Electronic Supplementary Information for

Controlling the Sn-C bonds content in SnO_2@CNTs composite to form in-situ pulverized structure for enhanced electrochemical kinetics

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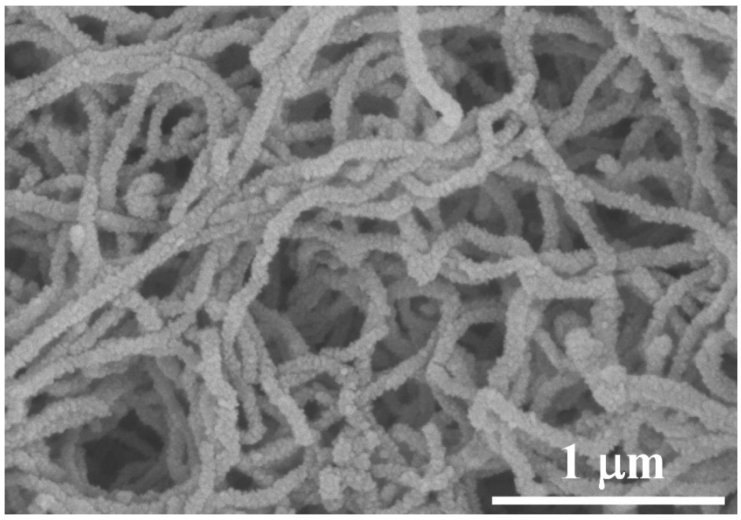

Fig. S1 SEM image of precursor obtained by the hydrothermal method.

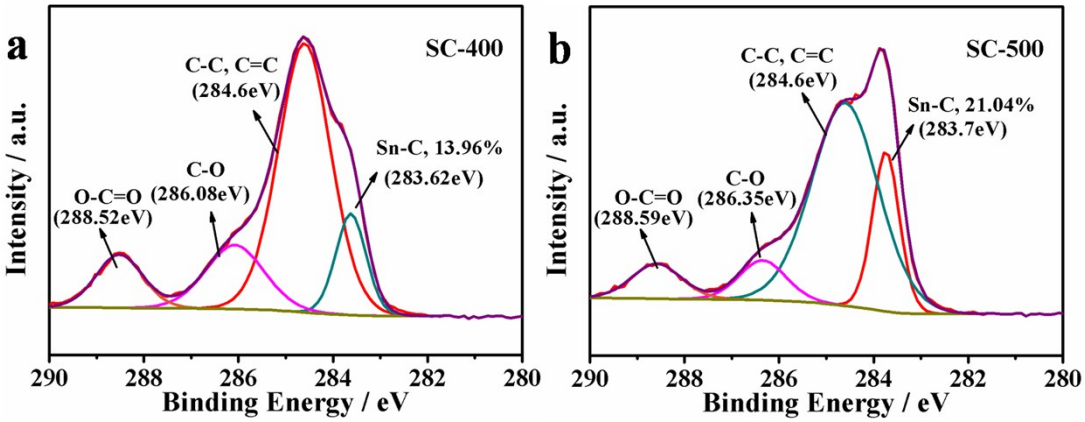

Fig. S2 The second test of C 1s spectra of (a) SC-400 and (b) SC-500.

