Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting information

Sn-C bond on the interface of $Sn_2Nb_2O_7$-Super P nanocomposite for enhanced electrochemical performance

Xingang Kong[a]*, Jiarui Zhang[a], Qinqin Gong[a], Jianfeng Huang[a]*, Lixiong Yin[a], Jiayin Li[a], Qi Feng[ab]

[a] School of Materials Science and Engineering, Shaanxi University of Science and Technology, Weiyang, Xi'an, Shaanxi 710021, PR China

[b] Department of Advanced Materials Science, Faculty of Engineering, Kagawa University, 2217-20 Hayashi-cho, Takamatsu-shi, 761-0396 Japan

E-mail: yezhu_1983@163.com, huangjf@sust.edu.cn

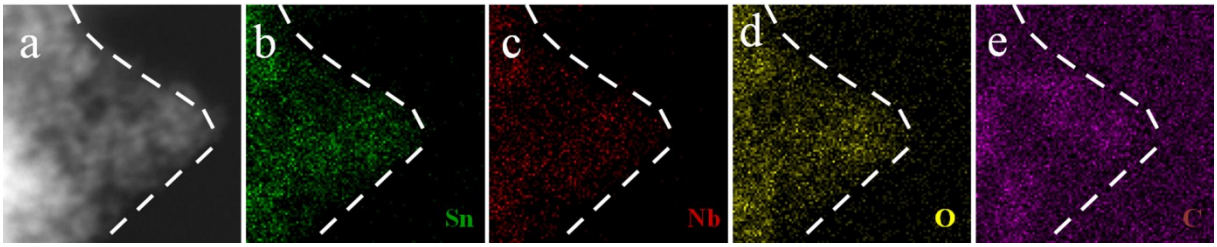

Fig. S1. (a) STEM of SNO-SP and corresponding elemental mapping of (b) Sn, (c) Nb, (d) O and (e) C.

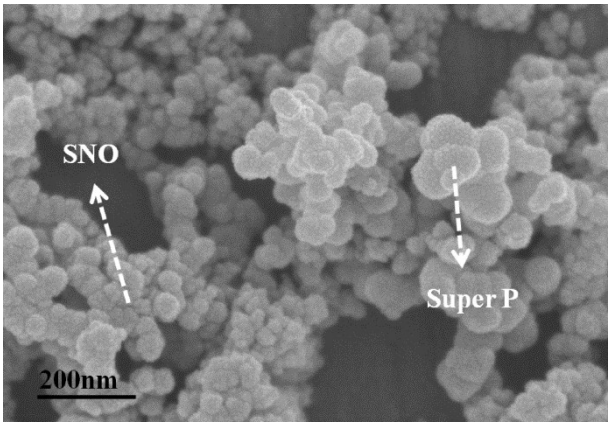

Fig. S2. The FE-SEM image of Mixture sample.

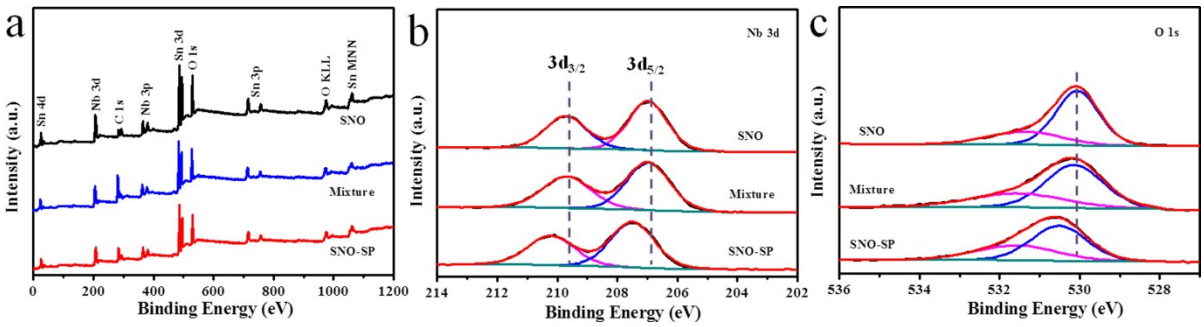

Fig. S3. (a) Survey spectrum, (b) Nb 3d and (c) O 1s spectrum of SNO, Mixture and SNO-SP.

The surface chemical compositions and chemical states of SNO, Mixture and SNO-SP are analyzed through X-ray photoelectron spectroscopy (XPS). Fig. S3a shows the survey spectra of SNO-SP and mixture, suggesting the existence of Sn, Nb, O and C elements. As shown in Fig. S3b, the spin orbit separation of Nb 3d is 2.8 eV and the Nb $3d_{5/2}$ core level peak appears at 206.8 eV, indicating that the oxidation state of Nb element in the mixture is Nb^{5+}. The high resolution O 1s spectra exhibits two obvious peaks located at 530.5 and 531.6 eV, respectively (Fig. S3c). The former binding energy

peak is associated with the O 1s core level of the O^{2-} anions in the SNO crystal lattice, and the latter binding energy peak could be attributed to surface adsorbed oxygen, such as hydroxyl species.

