

Three-dimensional bi-conductive Si-based anode for high-performance lithium ion battery

Yangqiang Jiang^{a,1}, Feng Xiang^{a,1}, Shijun Fan^{*a}, Zixu Sun^{*b},

^a*Sichuan Changhong Battery Co., Ltd.*

^b*Key Lab for Special Functional Materials of Ministry of Education, National and Local Joint Engineering Research Center for High-Efficiency Display and Lighting Technology, School of Materials Science and Engineering, Collaborative Innovation Center of Nano Functional Materials and Applications, Henan University, Kaifeng 475004, People's Republic of China*

¹Y. J. and F. X. contributed equally to this work.

*Corresponding author.

E-mail address: fsj7254@sina.com (S. Fan); sunzixu317@163.com (Z. Sun);

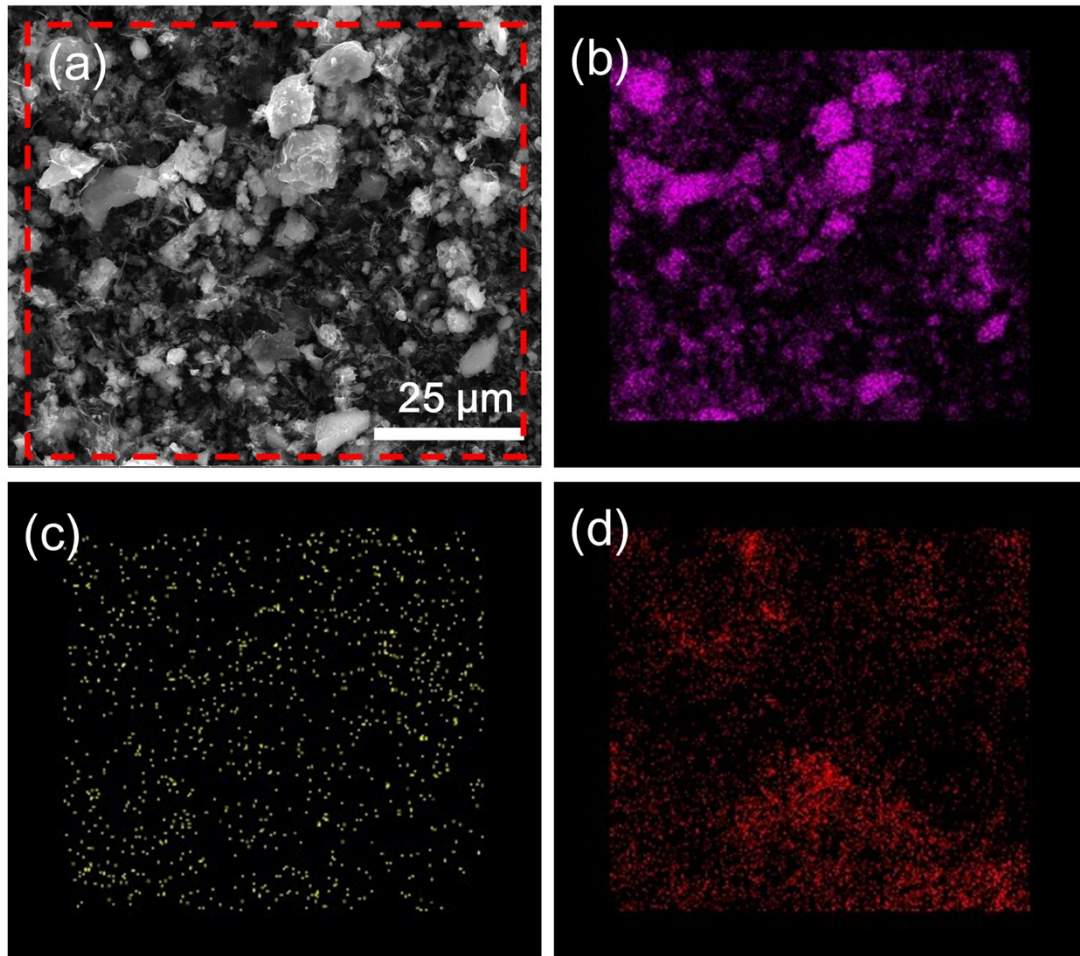


Fig. S1 (a) EDS mapping of the SCC/RGO/CNT composite, (b) Si, (c) Cu and (d) C.

