

Supporting Information for

A scalable ball milling strategy to endow SnS anode electrode with free volume property for enhanced electrochemical performance

Huibin Guan^a, Dong Feng^{*b}, Qi Liu^b, Tianbiao Zeng^{*a}

a. State Key Laboratory of Polymer Materials Engineering, Polymer Research Institute of Sichuan University, Chengdu 610065, China

b. Yunnan Provincial Key Laboratory of Energy Saving in Phosphorus Chemical Engineering and New Phosphorus Materials, Faculty of Chemical Engineering, Kunming University of Science and Technology, Kunming 650500, China

*: Corresponding authors (D Feng, fdryan@kust.edu.cn; T Zeng, tianbiaoZeng@126.com)

Table S1 Tap density and real density of pure SnS, SnS/G-5%, SnS/G-15%, SnS/G-25%, and milled graphite. (The real density was measured by drainage method, and liquid was absolute alcohol)

Density	SnS	SnS-5%	SnS-15%	SnS-25%	Graphene
Tap density	2.571	2.117	1.601	1.763	1.406
Real density	5.457	4.481	4.318	4.368	1.92

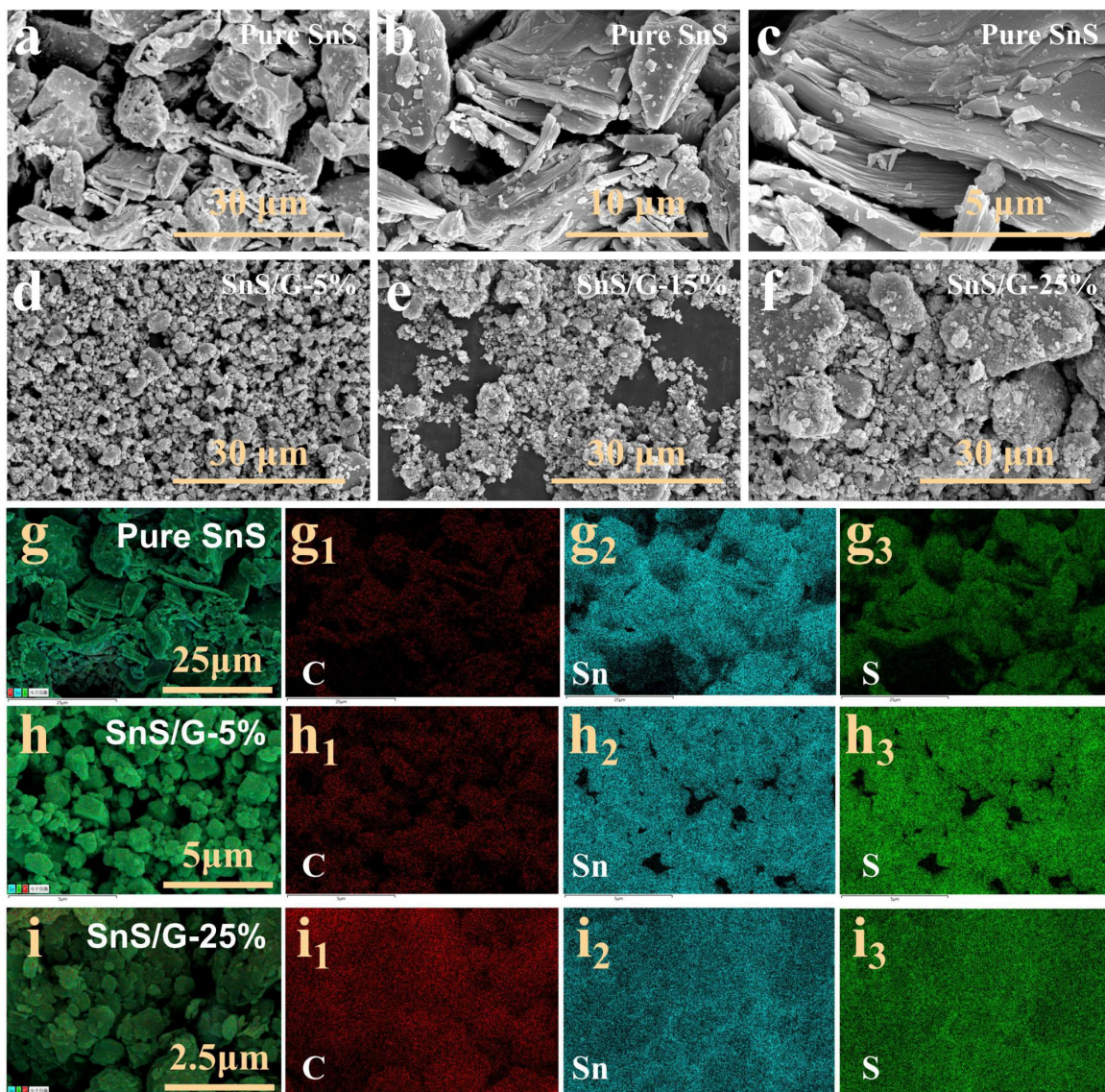


Fig. S1 (a, b, c) SEM images of pure SnS, (d) SnS/G-5%, (e) SnS/G-15%, (f) SnS/G-25%; Mapping images of C, Sn, S distribution of (g~g₃) pure SnS, (h~h₃) SnS/G-5%, (i~i₃) SnS/G-25%.

