Supporting Information

Effective disproportionation of SiO induced by Na_2CO_3 and improved cycling stability via PDA-based carbon coating as anode materials for Li-ion batteries

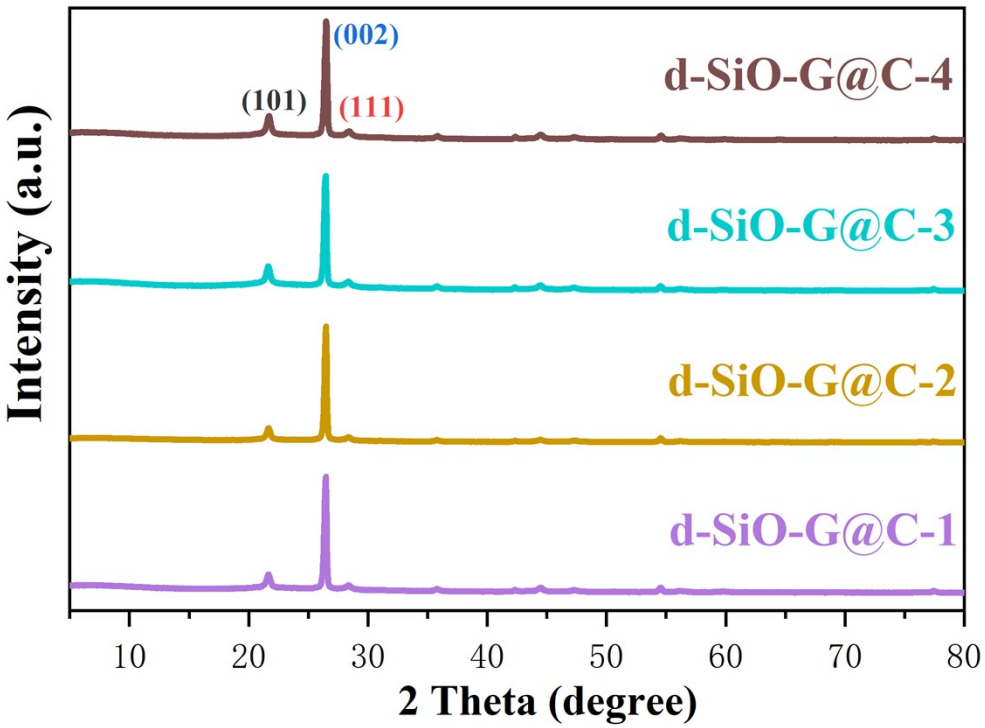

Fig. S1 XRD patterns of d-SiO-G@C materials.

