Supporting Information

Amorphous Boron Nanorods as Anode Material for Lithium Ion Batteries at Room Temperature

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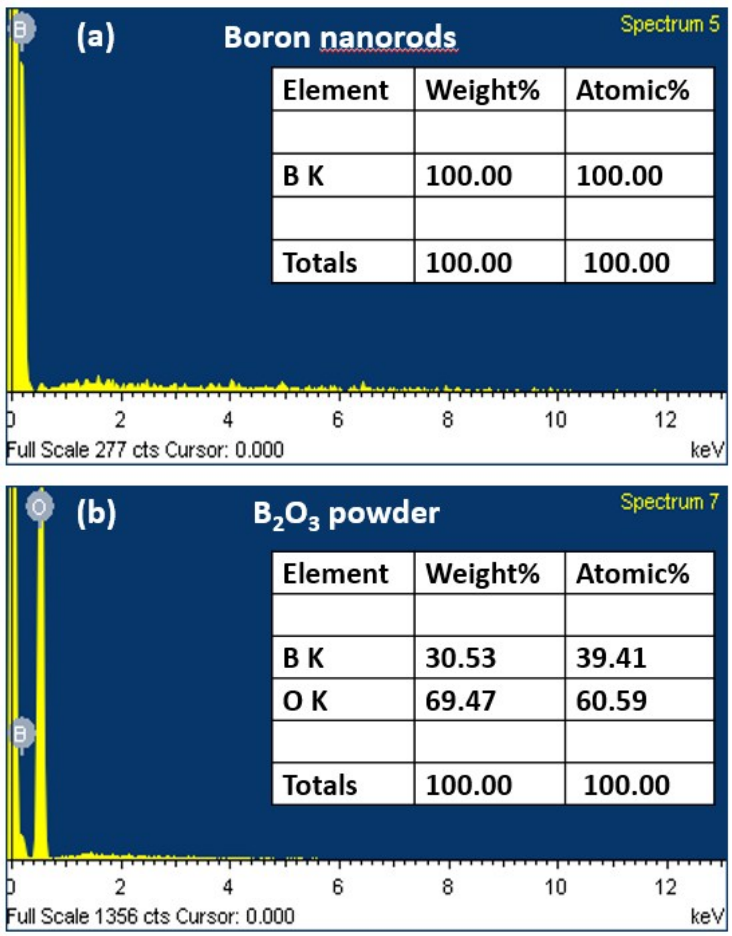

Figure S1: EDS of (a) as-prepared boron nanorods and (b) raw B_2O_3 powders.

The diffusion coefficient can be expressed as the following equation[1]:

$$D_{Li+} = \frac{\pi}{4}\left(\frac{m_B V_M}{M_B S}\right)^2 \left(\frac{\Delta E_S}{\tau\left(\frac{dE_t}{d\sqrt{\tau}}\right)}\right)^2, \tau \ll \frac{L^2}{D_{Li+}} \quad (1)$$

where m_B, V_M, M_B, S and τ are mass, molecular volume, molecular weight, active surface area and current pulse time of the electrode. If E versus $\sqrt{\tau}$ shows a linear behavior during the current pulse (Figure S1), the equation can be transformed into:

$$D_{Li+} = \frac{\pi}{4\tau}\left(\frac{m_B V_M}{M_B S}\right)^2 \left(\frac{\Delta E_S}{\Delta E_t}\right)^2, \tau \ll \frac{L^2}{D_{Li+}} \quad (2)$$

Where ΔE_S and ΔE_t for each titration are illustrated in Figure S2.

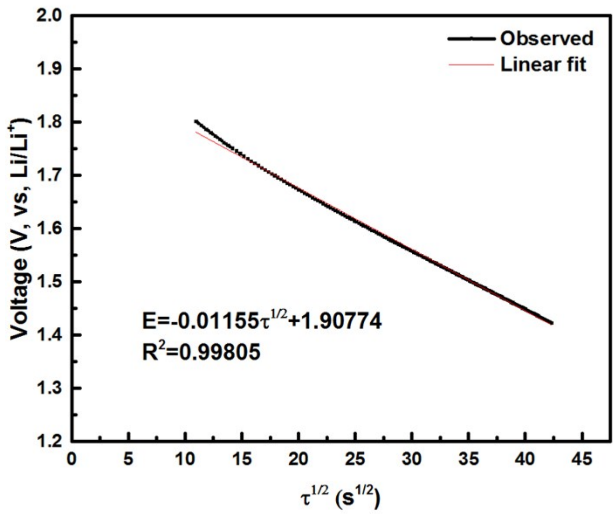

Figure S2: Linear behavior of the E vs $\tau^{1/2}$ relationship.

