Supporting Information

MoS_2 Covered SnS Nanosheets as high performance anode materials for lithium ion batteries

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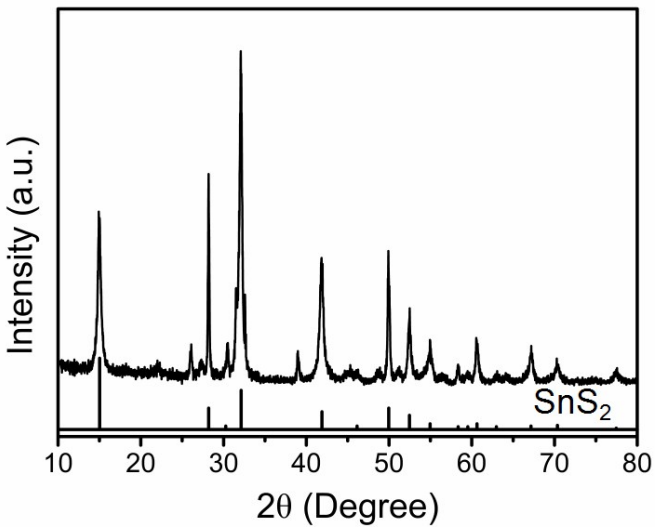

Fig.S1 XRD pattern of the SnS_2.

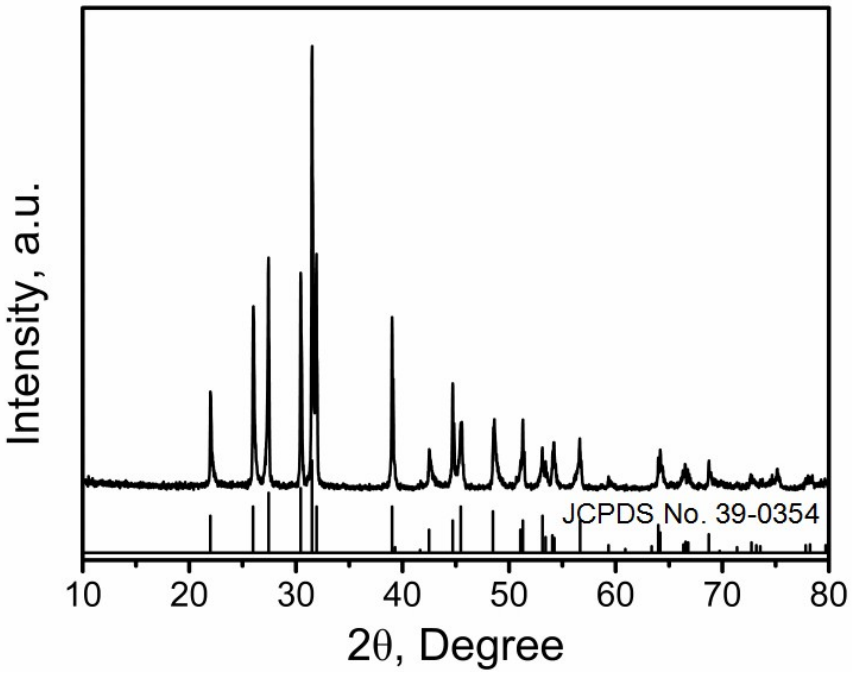

Fig.S2 XRD patterns of SnS.

