Supporting Information

Bacterial Cellulose-Polyaniline Composite derived Hierarchical Nitrogen-Doped Porous Carbon Nanofibers as Anode for High Rate Lithium-Ion Batteries

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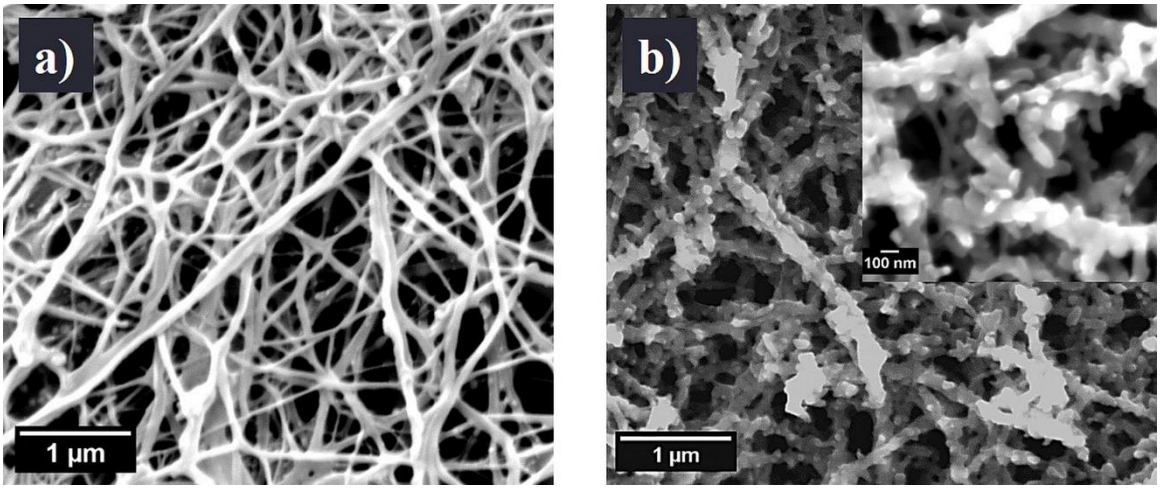

Figure S1. a) SEM micrograph of BC b) SEM micrograph of carbonized BC-PANI

Table S1 Textural properties of BC-PANI composite and its derived carbon

Sample	Type of isotherm	Specific surface area [m^2g^{-1}]	Micro pore area [m^2g^{-1}]	Average Pore volume [ccg^{-1}]
BC-PANI	II	25	-	0.12
Carbonized BC-PANI	II	159	109	0.25
BC-PANI_AC	IV	2037	1004	0.75

