

A high-sulfur-loading freestanding SPANI/MWCNT electrode for high-performance lithium-sulfur batteries

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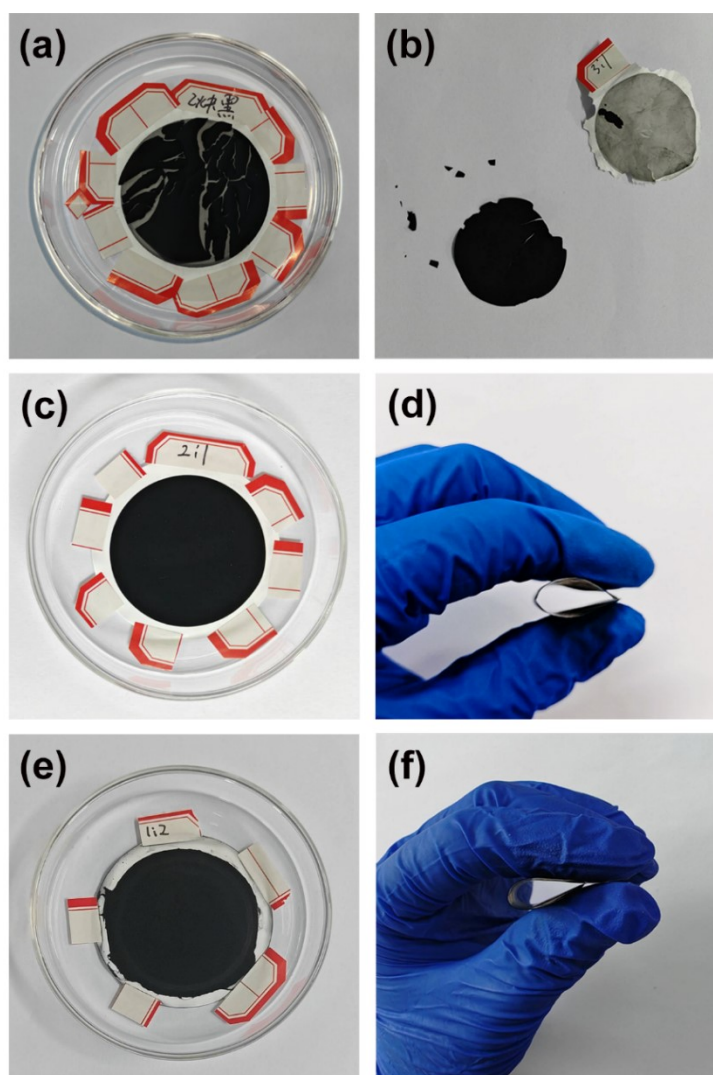


Fig. S1 Optical images of various freestanding electrodes: (a) SPANI/acetylene black (1:1), (b) SPANI/MWCNT (3:1), (c) and (d) SPANI/MWCNT (2:1), and (e) and (f) SPANI/MWCNT (1:2).

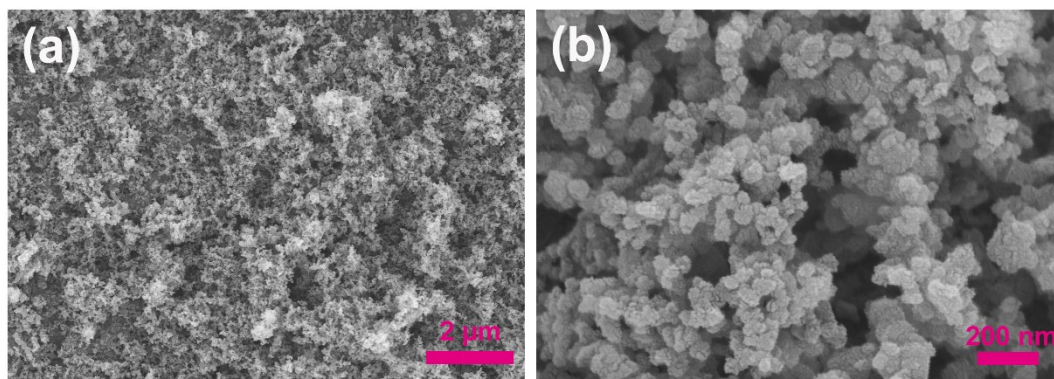


Fig. S2 SEM images of acetylene black at different magnifications.

