

Supporting Information

Excellent Electrochemical Performance of Tin Monosulphide (SnS) as Sodium-ion Battery Anode

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EDAX analysis was done on the as prepared SnS material. It was found that the atomic ratio of Sn and S in the as prepared material is around 1:1.

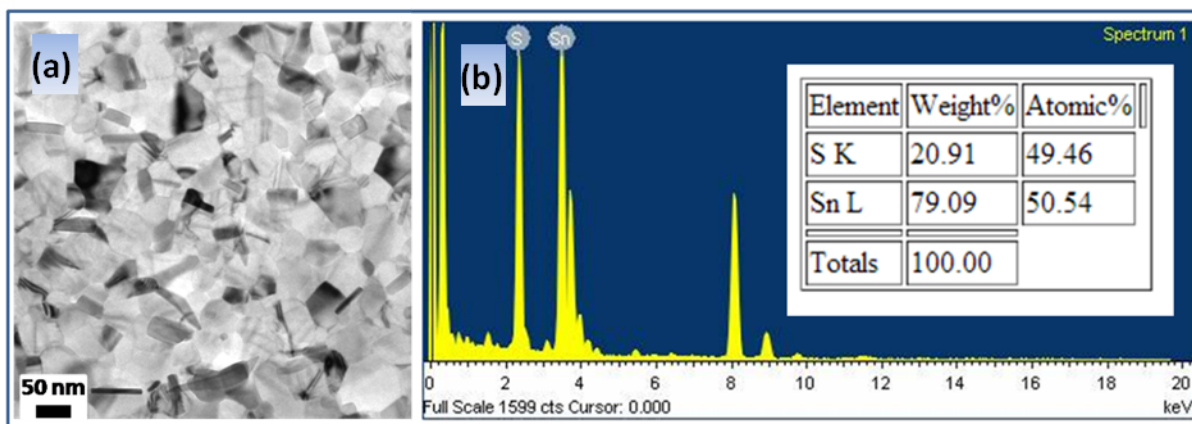


Fig S1: (a) TEM image and (b) its corresponding EDAX spectra

An electrode with 70% active material, 20% carbon and 10% binder (by wt) was prepared and its electrochemical performance was compared with the electrode having 60:20:20 composition. The comparison is shown in Fig S2.

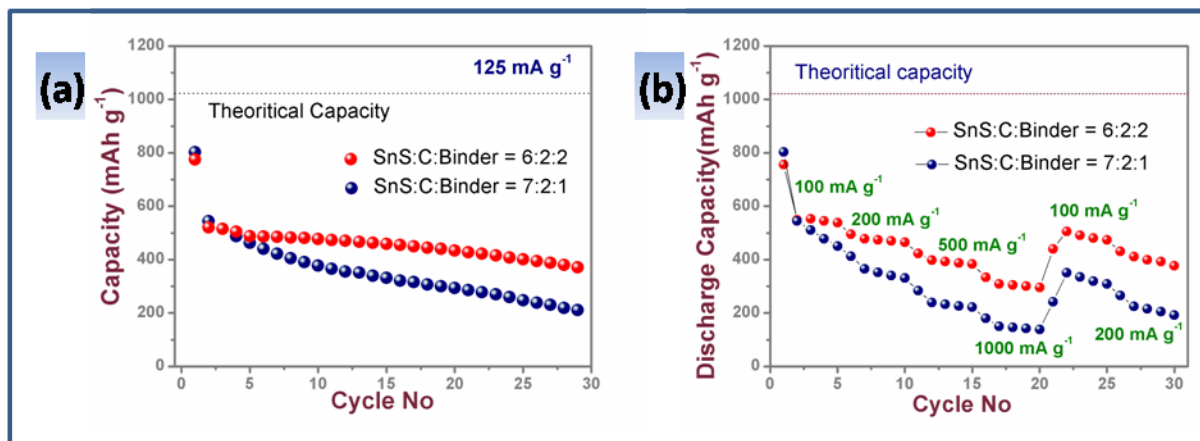


Fig S2: (a) Cycling performance and (b) rate performance of electrode material at different electrode composition

From the FEG-SEM images (Fig S3) it has been found that some plate kind of morphology was observed after 30 cycles of charge-discharge reactions which means that the morphology of the active material was changed during conversion and alloying reactions.