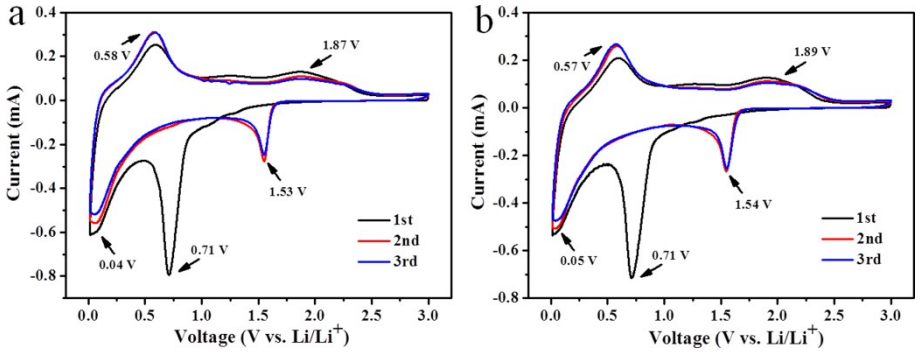

Fig. S4. The cyclic voltammetry curves at 0.1 mV s^{-1} of (a) Mixture and (b) SNO.

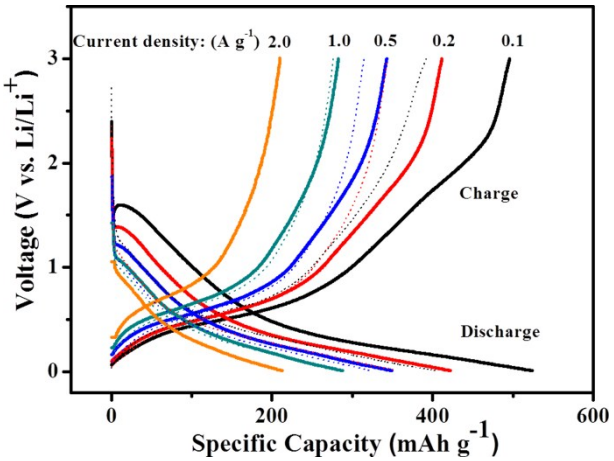

Fig. S5. The galvanostatic charge-discharge profiles of SNO-SP at various current densities.

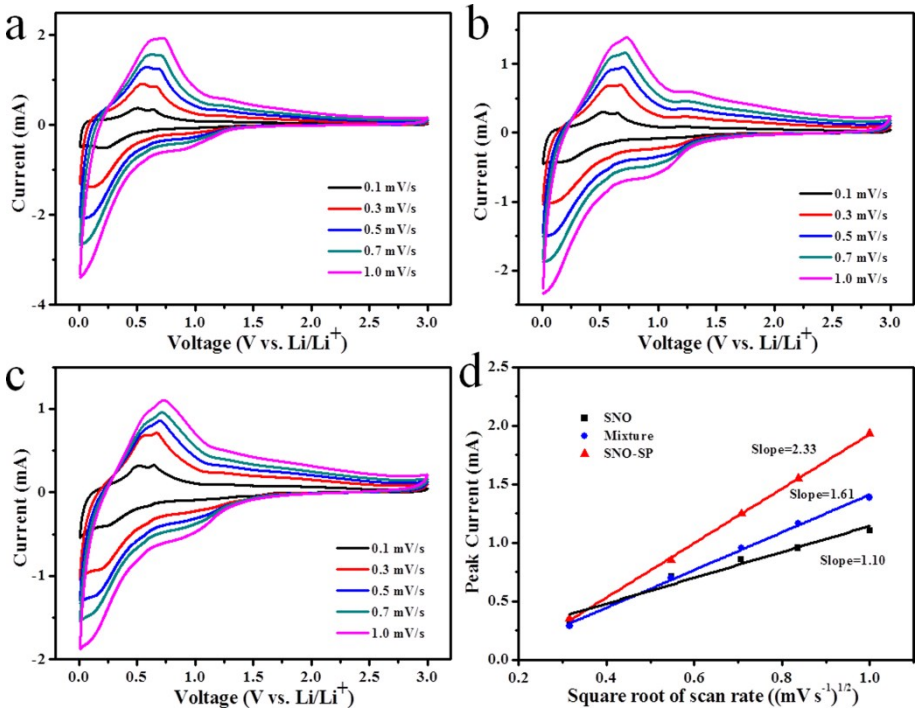

Fig. S6. The CV curves of (a) SNO-SP, (b) Mixture and (c) SNO electrodes after 100 cycles at different scan rate ranging from 0.1 to 1.0 mV^{-1}, (d) corresponding cathodic peak current versus the square root of the scan rates.