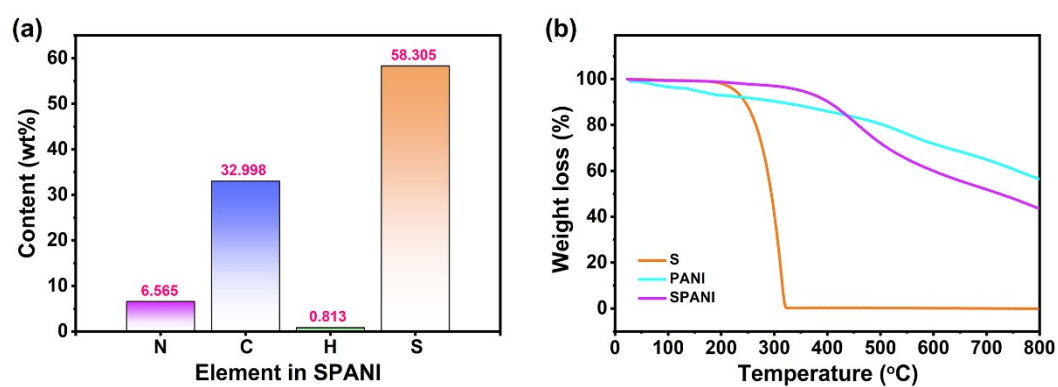


Fig. S3 (a) Elemental analysis (EA) of SPANI. (b) Thermogravimetric analysis (TGA) of S, PANI, and SPANI.

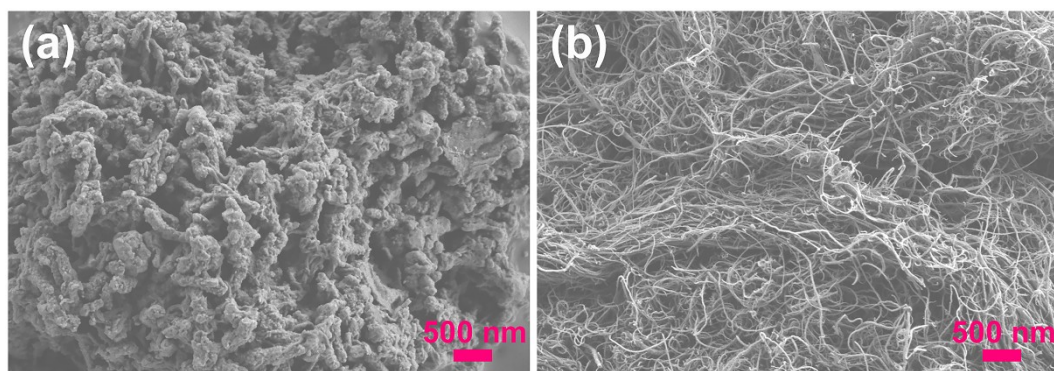


Fig. S4 SEM images of (a) SPANI and (b) MWCNT at a large magnification.

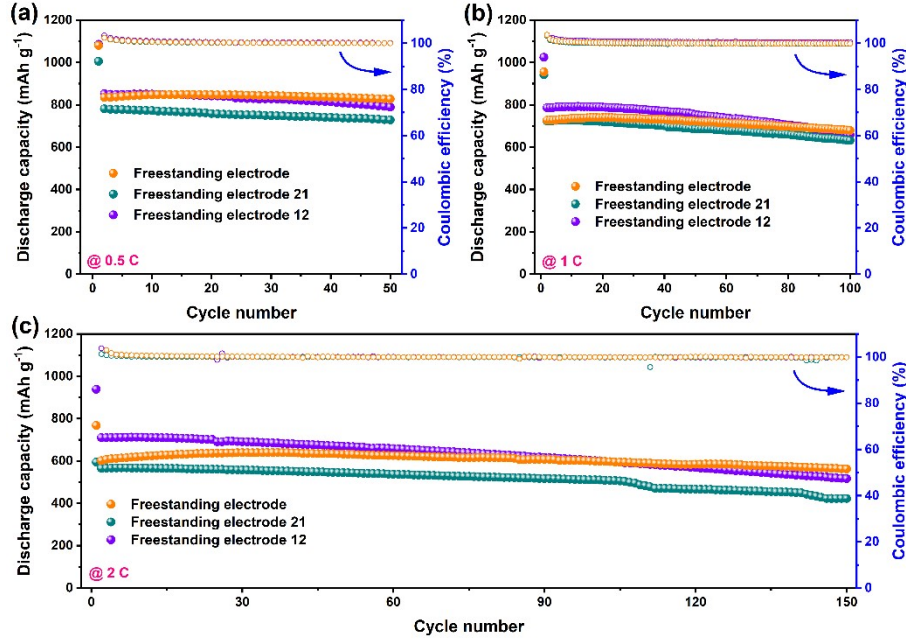


Fig. S5 Cycle performances of the freestanding electrode (SPANI/MWCNT=1:1), the freestanding electrode 21 (SPANI/MWCNT=2:1), and the freestanding electrode 12 (SPANI/MWCNT=1:2).

