Supporting information

A Facile Synthesis of Carbon-Coated Silicon/Graphite Spherical Composites for High-Performance Lithium-Ion Batteries

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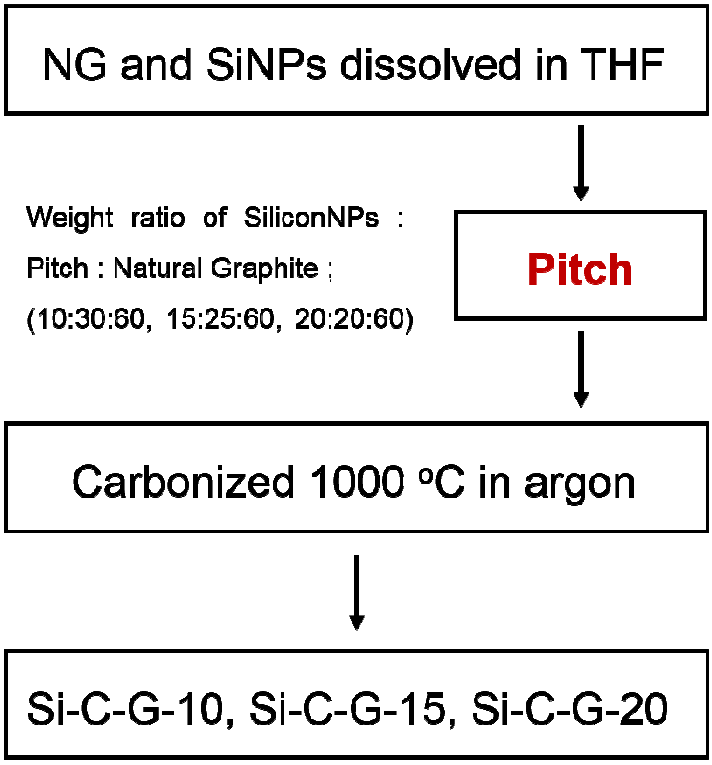

Figure S1. Flow charts for the preparation of the various Si-C-G composites.

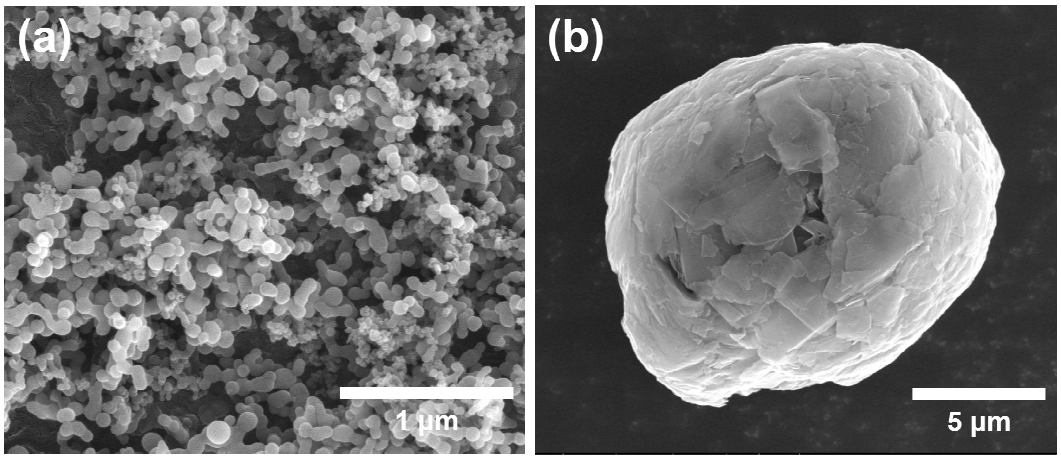

Figure S2. Field-emission scanning electron spectroscopy (FESEM) images for (a) silicon nanoparticles and (b) pristine natural graphite.

