Supporting Information

Construction of 3D carbon networks with well-dispersed SiO_x nanodomains from gelable building blocks for lithium-ion batteries

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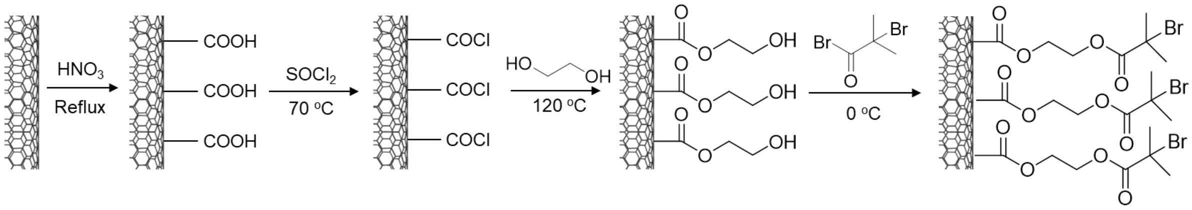

Fig. S1 Schematic representation of the process of introduction of Br-containing surface ATRP initiation sites for CNT.

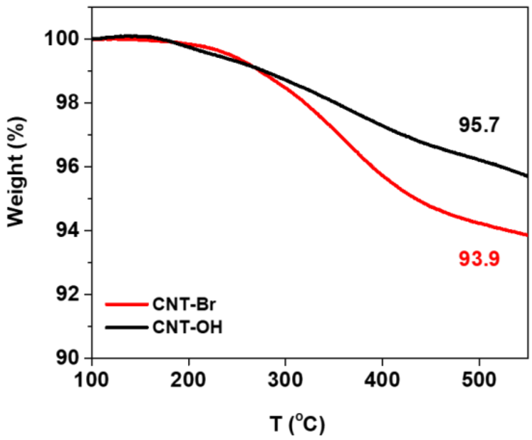

Fig. S2 TGA curves of CNT-NH_2 and CNT-Br in N_2 flow.

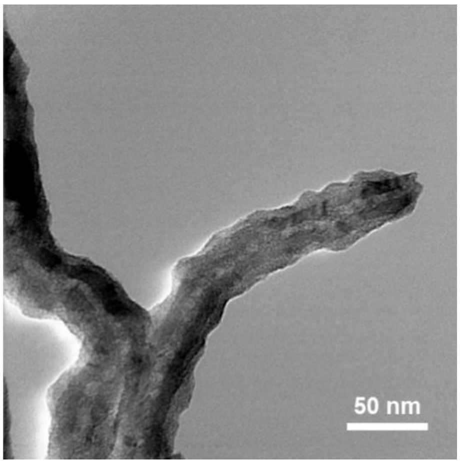

Fig. S3 TEM images of CNT-*g*-*x*PTEPM.

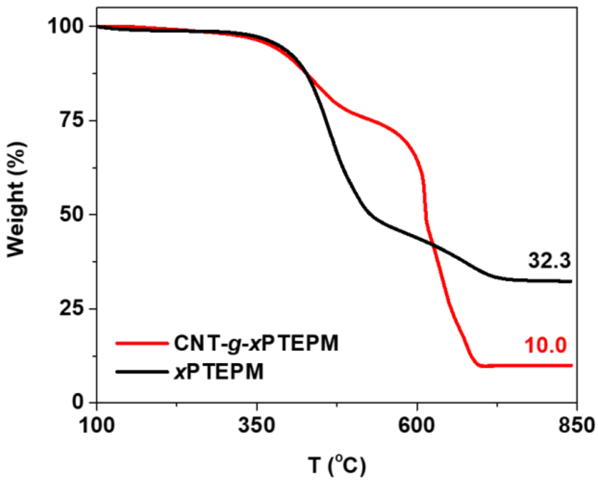

Fig. S4 TGA curves of CNT-*g*-*x*PTEPM and *x*PTEPM in O_2 flow.

