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Addition/Correction

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Correction to Improved Electrochemical Capacity of Precursor-Derived Si(B)CN-Carbon Nanotube Composite as Li-Ion Battery Anode

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P 5095. The correct values of D_{Li} for Si(B)CN-CNT are in the range of approximately 1×10^{-13} and 1×10^{-16} m^2/s during intercalation and extraction. These values are in the same range as polymer-derived SiOC anodes. In addition and related to this, Figure S4b in the Supporting Information was incorrect. The revised Supporting Information is present below in its entirety.

I. X-RAY DIFFRACTION DATA (XRD)

To characterize the crystalline nature of the specimens processed at higher temperature Bruker powder X-ray diffractometer (Madison, WI) using Cu−Kα radiation and nickel filter was employed.

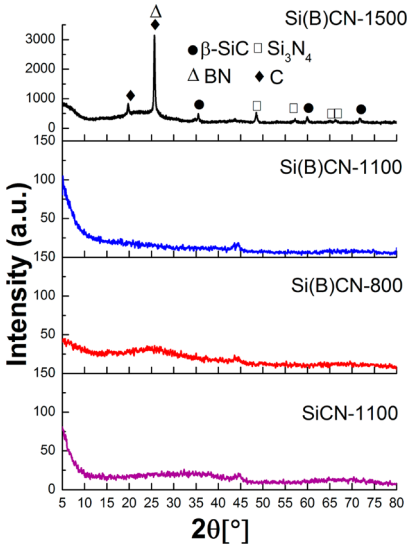

Figure S1. X-ray diffraction data for various Si(B)CN and SiCN pellet specimen, confirming the amorphous nature of the precursor-derived Si(B)CN ceramic for temperatures below 1500 °C.

II. TRANSMISSION ELECTRON MICROSCOPY (TEM)

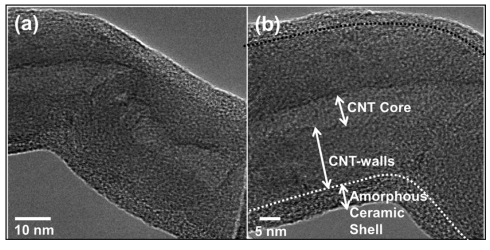

Figure S2. High-resolution TEM images of the Si(B)CN-CNT-1100 composite showing the shell/core morphology.

III. ELECTROCHEMICAL CYCLING

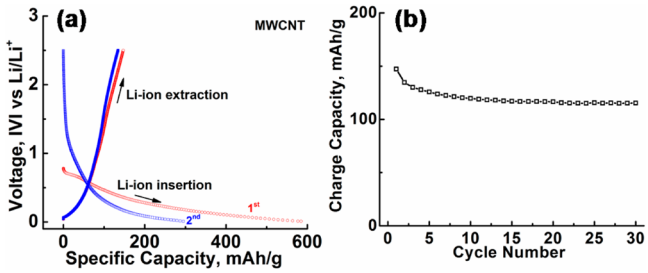

Figure S3. (a) First and second charge/discharge cycles for the MWCNT anode, cycled at 100 mA/g, and (b) Charge capacity for the first 30 cycles for MWCNT anode.

IV. GALVANOSTATIC INTERMITTENT TITRATION TECHNIQUE (GITT) EXPERIMENT

The solid-state lithium ion diffusion coefficients were determined using

$$D_{GITT} \approx \frac{4}{\pi\tau}\left(\frac{m_B V_M}{M_B S}\right)^2\left(\frac{\Delta E_s}{\Delta E_t}\right)^2 \quad (1)$$

Where m_B, V_M, M_B, and S are electrode mass, molar volume, molecular weight and surface area, respectively. τ is the time over which the constant current pulse is applied and ΔE_s and ΔE_t are voltage steps as shown in Figure S4.[1,2]

GITT experiment was carried out on the best performing anode, i.e., Si(B)CN-CNT-1100. A current pulse of 100 mA g^{-1} was applied for 15 min followed by a 4 h of relaxation between pulses (until equilibrium is realized) was applied to the electrode for during both lithiation and delithiation. The diffusion coefficient (D_{Li}) was thus calculated by taking the weight of active material on anode (2.5 mg), molecular weight (based on XPS elemental composition, 147.8 g/mol), molecular volume (64.2 cm^3/mol), and surface area (1.6 cm^2).

V. PROCEDURE FOR MEASURING ELECTRICAL RESISTIVITY OF THE PELLETS

Van der Pauw's Four Point Resistivity Measurement Method[3]

The specimen pellets used for these measurements were formed by cold pressing (4 kpsi) the specimen powder for 30 s without the binder, conducting agent or other additives. The measurements were recorded in the ohmic region.

Step 1: Primary measurement

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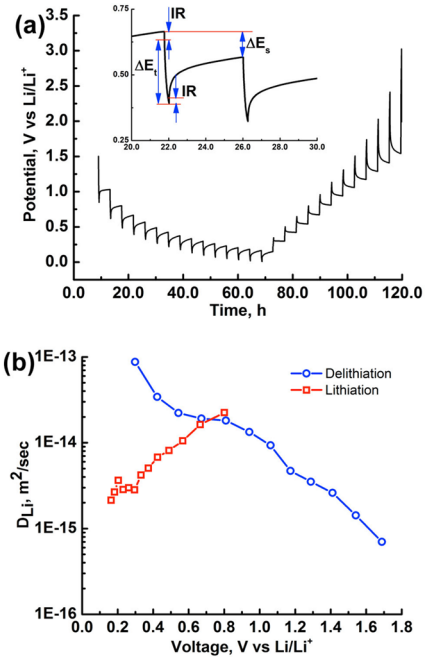

Figure S4. GITT Data: (a) Charge and discharge cycles with 15 min of current pulse at 100 mA/g followed by 4 h of relaxation for Si(B)CN-CNT-1100 specimen and (b) calculated diffusion coefficient based on the relaxation steps at the corresponding voltages.