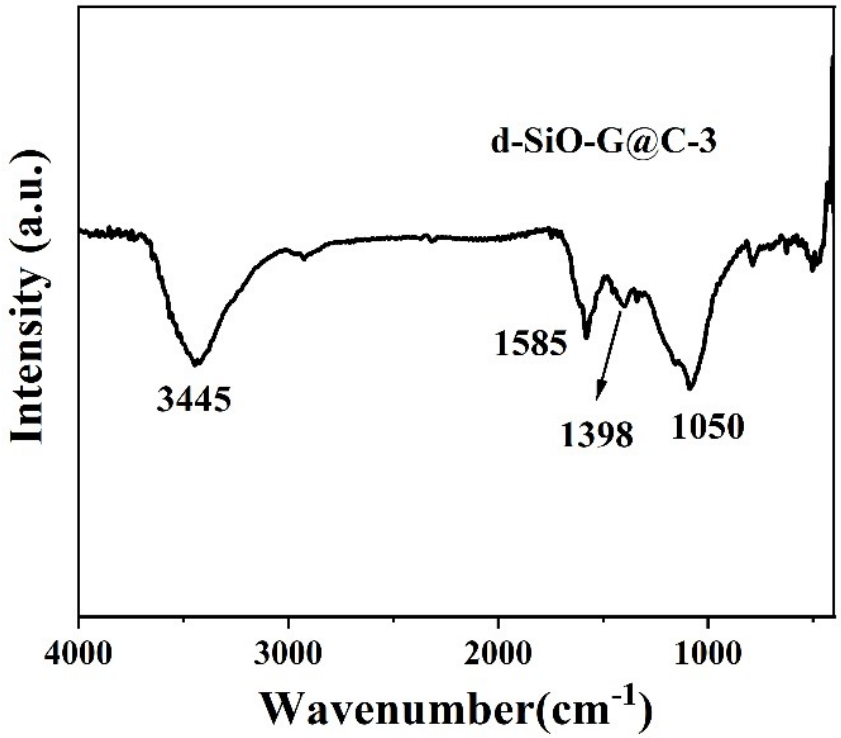

Fig. S2 FTIR spectra of d-SiO-G@C-3 composite.

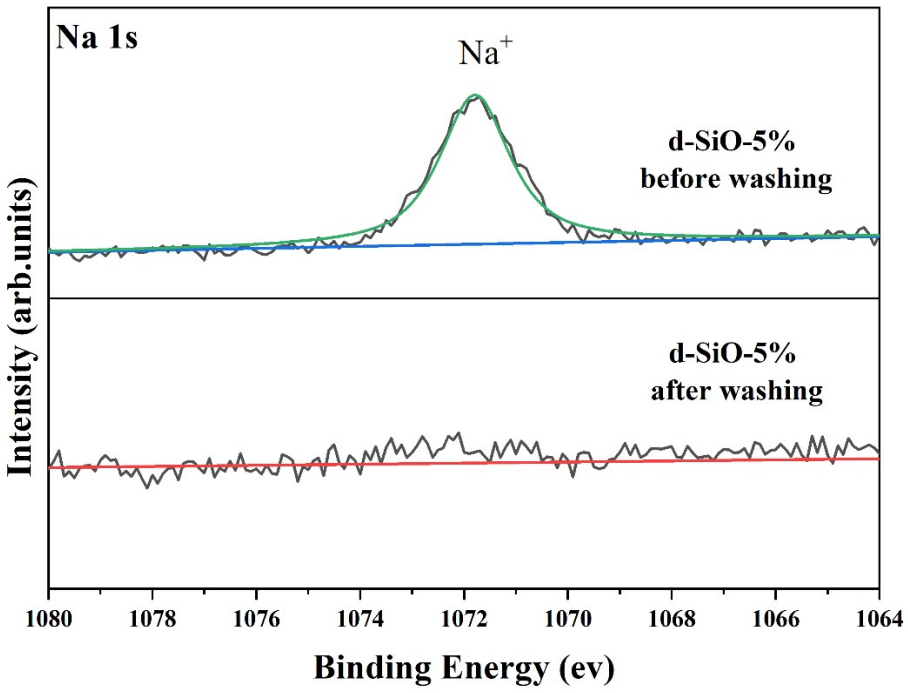

Fig. S3 XPS spectra of Na 1s before and after washing.

