Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2019

Supporting Information

Two-phase interface hydrothermal synthesis of binder-free SnS_2/graphene flexible paper electrodes for high-performance Li-ion batteries

Hao Wen, Wenbin Kang, Xingang Liu, Wenjuan Li, Liping Zhang and Chuhong Zhang★

State Key Laboratory of Polymer Materials Engineering, Polymer Research Institute, Sichuan University, No. 24, South Section 1, Yihuan Road, Chengdu 610065, China.

★To whom correspondence should be addressed.

E-mail: chuhong.zhang@scu.edu.cn

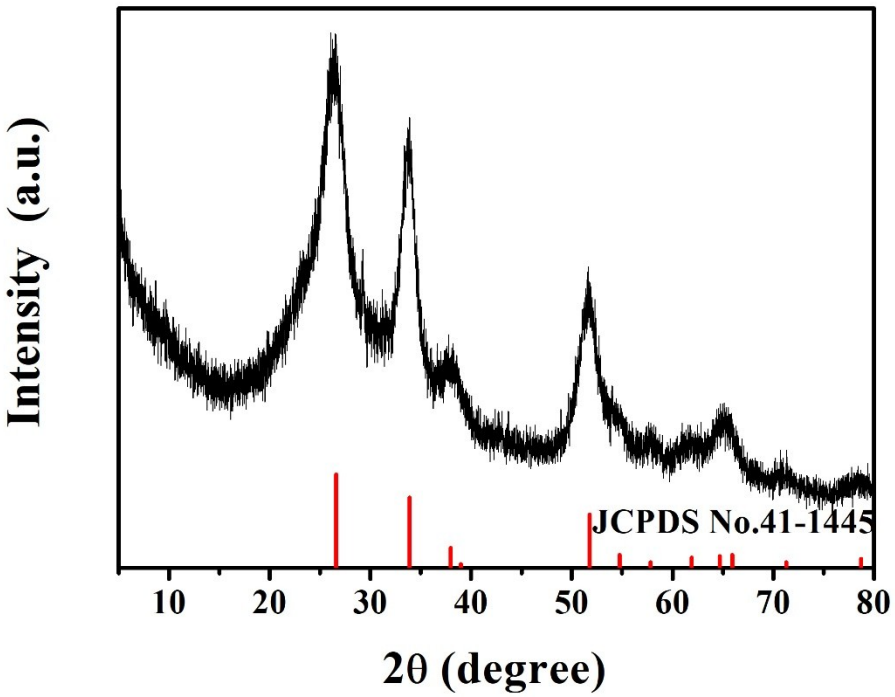

Figure S1. XRD pattern of the SnS_2/graphene oxide composite paper subjected to a hydrothermal process at the solid/gas interface with de-ionized water as a reducing agent.

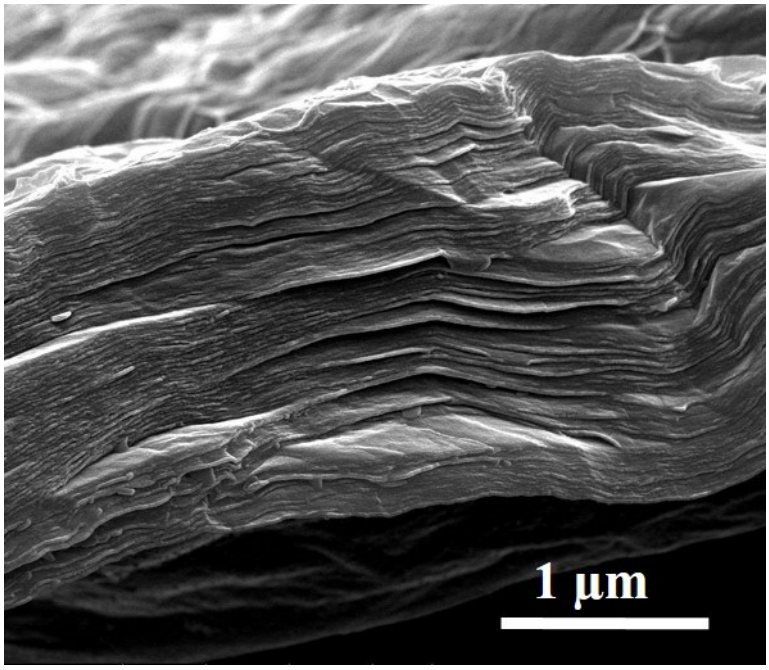

Figure S2. Cross-section view SEM image of the graphene paper.

