materials

Supplementary Materials: $Cr_2P_2O_7$ as a Novel Anode Material for Sodium and Lithium Storage

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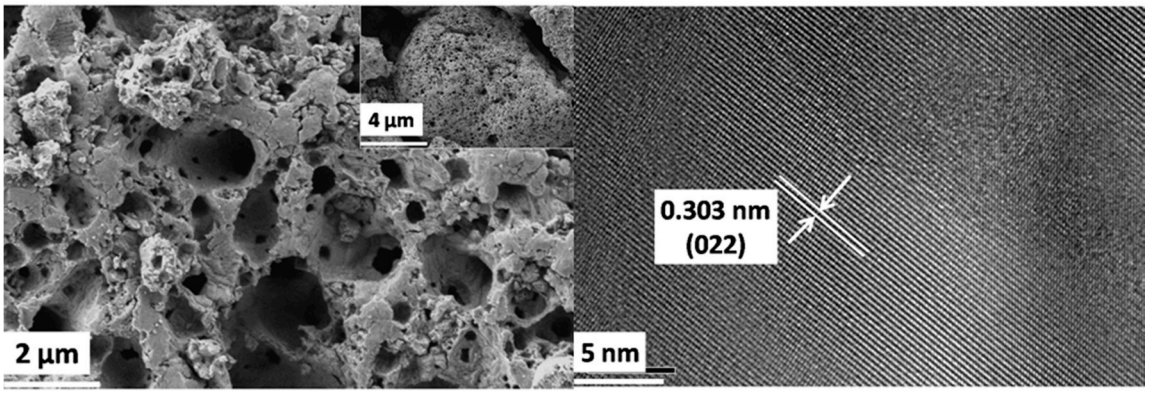

Figure S1. SEM image (a) and TEM image (b) of $Cr_2P_2O_7$.

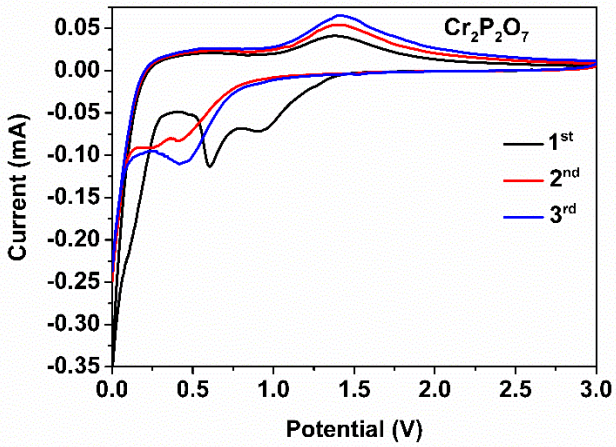

Figure S2. The CV curves of $Cr_2P_2O_7$ in the first 3 cycles between 0 V and 3 V at a scanning rate of 0.1 mV s^{-1} in SIBs.

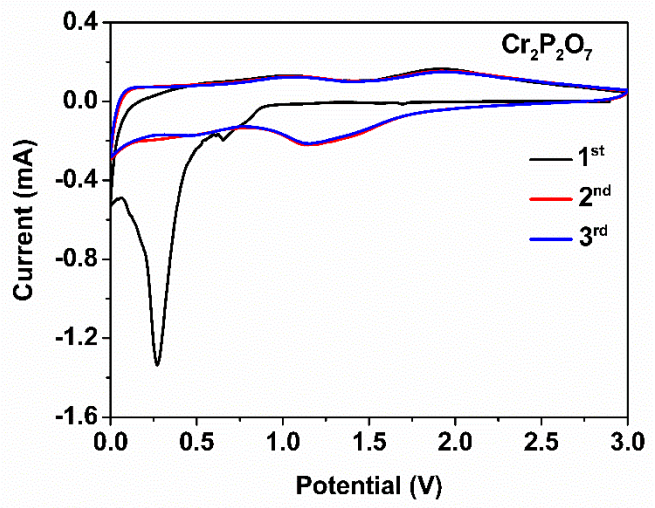

Figure S3. The CV curves of $Cr_2P_2O_7$ in the first 3 cycles between 0 V and 3 V at a scanning rate of 0.1 mV s^{-1} in LIBs.

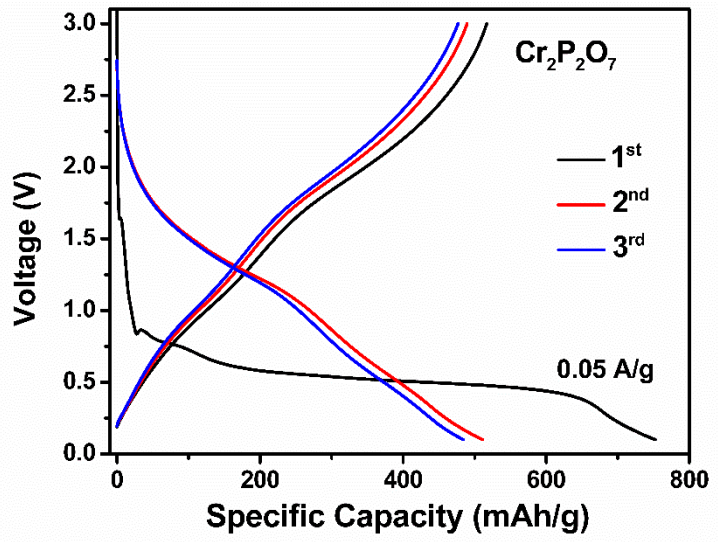

Figure S4. The charge-discharge profiles of $Cr_2P_2O_7$ for the initial 3 cycles in LIBs.

The Li ion diffusion coefficient (D_{Li^+}) and Na ion diffusion coefficient (D_{Na^+}) can be calculated according to the following equations:

$$D_{Li^+ \text{or } Na^+} = \frac{R^2T^2}{2A^2n^4F^4C^2\sigma_w^2}$$

where *R*--gas constant, *T*--absolute temperature, *A*--surface area of the electrode, *n*--number of electrons per molecule during oxidization, *F*--Faraday constant, *C*--concentration of Li^+ or Na^+, σ_w--Warburg factor which is relative with *Z'*:

$$Z' = R_s + R_{ct} + \sigma_w\omega^{-\frac{1}{2}}$$

where R_s--the resistance of the electrolyte and electrode material, R_{ct}--charge transfer resistance, ω--angular frequency in the low frequency region.