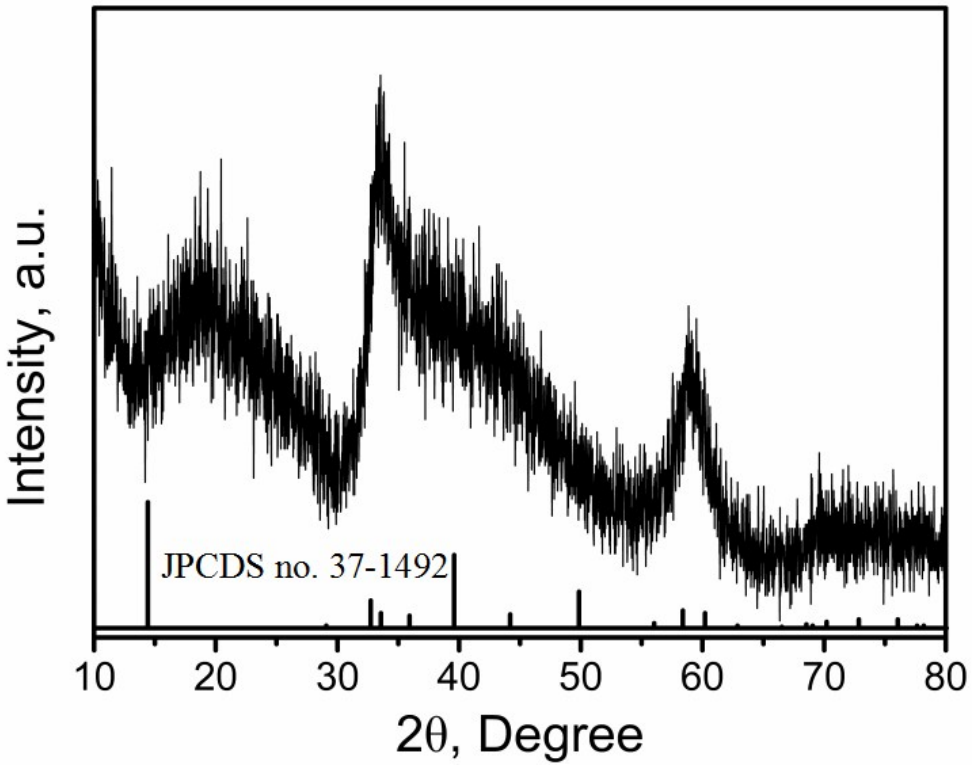

Fig.S3 XRD patterns of MoS_2/C composite.

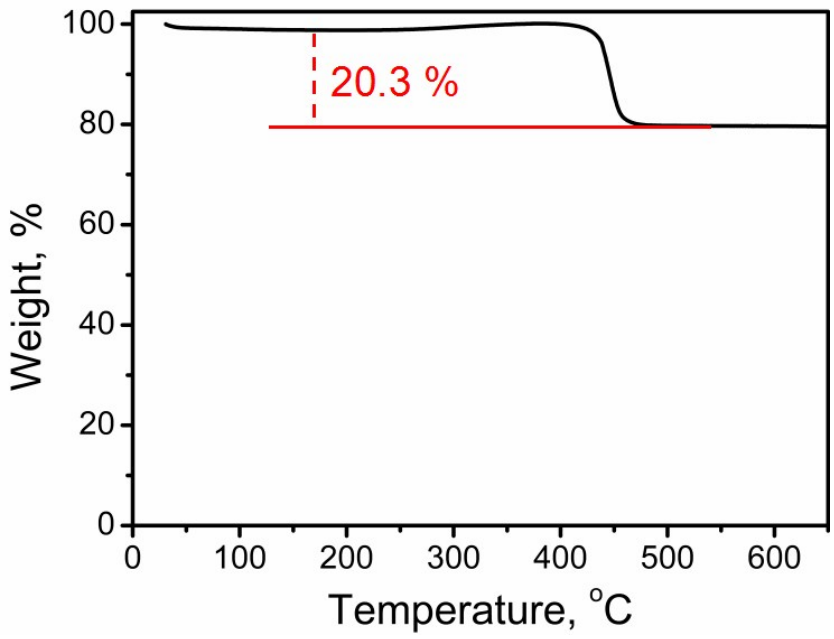

Fig.S4 TG curves of $SnS/MoS_2/C$.

Table. S1 ICP analysis of atomic percentages of SnO_2/ MoO_3 composites.

	ICP Measured Value		Component	
sample	Sn (wt%)	Mo (wt%)	SnO_2 (wt%)	MoO_3 (wt%)
SnO_2/MoO_3	87.59 %	12.41 %	85.68 %	14.32 %

