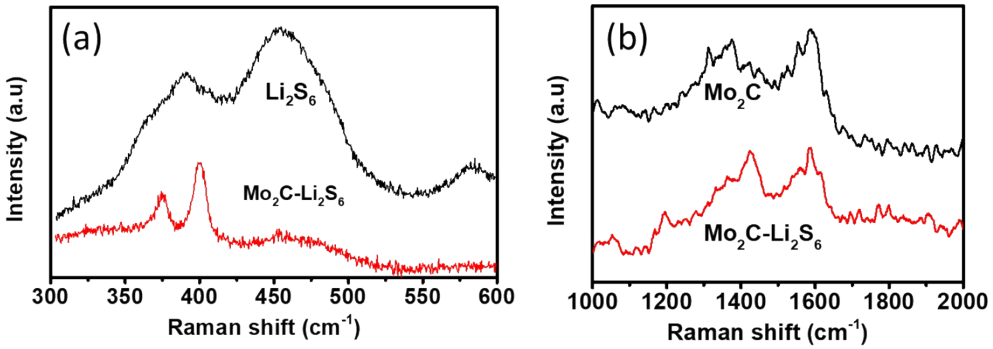

Fig. S5 Raman spectra of representative (a) Li_2S_6 and Mo_2C / Li_2S_6, (b) Mo_2C and Mo_2C/Li_2S_6 to highlight the interaction.

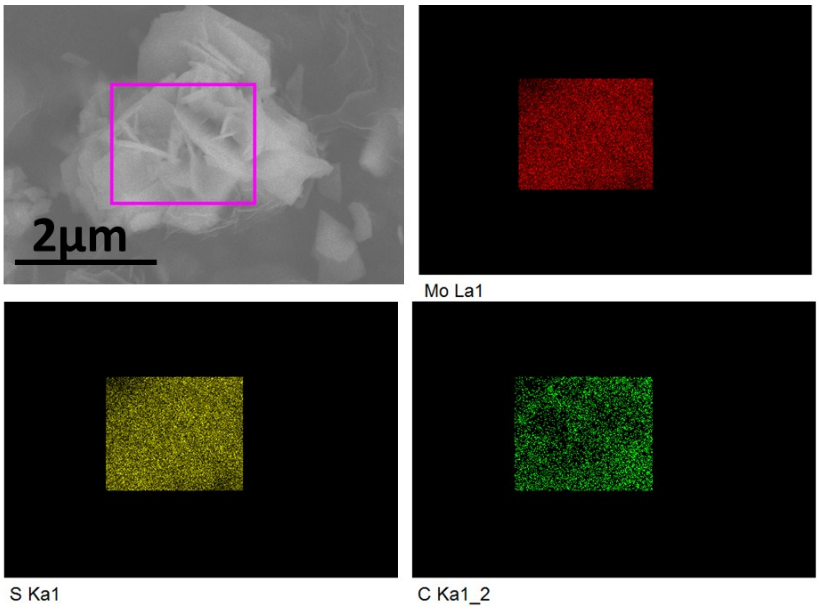

Fig. S6 SEM image and corresponding EDX elemental mappings of Mo, S and C elements in the S@Mo_2C composite.

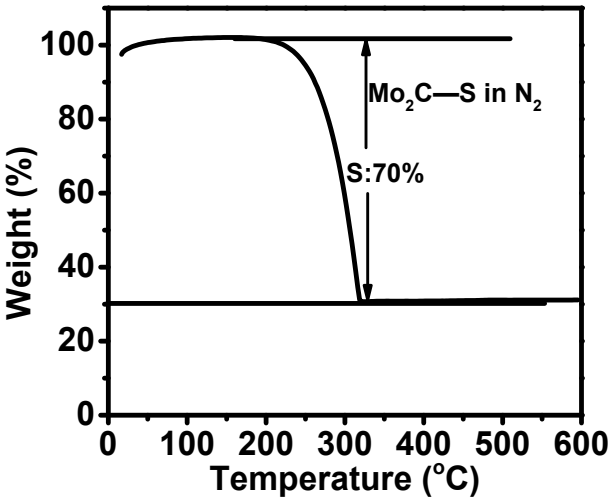

Fig. S7 TGA curves of S@Mo_2C in N_2 atmosphere with a heating rate of 10 °C min^{-1}.

