Supporting Information

Micron-sized SiO_x/N-doped carbon composite spheres fabricated with biomass chitosan for high-performance lithium-ion battery anodes

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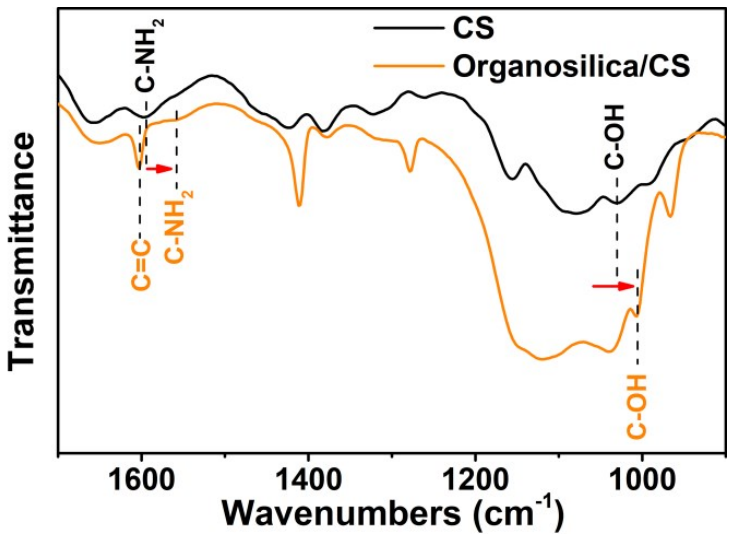

Fig. S1. FTIR spectra of raw CS and organosilica/CS composite.

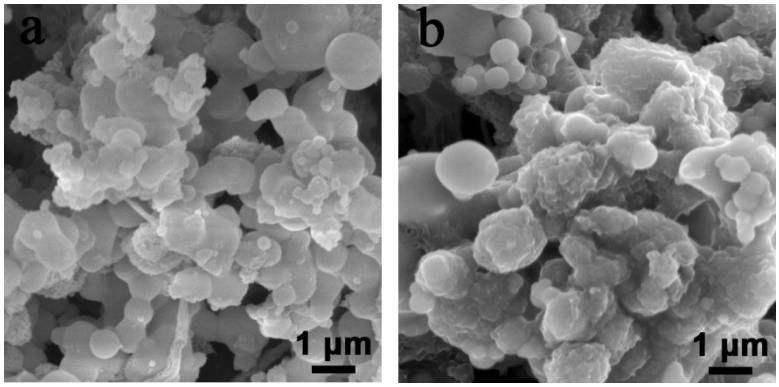

Fig. S2. SEM image of SiO_x/organosilica-1(a) and SiO_x/NC-1(b).

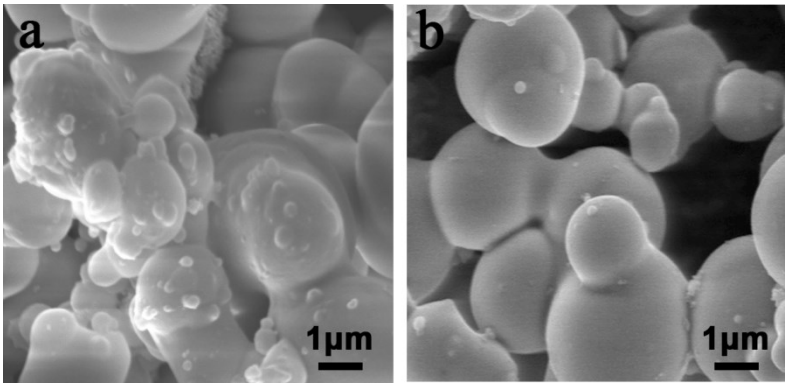

Fig. S3. SEM image of SiO_x/organosilica-3(a) and SiO_x/NC-3(b).

