Support Information

Chinese Hydrangea Lantern-like Co_9S_8@MoS_2 Composites with Enhanced Lithium ion Battery Properties

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Synthesis of pure Co_9S_8 Spheres

1 mmol $CoCO_3$ was dispersed in 20 mL EA by ultrasound for 30 min to form a pink solution. Then 1.5 mmol TAA were added to the above solution under magnetic stirring to form homogeneous solution, at the same time, 10 mL DMF and 3 mL NaOH solution (0.02 mol L^{-1}) were added and vigorously stirred for 30 min. The mixture solution was transferred into a 50 mL Teflon-lined stainless steel autoclave and heated in an oven at 160 ℃ for 24 h. After cooling to room temperature, black precipitate was collected by centrifugation and washed with DI and ethanol there time, respectively, and then dried at 60 ℃ for 12 h.

Synthesis of pure MoS_2

1 mmol $Na_2MoO_4{\cdot}2H_2O$ and 2 mmol TAA were added to the above solution under magnetic stirring to form homogeneous solution, at the same time, 10 mL DMF

and 3 mL NaOH solution (0.02 mol L^{-1}) were added and vigorously stirred for 30 min. The mixture solution was transferred into a 50 mL Teflon-lined stainless steel autoclave and heated in an oven at 160 ℃ for 24 h. After cooling to room temperature, black precipitate was collected by centrifugation and washed with DI and ethanol there time, respectively, and then dried at 60 ℃ for 12 h.

Contents

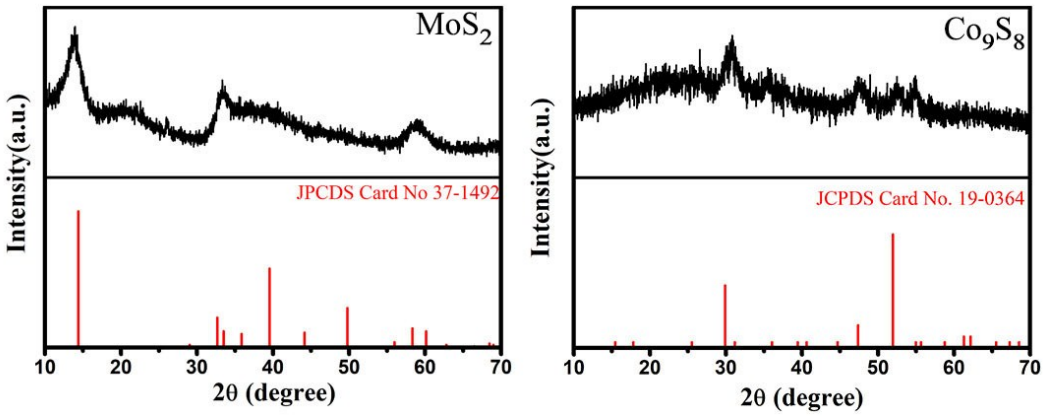

Figure S1. The XRD curves of pure Co_9S_8 and pure MoS_2.

