

Supporting Information

3D carbon-coated stannous sulfide-molybdenum disulfide composite as anode for high-performance lithium-ion batteries

Yuanyi Luo^{a#}, Chunxia Chen^{a#}, Weicheng Sun^a, Ludi Shi^a, Yemao Lin^a, Guangtao Cong^{*a}, Jiali Yu^a, Caizhen Zhu^{*a}, Jian Xu^a

^aInstitute of Low-dimensional Materials Genome Initiative, College of Chemistry and Environmental Engineering, Shenzhen University, Shenzhen, Guangdong, 518060, P. R. China.

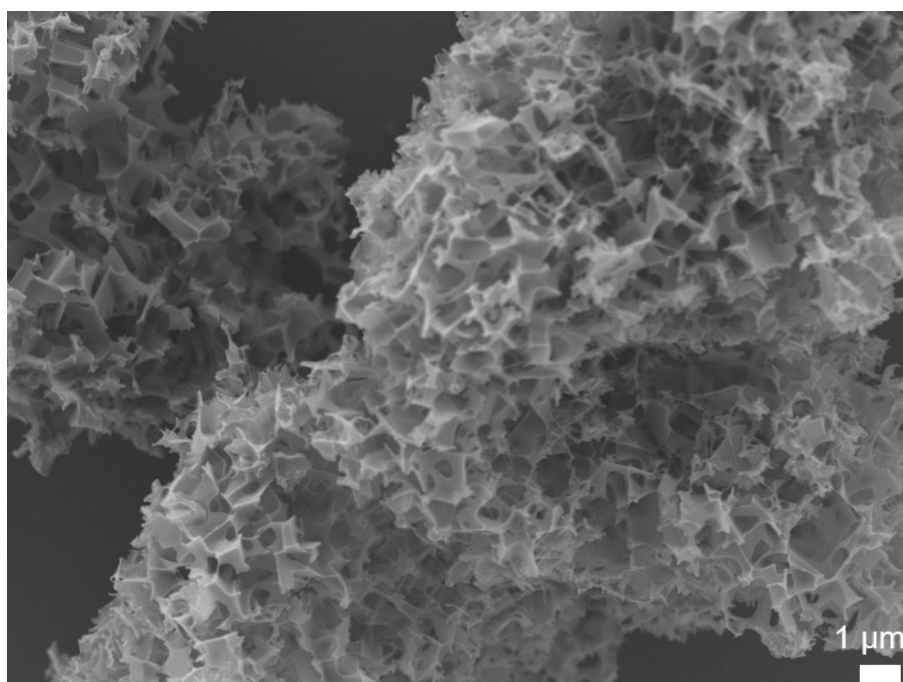


Fig. S1. FESEM images of the as-prepared 3D SnS @C.