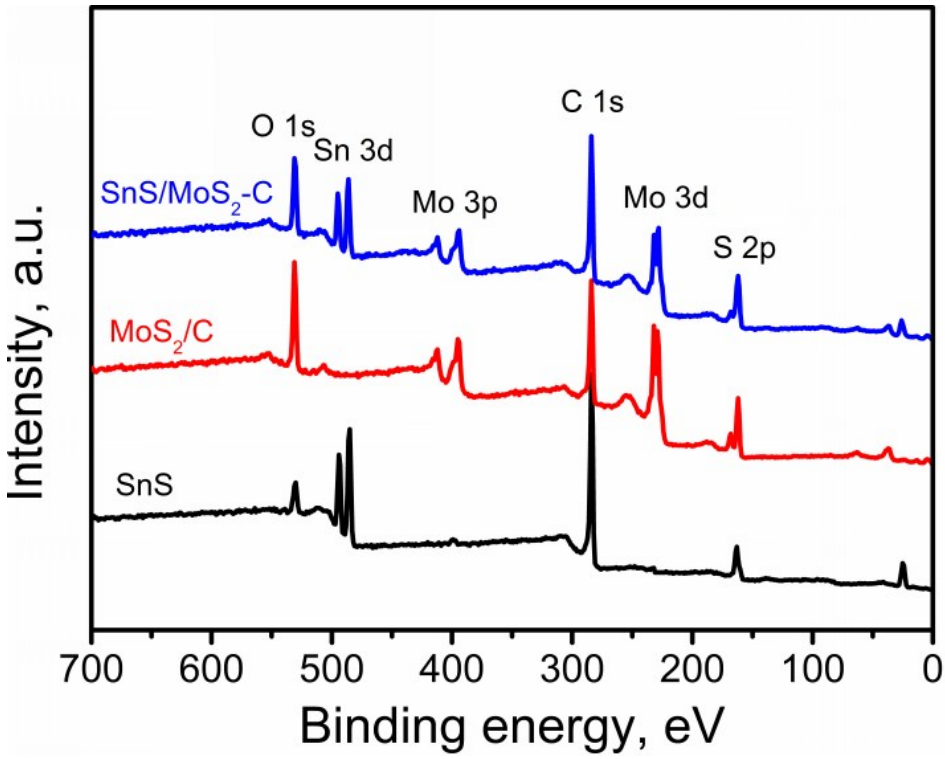

Fig. S5 XPS survey spectra of the as-synthesized SnS, MoS_2/C and SnS/MoS_2-C composite.

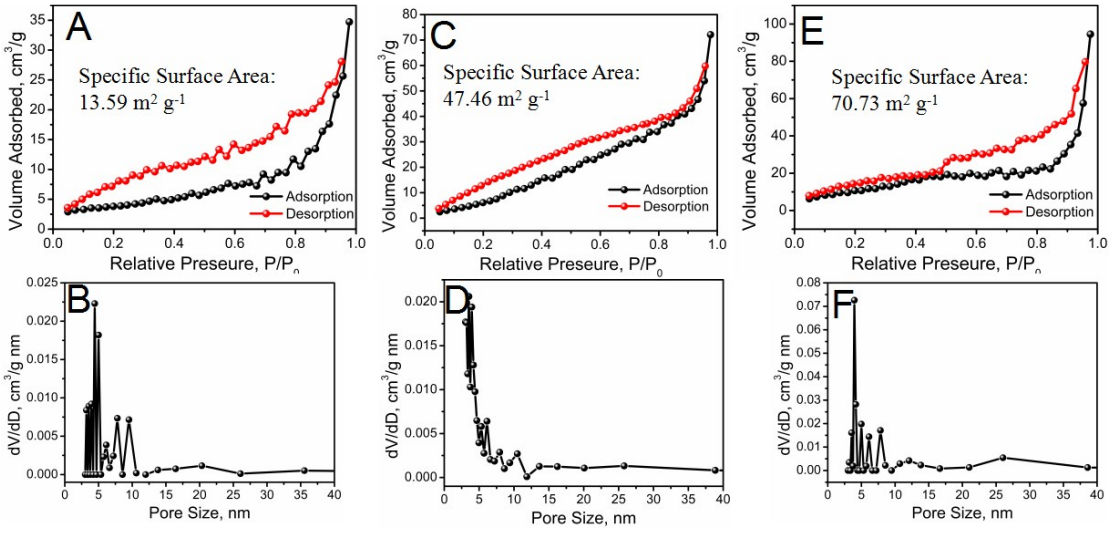

Fig. S6 (A, C, E) Adsorption–desorption isotherms and (B, D, F) pore size distributions of SnS_2, SnS and SnS/MoS_2-C, respectively.

