Supplementary Information for

A Simple Method for Producing Bio-Based Anode Materials for Lithium-Ion Batteries

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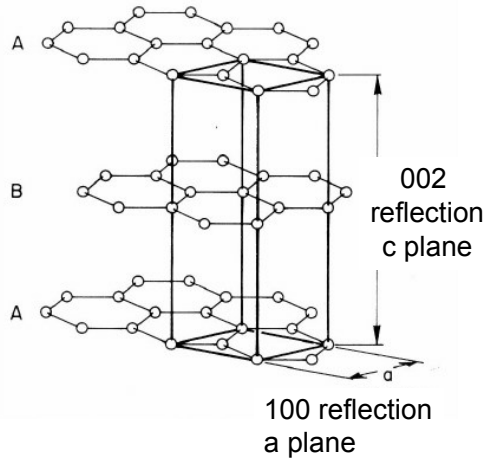
Table S1



$$B(2\theta) = \frac{K\lambda}{Lcos(\theta)} \quad (1)$$

$$\frac{I(D)}{I(G)} = \frac{C(\lambda)}{L} \quad (2)$$

$$\alpha = \frac{I(G)}{I(D) + I(G)} \quad (3)$$

Figure S1. ABA stacking of sp2 hybridized graphene sheets in graphite with the 002 and 100 reflections highlighted. Equation 1: Scherrer equation used to estimate graphite crystallite size (L) from the full width at half height (B) of diffraction peaks at particular 2-theta angles. Equation 2: inverse relationship between Raman spectra D and G peak intensity ratio and graphite crystallite size (L). Equation 3: degree of graphitization as determined by D and G peak intensities.

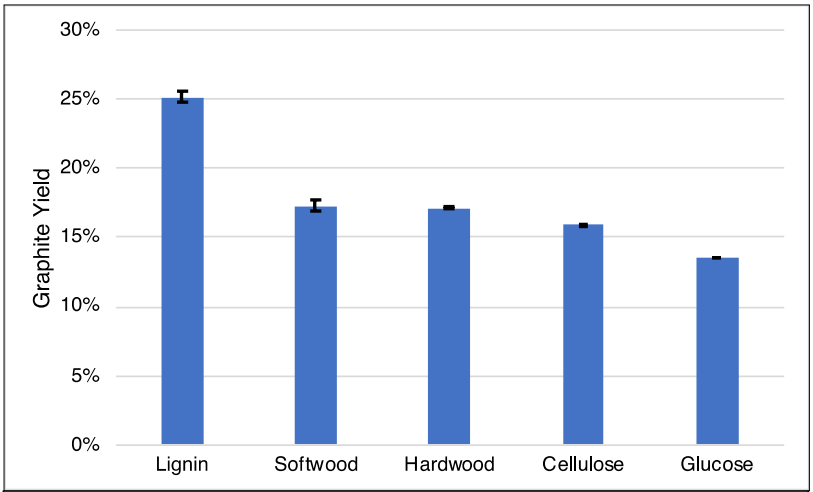


Figure S2. Biographite mass yields of various biomaterials treated under baseline conditions, reported as percent of starting mass. Lignin refers to organosolv lignin.