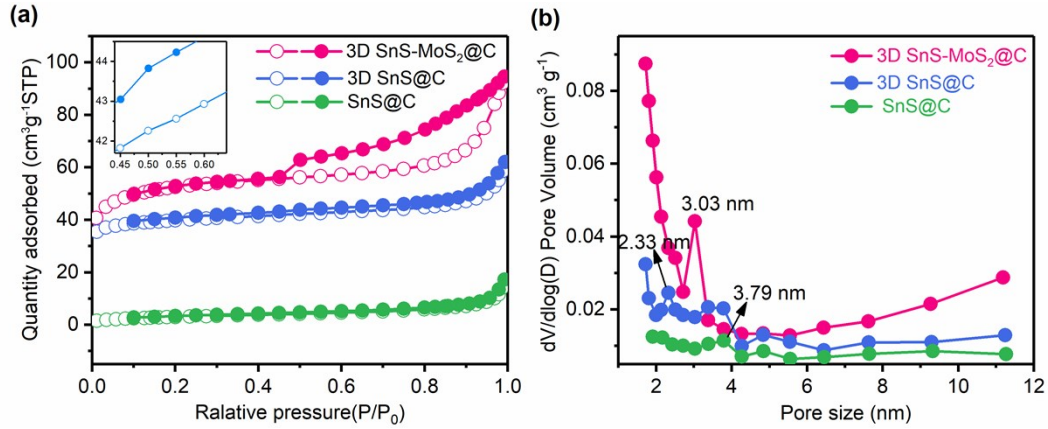


Fig. S2. The nitrogen adsorption/desorption isotherm plots (a) and pore size distribution (b) of 3D SnS-MoS₂@C, 3D SnS@C, and SnS@C. The nitrogen adsorption/desorption isotherm plot of 3D SnS@C also exhibits a minor hysteresis loop, and inset shows the enlarged area of the ending parts of the hysteresis loop of 3D SnS@C. The discrepancy in the nitrogen adsorption/desorption isotherm plots of 3D SnS-MoS₂@C, 3D SnS@C might be ascribed to the difference in their chemical compositions and fine structures of pore boundaries.

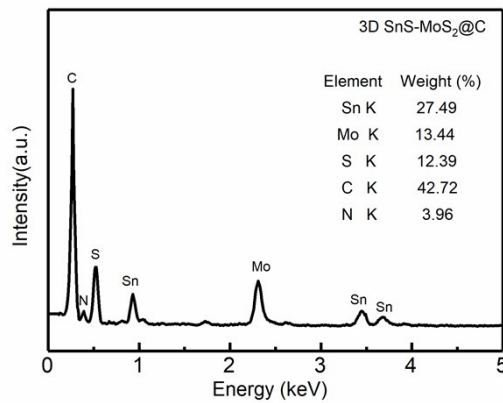


Fig. S3. EDS analysis of the elemental composition of 3D SnS-MoS₂@C.

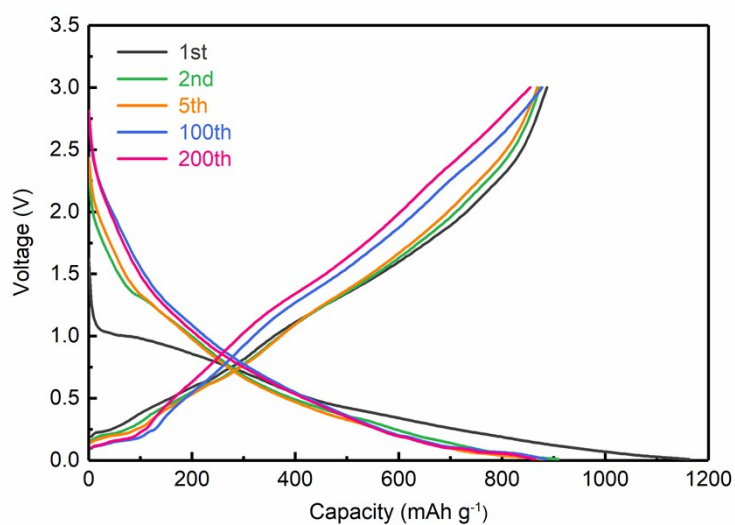


Fig. S4. Charge/discharge curves of 3D SnS-MoS₂@C cycling in the voltage range of 0.01–3.0 V at a current density of 200 mA g⁻¹.