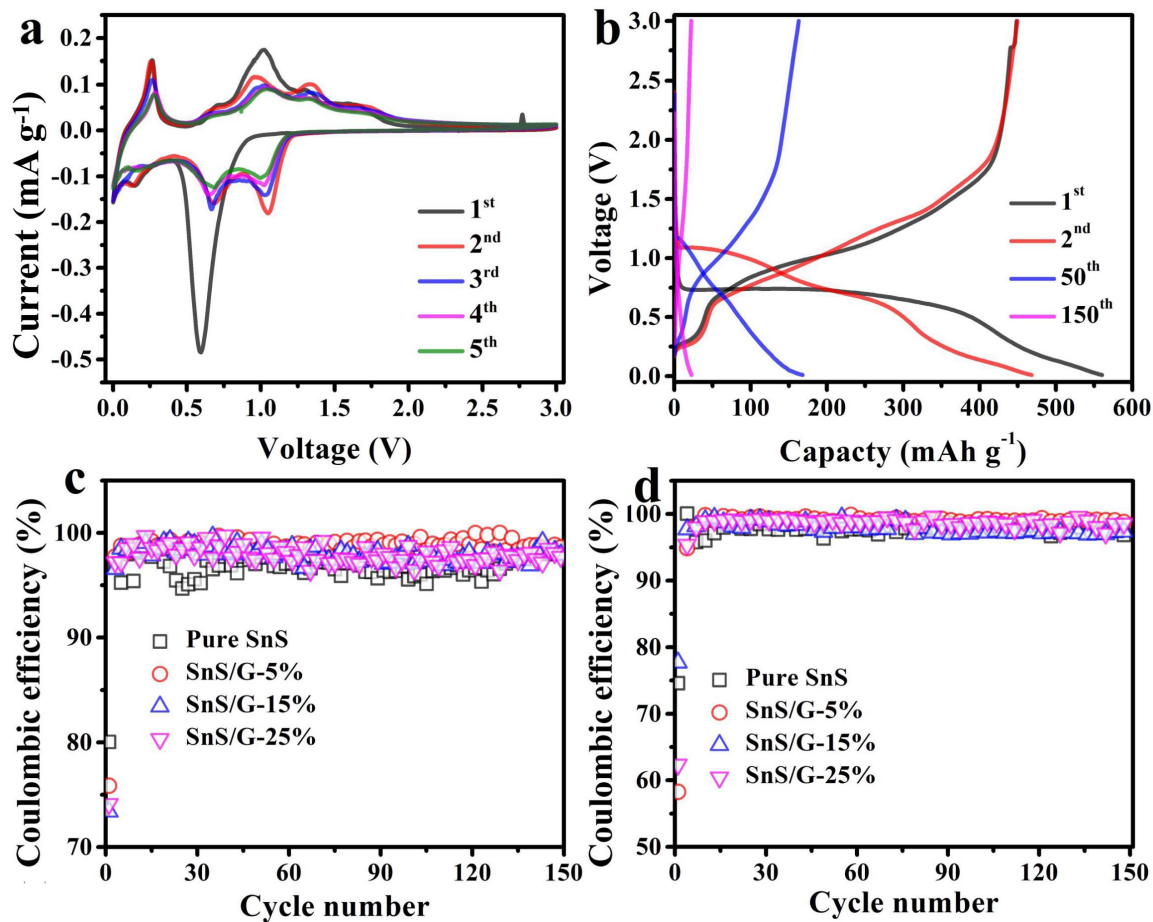


Fig. S2 (a) CV curves of pure SnS; (b) discharge/charge curves of pure SnS under 0.1 A g^{-1} ; (c) coulombic efficiency of pure SnS, SnS/G-5%, SnS/G-15%, and SnS/G-25% under 0.1 A g^{-1} ; (d) coulombic efficiency of pure SnS, SnS/G-5%, SnS/G-15%, and SnS/G-25% under 0.5 A g^{-1} .