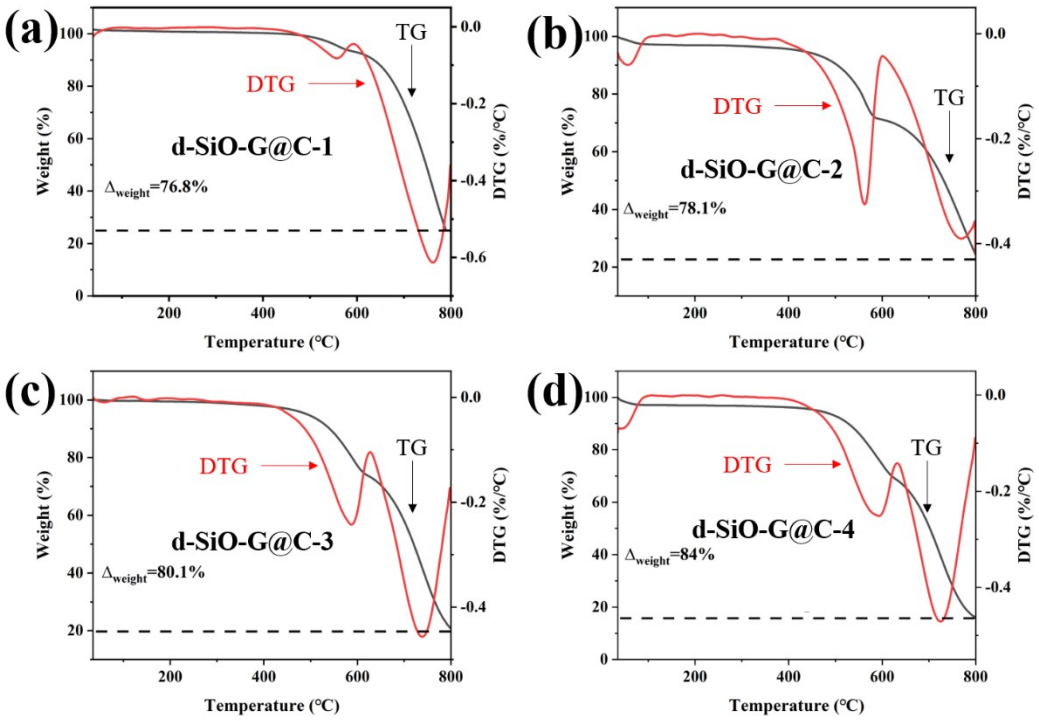

Fig. S4 TG-DTG analysis curves of (a) d-SiO-G@C-1, (b) d-SiO-G@C-2, (c) d-SiO-G@C-3 and (d) d-SiO-G@C-4 composites in air.

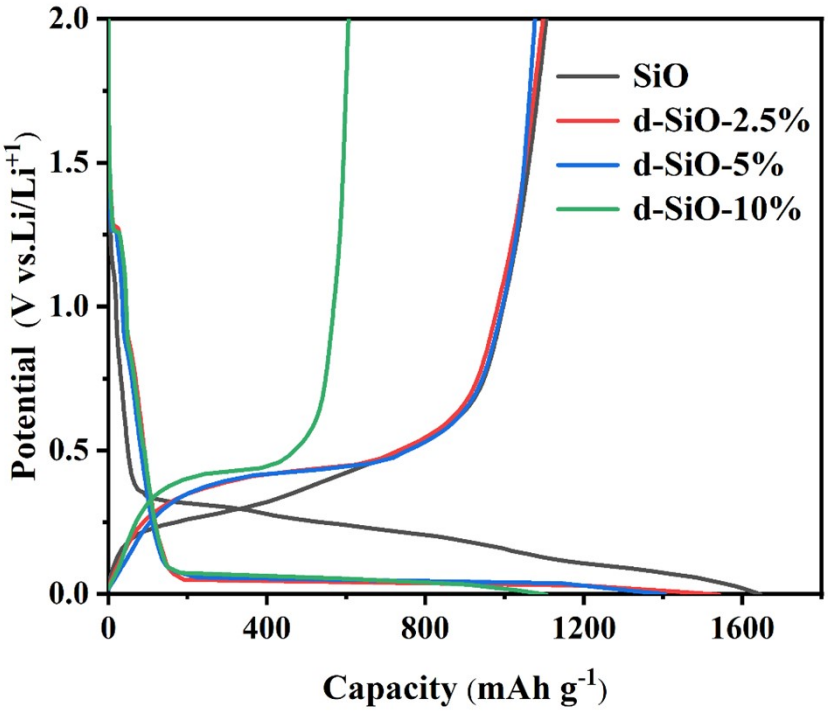

Fig. S5 First charge/discharge curves of SiO materials with different amounts of Na_2CO_3