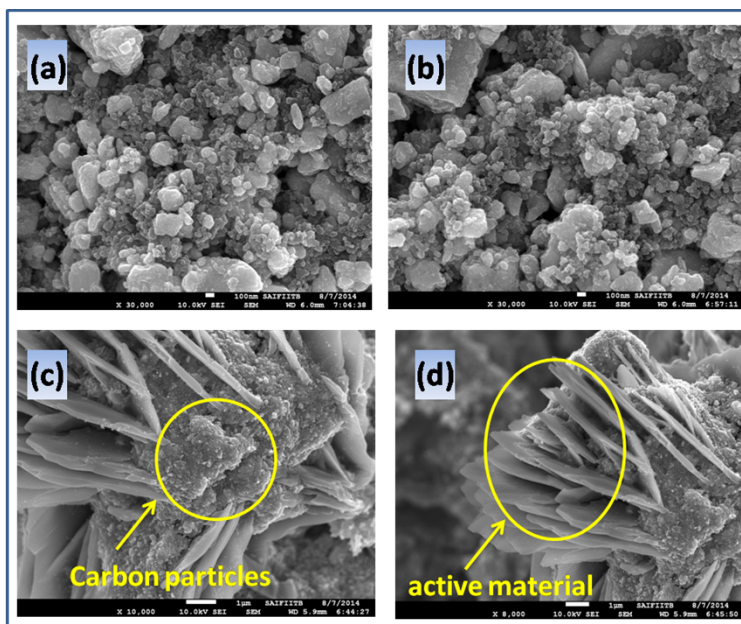


Fig S3: FEG-SEM images of the SnS electrode film (a,b) before cycling and (c,d) after 30 cycles at a current rate of 125 mA g⁻¹

Further morphological analysis has been done using FEG-TEM analysis. Due to well dispersion the particle distribution was clearly shown in the TEM images (Fig S4). The nano-rods of SnS particles were not visible after 30 cycles of charge-discharge reactions as after 1st cycle there is no existence of SnS particles as it forms nanoparticles of Sn and polysulfur after 1st cycle.

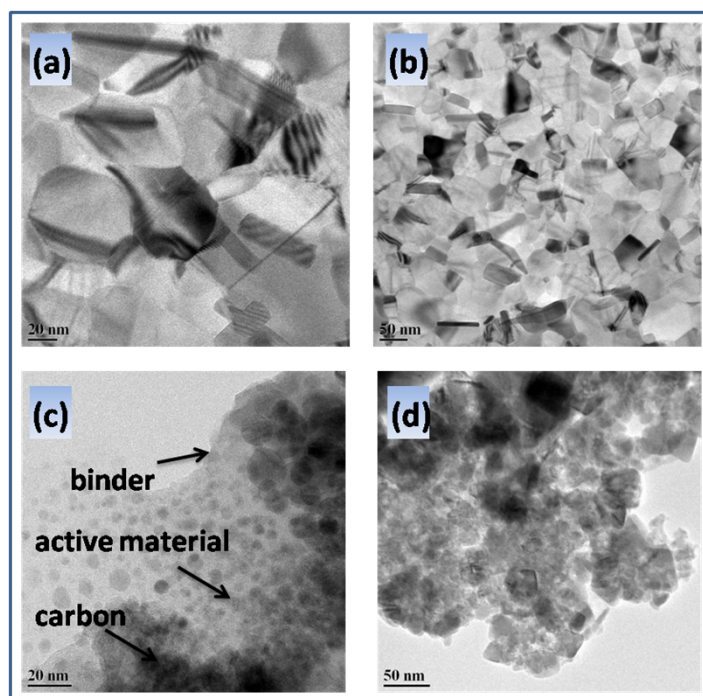


Fig S4: FEG-TEM images of the SnS electrode film (a,b) before cycling and (c,d) after 30 cycles at a current rate of 125 mA g⁻¹

Table T1: Fitted parameters for equivalent circuits for PEIS shown in fig 3.

	Voltages (V)	R ₁ (Ohm)	R ₂ (Ohm)	R ₃ (Ohm)
Discharge	OCV	6.891	107.8	-
	0.8	9.47	153.6	-
	0.5	10.29	195.7	-
	0.3	10.55	200.4	-
	0.1	11.23	210	-
Charge	0.5	10.37	216	-
	0.8	11.29	219.8	-
	1.2	10.7	253.9	-
	1.5	9.818	149.4	156.6
	2.0	10.03	159	-