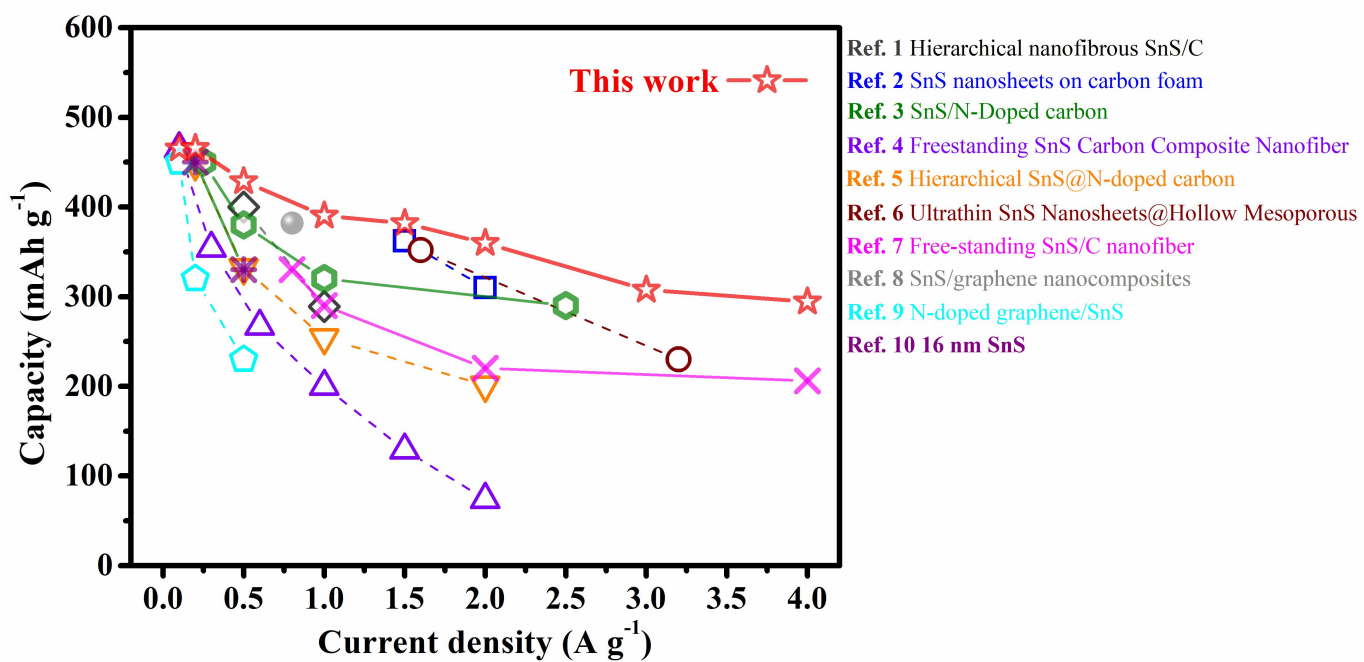


Fig. S3 Comparison of the rate performance of SnS/G-15% with recent-reported SnS-based, SnS₂-based and Sn₂S₃-based anode.

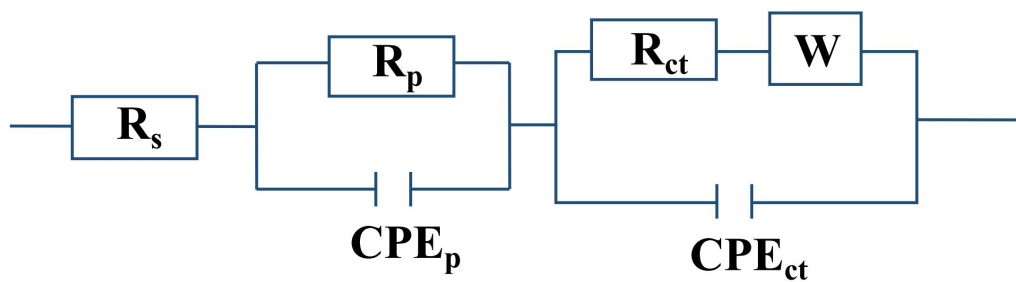
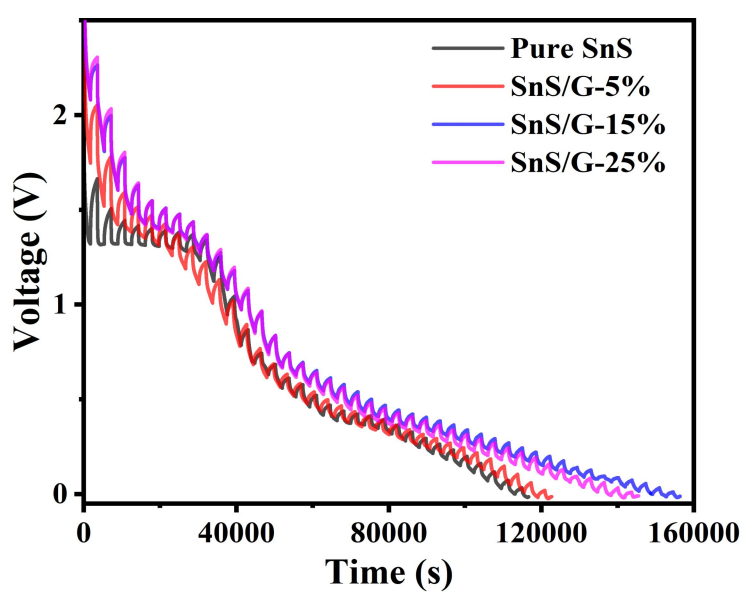


Fig. S4 Fitted circuit diagram of EIS.