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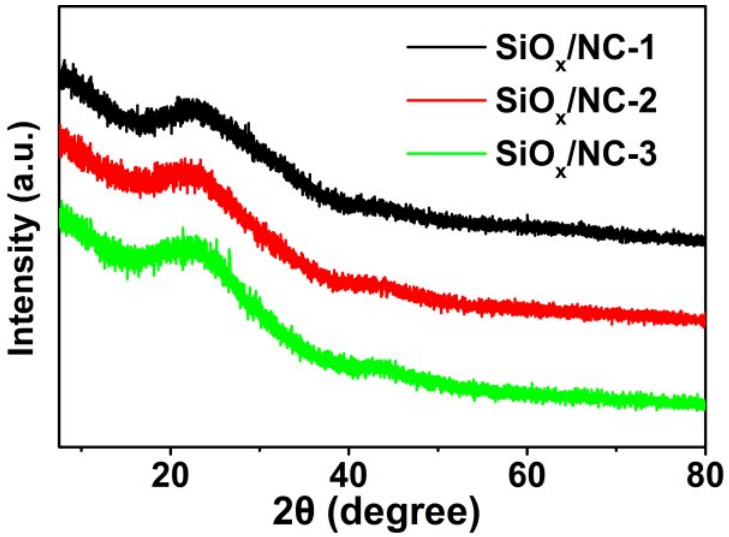

Fig. S4. XRD patterns of SiO_x/NC-1, SiO_x/NC-2 and SiO_x/NC-3.

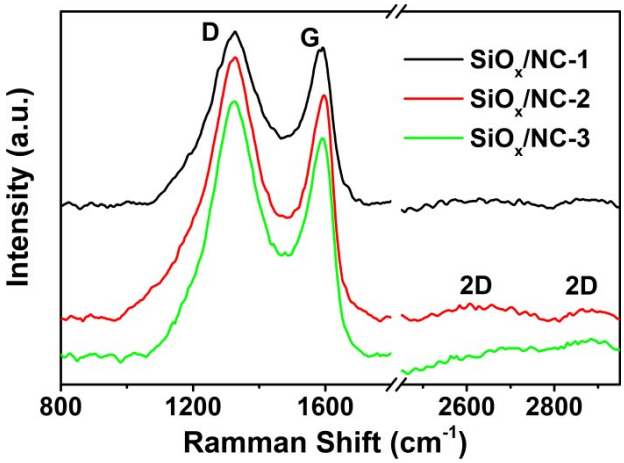

Fig. S5. Raman spectra of SiO_x/NC-1, SiO_x/NC-2 and SiO_x/NC-3.

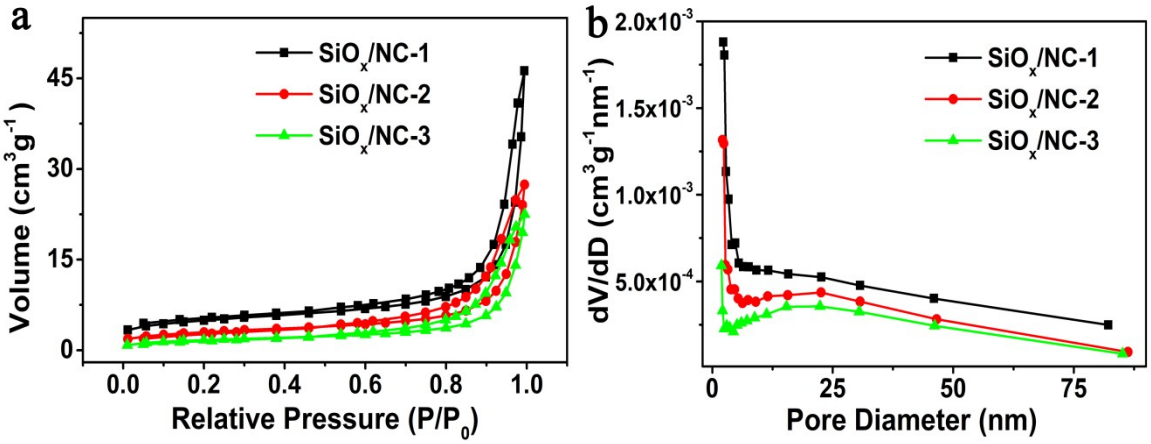

Fig. S6. N_2 adsorption-desorption isotherms (a) and pore size distribution (b) of SiO_x/NC microspheres.

