Electronic Supplementary Material (ESI) for Nanoscale.

SnS_2-SnS *pn* hetero-junction bonded on graphene with boosted charge transfer for lithium storage

Jie Wang, [ab] Zijia Zhang [a] and Hailei Zhao [*ab]

[a] School of Materials Science and Engineering, University of Science and Technology Beijing, Beijing 100083, China.

[b] Beijing Municipal Key Laboratory of New Energy Materials and Technologies, Beijing 100083, China

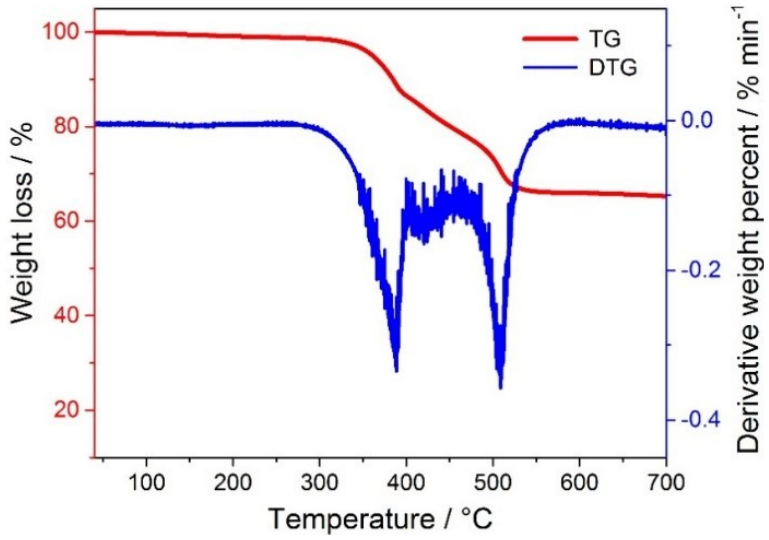

Fig. S1 TG and DTG curves of SnS_2-SnS/rGO composite.

In the DTG curve, there are two prominent peaks located at ~390 °C and ~510 °C, which are attributed to the oxidation of SnS_2 to SnO_2 and the combustion of graphene.[1]

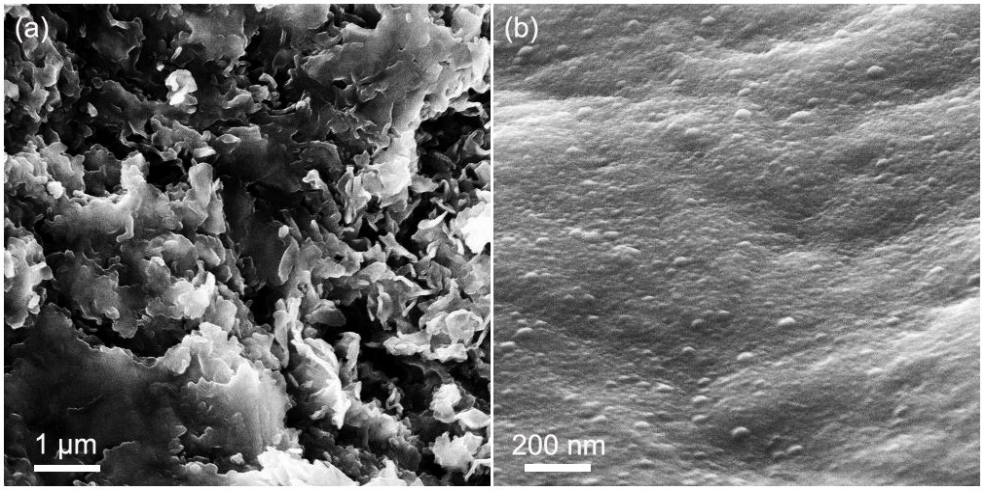

Fig. S2 FESEM images of SnS_2-SnS/rGO sample.