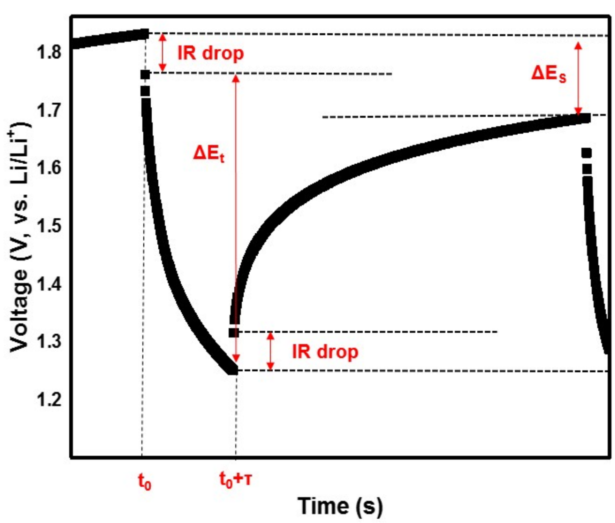

Figure S3: Schematic of GITT technique.

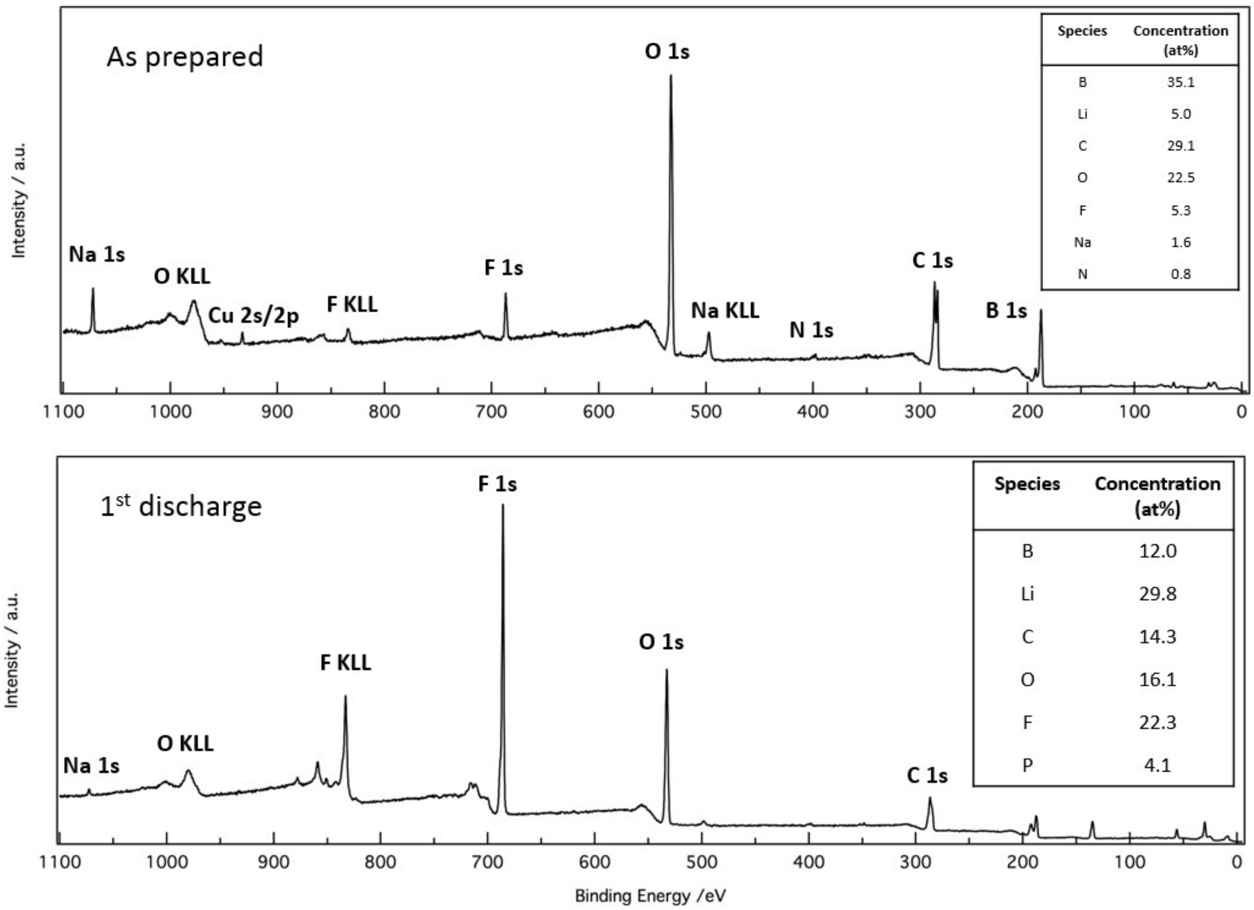

Figure S4: *Ex situ* XPS service scans of as prepared and 1st discharged boron materials

Notes and references

(1) Rui, X. H.; Ding, N.; Liu, J.; Li, C.; Chen, C. H.: Analysis of the chemical diffusion coefficient of lithium ions in Li3V2(PO4)(3) cathode material. *Electrochim Acta* **2010**, *55*, 2384-2390.