Table S2 Element values of EIS.

Materials	R _s (Ω)	R _{p1} (Ω)	CPE ₁		R _{p2} (Ω)	CPE ₂		W (mMho*s ^{0.5})
			Y0 (μMho*s ^N)	N		Y0 (μMho*s ^N)	N	
Pure SnS	4.88	20.6	0.667	0.8	71	1.52	0.309	4.28
SnS/G-5%	5.66	13.7	0.984	0.663	21.1	4.53	0.555	104
SnS/G-15%	3.93	10.8	1.16	0.825	20.3	2.01	0.577	82.2
SnS/G-25%	3.87	10.5	2.18	0.818	18.1	4.18	0.548	19

**Fig. S5** GITT curves of pure SnS, SnS/G-5%, SnS/G-15%, and SnS/G-25% under 0.1 A g⁻¹.

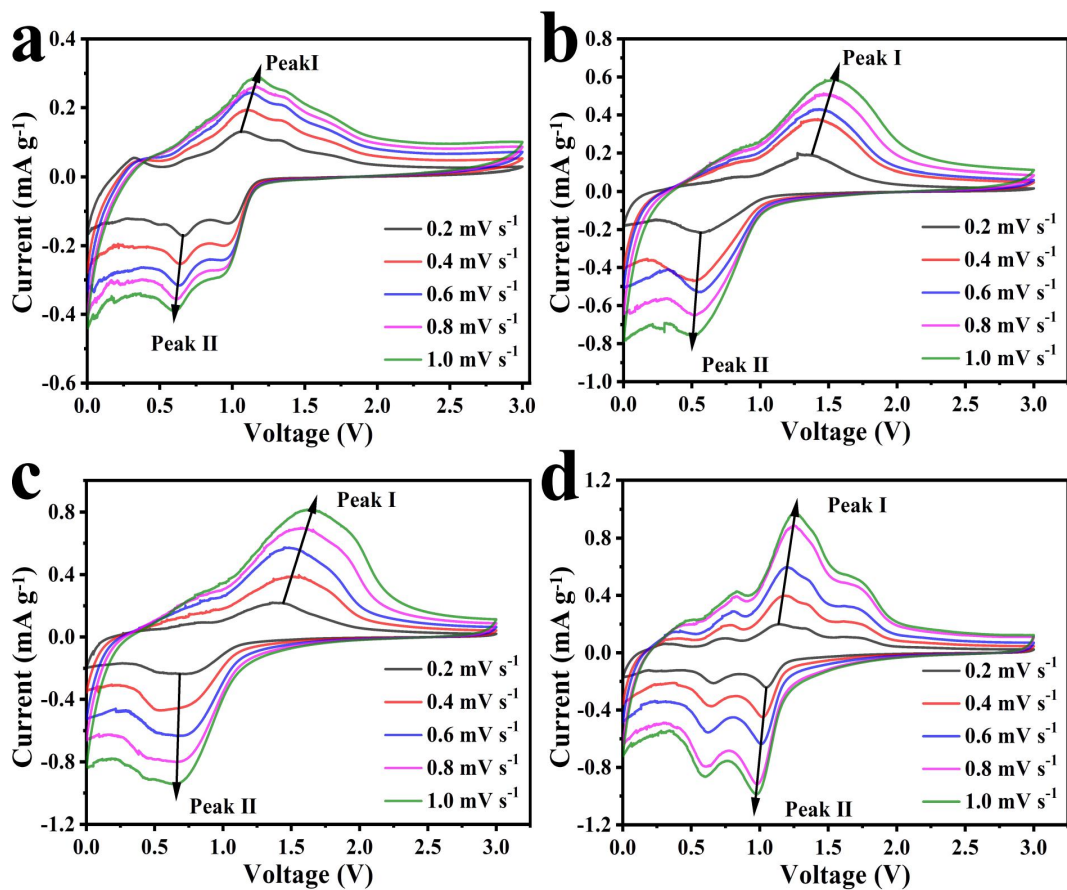


Fig. S6 Rate CV curves of (a) pure SnS, (b) SnS/G-5%, (c) SnS/G-15%, and (d) SnS/G-25%.

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