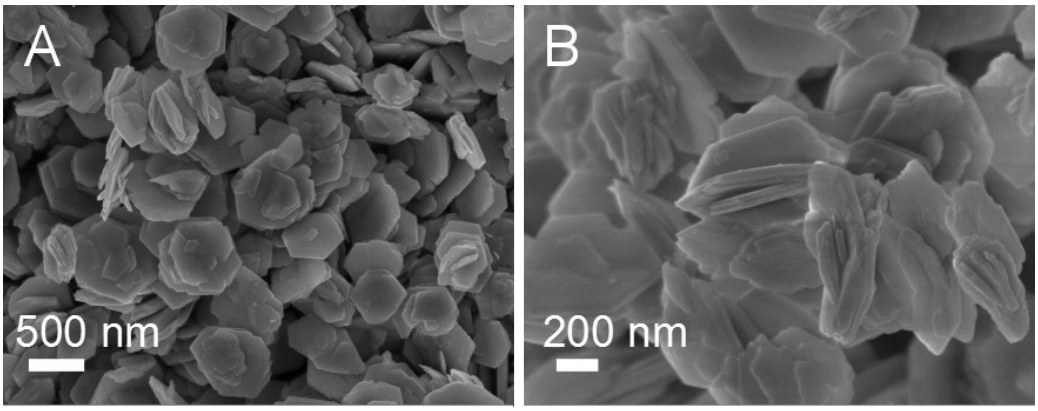

Fig.S7 SEM images of SnS_2 without added NH_4F.

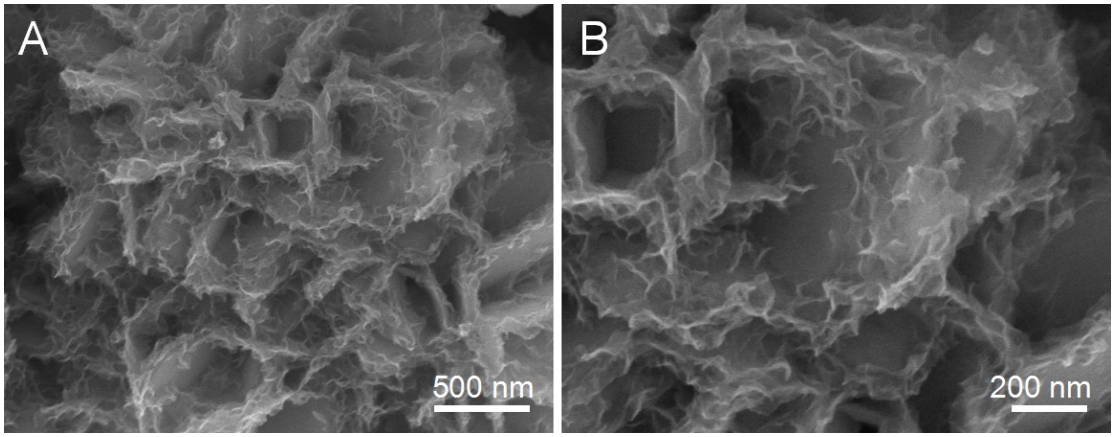

Fig.S8 SEM images of SnS_2/MoS_2-C composite before annealing.

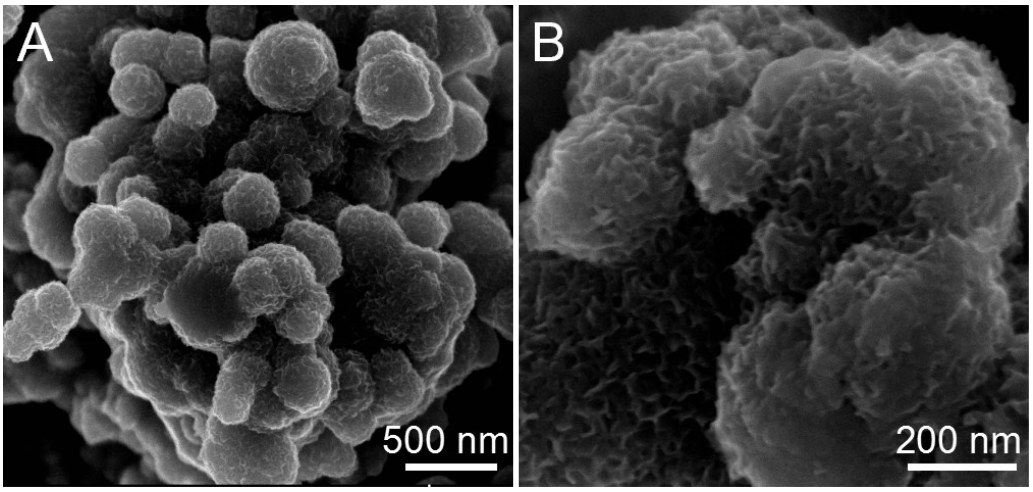

Fig.S9 SEM images of MoS_2/C composite.