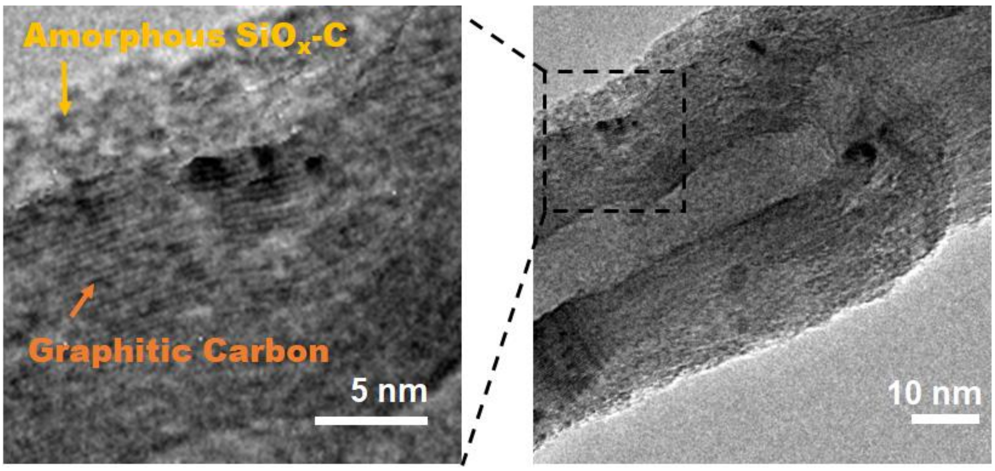

Fig.S5 High-resolution TEM image of CNT@SiO_x-C.

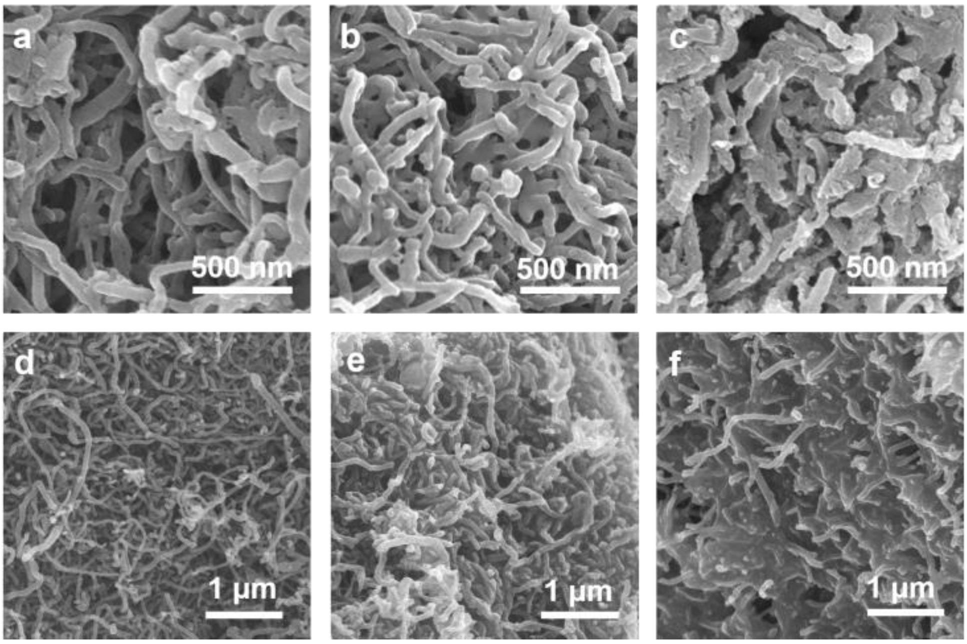

Fig.S6 SEM images of CNT-*g*-*x*PTEPM with different polymerization time of (a) 12 h, (b) 24 h, (c) 48 h and CNT@SiO_x-C with different polymerization time of (d) 12 h, (e) 24 h, (f) 48 h, respectively.

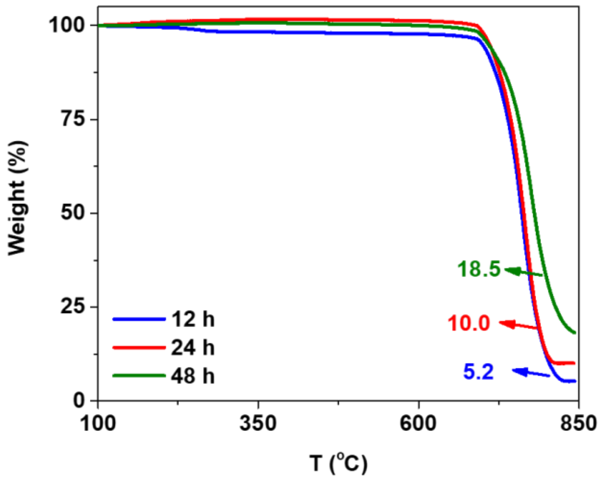

Fig. S7 TGA curves of synthesized CNT@SiO_x-C with different polymerization time.

