

Supplementary material for:

High-performance Tin Phosphide/Carbon Composite Anode for Lithium-ion Batteries

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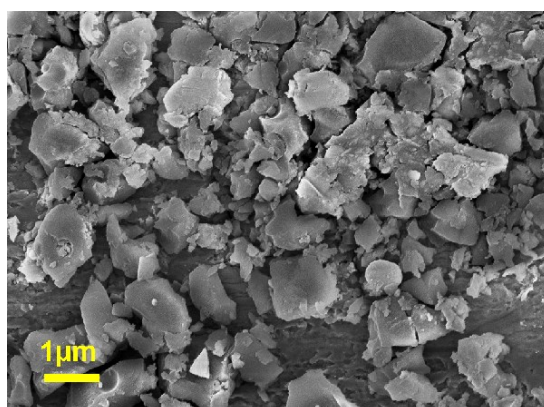


Fig. S1 Low-magnified SEM image of the SnP/C composite.

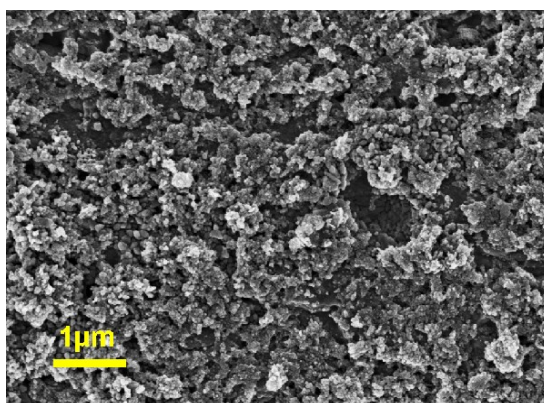


Fig. S2 Low-magnified SEM image of the Sn₄P₃/C composite.

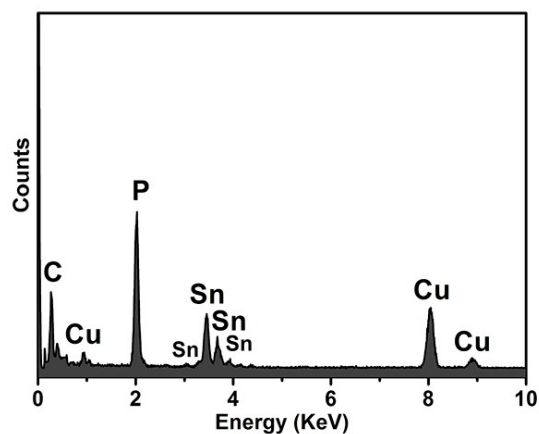


Fig. S3 The EDX spectra for the SnP/C composite, and the signal of Cu arises from the TEM grid.

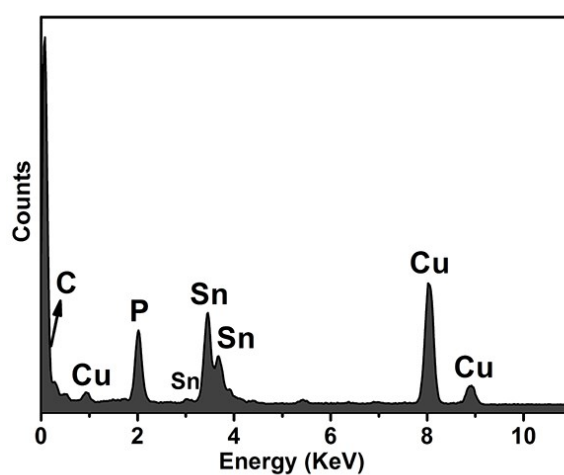


Fig. S4 The EDX spectra for the Sn₄P₃/C composite, and the signal of Cu arises from the TEM grid.

Raman spectrum of the SnP/C composite (**Fig. S5**) shows two characteristic peaks situated around 1337 cm⁻¹ and 1601 cm⁻¹, attributed to the D- and G-bands of graphite, respectively.

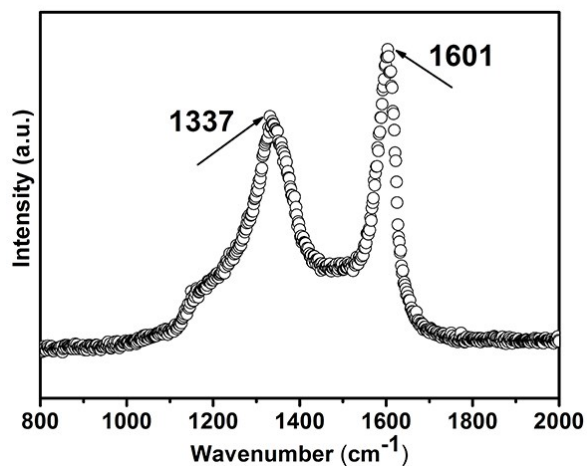


Fig. S5 Raman spectrum of the SnP/C composite.

