Supporting Information

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Figure S1. SEM images of (a) graphite and (b) red phosphorus.

Figure S2. XRD pattern of the P/GnPs -300.

Figure S3. (a) SEM image with corresponding EDS mapping, and (b) TEM image of P/GnPs -300.

Figure S4. XPS spectra of (a) C1s and (b) P 2p of P/GnPs-300.

Figure S5. Raman spectra of P/GnPs composites milled at different speeds.

Figure S6. FTIR spectra of P/GnPs composites milled at different speeds.

Figure S7. Electrochemical impedance spectra of P/GnPs – 500 (b) compared with P/GnPs -300 (c) in the charged state at 0.6 V in the 5th, 20th, and 100th cycles. (a) Equivalent circuit used to interpret the results.

Figure S8. Cycling performance of the P/GnPs -500 composite electrode at the high current densities of 500 mA g⁻¹ and 1 A g⁻¹.

Figure S9. (a) Charge-discharge curves for selected cycles, and (b) cycling performance of the graphite milled for 40 h.

Figure S10. Photographs of the electrodes after 200 cycles: (a) P/GnPs-300; (b) P/GnPs -500.

Table S1. $R_{ct}$ (Ω) and $R_x$ (Ω) of the P/GnPs electrodes after different cycles.
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<th>5th cycle</th>
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<td></td>
<td>$R_x$</td>
<td>$R_{ct}$</td>
<td>$R_x$</td>
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Figure S8. Cycling performance of the P/GnPs -500 composite electrode at the high current densities of 500 mA g⁻¹ and 1 A g⁻¹ (the current density is 100 mA g⁻¹ in the first 5 cycles).
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