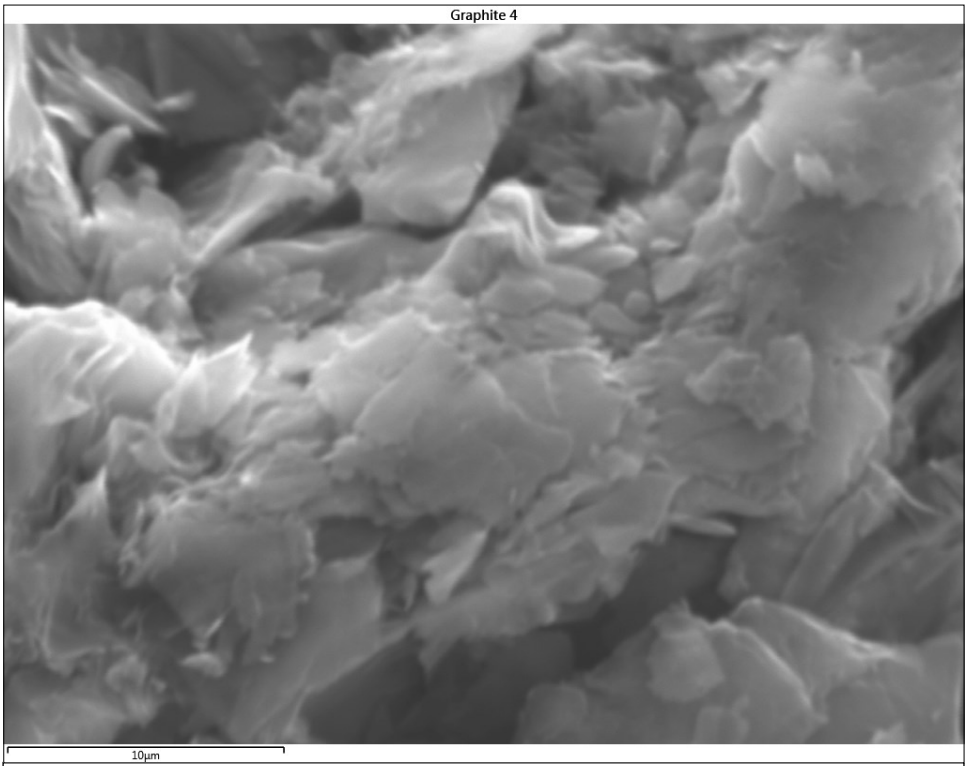


Figure S3. Scanning electron micrograph of commercial synthetic graphite

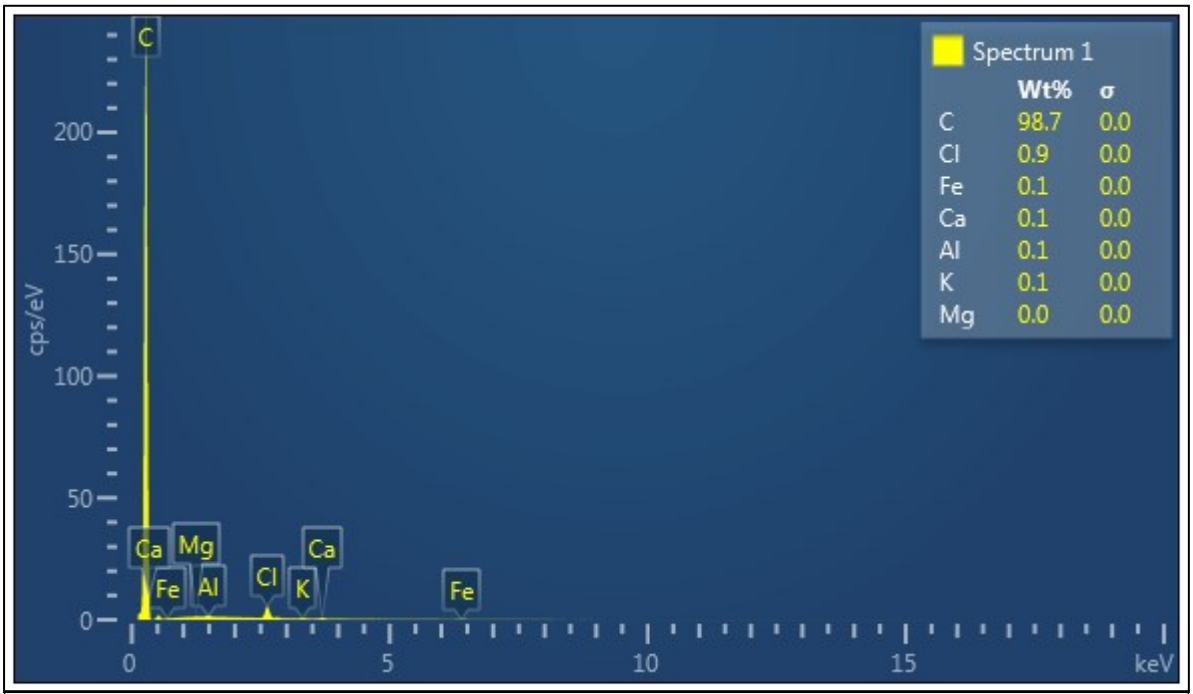


Figure S4. Energy dispersive x-ray spectroscopy data of softwood-derived biographite after iron removal via HCl washing.

Table S1. Summary of electrochemical performance of biographite (this work) and other graphite materials reported in previous studies

Sample	Voltage window (V)	1st CE (%)	1st delithiation capacity ($mAhg^{-1}$)	Rate capability ($mAhg^{-1}$)	Capacity Retention (%)	Reference
Biographite	0.005-1.5	84.0	335 (at 0.1C)	40 (at 4C) 15 (at 8C)	89 (100 cycles at 0.5C)	This work
Natural graphite	0.001-2.5	80.0	314 (at 0.1C)	~25 (at 1.2C)	52 (30 cycles at 0.1C)	[1]
PVC-coated natural graphite	0.001-2.5	87.0	330 (at 0.1C)	~120 (at 1.2C)	101 (30 cycles at 0.1C)	[1]
Natural graphite	0.00-2.0	83.9	253 (at 0.5C)	-	-	[2]
Na_2CO_3 coated natural graphite	0.00-2.0	86.2	316 (at 0.5C)	-	-	[2]
Artificial graphite	0.00-2.0	53.0	310 (at 30 mAg^{-1})	-	-	[3]
Natural graphite	0.01-2.0	94.5	352.6 (at 0.2C)	~330 (at 5C)	84 (50 cycles at 0.5C)	[4]
H_3PO_4-treated natural graphite	0.01-2.0	92.5	352.5 (at 0.2C)	~338 (at 5C)	94 (50 cycles at 0.5C)	[4]

References

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2. Komaba, S., Watanabe, M., Groult, H. & Kumagai, N. Alkali carbonate-coated graphite electrode for lithium-ion batteries. *Carbon* **46**, 1184-1193 (2008).

3. Yoon, S., Kim, H. & Oh, S. M. Surface modification of graphite by coke coating for reduction of initial irreversible capacity in lithium secondary batteries. *J. Power Sources* **94**, 68-73 (2001).

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