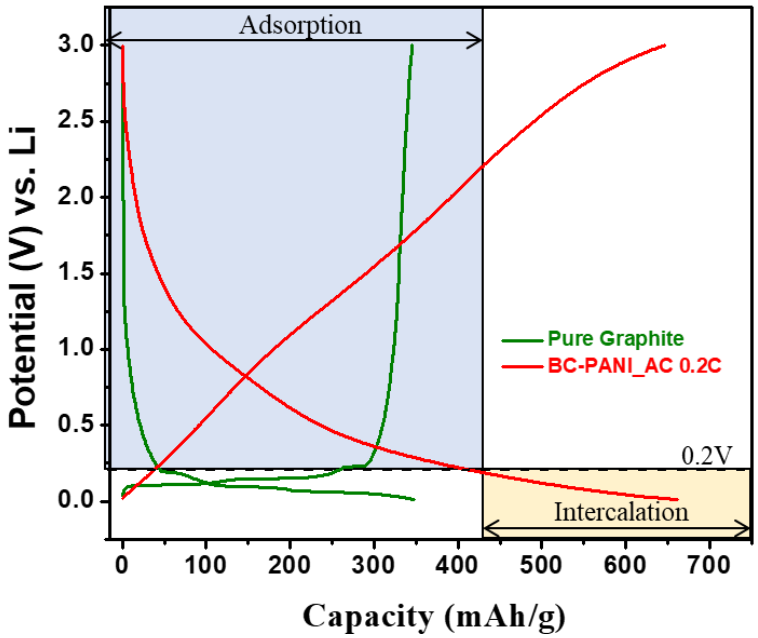

Figure S2. Charge-discharge curves of BC-PANI_AC and pure graphite at 0.2C

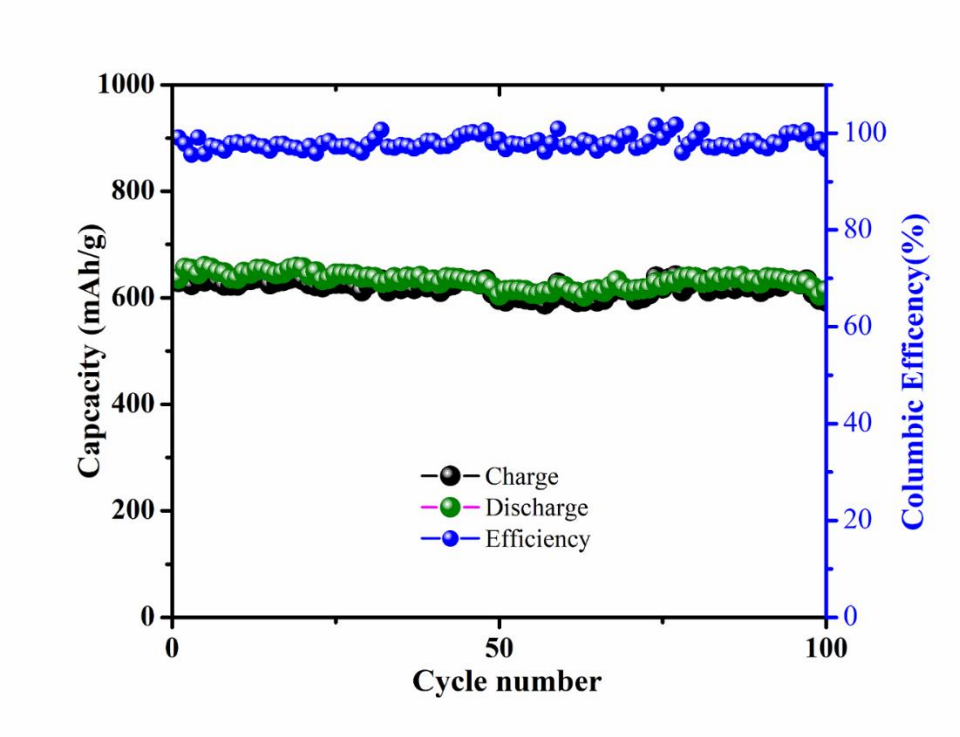

Figure S3. Cyclic stability performed at 0.2C

Table S2. Calculation of % interaction of nitrogen structures with lithium

Structure	Calculated binding energy (KJ/mol)	Normalised B.E	Atomic Contribution (%) based on area under curve from XPS	Relative contribution (From binding energy and atomic%)
	(A)	($B_i=A_i/\sum A\times100$)	(C_i)	($D=100\times (B_i x C_i)/\sum BC$)
Pyrrolic N	-578	30	66	**63**
Pyridine N	-735	38	10	**12**
Oxidized N	-604	32	24	**25**
Total	-1917	100	100	**100**

Calculation example for Pyrrolic N:

The calculated binding energy (B.E) of Li for Pyrrolic N from DFT = -578 KJ/mol.

Therefore, Normalised $\mathrm{B.E} = \frac{B.E\ of\ Pyrrolic\ N}{B.E.of\ pyrrolic\ N + B.E.of\ pyridine\ N + B.E.of\ oxidized\ N}$

$$= \frac{-578}{-1917}$$

$$= \sim 30\%$$

The atomic contribution (%) of Pyrrolic N based on area under curve from XPS = 66%

$$Relative\ contributuion\ of\ pyrrolic\ N(From\ B.E\ and\ XPS\ atomic\ \%) = \frac{30\times66}{30\times66+38\times10+32\times24}$$

$$= \sim \mathbf{63}\%$$