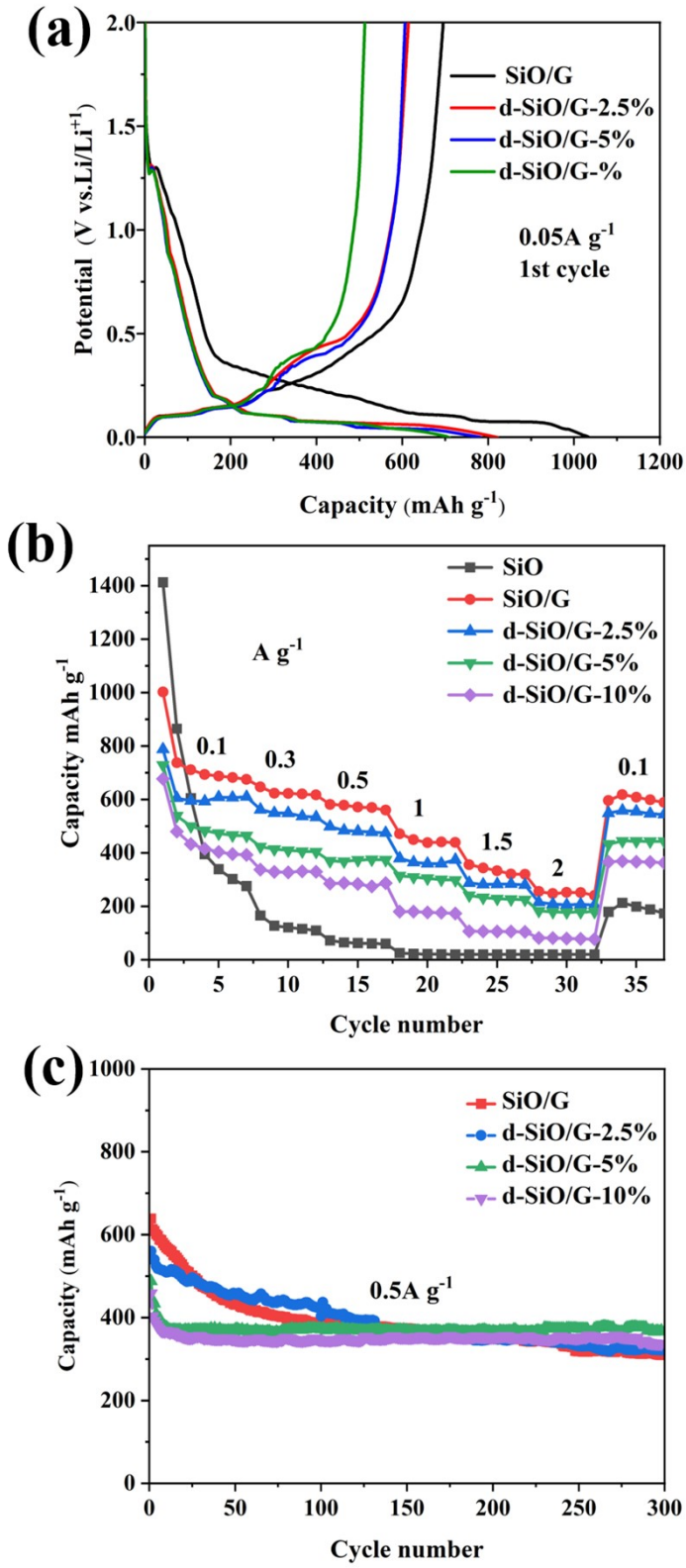

Fig. S6 Electrochemical performances of SiO-G composites with different amounts of Na_2CO_3 composites. (a) Charge and discharge curves of the first cycle, (b) Rate performance, (c) Cycling performance.

