Electronic Supplementary Information for

Nitrogen-Doped Carbon Coated SiO Nanoparticles Co-modified with Nitrogen-Doped Graphene as Superior Anode Material for Lithium-ion Batteries

Chenfeng Guo [a], *Jingxuan Mao* [b], *Dianlong Wang* [a]*

[a] Harbin Institute of Technology, School of Chemical Engineering and Technology, Harbin 150001, P R China
[b] Harbin Engineering University, College of Software, Harbin 150001, P R China.
Fax: +86 451 86413721; Tel: +86 451 86413751
* To whom correspondence should be addressed. E-mail: wangdianlonghit@163.com, chenfeng1984hit@aliyun.com

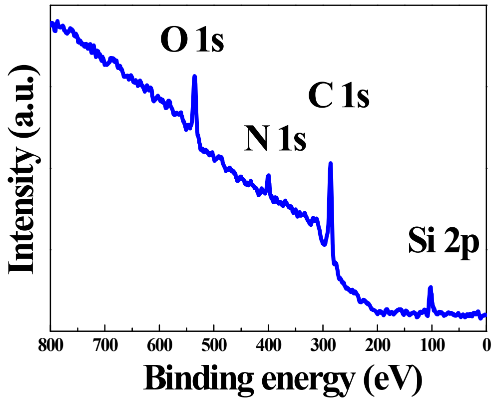

Figure S1. XPS survey scan of NC-SiO.

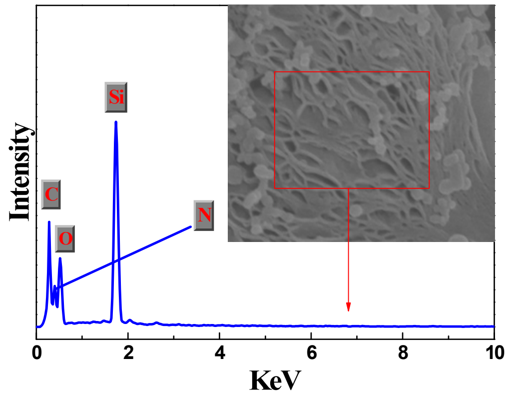

Figure S2. EDAX spectra from the surface of the ASiO/(NC+NG) NCPs.

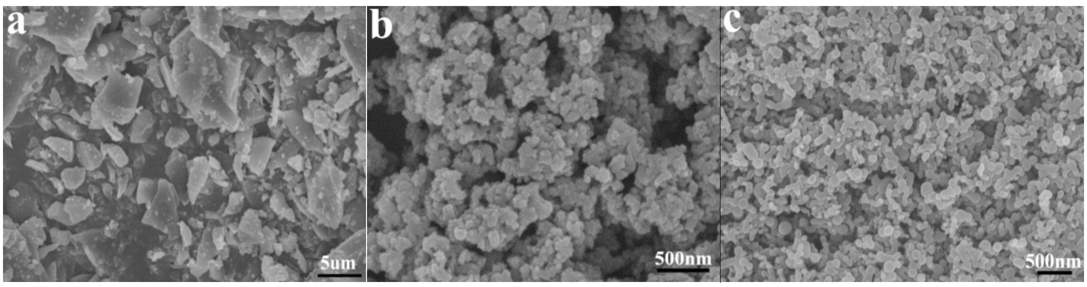

Figure S3. FESEM image of (a) as-received SiO powder; (b) ASiO NPs and (c) NC-ASiO NPs.

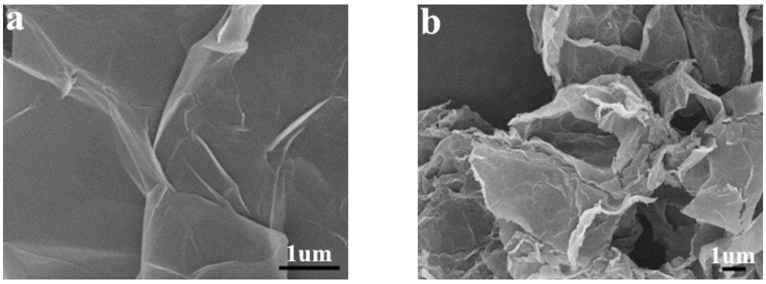

Figure S4. FESEM image of as-prepared (a) PG and (b) NG.

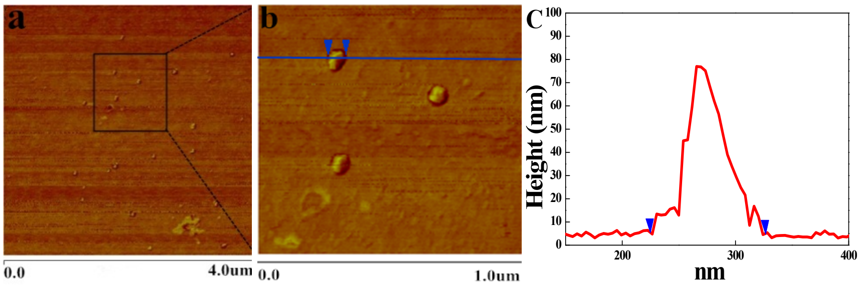

Figure S5. AFM images of ASiO/(NC+NG) NCPs at different magnification: (a) overing an area of 4μm by 4μm; (b) overing an area of 1μm by 1μm and (c) its section analysis.

