

Supplementary Information

Solvothermal-induced 3D Macroscopic SnO₂/Nitrogen-doped

Graphene Aerogels for High Capacity and Long-life Lithium Storage

Ronghua Wang, Chaohe Xu, Jing Sun *, Lian Gao and Heliang Yao

E-mail: jingsun@mail.sic.ac.cn

Tel: +86 21 52414301. Fax: +86 21 52413122.

The State Key Lab of High Performance Ceramics and Superfine Microstructure,
Shanghai Institute of Ceramics, Chinese Academy of Sciences, 1295 Ding Xi Road,
Shanghai 200050

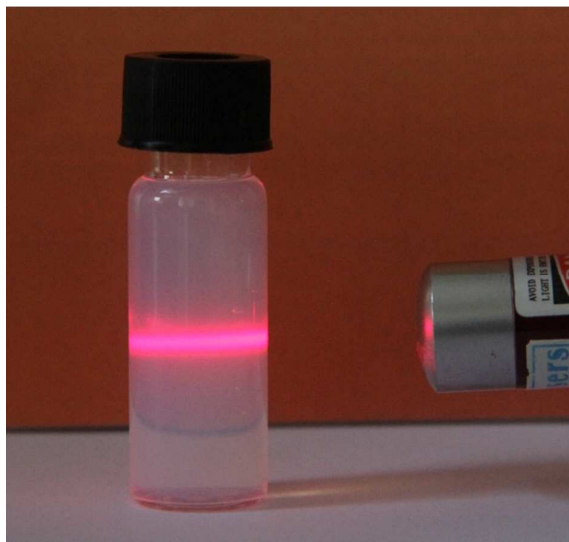


Figure S1. A photograph of SnO₂ dispersion. The tyndall effect confirms the colloidal nature of the SnO₂ dispersions.

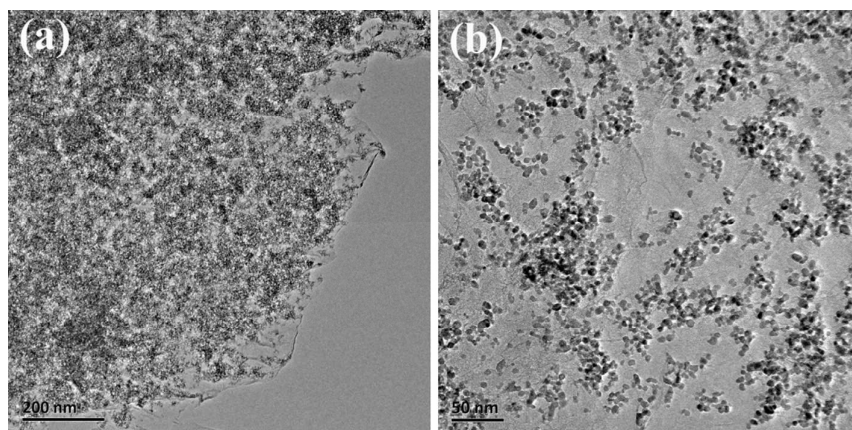


Figure S2. TEM images of SnO₂/GO.

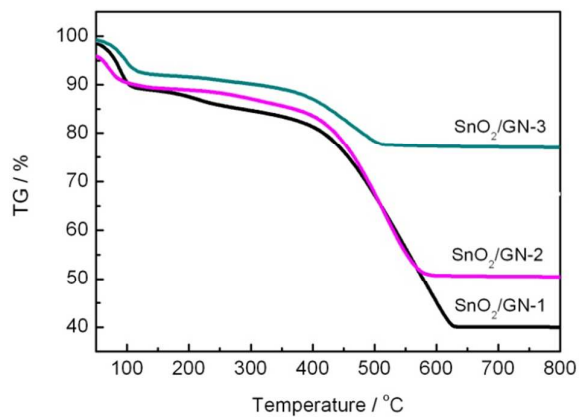


Figure S3. TG curves of SnO₂/GN. The weight contents of GN and SnO₂ are calculated by getting rid of the weight loss of adsorption water.

