Supporting Information for

Spherical Sn-Fe_3O_4@graphite composite as long-life and high-rate-capability anode for lithium ion batteries

Hanyin Zhang[1], Renzong Hu[1]*, Hui Liu[1], Wei Sun[1], Zhongchen Lu[2], Jiangwen Liu[1], Lichun Yang[1], Yao Zhang[3], Min Zhu[1]

[1]Guangdong Provincial Key Laboratory of Advanced Energy Storage Materials, School of Materials Science and Engineering, South China University of Technology, Guangzhou 510640, China

[2] School of Mechanical and Automotive Engineering, South China University of Technology, Guangzhou 510640, China

[3]Cell technology research center, Sunwoda Electronic Co., Ltd, Shenzhen 518107，China

*Corresponding author.

E-mail address: msrenzonghu@scut.edu.cn

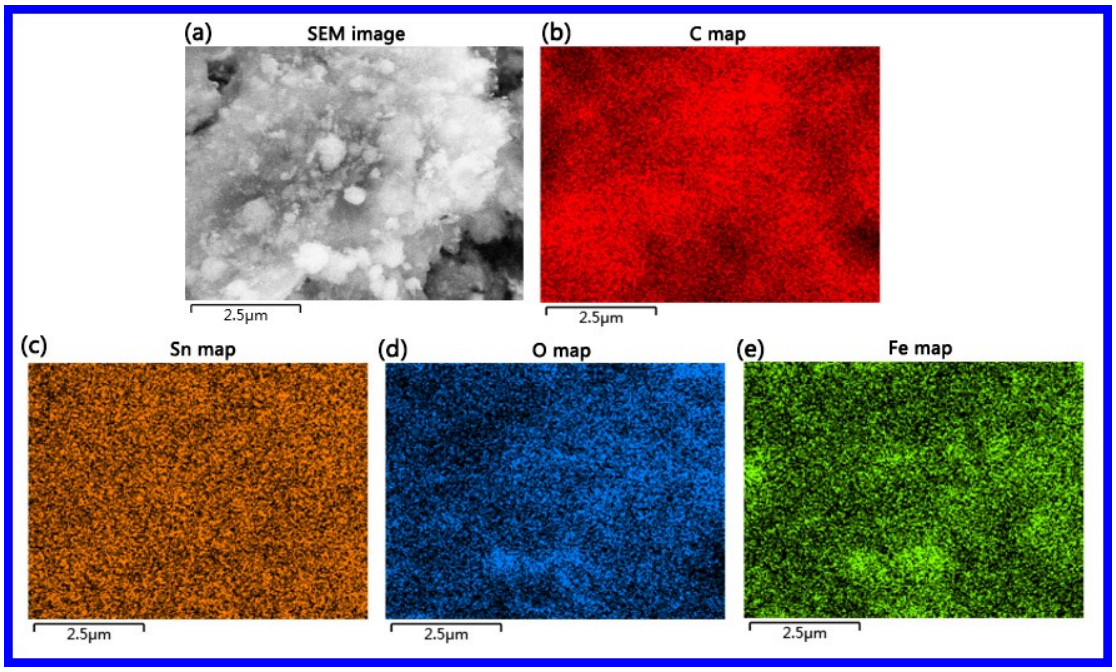

Fig. S1 (a) The SEM image of the Sn-Fe_3O_4@G composite powder, and the corresponding elemental mapping of (b) C, (c) Sn, (d) O and (e) Fe.

Compared with the elemental mapping of C dispersion (**Fig. S1 (b)**) and the SEM image (**Fig. S1 (a)**), it can prove that the sheet shape matrix is graphite. Moreover, it is clear that the dispersion of Sn is highly homogenous (**Fig. S1 (c)**). It is contributed to the combined effects of heating and stress during the P-milling process. The same dispersion of O (**Fig. S1 (d)**) and Fe (**Fig. S1 (e)**) represents the distribution of the Fe_3O_4. The Sn and Fe_3O_4 particles mainly disperse within the graphite matrix.