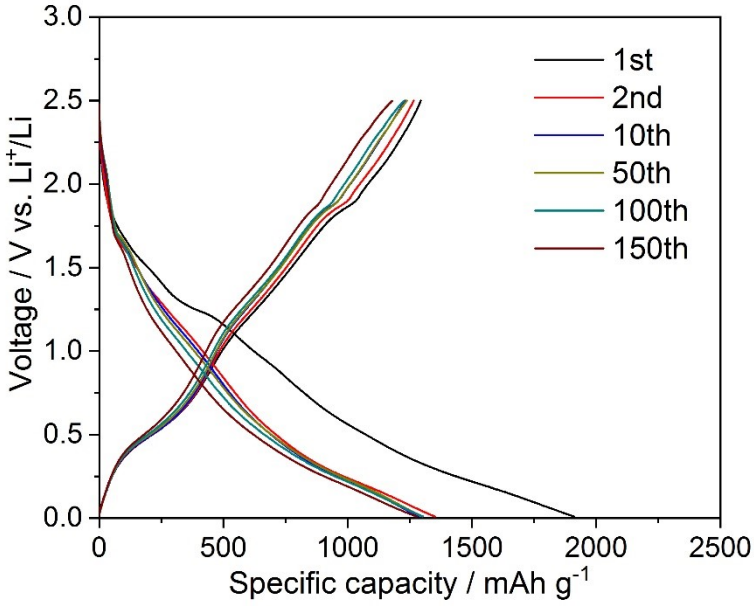

Fig. S3 Charge-discharge voltage profiles of SnS_2-SnS/rGO electrode at 0.1 A g^{-1} for lithium storages.

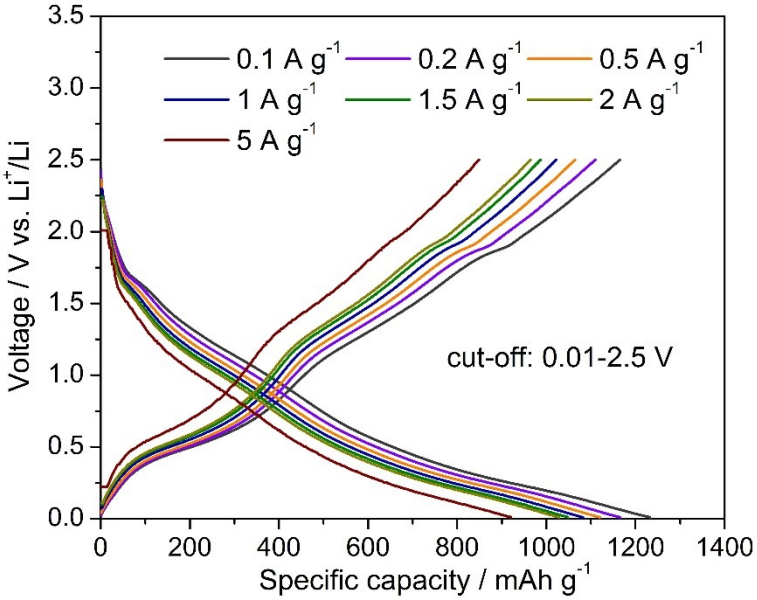

Fig. S4 Charge/discharge curves of SnS_2-SnS/rGO electrode.

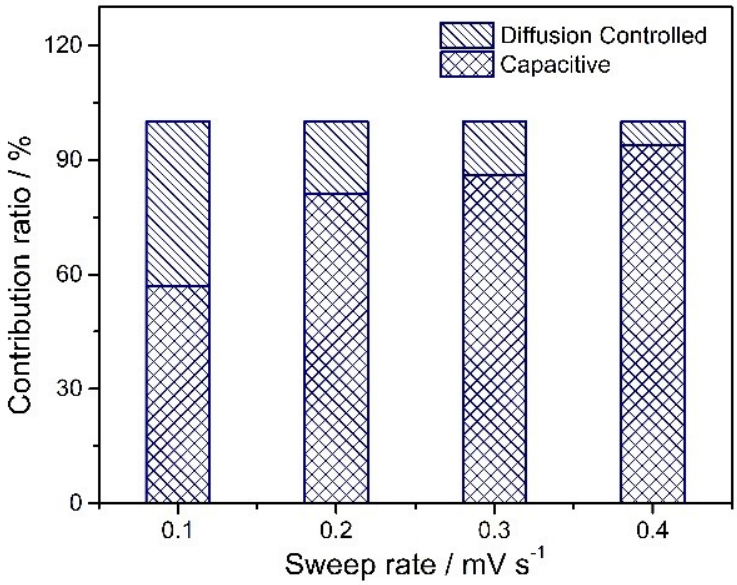

Fig. S5 Contribution ratio of the diffusion-controlled and capacitive capacities of SnS_2-SnS/rGO sample at different scan rates.