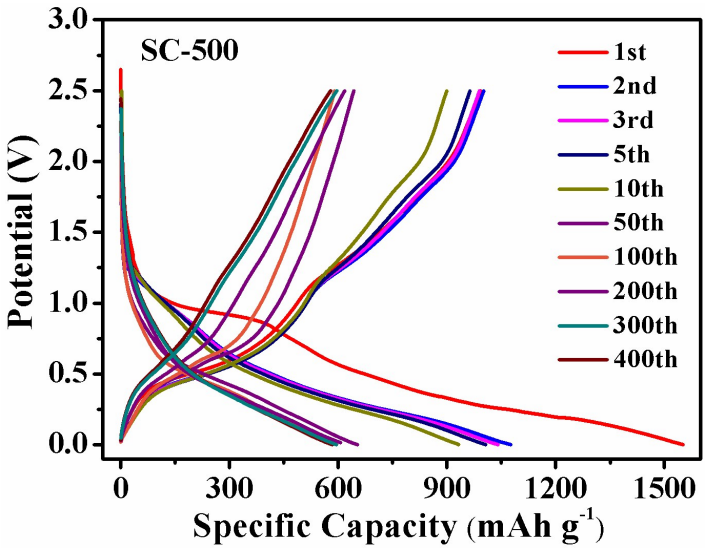

Fig. S3 Charge/discharge voltage profiles of SC-500 composite for the 1 st, 2 nd, 3 rd, 5 th, 10 th, 50 th, 100 th, 200 th, 300 th and 400 th cycles at 200 mA g^{-1}.

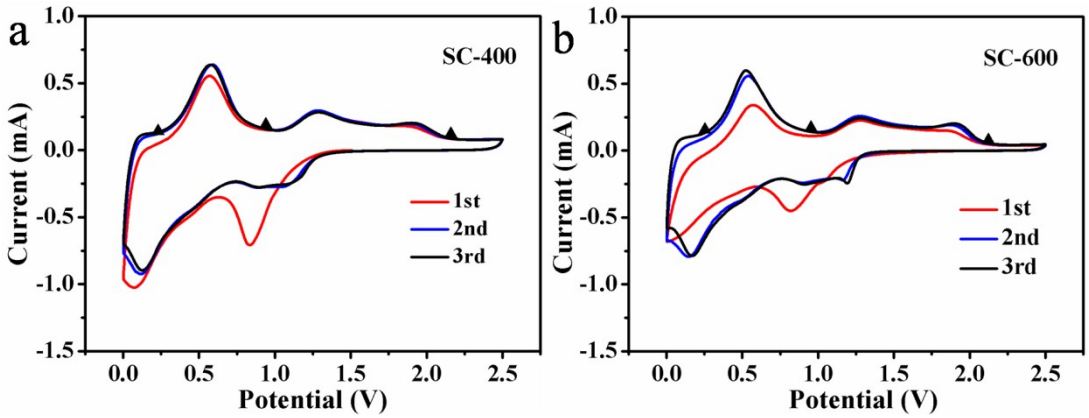

Fig. S4 The cyclic voltammetry curves of (a) SC-400 and (b) SC-600 composite electrodes at 0.1 mV s^{-1} in the potential range 0.001-2.5 V.