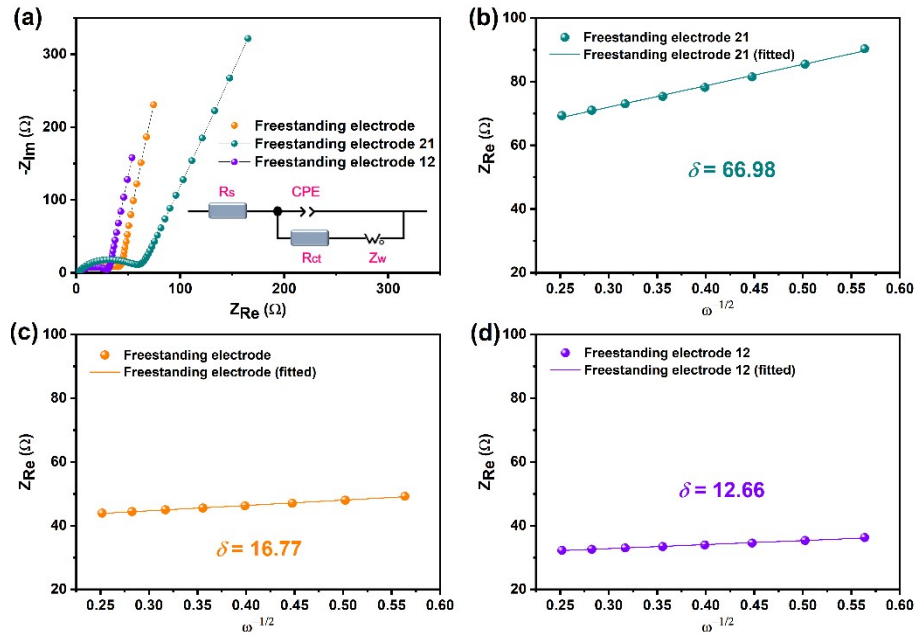


Fig. S6 (a) EIS results after the first cycle (the equivalent circuit is attached) of three freestanding electrodes with different SPANI/MWCNT ratios. Warburg factors (δ) for (b) the freestanding electrode 21 (SPANI/MWCNT=2:1), (c) the freestanding electrode (SPANI/MWCNT=1:1), and (d) the freestanding electrode 12 (SPANI/MWCNT=1:2).

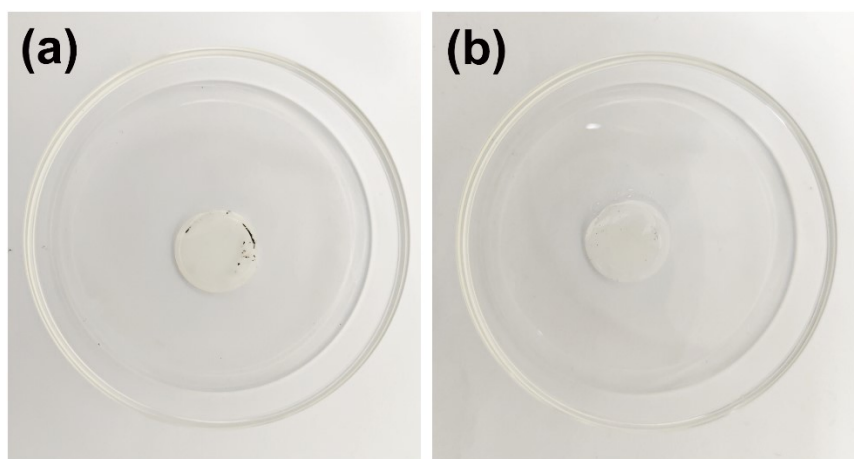


Fig. S7 Optical images of separators after 50 cycles at 0.2 C in batteries assembled with (a) the coated (acetylene black as a conductive agent) electrode (sulfur loading: 0.9 mg cm⁻²) and (b) the freestanding electrode (sulfur loading: 1.0 mg cm⁻²).