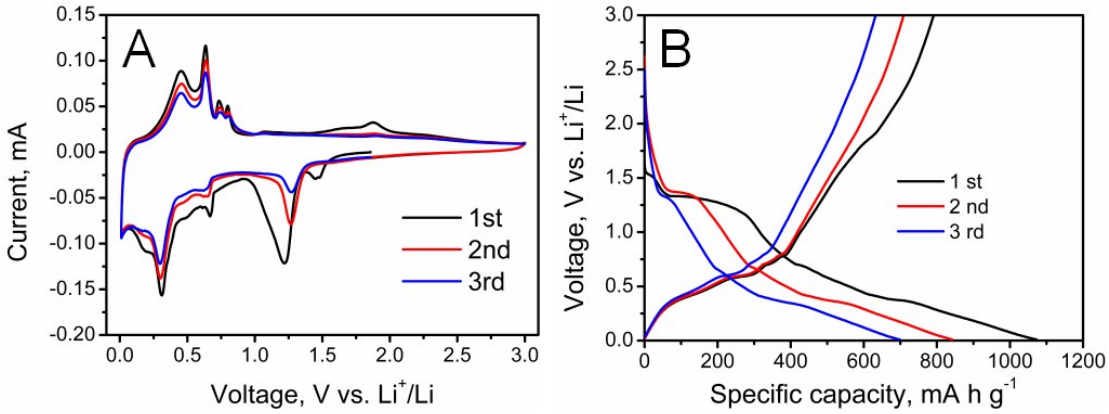

Fig. S10. (A) CV curves of SnS; (B) charge and discharge profiles of SnS.

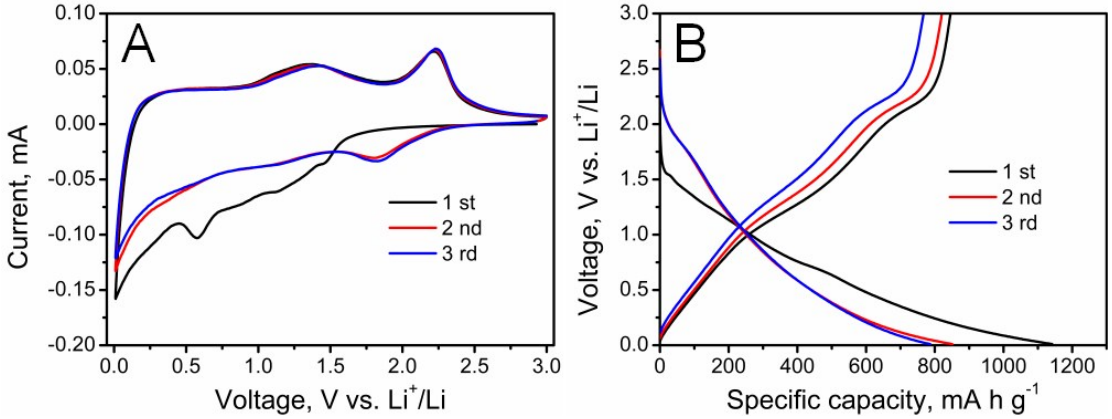

Fig.S11 (A) CV curves of MoS_2/C composite; (B) charge and discharge profiles of MoS_2/C composite.

