Fig. S1 (a) FESEM image of IL-C-SiO$_2$ composite; (b) TEM image of IL-C-Si-HS composite; (c) FESEM image of G-C-SiO$_2$ composite; (d) TEM image and HRTEM image (inset) of G-C-Si composite.
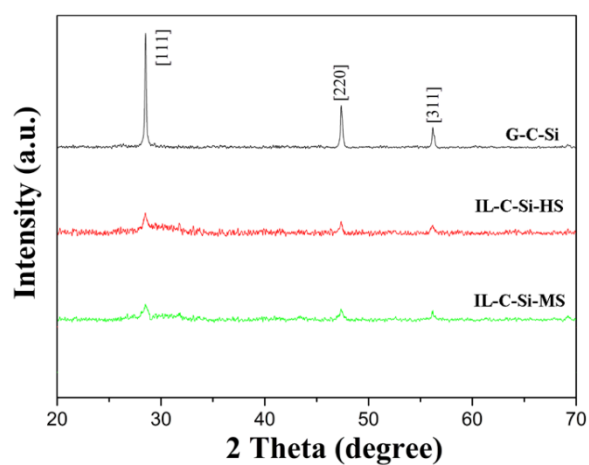

Fig. S2 XRD patterns of C/Si composites prepared in three different ways.
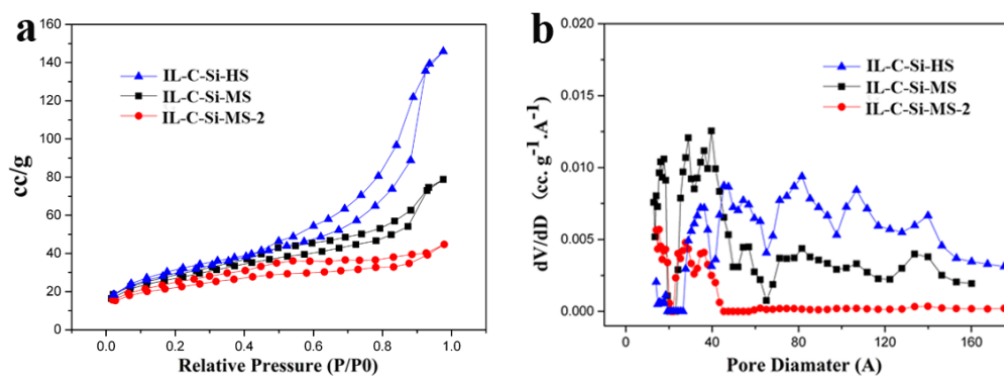
Fig. S3 (a) Nitrogen sorption isotherms of IL-C-Si-HS, IL-C-Si-MS and IL-C-Si-MS-2; (b) Pore-size distribution plots of IL-C-Si-HS, IL-C-Si-MS and IL-C-Si-MS-2 computed by the DFT method.
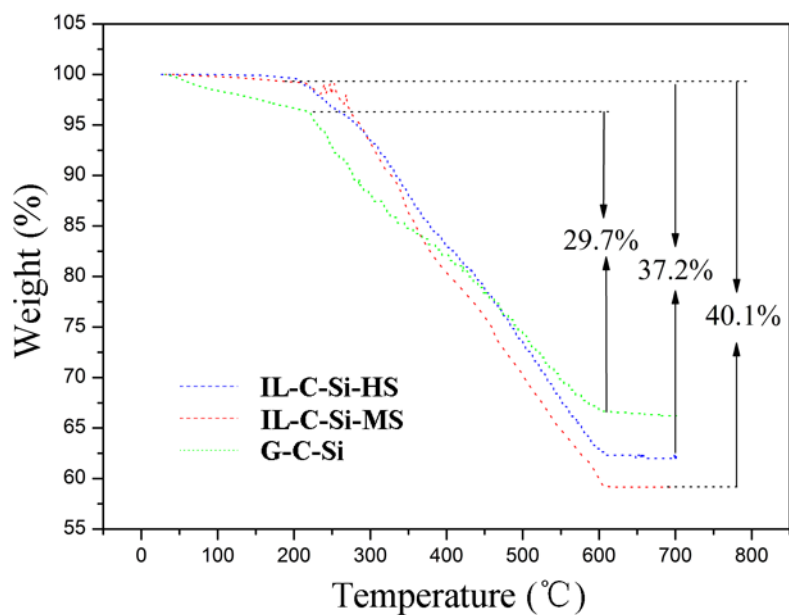

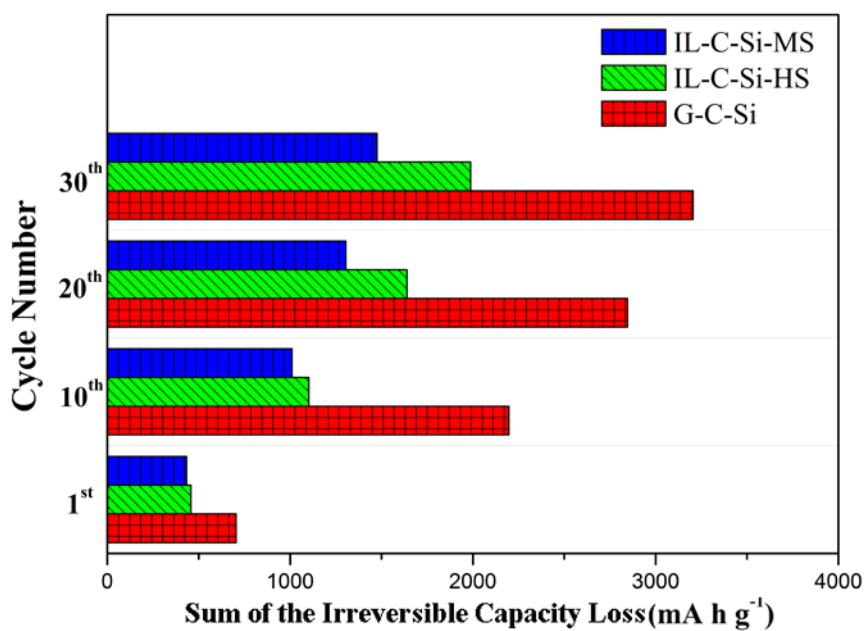**Fig. S4** TGA curves of different C/Si composites.

Fig. S5 Sum of irreversible capacity loss during the cycling of various carbon/silicon electrodes.

Table. S1 Physical properties from N_2 sorption isotherms for various silica and carbon/silicon products.

Sample	BET Surface Area (m^2.g^{-1})	Pore Volume (cc.g^{-1})	Pore diameter (nm)	Isotherm type	Hysteresis loop type
SiO$_2$ nanoparticles	719.2	0.439	1.5-2.5	I	H4
PEI-1-SiO$_2$	844	0.736	2.5-3.5	IV	H1
PEI-2-SiO$_2$	967	0.859	2.5-3.5	IV	H1
IL-C-Si-HS	165	0.254	3-14	IV	H1
IL-C-Si-MS	104	0.196	2-6	IV	H1
IL-C-Si-MS-2	67	0.057	2-4	II	H4