For SnO₂/GN-1:

$$C_{GN} = 1 - \frac{C_{SnO_2}}{1 - C_{H_2O}} = 1 - \frac{0.4002}{1 - 0.0953} = 55.76\%$$

For SnO₂/GN-2:

$$C_{GN} = 1 - \frac{C_{SnO_2}}{1 - C_{H_2O}} = 1 - \frac{0.5043}{1 - 0.0957} = 44.23\%$$

For SnO₂/GN-3:

$$C_{GN} = 1 - \frac{C_{SnO_2}}{1 - C_{H_2O}} = 1 - \frac{0.7700}{1 - 0.0538} = 18.62\%$$

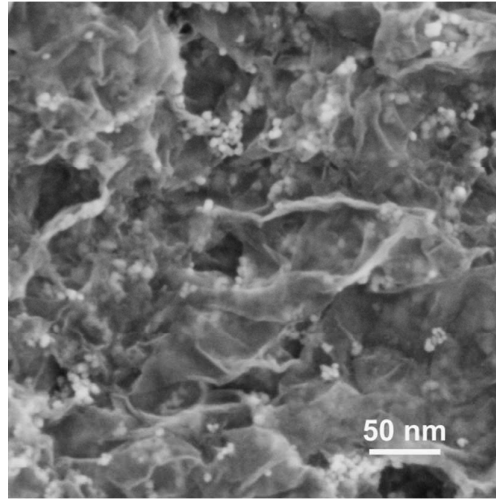


Figure S4. A high-magnified SEM image of SnO₂/GN-2. As it shows, SnO₂ nanoparticles, with an ultra-small size of 3-7 nm, were uniformly dispersed within the hybrid.

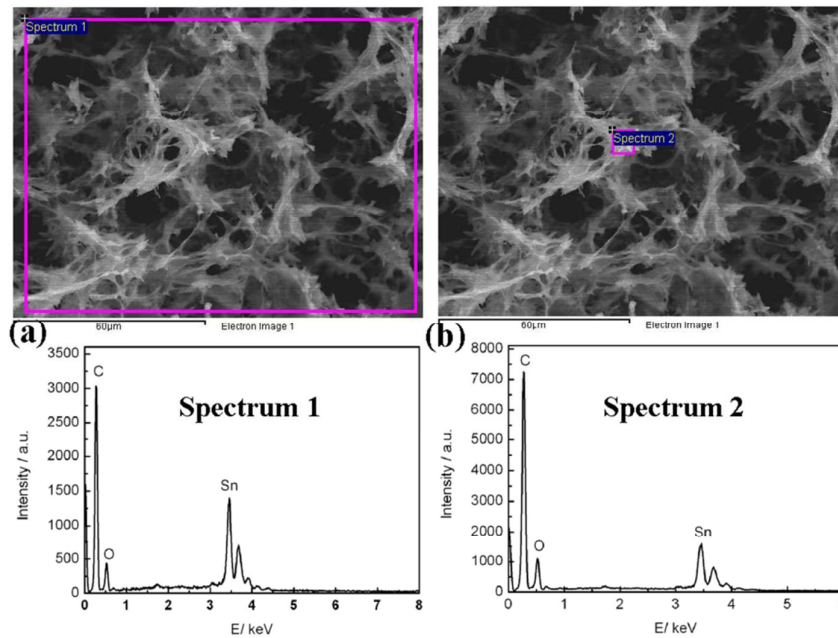


Figure S5. EDS spectra of $\text{SnO}_2/\text{GS-2}$ aerogel in different regions. The chemical composition verified by EDS can confirm the existence of SnO_2 .

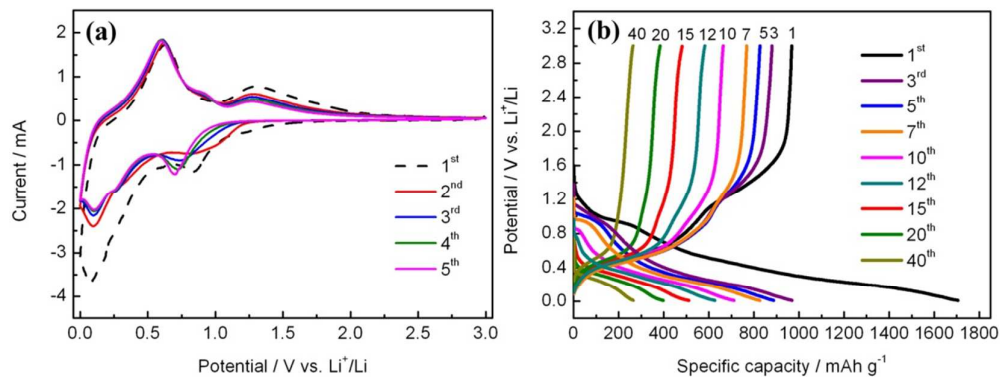


Figure S6. (a) Cyclic voltammograms for the first five cycles of pure SnO_2 electrode;
(b) charge-discharge profiles of pure SnO_2 electrode at a current density of 500 mA g^{-1} .