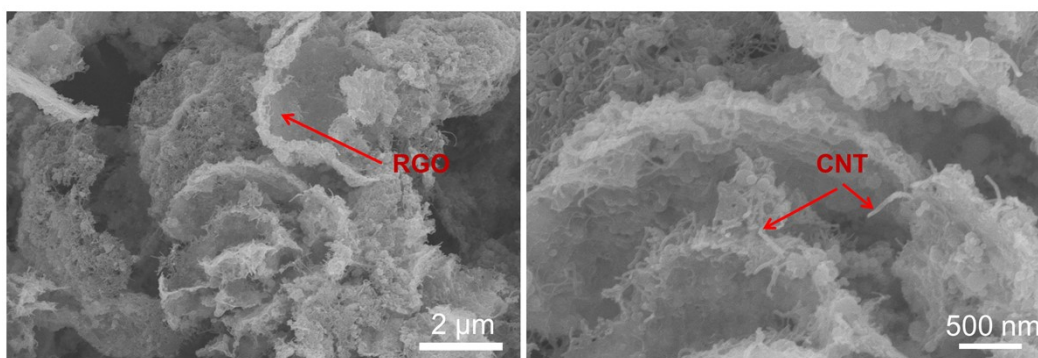


Fig. S2 SEM image of the 3D SCC/RGO/CNT composite.

Table. S1 the element content of the SCC/RGO/CNT composite by the EDX.

Element	C (K)	Si (K)	Cu (K)
Weight %	15.57	69.86	14.57
Atomic %	32.25	56.78	10.97

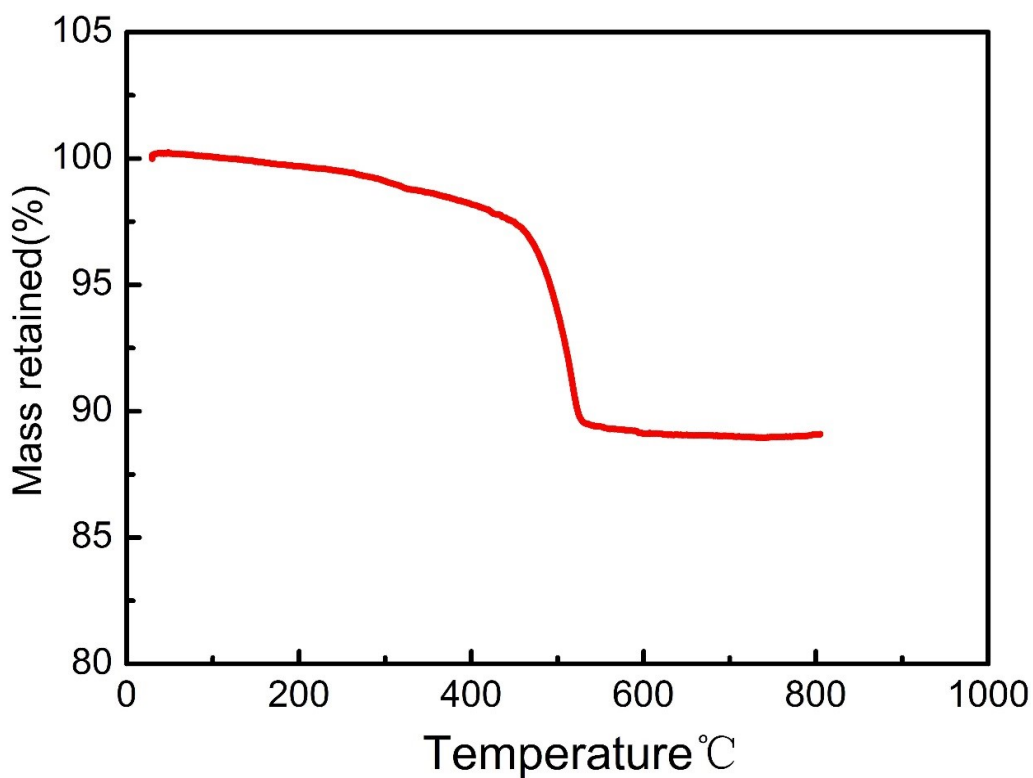


Fig. S3 TGA curve of the SCC/RGO/CNT composite.