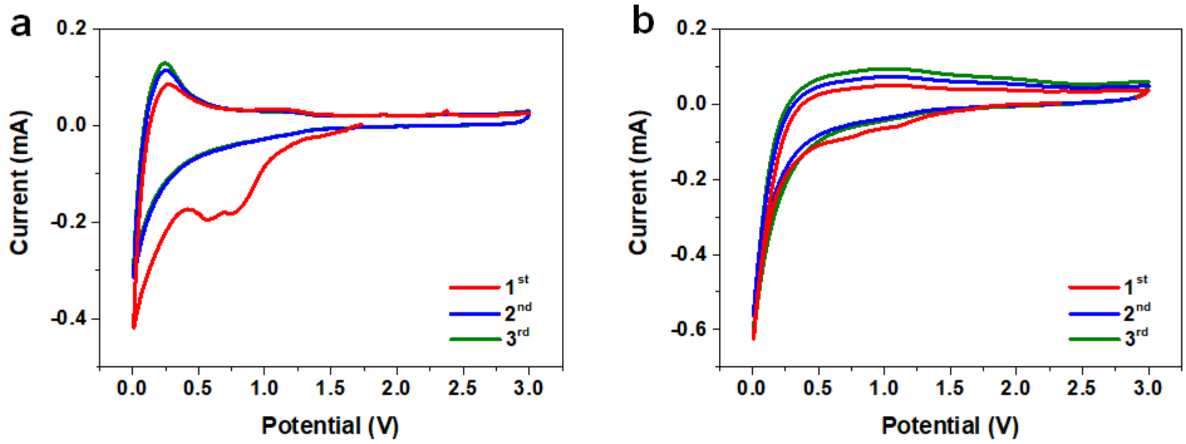

Fig. S8 Cyclic voltammograms of a half-cell composed of (a) SiO_x-C and (b) CNT vs. Li/Li^+ at a scan rate of 0.5 mV s^{-1} during the first 3 cycles.

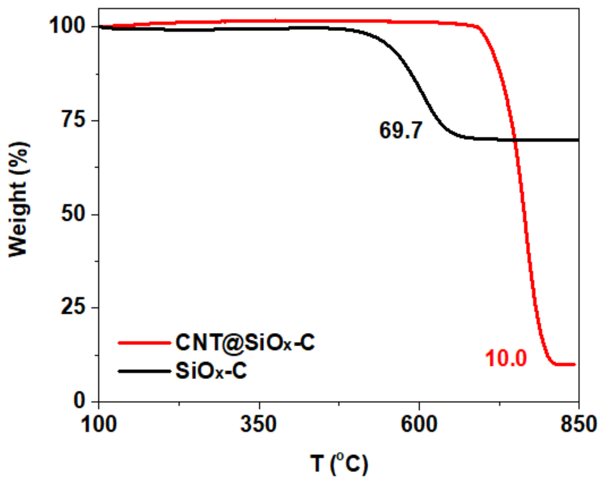

Fig. S9 TGA curves of CNT@SiO_x-C and SiO_x-C in O_2 flow.

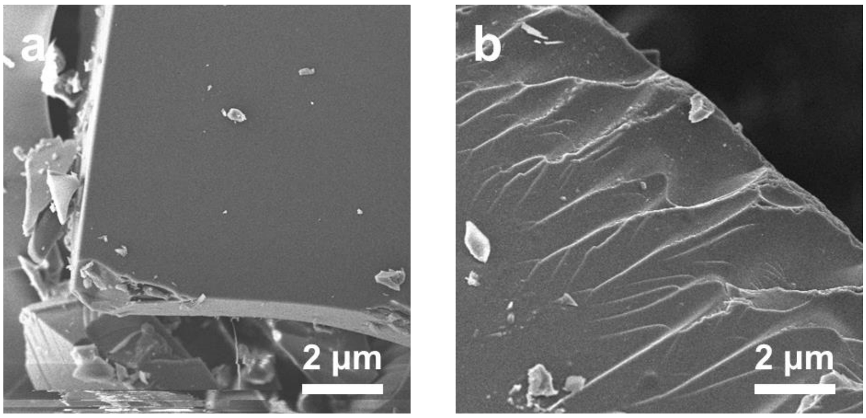

Fig. S10 SEM images of (a) *x*PTEPM and (b) SiO_x-C.