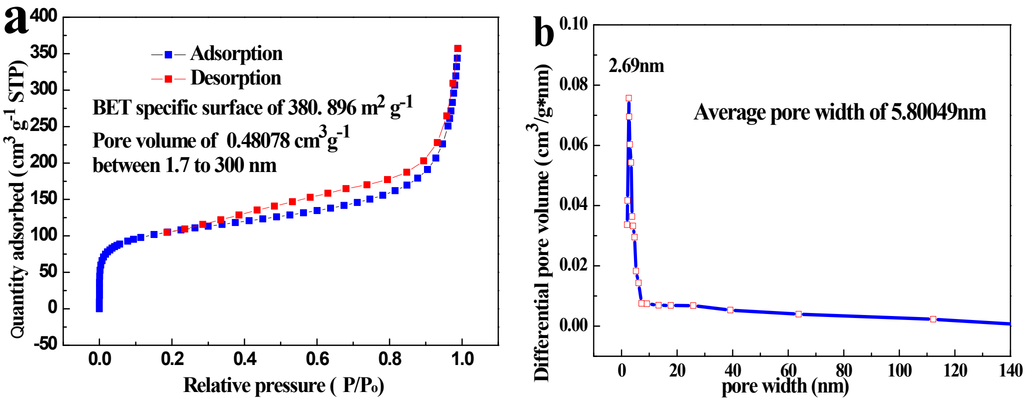

Figure 6. (a) Nitrogen adsorption/desorption isotherms at 77 K, and (b) pore-size distribution curves of ASiO/(NC+NG) NCPs.

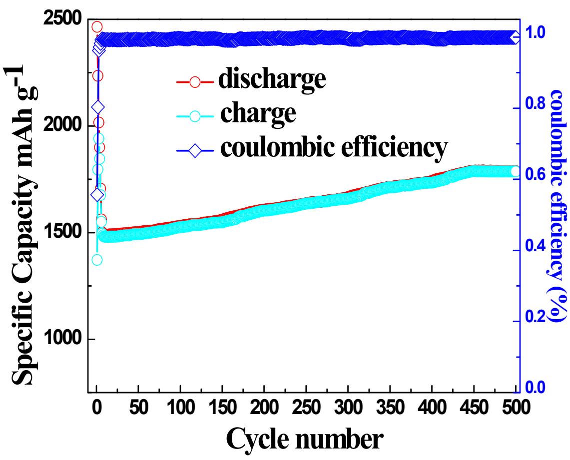

Figure S7. Superior cycle stability of ASiO/(NC+NG) NCPs in the long-run up to 500 cycles under a current density of 100 mA g^{-1}. (Red: discharge capacity; cyan: charge capacity; blue: coulombic efficiency).

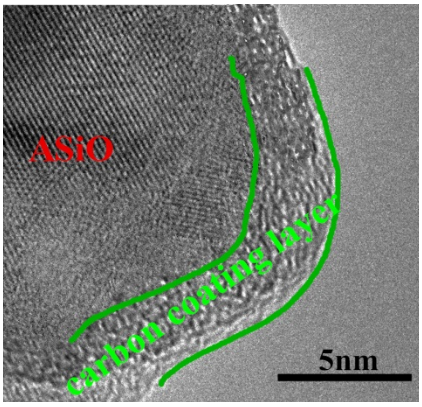

Figure S8. HRTEM image of C-ASiO. About 3 nm thickness of amorphous carbon coating layer is found on the surface of ASiO particle, which confirmed the similar coating thickness with NC coating layer. The similar size and morphology of C-ASiO and NC-ASiO, coupled with the similar results of ASiO content analysis and the XRD analysis could clarify the similarity of carbon coating and NC coating technique.

Table S1. Elemental Composition of ASiO/(NC+NG), ASiO/(NC+PG), NC-ASiO and C-ASiO.

Sample	C (wt%)	O (wt%)	Si (wt%)	N (wt%)
ASiO/(NC+NG)	30.47	28.49	38.43	2.61
ASiO/(NC+PG)	31.37	29.41	38.44	0.78
NC-ASiO	12.69	31.28	54.91	1.12
C-ASiO	13.11	31.59	55.30	0.00

Table S2. The circuit parameters derived using equivalent circuit model for the ASiO/(NC+NG) electrode performed after 20th, 30th and 40th cycles.

Electrodes (ASiO/(NC+NG))	R_e (Ω)	R_f (Ω)	Q_1 (μF)	η_1	C_1 (μF)	R_{ct} (Ω)	Q_2 (μF)	η_2	C_2 (μF)
20th	22.03	47.06	40.29	0.76	436.83	204.4	130.5	0.72	6868.60
30th	20.42	37.62	46.39	0.69	1327.10	176.6	151.4	0.71	9736.09
40th	18.96	35.56	51.26	0.69	1498.37	149.7	165.9	0.71	10351.78