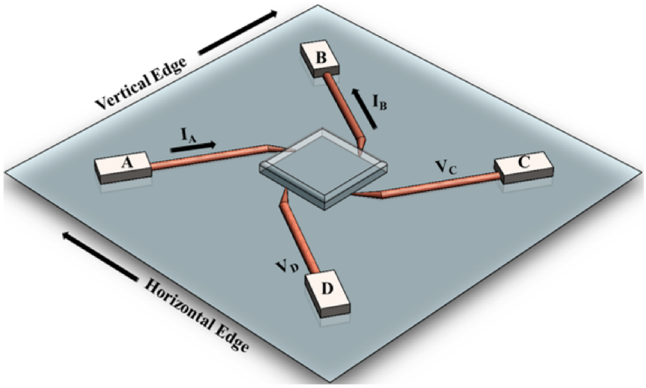

Figure S5. Experimental setup for measuring the 4-point resistivity measurements.

$R_{AB,CD}$ was defined as the resistance measured with current supplied between points A and B and consequently measuring the potential across points C and D. According to the Ohm's law $R_{AB,CD}$ was found to be

$$R_{AB,CD} = V_D - V_C/i_{AB} \quad (2)$$

Similarly

$$R_{BC,DA} = V_A - V_D/i_{BC} \quad (3)$$

Step 2: Reciprocal measurements

Ideally as $R_{AB,CD} = R_{CD,AB}$, the resistances measured along the edges of the samples were averaged for higher accuracy. Hence

$$R_{edge1} = (R_{AB,CD} + R_{CD,AB})/2 \quad (3a)$$

and

$$R_{edge2} = (R_{BC,DA} + R_{DA,BC})/2 \quad (4)$$

Step 3: Reverse polarity measurements

Table S1. Summary of Surface Elemental Composition of Various Specimen (atomic percent) Used in This Study. All Atomic Percentage Measurements Are Accurate up to Approximately 15%

specimen	Si	B	C	N	O
Si(B)CN-800	24.9	4.6	32.4	19.8	18.4
Si(B)CN-1100	24.4	6.1	24.6	19.5	25.4
Si(B)CN-1500	23.2	5.5	19.7	14.3	37.4
Si(B)CN-CNT-800	13.8	18.2	37.1	17.8	13
Si(B)CN-CNT-1100	9.9	6.5	52.9	2.9	27.7
Si(B)CN-CNT-1500	7.9	17.7	39.9	27	7.5

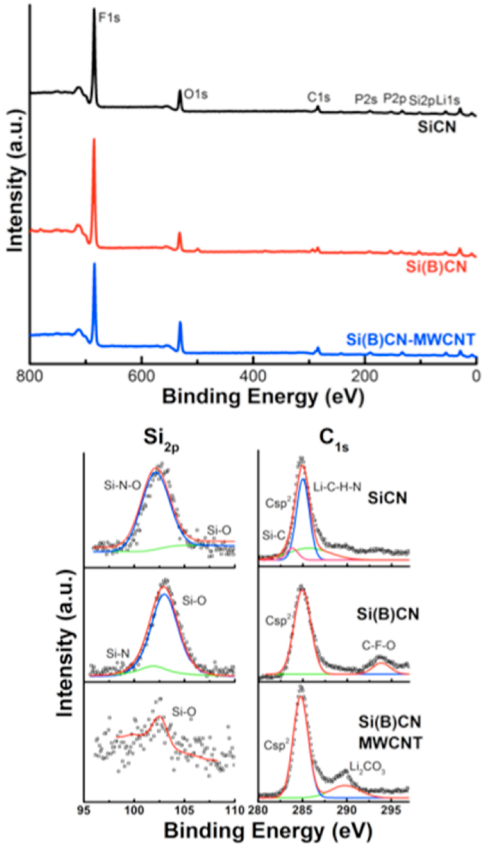

Figure S6. (a) Elemental survey (top) and (b) high-resolution scan (bottom) for SiCN-1100, Si(B)CN-1100, and Si(B)CN-CNT cycled anode specimens.

For attaining higher precise measurements, the polarity at each points were reversed both at the current source and voltage measurement terminals. Hence

$$R_{edge1} = (R_{AB,CD} + R_{BA,DC} + R_{CD,AB} + R_{DC,BA})/4 \quad (5)$$

and

$$R_{edge2} = (R_{BC,DA} + R_{CB,AD} + R_{DA,BC} + R_{AD,CB})/4 \quad (6)$$

Finally, for the known thickness of the sample d, the resistivity is defined as

$$\rho = \left(\frac{\pi}{\ln}\right)\left(\frac{d}{2}\right)\frac{R_{edge1} + R_{edge2}}{2} f \quad (7)$$

Where f is defined as the function of the measured resistances.

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VI. X-RAY PHOTOELECTRON SPECTROSCOPY

Chemical composition on the surface of the specimens was analyzed by X-ray photoelectron spectroscopy using PHI Quantera SXM (Physical Electronics Inc. Chanhassen, MN) with monochromatic Al Ka X-radiation (beam size <9 μm).

REFERENCES

(1) Van der Pauw, L. J. *Philips Res. Repts.* **1958**, *13* (1), 1−9.
(2) Weppner., W.; Huggins, R. *J. Electrochem. Soc.* **1977**, *124* (10), 1569−1578.
(3) Wen, C.; Boukamp, B.; Huggins, R.; Weppner, W. J. *Electrochem. Soc.* **1979**, *126* (12), 2258−2266.