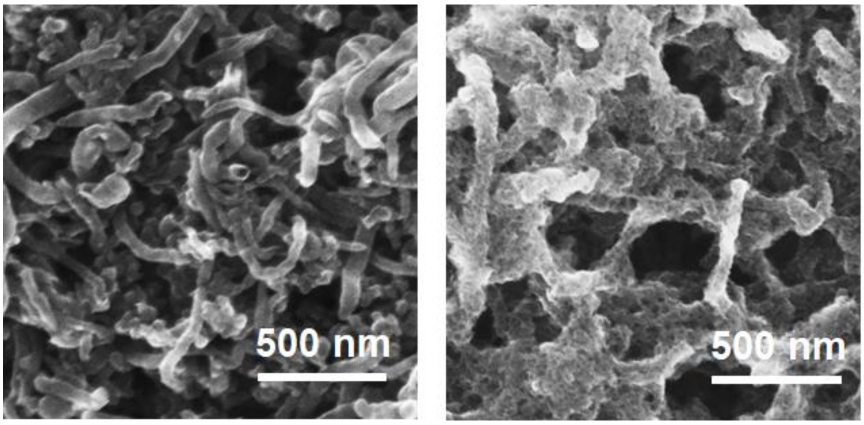

Fig. S11 SEM images of CNT@SiO_x-C electrode (a) before cycling and (b) after 50 cycles.

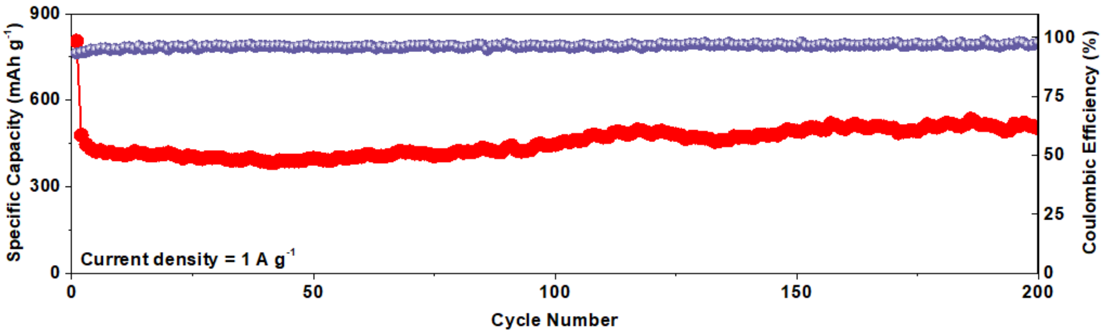

Fig. S12 Cycling performance of CNT@SiO_x-C at the current of 1 A g^{-1}.

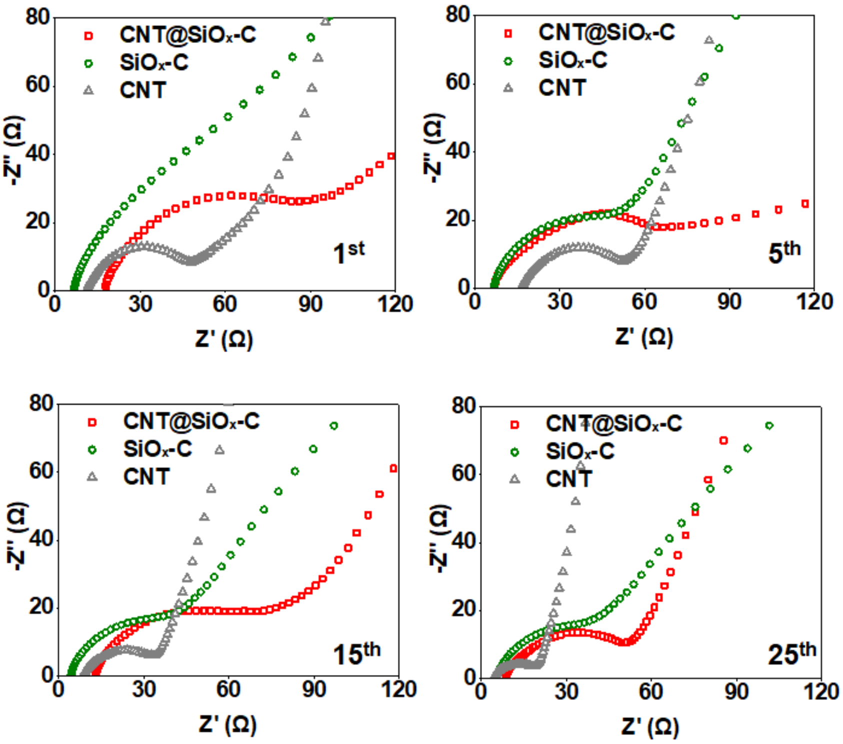

Fig. S13 Nyquist plots of CNT@SiO_x-C, SiO_x-C and CNT after different cycles in the frequency range between 100 kHz and 0.01 Hz.