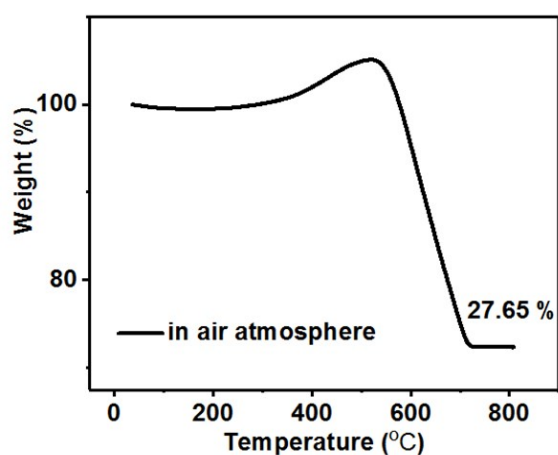


Fig. S6 TGA curve of the SnP/C composite under air atmosphere.

C 1s spectrum of the SnP/C composite is shown in **Fig. S7**, where the main peak at 284.7 eV is attributed to the graphitic carbon coat of SnP/C and the small peak at ~286.1 eV corresponding to the C-O bond.

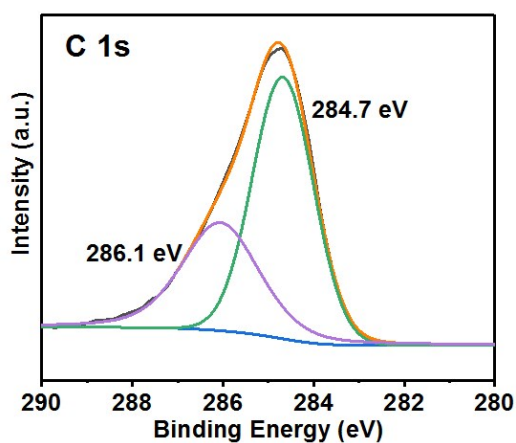


Fig. S7 X-Ray photoelectron spectral region for C 1s level of the SnP/C composite.

Fig. S8 shows the C 1s spectrum of the Sn₄P₃/C composite, which is very similar to that of SnP/C. And the small peak at ~286 eV can be ascribed to the C-O.

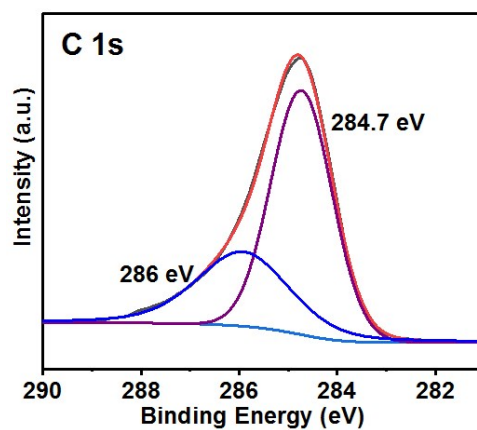


Fig. S8 X-Ray photoelectron spectral region for C 1s level of the $\text{Sn}_4\text{P}_3/\text{C}$ composite.

The cyclic performance of the SnP/C at 0.1 A g^{-1} is displayed in **Fig. S9**, and the SnP/C electrode remains a specific capacity around 751 mAh g^{-1} after 30 cycles.

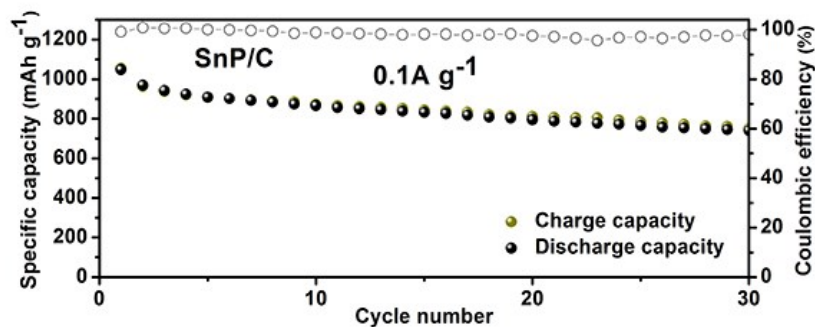


Fig. S9 Cycling performance and coulombic efficiency (CE) of the SnP/C composite electrode at a current density of 0.1 A g^{-1} .

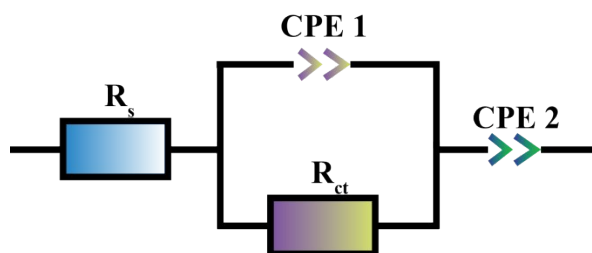


Fig. S10 The equivalent circuit model to fit the Nyquist plots, and R_s : Contact resistance between electrode and electrolyte; R_{ct} : Charge transfer resistance; CPE: Constant phase element.