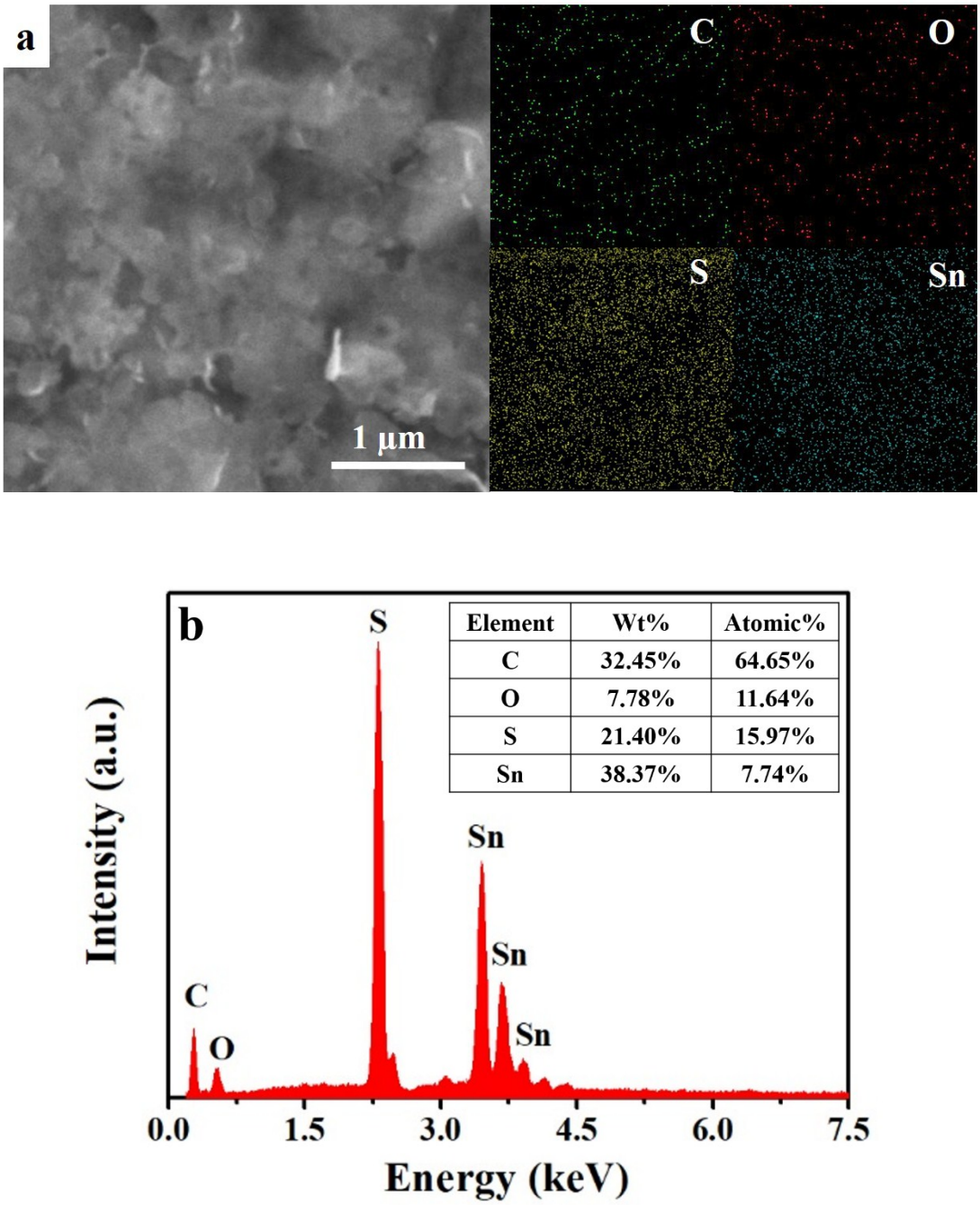

Figure S3. a) SEM image of the SGP with corresponding EDX mapping images; b) EDX spectrum of the SGP.