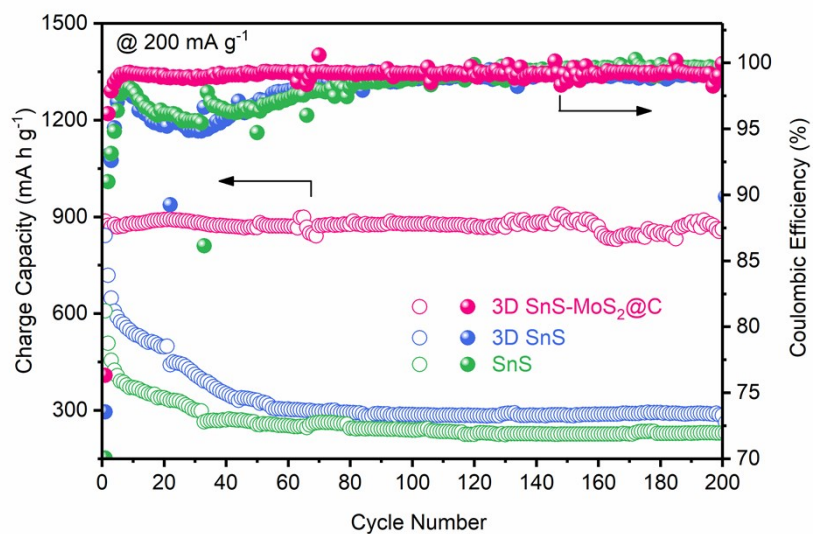


Fig. S5. Cycling performances of 3D SnS-MoS₂@C, 3D SnS@C and SnS@C composite at 200 mA g⁻¹ for the first 200 cycles.

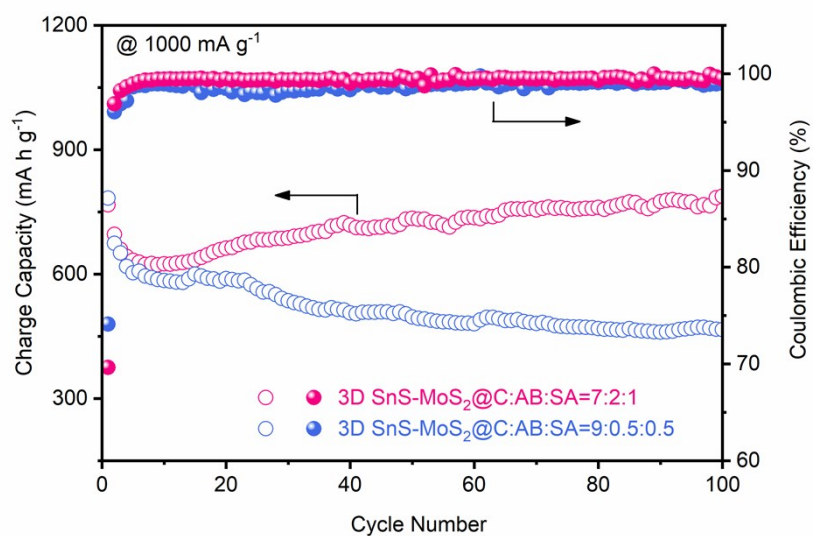


Fig. S6. Galvanostatic cycling of the 3D SnS-MoS₂@C electrodes with 70 wt% and 90 wt% weight ratio of 3D SnS-MoS₂@C.

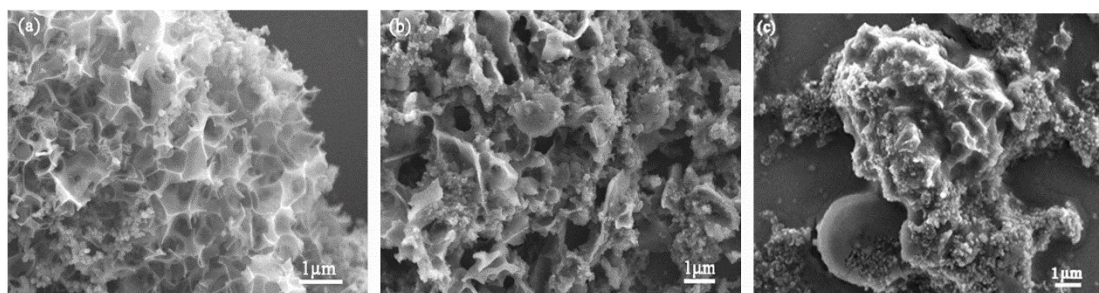


Fig. S7. FESEM images of the 3D SnS-MoS₂@C (a), 3D SnS@C (b) and SnS@C (c) electrodes after 50 cycles at 1000 mA g⁻¹.