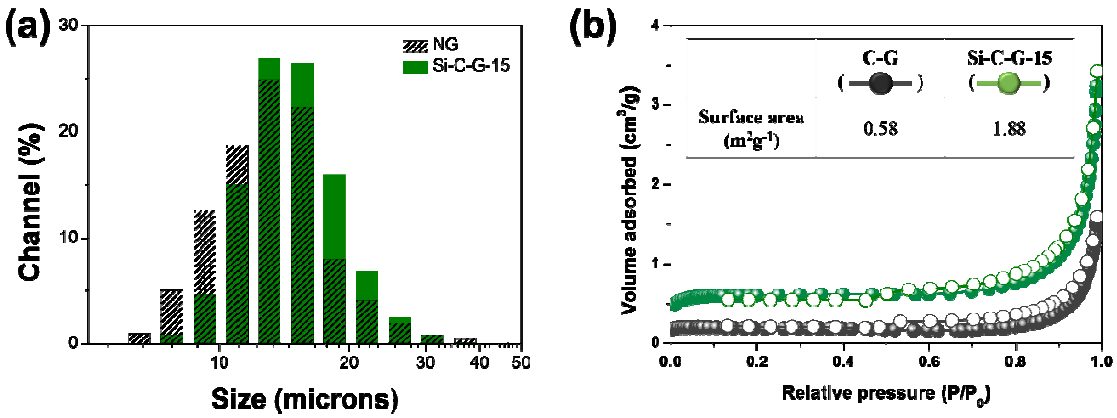

Figure S3. (a) Particle size distribution for Si-C-G-15 composite and (b) N_2 adsorption (open symbols) and desorption (solid symbols) isotherm of Si-C-G composite. The surface areas (S_{BET}) are denoted inside.

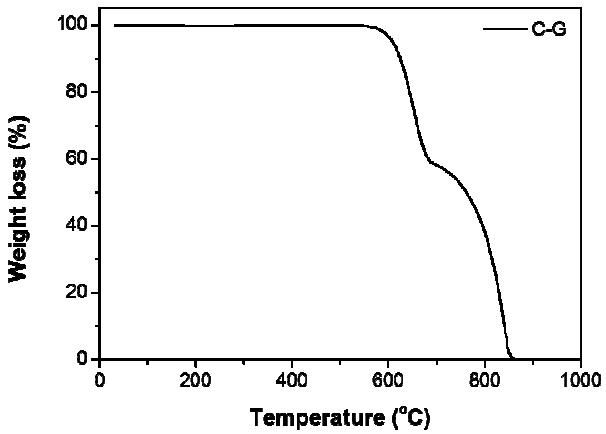

Figure S4. Thermogravimetric analysis curve of C-G composites.