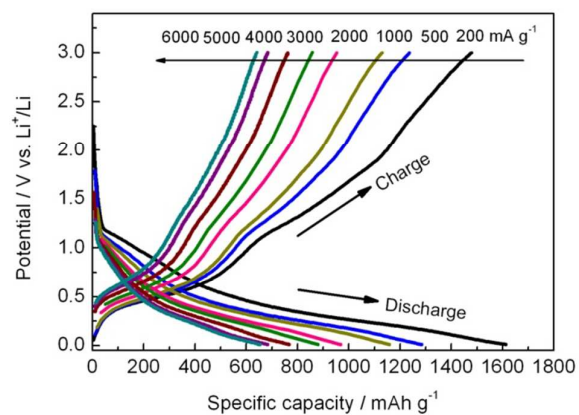


Figure S7. The charge/discharge curves of SnO₂/GN-2 at various current densities.

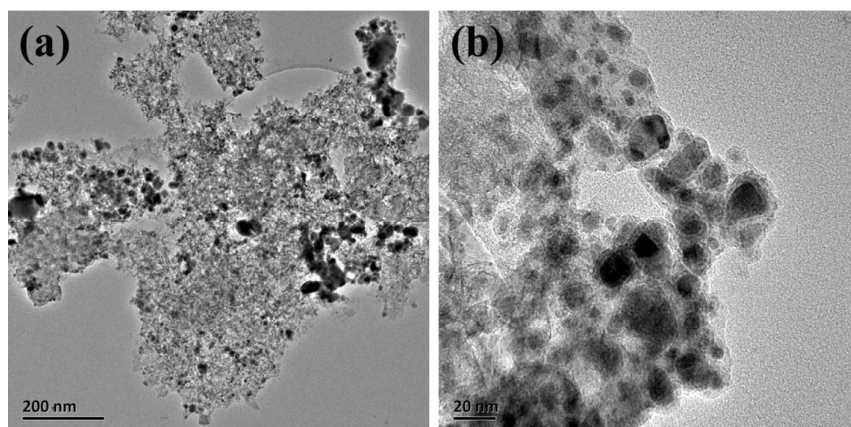


Figure S8. TEM images of pure SnO₂ electrode after cycling at 500 mA g⁻¹.

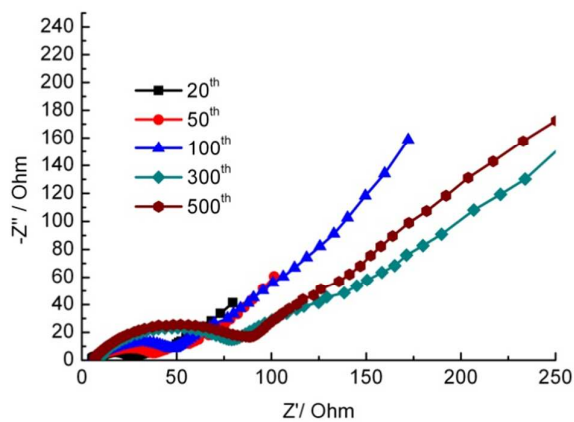


Figure S9. Nyquist plots of pure SnO₂ electrode after specific cycles.

Table S1. EIS fitting results of SnO₂/GN electrode after specific cycles.

Cycles	Rs	CPE1-T	CPE1-P	R _{SEI}	CPE2-T	CPE2-P	R _{ct}
20 th	6.059	0.0003355	0.5866	16.75	0.008287	0.7458	8.087
50 th	5.829	0.0003231	0.5837	18.50	0.005880	0.7590	10.77
100 th	6.301	0.0002272	0.6173	17.58	0.005779	0.7567	9.247
300 th	5.202	0.0004779	0.5311	15.66	0.007696	0.6877	9.419
500 th	4.705	0.0006103	0.5299	12.82	0.006613	0.7835	7.684