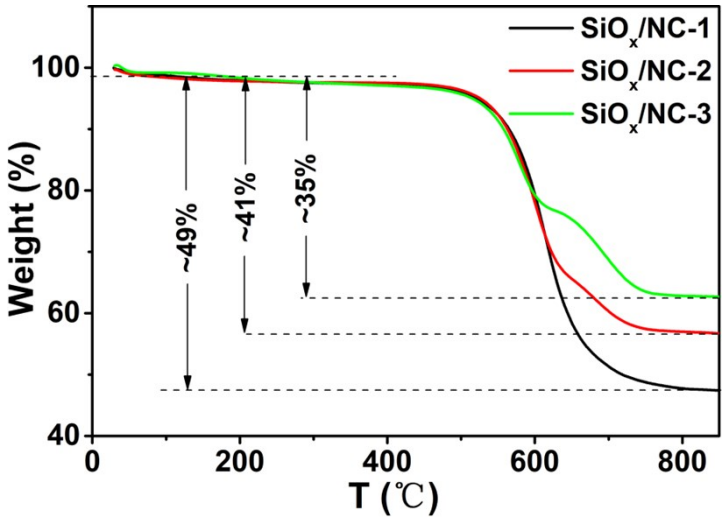

Fig. S7. TGA curves of SiO_x/NC microspheres.

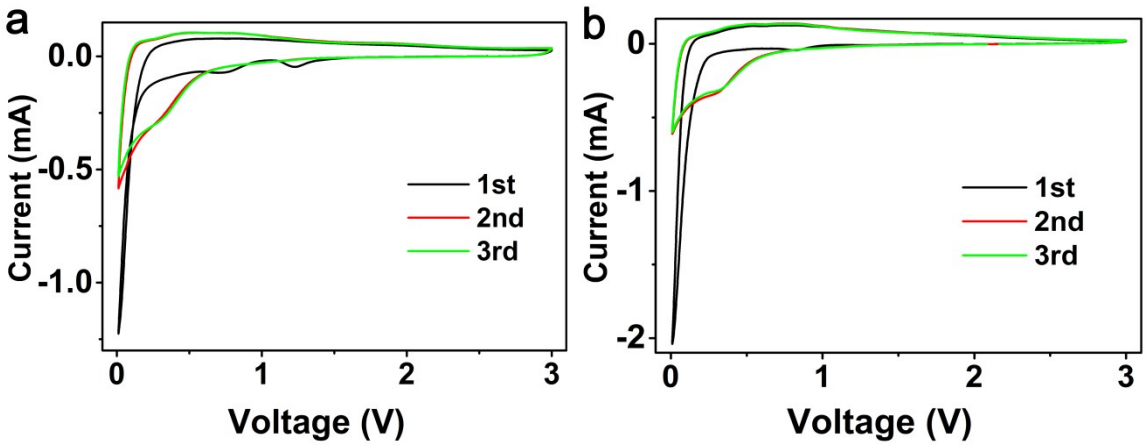

Fig. S8. CV curves of SiO_x/NC-1 (a) and SiO_x/NC-3 (b).

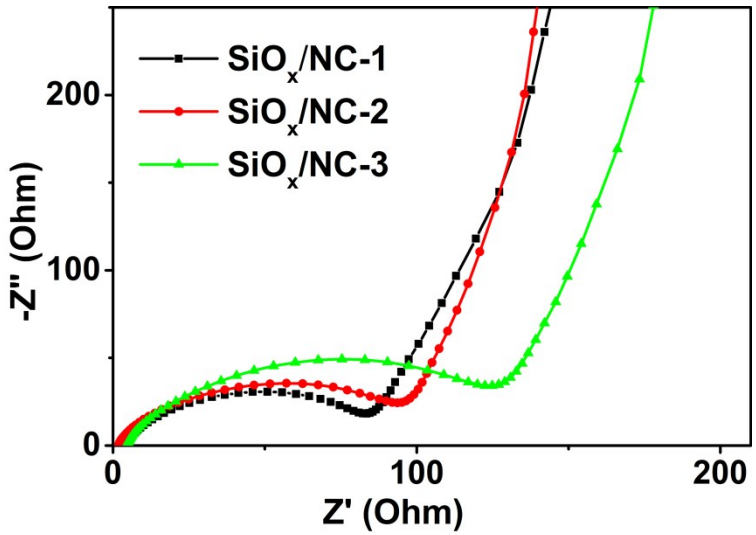

Fig. S9. EIS spectra of SiO_x/NC half cells.