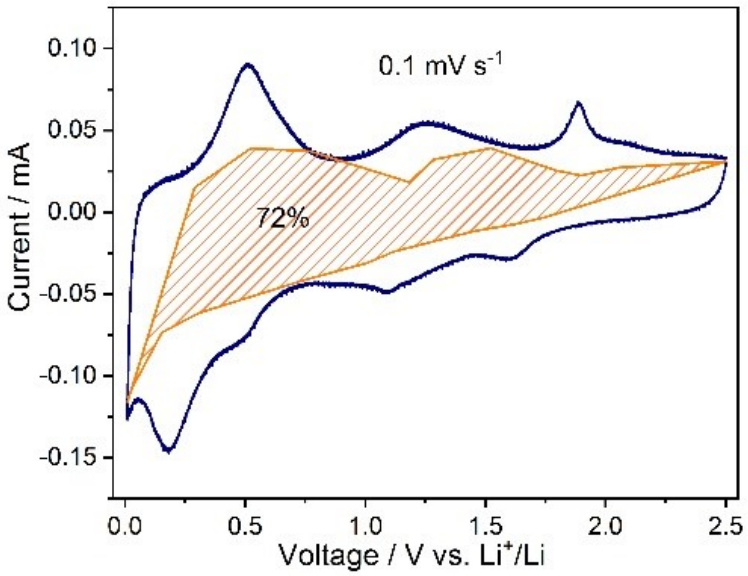

Fig. S6 CV curves of SnS_2/rGO with separation between total current (blue line) and surface capacitive current (orange line) at a scan rate of 0.1 mV s^{-1}.[2]

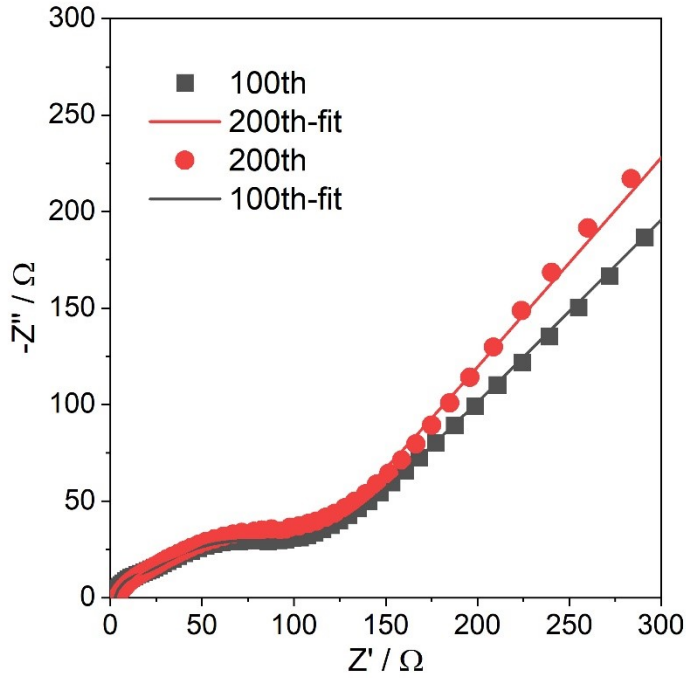

Fig. S7 Nyquist plots of SnS_2-SnS/rGO electrode in the range of 0.1 Hz to 10^6 Hz.

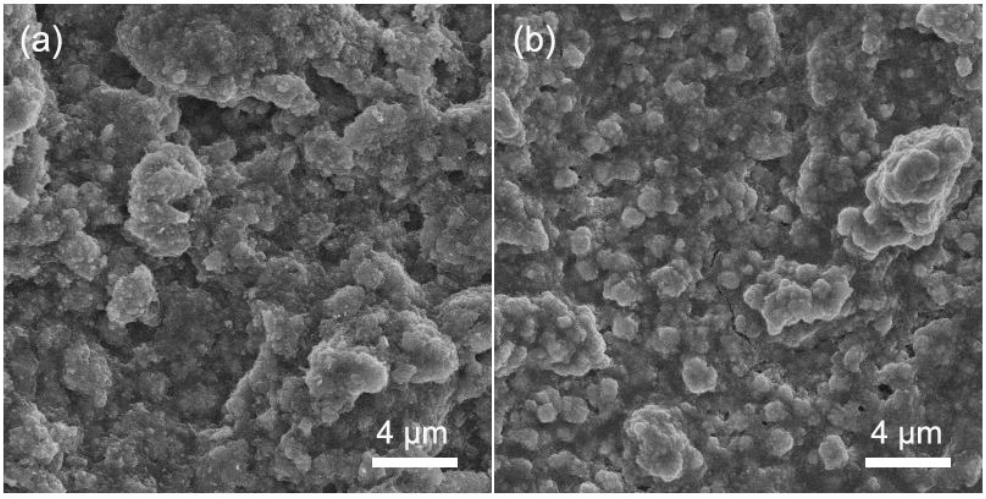

Fig. S8. FESEM images of SnS_2-SnS/rGO electrode (a) before and (b) after cycling for 100 cycles at a current density of 1 A g^{-1}.

References

1. J. Huang, K. Yu, C. Gu, M. Zhai, Y. Wu, M. Yang and J. Liu, *Sens. Actuators B*, 2010, **147**, 467-474.

2. Z. Zhang, H. Zhao, J. Fang, X. Chang, Z. Li and L. Zhao, *ACS Appl. Mater. Interfaces*, 2018, **10**, 28533-28540.