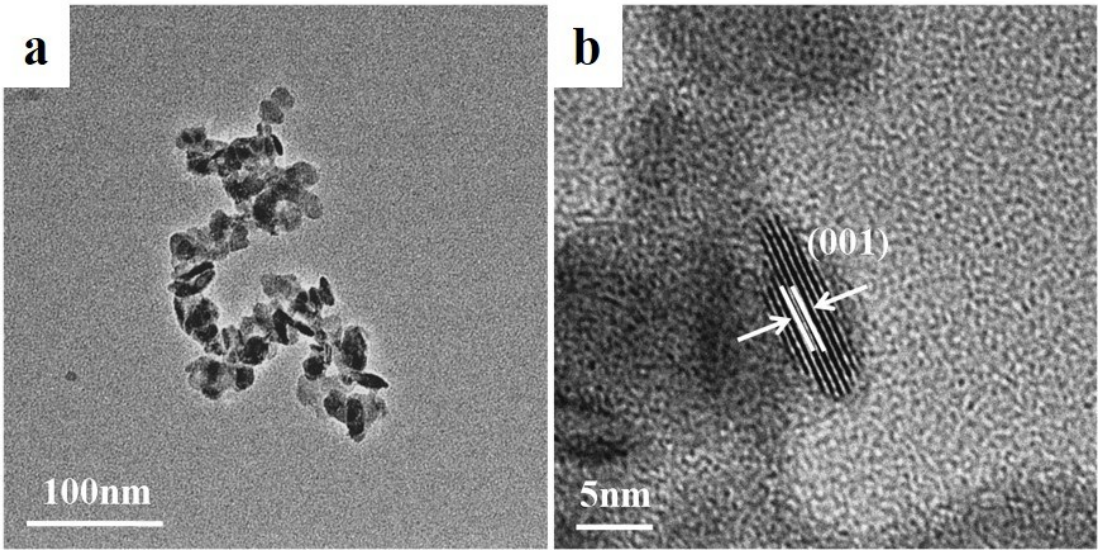

Figure S4. a) TEM and b) HRTEM images of the pristine SnS_2 nanocrystals.