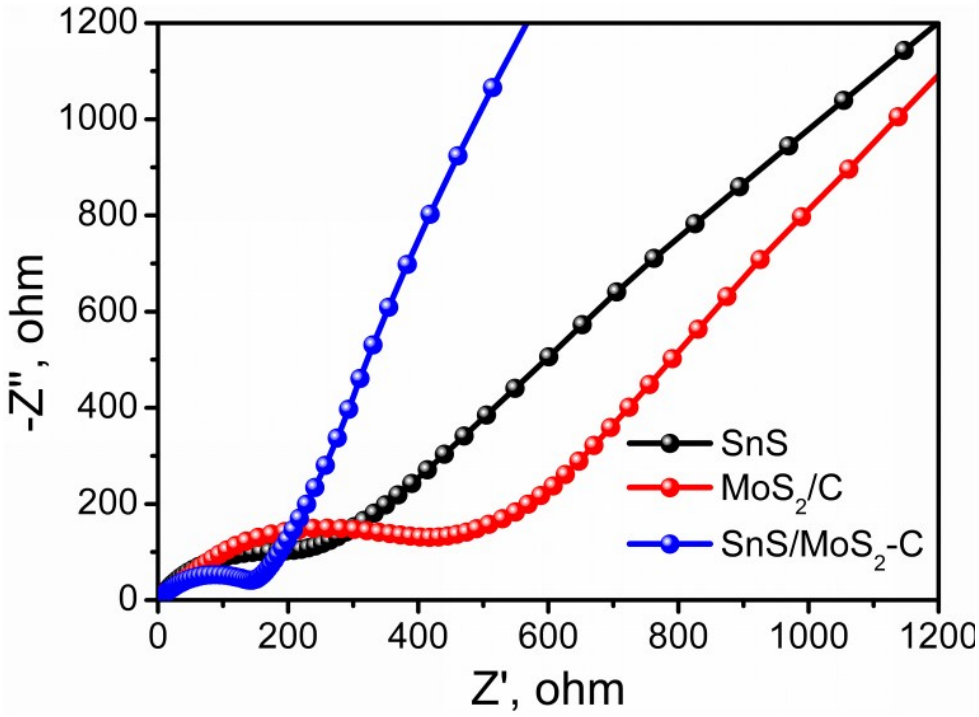

Fig. S12 Nyquist plots of SnS, MoS_2/C and SnS/MoS_2-C.

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Table S2. Comparison of specific capacity at different current densities for SnS-based composite anodes reported previously.

Materials	Capacity retention	Rate performance	Ref
SnS nanosheet	560 mA h g^{-1} after 50 cycles at 782 mA g^{-1}	639 mA h g^{-1} at 4.0 A g^{-1}	S1
Sandwich-like SnS /Polypyrrole	967 mA h g^{-1} after 50 cycle at 100 mA g^{-1}	576 mA h g^{-1} at 5.0 A g^{-1}	S2
Spherical Graphene Framework/SnS	800 mA h g^{-1} after 100 cycles at 100 mA g^{-1}	380 mA h g^{-1} at 5.0 A g^{-1}	[18]
Porous SnS Nanorods/Carbon	696 mA h g^{-1} after 50 cycles at 50 mA g^{-1}		[13]
SnS nanoflowers	580 mA h g^{-1} after 30 cycles at 50 mA g^{-1}		[16]
SnS nanosheet bonded with graphene	560 mA h g^{-1} after 100 cycles at 100 mA g^{-1}	331 mA h g^{-1} at 2.0 A g^{-1}	[14]
3D-hierarchical SnS nanostructures	520 mA h g^{-1} after 50 cycles at 50 mA g^{-1}	330 mA h g^{-1} at 0.5 A g^{-1}	[17]

SnS@polypyrrole-nanobelt /carbon nanotube paper	887 mA h g^{-1} after 100 cycles at 100 mA g^{-1}	349 mA h g^{-1} at 5.0 A g^{-1}	[15]
SnS/C Nanocomposite	607 mA h g^{-1} after 200 cycles at 1.0 A g^{-1}	484 mA h g^{-1} at 5.0 A g^{-1}	[11]
SnS/MoS_2-C composite	989.7 mA h g^{-1} after 60 cycles at 0.2 A g^{-1}; 718 mA h g^{-1} after 700 cycles at 2.0 A g^{-1}	675 mA h g^{-1} at 5.0 A g^{-1}	This work

[1] Jin-Gu Kang a, Jae-Gwan Park a, Dong-Wan Kim. Superior rate capabilities of SnS nanosheet electrodes for Li ion batteries, Electrochemistry Communications 12 (2010) 307–310.

[2] Jun Liu, Mingzhe Gu, Liuzhang Ouyang, Hui Wang, Lichun Yang, and Min Zhu, Sandwich-like SnS/Polypyrrole Ultrathin Nanosheets as High-Performance Anode Materials for Li-Ion Batteries, ACS Appl. Mater. Interfaces 2016, 8, 8502−8510.