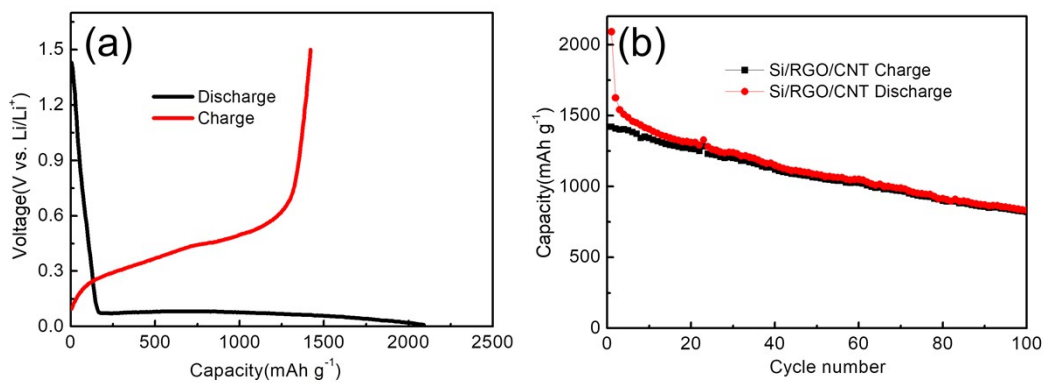


Fig. S4 (a) The first charge/discharge of the Si/RGO/CNT electrode at 2 A/g, (b) Cycling performance of the Si/RGO/CNT electrode at 2 A/g.

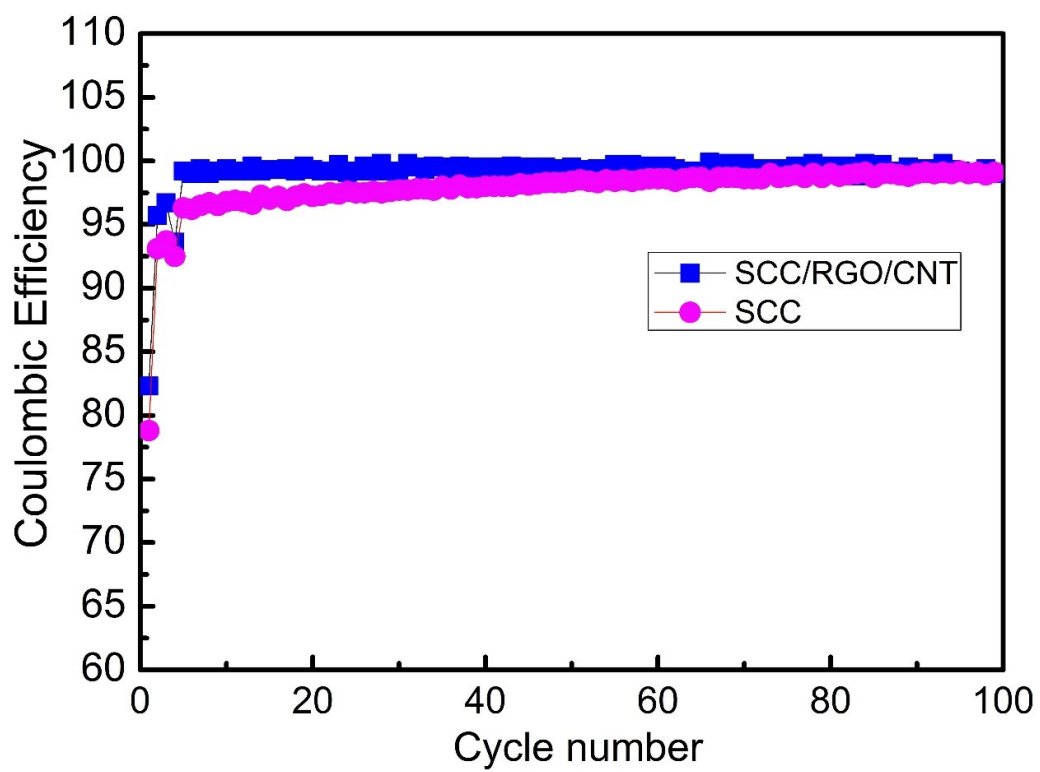


Fig. S5 Coulombic efficiency of the two composites.

Table. S2 the values of the two composites for the first cycle.

Composite	Discharge capacity (mAh/g)	Charge capacity (mAh/g)	CE (%)
SCC	3187.9	2511.1	78.8
SCC/RGO/CNT	2702	2224.9	82.3

CE: coulombic efficiency.