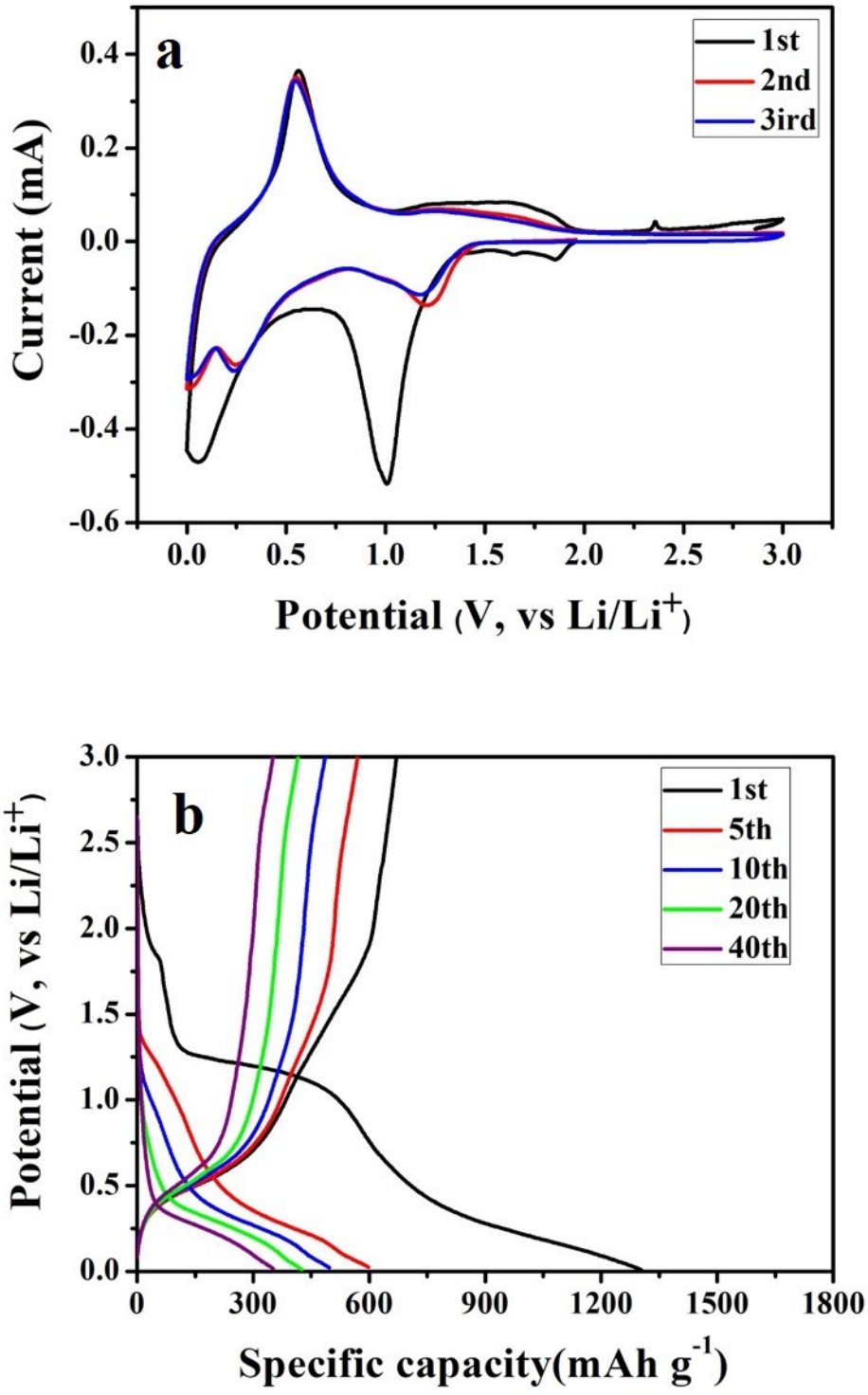

Figure S5. a) Cyclic voltammograms of the pristine SnS_2 measured at a scan rate of 0.1 mV s^{-1}; b) Galvanostatic charge-discharge profiles of the pristine SnS_2 measured at a current density of 100 mA g^{-1} in the voltage range of 0.01 to 3.0 V (vs. Li/Li^+).