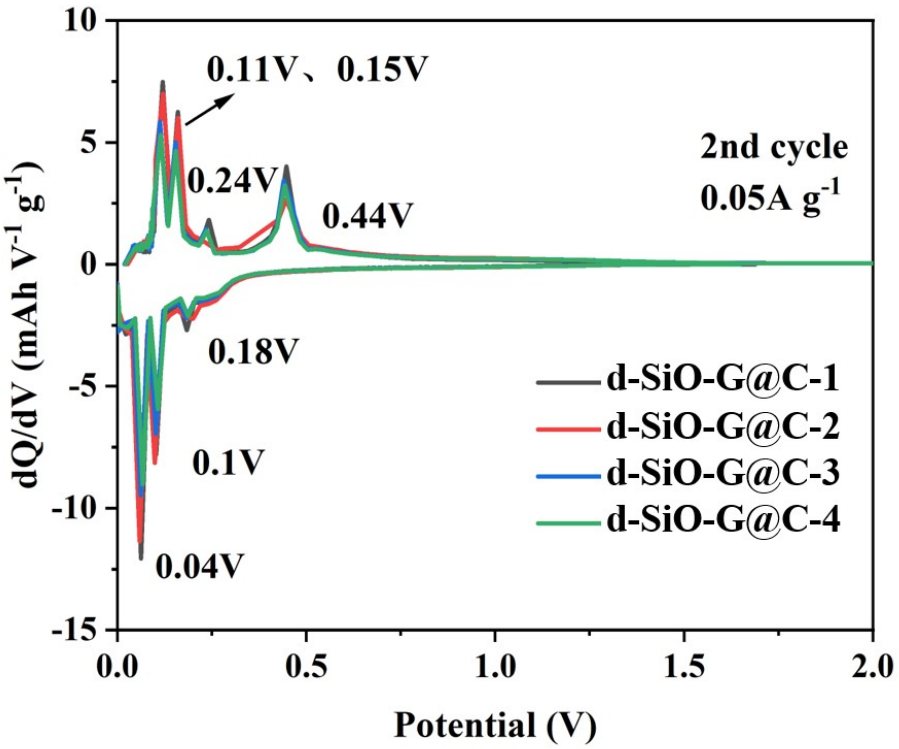

Fig. S7 dQ/dV curvesof d-SiO-G@C composites during the second cycles.

Table S1 Peak areas of different oxidation states of Si from the Si 2p XPS of d-SiO-G-x composites

sample	Si^0	Si^{1+}	Si^{2+}	Si^{3+}	Si^{4+}
d-SiO-G-2.5%	7%	10.8%	17.5%	37.2%	27.5%
d-SiO-G-5%	9.2%	9%	16.6%	27.1%	38.1%
d-SiO-G-10%	4.7%	7.3%	15.7%	25.8%	46.5%

Table S2 Determination of silicon ions content in different solutions by ICP-OES method

sample	The Si ion content in the supernatant（mg L^{-1}）
DI Water	＜0.1
d-SiO-G-5%	0.69
d-SiO-G-10%	1.19

Table S3 Initial specific charge/discharge capacities and ICE of commercial SiO material and d-SiOx composites

sample	Specific capacity of first charge (mAh g^{-1})	Specific capacity of the first discharge (mAh g^{-1})	ICE
SiO	1105.8	1646.2	63.1%
d-SiO-2.5%	1096.7	1541.7	71.1%
d-SiO-5%	1076.5	1404.5	76.6%
d-SiO-10%	605.8	1106.0	54.8%

Table S4 Initial specific charge/discharge capacities and ICE of SiO-G and d-SiO-G composites

sample	Initial specific charge capacity (mAh g^{-1})	Initial specific discharge capacity (mAh g^{-1})	ICE
SiO-G	695.2	1033.9	67.2%
d-SiO-G-2.5%	614.1	822.3	74.7%
d-SiO-G-5%	606.3	781.6	77.6%
d-SiO-G-10%	512.9	710.4	72.2%

Table S5 Initial specific charge/discharge capacities and ICE of d-SiO-G-5% and d-SiO-G@C composites

Sample	Initial specific charging capacity（mAh g^{-1}）	Initial specific discharge capacity（mAh g^{-1}）	ICE
d-SiO-G-5%	610.3	810.6	75.3%
d-SiO-G@C-1	581.9	807.8	72.0%
d-SiO-G@C-2	575.6	795.0	72.2%
d-SiO-G@C-3	563.4	775.9	72.6%

d-SiO-G@C-4	548.3	774.3	70.8%

Table S6 EIS curves of d-SiO-G-5% and d-SiO-G@C-3 at the 3rd and 300th cycle.

	d-SiO-G-5%		d-SiO-G@C-3	
Cycle	3rd	300th	3rd	300th
R_f/Ω	5.23	7.98	5.44	6.36
R_{ct}/Ω	32.05	58.87	30.18	45.42
R_S	3.18	7.03	0.45	5.8
R_W	3.18	2.94	2.93	2.69