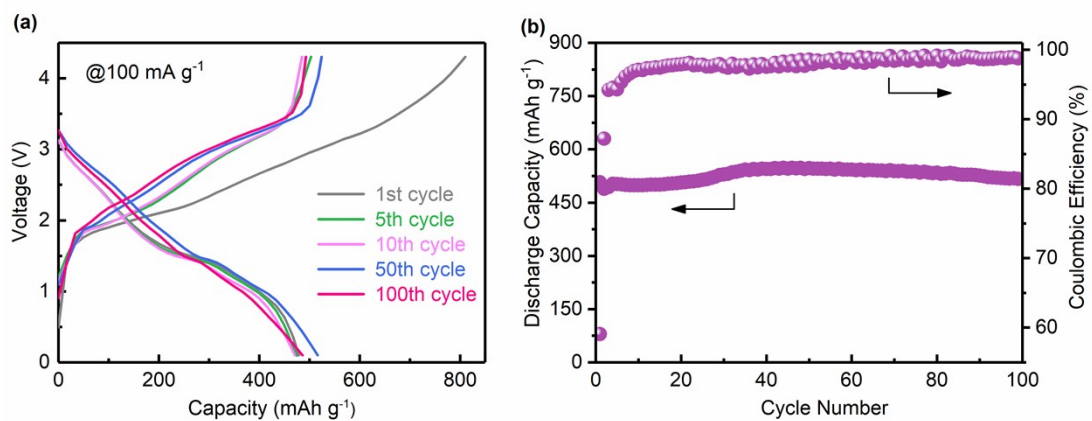


Fig. S8. Voltage profiles (a) and corresponding discharge capacities/CEs (b) of the galvanostatic cycling tests of the full cell with 3D SnS-MoS₂@C anode and LiFePO₄ cathode at 100 mA g⁻¹.



Fig. S9. Digital photo of the LED fan powered by three 3D SnS-MoS₂/LiFePO₄ full cells connected in series.

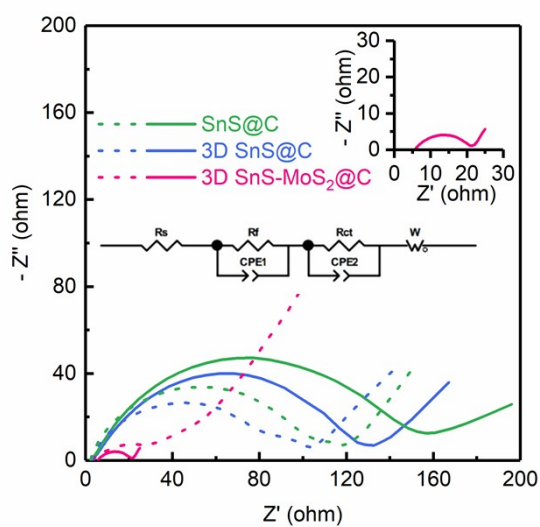


Fig. S10. Nyquist plots of the 3D SnS-MoS₂@C, 3D SnS@C, and SnS@C electrodes after 50 cycles at a current density of 100 mA g⁻¹. Dotted lines and solid lines represent the Nyquist plots of each electrode before cycling and after 50 cycles respectively.

Table 1. EIS fitting of 3D SnS-MoS₂@C, 3D SnS@C, and SnS@C electrodes after 50 cycles.

Sample after 50 cycles	R _s (Ω)	R _f (Ω)	R _{ct} (Ω)	W(Ω)
3D SnS-MoS ₂ @C	5.819	0.717	13.7	4.29
3D SnS@C	3.615	19.74	97.26	27.08
SnS@C	3.013	41.67	119.5	299.9