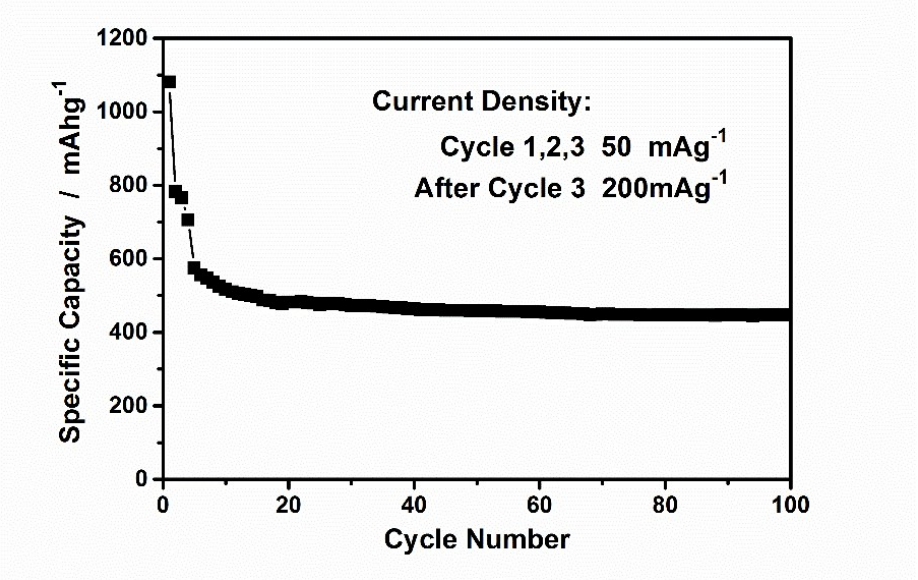

Fig. S2 The cycling performances of the Sn-Fe_3O_4@C composites at potential range between 0.01-2V.

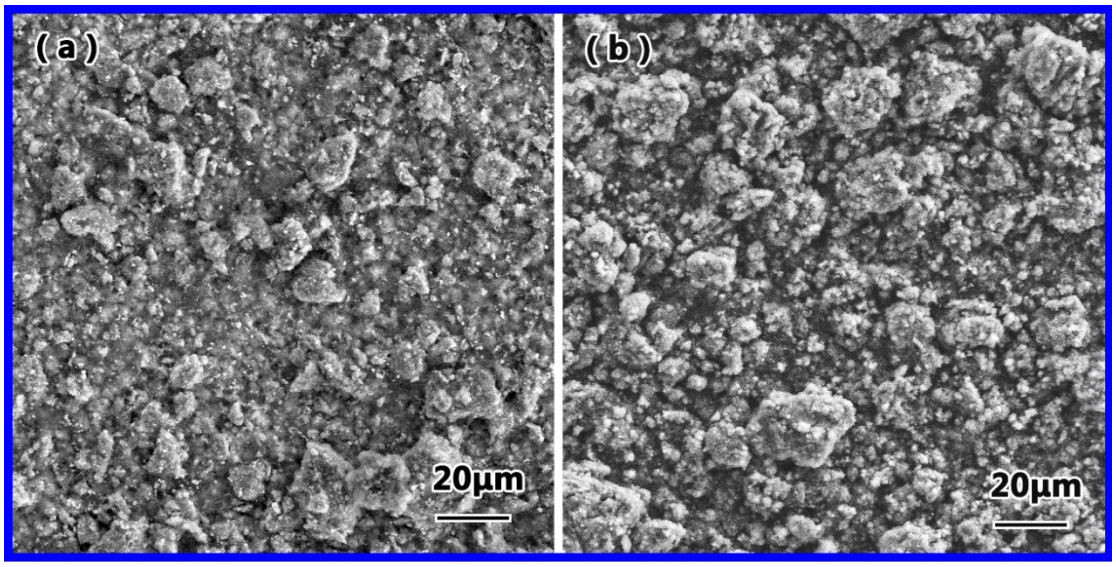

Fig. S3 The comparative morphology evolution of the electrode surface for the Sn-Fe_3O_4@C composite electrodes: the secondary electron SEM images of (a) the pristine Sn-Fe_3O_4@C composite electrode and (b) the Sn-Fe_3O_4@C composite electrode for 50 cycling tests.