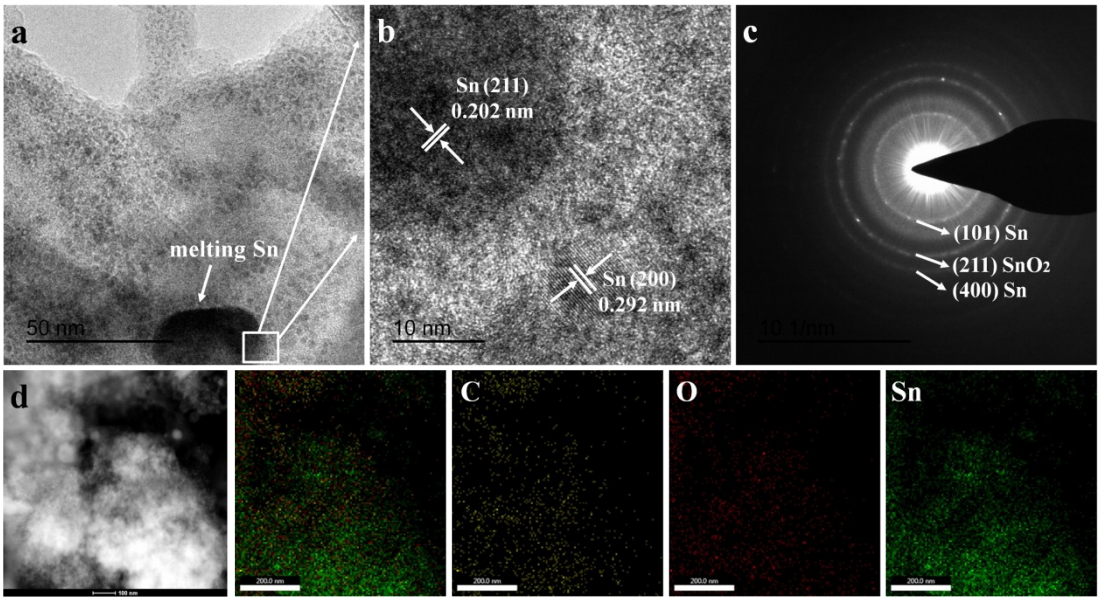

Fig. S5 (a) TEM, (b) high-resolution TEM and (c) SAED pattern of SC-400 electrode after 200 cycles; (d) is the STEM image of the SC-400 composite and the corresponding C, O and Sn EDS elemental mapping.

In Fig. S4a, the SnO_2 pulverizes into many ultrafine nanoparticles after 200 cycles. In addition, a big particle is observed, which is well indexed to Sn (211) plane based on HRTEM image shown in Fig. S4b. Therefore, the big particle should be the melting Sn due to the high temperature at high resolution. The SAED pattern in Fig. S4c indicates that both Sn and SnO_2 exist in the cycled SC-400. The EDS elemental mapping suggests that the of Sn, O and C uniformly disperses.

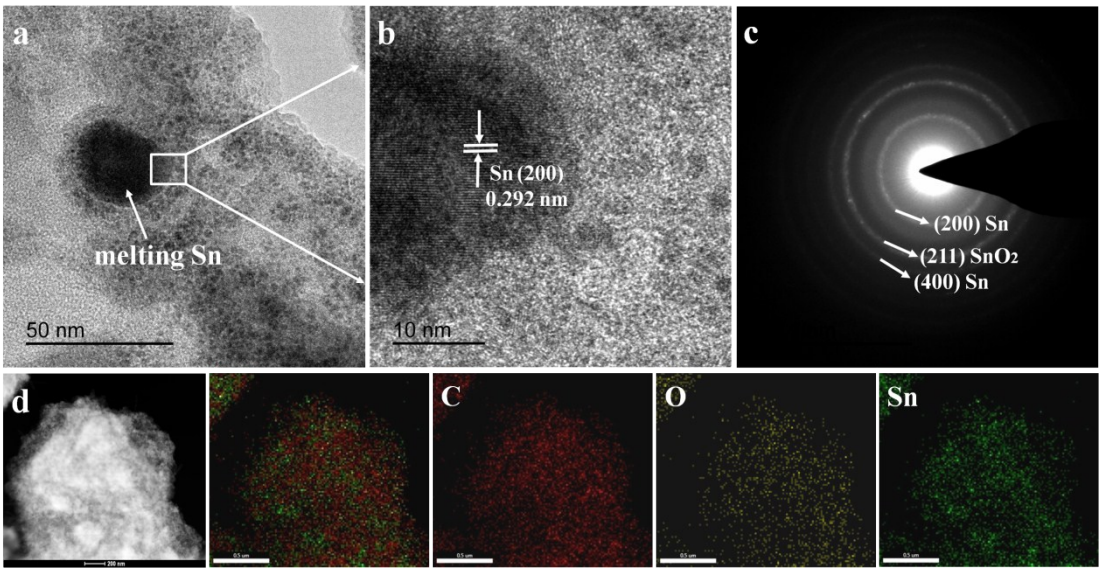

Fig. S6 (a) TEM, (b) high-resolution TEM and (c) SAED pattern of SC-600 electrode after 200 cycles; (d) is the STEM image of the SC-600 composite and the corresponding C, O and Sn EDS elemental mapping.

The situation in the SC-600 is similar to SC-400 that SnO_2 pulverizes into many small nanoparticles and part Sn melts into a big particle. In SAED pattern, both the Sn and SnO_2 phases are observed in the cycled electrodes. The homogeneous distribution of the Sn, O and C elements can be seen in the EDS elemental mapping.