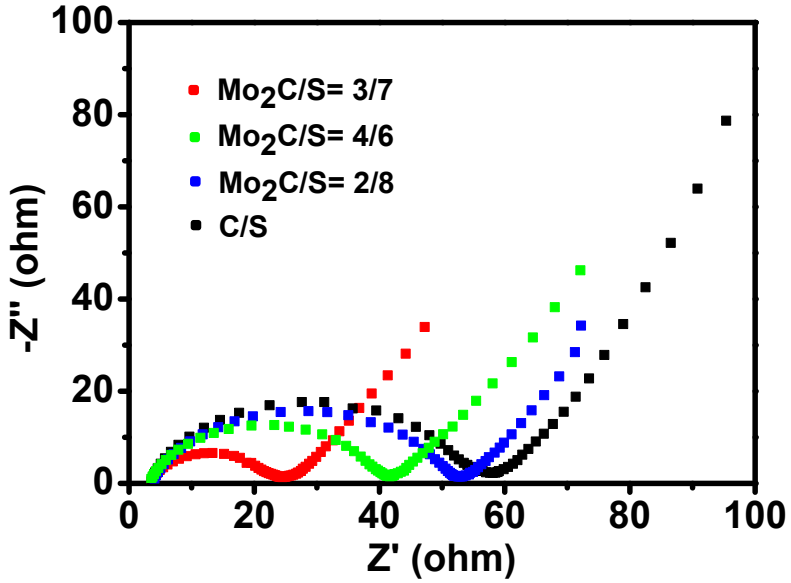

Fig. S8 Electrochemical impedance spectroscopy of 2Mo2C/8S, 3Mo2C/7S, 4Mo2C/6S and C/S electrode.

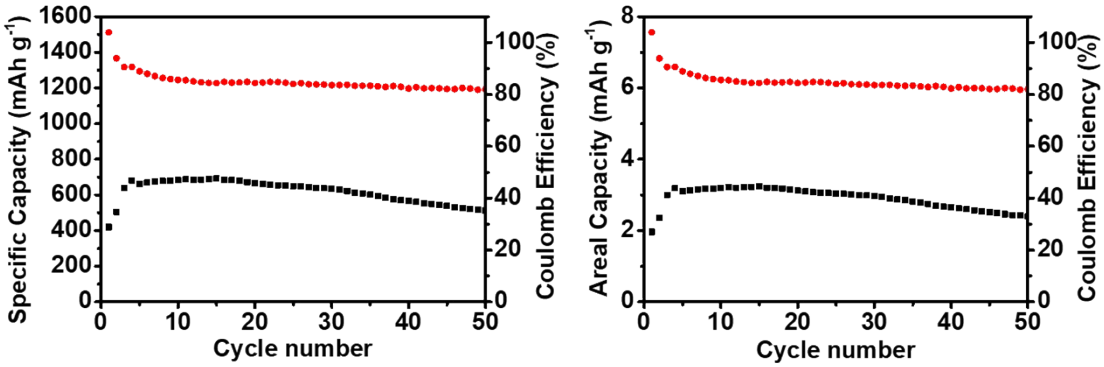

Fig. S9 (a) Specific capacity and (b) Areal capacity of Mo_2C at 0.1 C with a high sulfur loadings of 4.68 mg cm^{-2}.

Table S1. Electrical conductivity of different sulfur host materials.

Materials	TiO_2	Nb_2O_5	XC-72 carbon	TiN	This work
Conductivity （× S cm^{-1}）	10^{-10}	10^{-6}	1.5	46	30