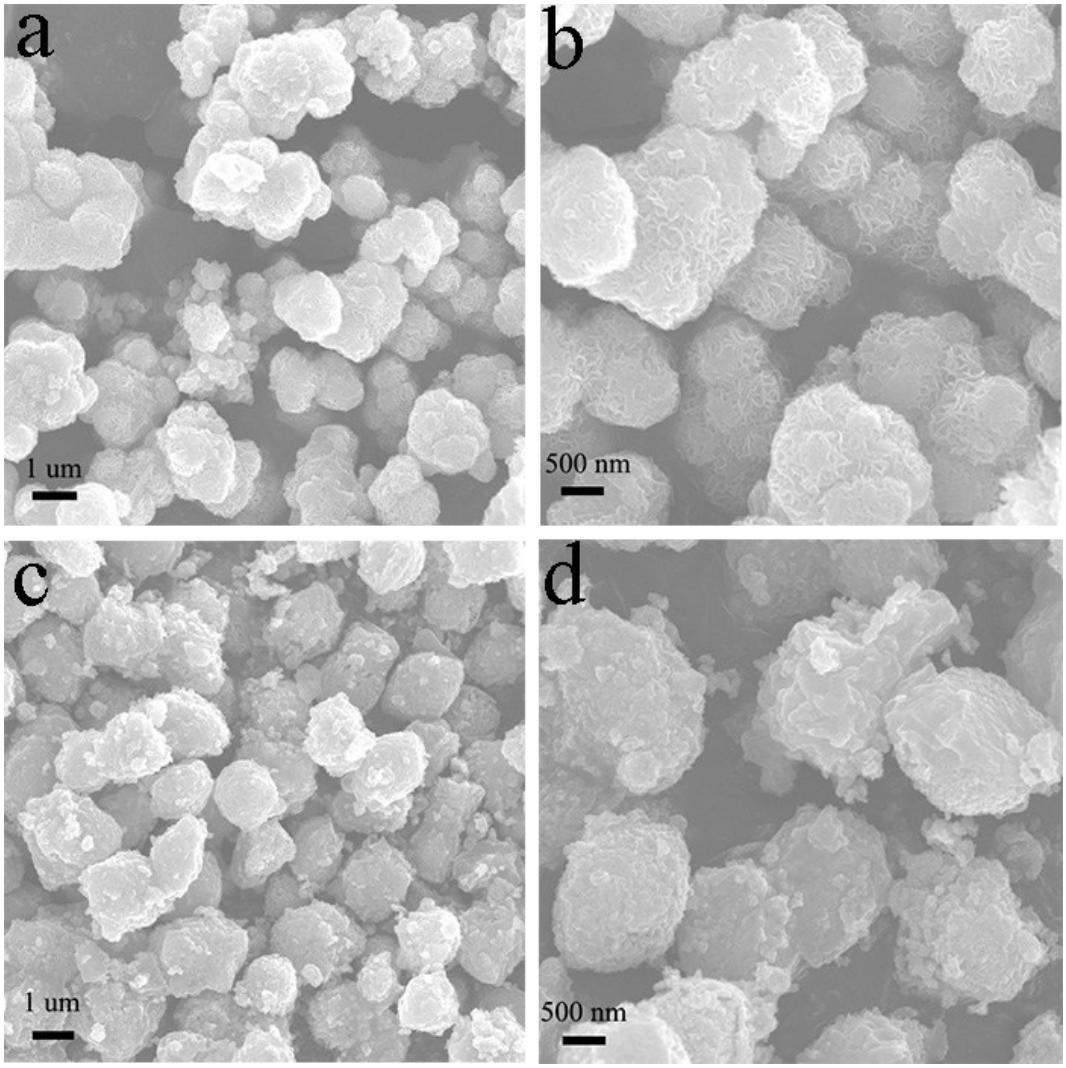

Figure S2. Different magnification FESEM images (a, b) pure MoS_2, (c, d) pure Co_9S_8.

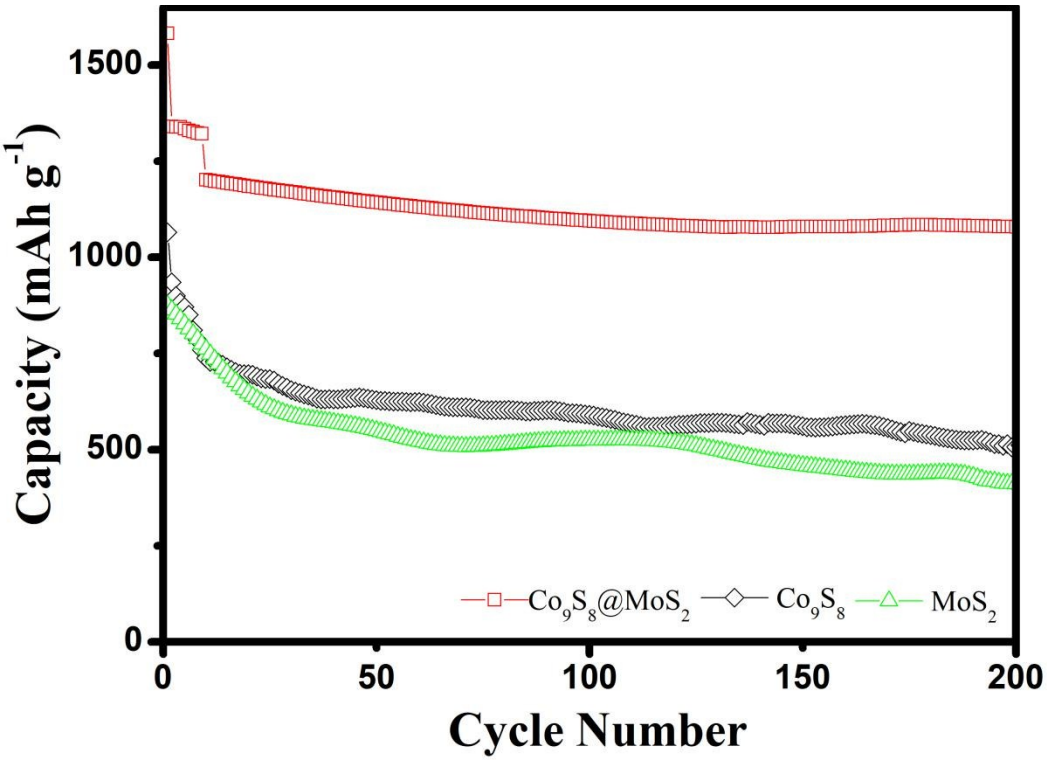

Figure S3. The discharge capacity of pure Co_9S_8, pure MoS_2 and Co_9S_8@MoS_2 at current density of 1.0 A g^{-1}