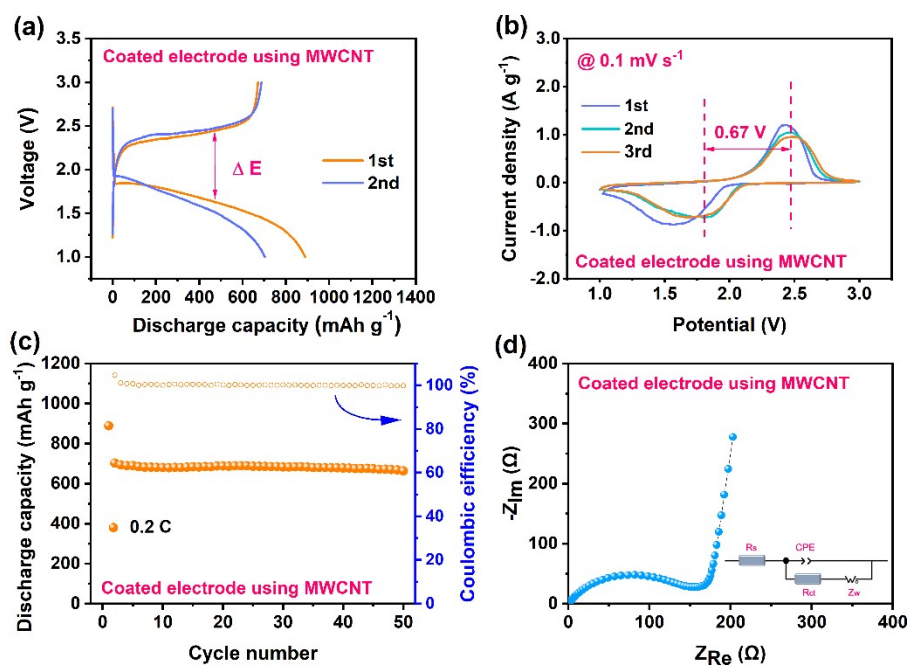


Fig. S8 (a) Charge-discharge curves, (b) cyclic voltammetry profiles, (c) cycling performances under 0.2 C, and (d) EIS result after the first cycle (the equivalent circuit is attached) for the coated electrode (sulfur loading: 0.9 mg cm⁻²) using MWCNT as a conductive agent.

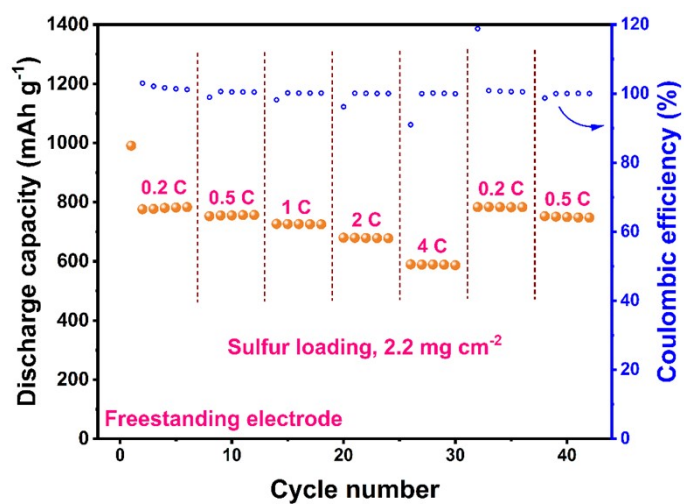


Fig. S9 Rate performance of the freestanding electrode (sulfur loading: 2.2 mg cm⁻²) at various C rates.

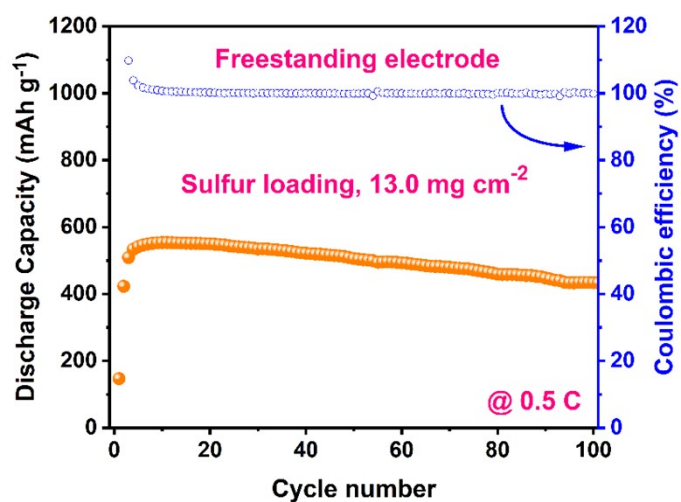


Fig. S10 Cycle performance of the freestanding electrode (sulfur loading: 13.0 mg cm⁻²) at 0.5 C for 100 cycles.