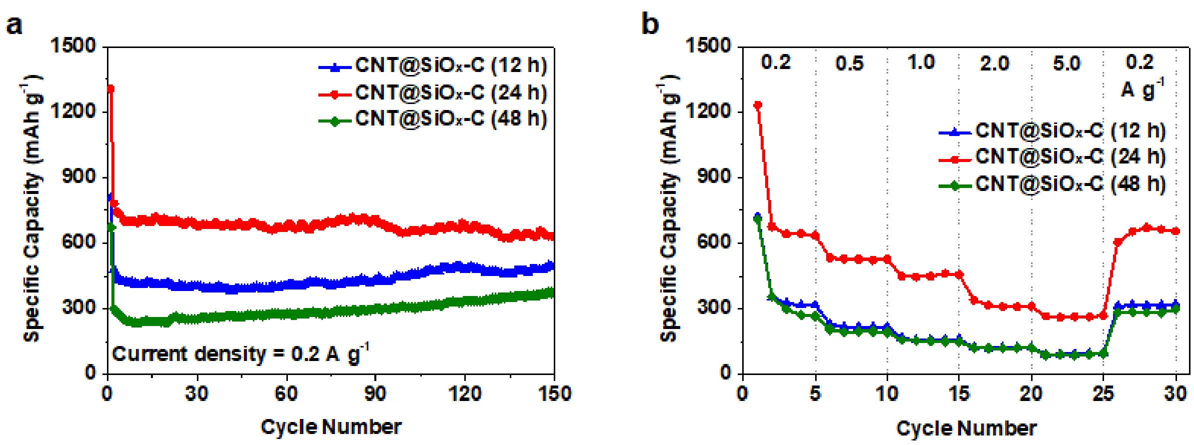

Fig. S14 (a) Cycling performance and (b) rate performance of CNT@SiO_x-C with different polymerization time in synthesis.

Supplementary Table 1. Electrochemical performance comparison of SiOx/C-based anode in high-energy rechargeable lithium battery reported by different research groups.

Materials	Content of SiO_x (%)	Current density (mA g^{-1})	Initial discharge capacity (mAh g^{-1})	Reversible capacity (mAh g^{-1})	Cycling number	Capacity retention (%)	References
CNT@SiO_x-C	10.0	0.2	1307	631	150	48.3	This work
		0.5	813	467	400	89	
		1	805.5	509	200	63.2	
				258	400	54	
SiO_x/C	30.0	0.065	~780	645	500	82.7	1
SiO_2/C/CNTs	67.8	1	~450	315.7	1000	70.2	2
		0.05	1267.2	826.1	100	65.2	
MPSiO_x@rGO	91.4	0.1	3765	580	200	15.4	3
C/SiO_x	15	0.2	383	290	100	75.7	4
SiO_x/C/G	80.5	0.2	601	541	600	90.0	5
SiO/G/CNTs	/	0.23	790	487	130	61.6	6
SiO_x@C	61.6	0.1	~990	563	400	56.9	7
		0.05	1160	630	150	54.3	
SiO_x–C	/	0.1	~1210	674.8	100	55.8	8
		0.5	~1060	485	100	45.8	
MWCNT@Si/SiO_x@C	55	0.4	1011	450	500	44.5	9
SiO_x/C-2	98.8	0.1	1296.3	843.5	200	65.1	10
SiO_x/C	68.6	0.1	2223.6	800	50	36.0	11
SiO_x@C nanorods	/	0.1	1324	720	350	54.4	12
S-1300	73.8	0.1	~960	810	100	84.4	13
SiO_x/C	/	0.1	~1380	780	350	56.5	14
SiO_x	100	0.5	~850	~640	50	75.3	15
		0.2	~1150	~700	50	60.9	
		0.1	~1290	~855	50	66.3	
SiO_x/SiO_y Bilayer	100	0.5	~2300	~570	150	~24.8	16

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