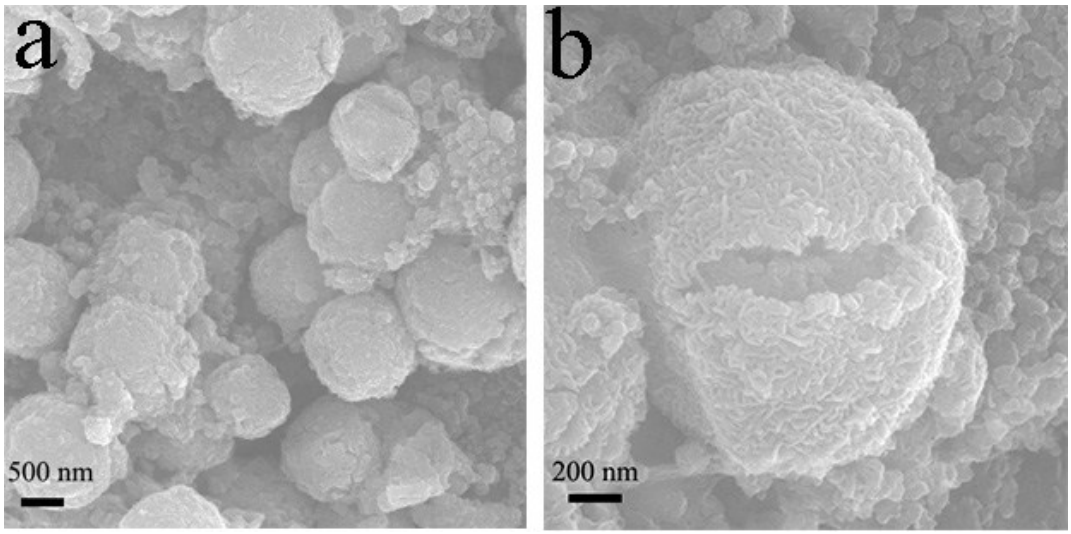

Figure S4. The FESEM image of Co_9S_8@MoS_2 at different magnification after 300 cycles.

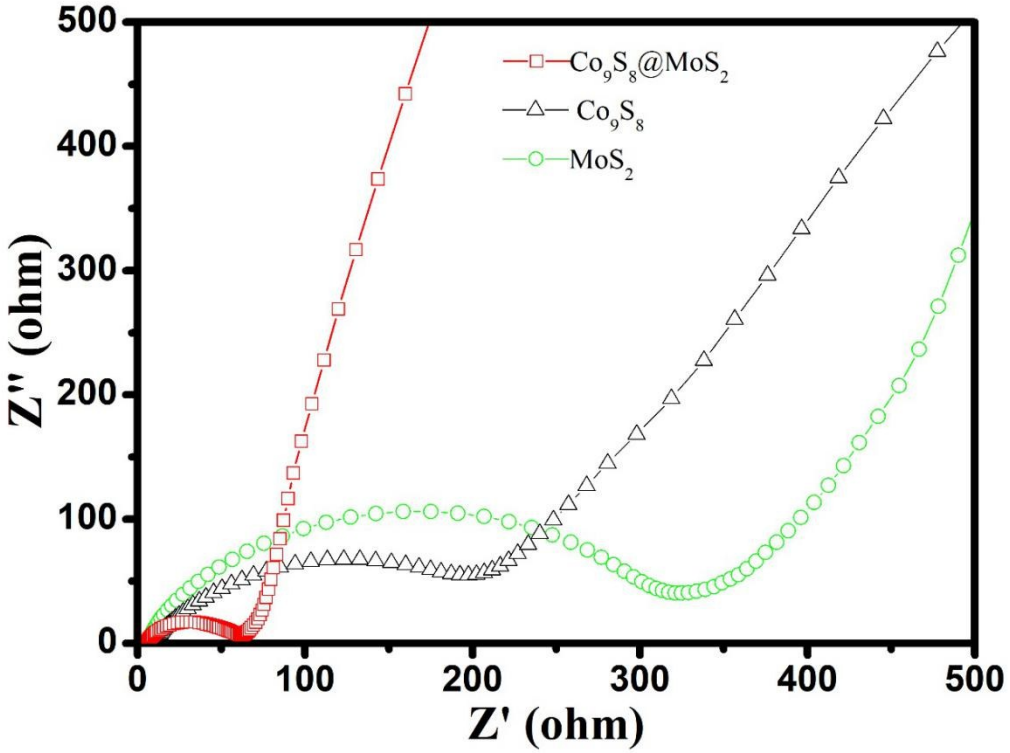

Figure S5. Nyquist plots of the AC impedance spectra for pure Co_9S_8, MoS_2 and $Co_9S_8@MoS_2$

Element	Weight/%	Atomic/%
S	40.51	59.99
Co	20.55	18.04
Mo	38.94	21.97
Aggregate	100	100

Table S1. The EDS results of $Co_9S_8@MoS_2$.