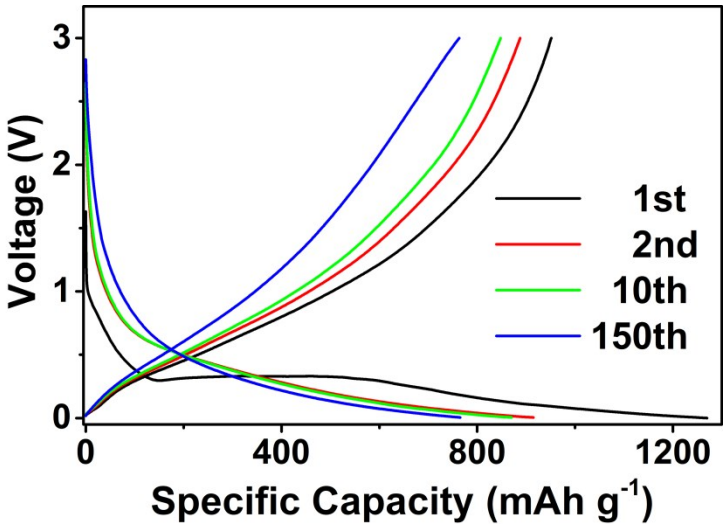

Fig. S10. Charge-discharge curves of SiO_x/NC-2 at 0.1 A g^{-1}.

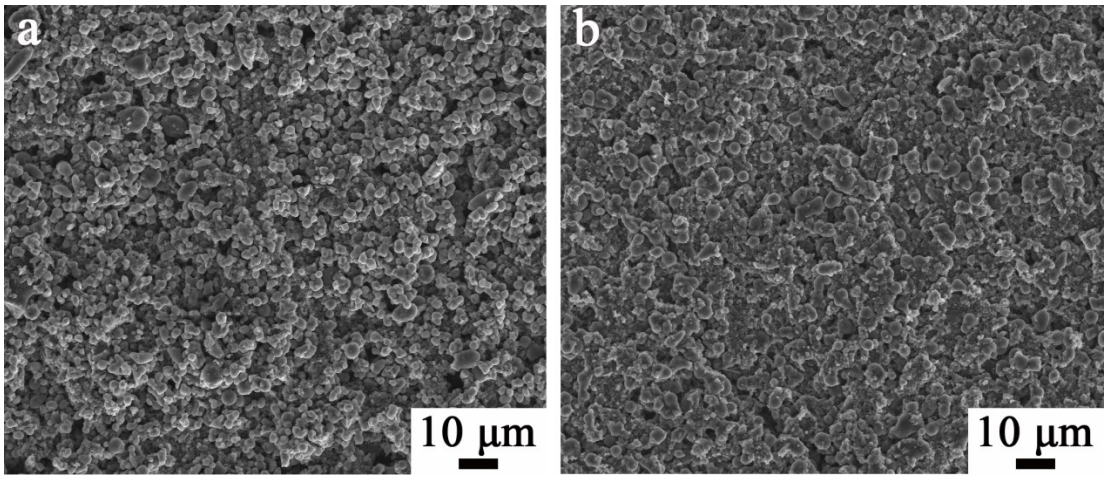

Fig. S11. SEM images of SiO_x/NC-2 electrode before (a) and after 100 cycles (b).

Table S1. Volume of solvents consumed for preparing different Si or SiO_x anode materials prepared by Stöber method

Electrode material	Volume of Solvent (ml)	Volume of Si source (ml)	$V_{solvent}/V_{Si\ source}$	Ref#
Si/Ti_3C_2 MXene composite	100	1	100	1
SiO_x/C microspheres	28	1	28	2
SiO_x/MWCNT/NC composite	83	1.8	46.1	3
SiO_x/C@RGO nanocomposite	192.7	1.84	104.7	4
Yolk@Shell SiOx/C microspheres	150	2.6	57.7	5
SiO_x/NC composite	120	7.44	16.1	6
ASD-SiOC nanocomposite	400	1	400	7
SiO_x/NC-2 microsphere	25	~ 2.5	**~ 10**	**This work**

Table S2. Discharge capacity (mAh g^{-1}) of SiO_x/NC and bare NC electrodes at different current densities (A g^{-1}).

Material	0.1	0.2	0.4	0.8	1.6	3.2	0.2
SiO_x/NC-1	685.0	603.0	524.1	461.7	394.4	322.6	593.7
SiO_x/NC-2	797.2	720.5	662.9	591.9	517.5	427.2	712.0
SiO_x/NC-3	799.6	705.4	617.5	512.1	419.1	329.0	712.2
NC	338.7	270.8	226.7	182.6	139.5	92.4	279.4

Reference

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