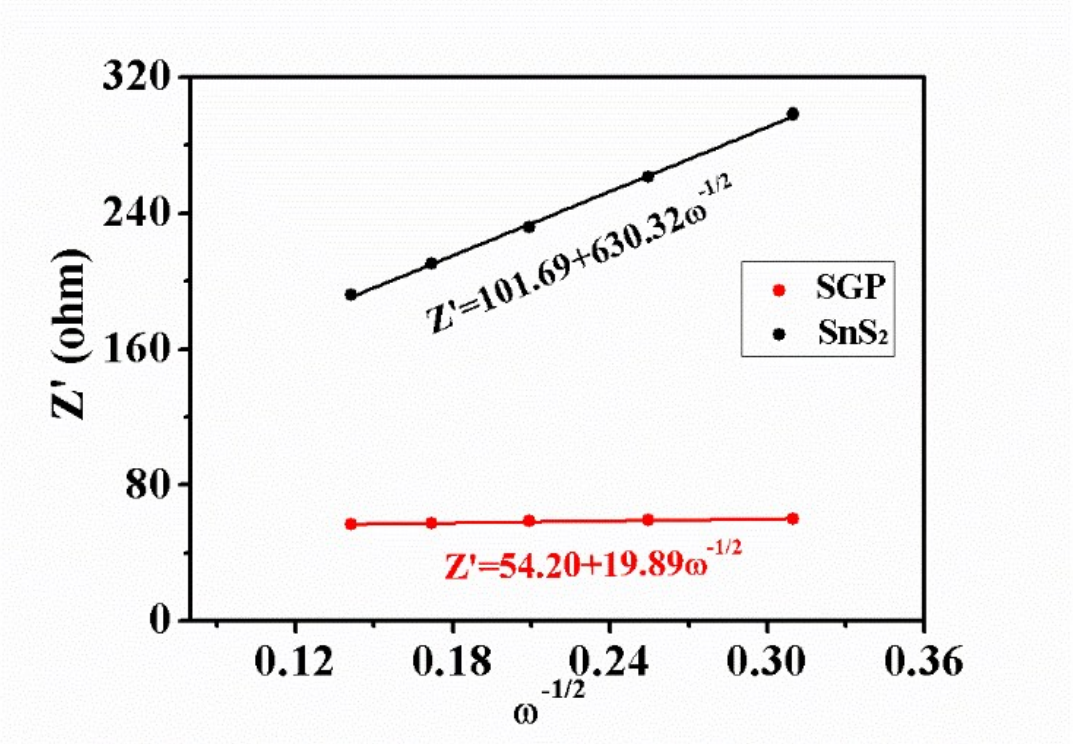

Figure S6. Z' as a function of the $\omega^{-1/2}$ plot in the low frequency region of the SGP and pristine SnS_2 nanocrystals electrodes (the slope of fitting curves is the Warburg factor, σ).

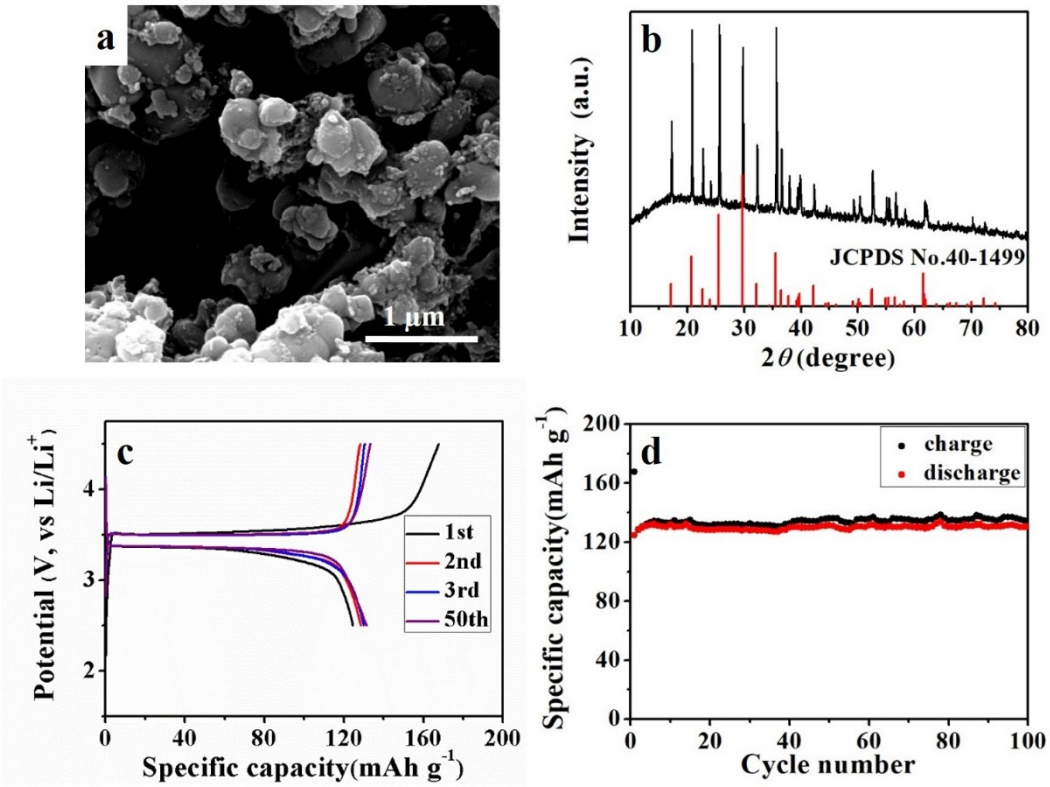

Figure S7. a) SEM image and b) XRD pattern of the commercial $LiFePO_4$; c) The galvanostatic charge-discharge curves, and cyclic performance of the $LiFePO_4$ half cell, measured at a current density of 100 mA g^{-1} in the voltage range of 2.5 to 4.5 V (*vs.* Li/Li^+).

Table S1. Values of the equivalent circuit elements used to fit the experimental data

	Before cycling		After 10 cycles	
	Pristine SnS_2	SGP	Pristine SnS_2	SGP
Re/Ω	6.78	2.02	6.05	1.66
Rs/Ω	195.69	139.2	141.7	50.38
Rct/Ω	2.3	1.94	2.1	0.28
R_{total}/Ω	204.77	143.16	149.85	50.38