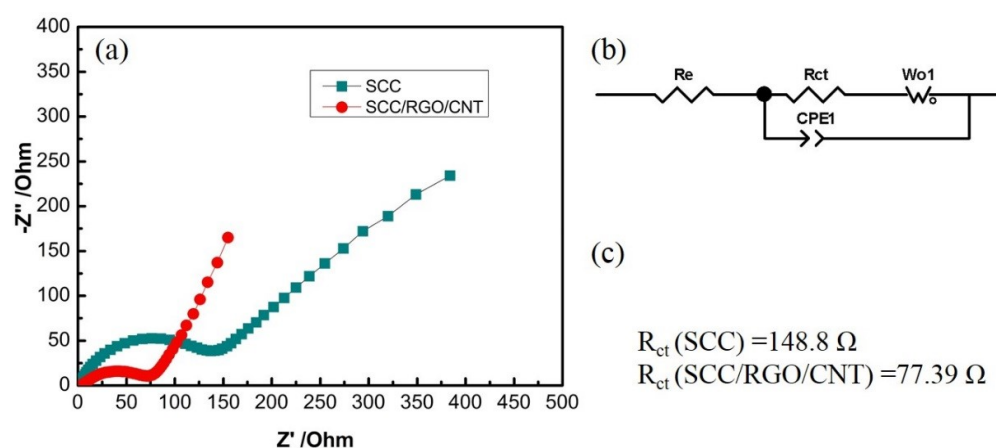


Fig. S6 (a) Nyquist plots of the two electrodes after one charge-discharge cycle at 50 mA/g. obtained after charging to 1.5 V, (b) the equivalent electrical circuit of two electrodes. (c) The values of R_{ct} of two electrodes.

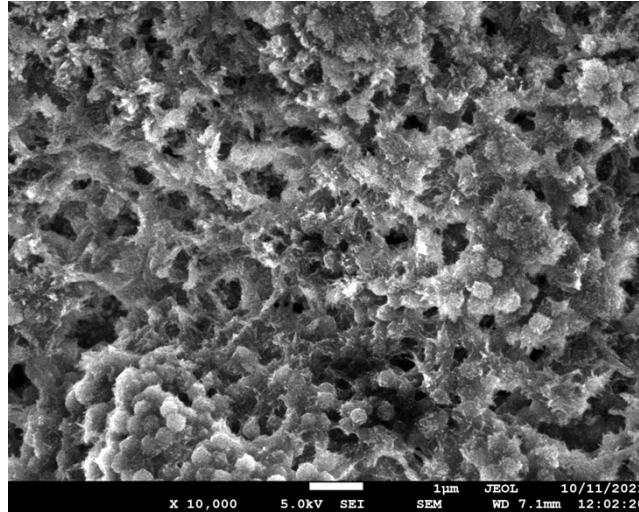


Fig. S7 the SEM image of the electrode after cycling performance.

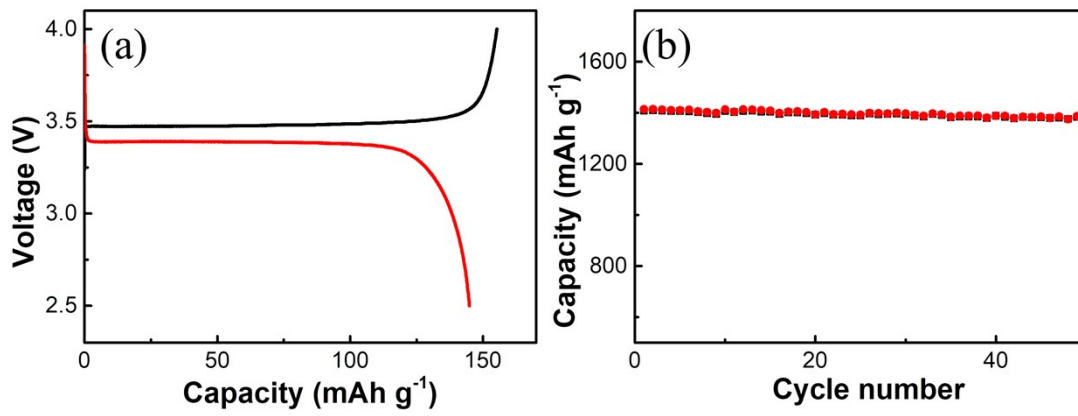


Fig. S8 (a) The charge-discharge profile of the LiFePO₄ electrode. (b) The cycle performance of the full cell at 2 A g⁻¹.