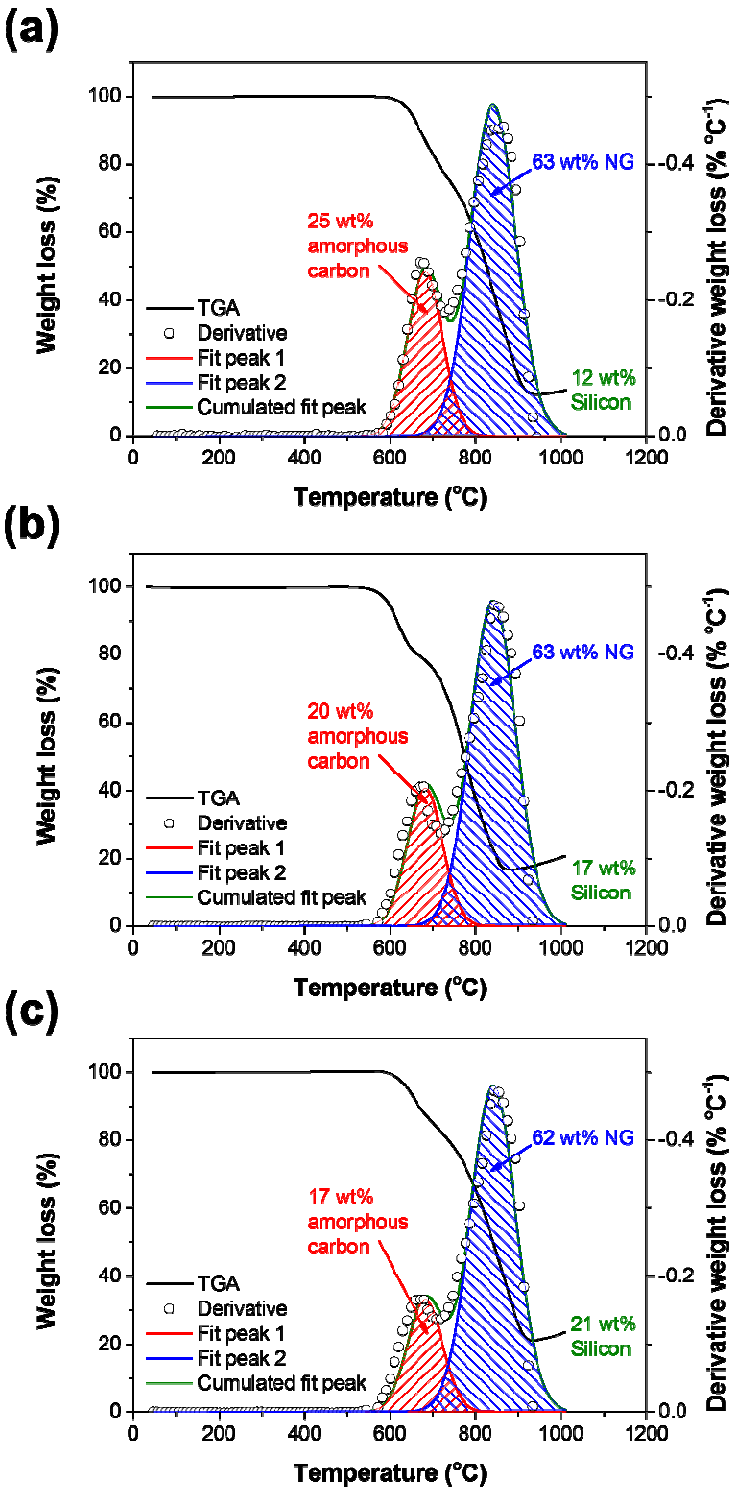

Figure S5. Thermogravimetric analysis curve of Si-C-G composites and de-convoluted peaks. (a) Si-C-G-10, (b) Si-C-G-15 and (c) Si-C-G-20.

Table S1. Thermogravimetric analysis of Si-C-G composites at the rate 5 °C min^{-1} in air.

	Natural graphite (wt. %)	Amorphous carbon (wt. %)	Silicon (wt. %)
Si-C-G-10	63	25	12
Si-C-G-15	63	20	17
Si-C-G-20	62	17	21

Table S2. Summary of electrochemical properties of Si-C-G-10, Si-C-G-15, and Si-C-G-20 obtained at the first cycles.

	Charge capacity ($mA\ g^{-1}$)	Discharge capacity ($mA\ g^{-1}$)	Initial coulombic efficiency (%)
Si-C-G-10	737	606	82.2
Si-C-G-15	885	712	80.5
Si-C-G-20	1009	805	79.8

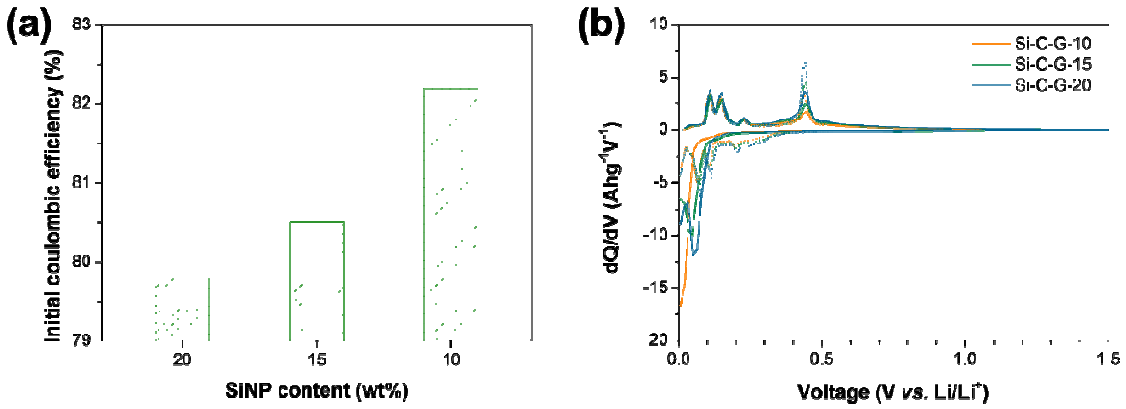

Figure S6. Electrochemical performance of Si-C-G-10, Si-C-G-15, and Si-C-G-20. (a) A comparison of initial coulombic efficiencies for the Si-C-G-10, Si-C-G-15, and Si-C-G-20 composite electrodes at the first cycle. (b) Differential capacity plots of galvanostatic voltage profiles during first (solid line) and second cycle (dash line).

Table S3. Specific capacity of the proposed Si-C-G composites obtained at different current densities. Retention refers to the capacity at a current density of 5.0 C as compared with that at a current density of 0.1C.

	0.1C	0.2C	0.5C	1C	2C	5C	Retention (%)
Si-C-G-10	637	626	617	608	596	569	89.3
Si-C-G-15	745	707	688	674	656	631	84.8
Si-C-G-20	816	772	746	723	697	661	81.1