

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.

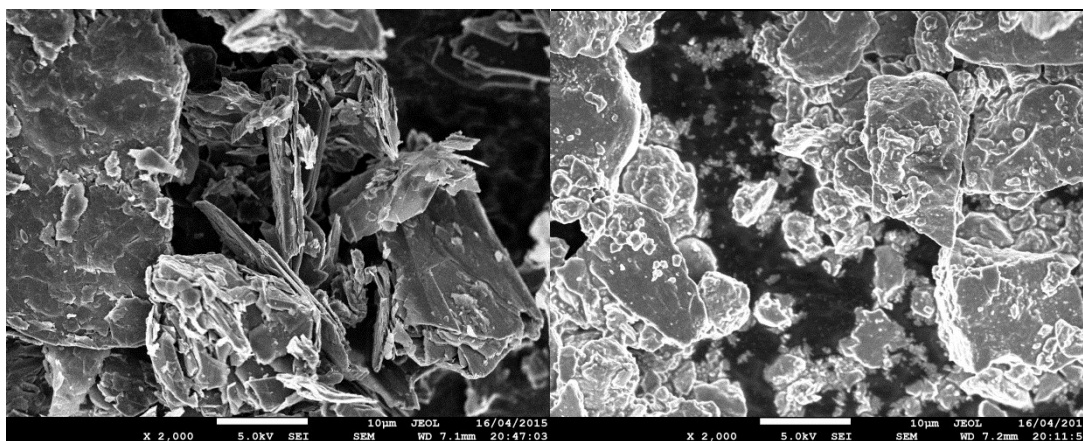


Figure S1. SEM images of (a) graphite and (b) red phosphorus.

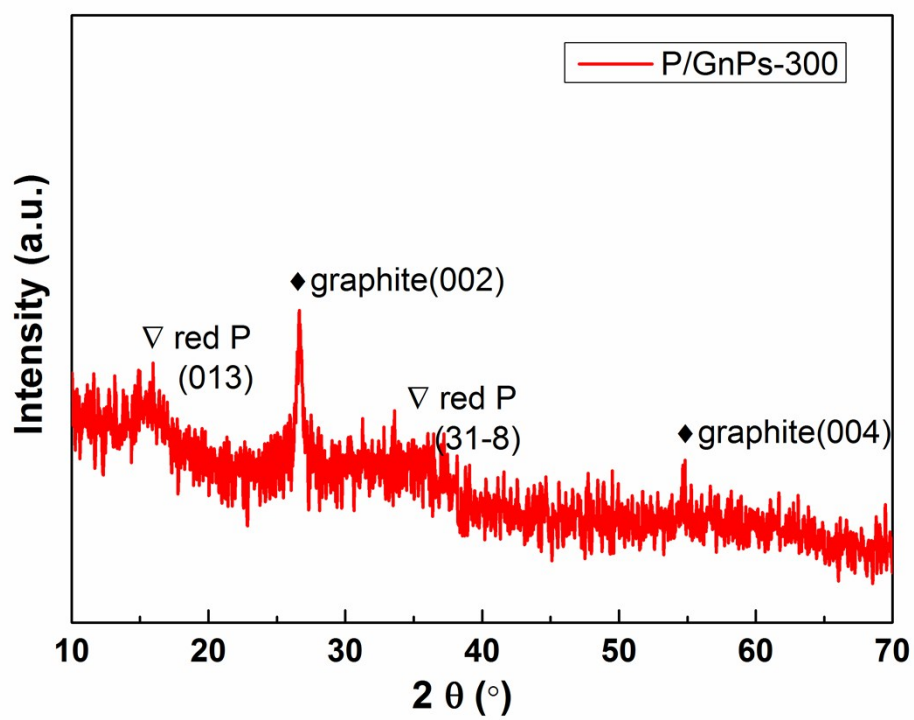


Figure S2. XRD pattern of the P/GnPs -300.

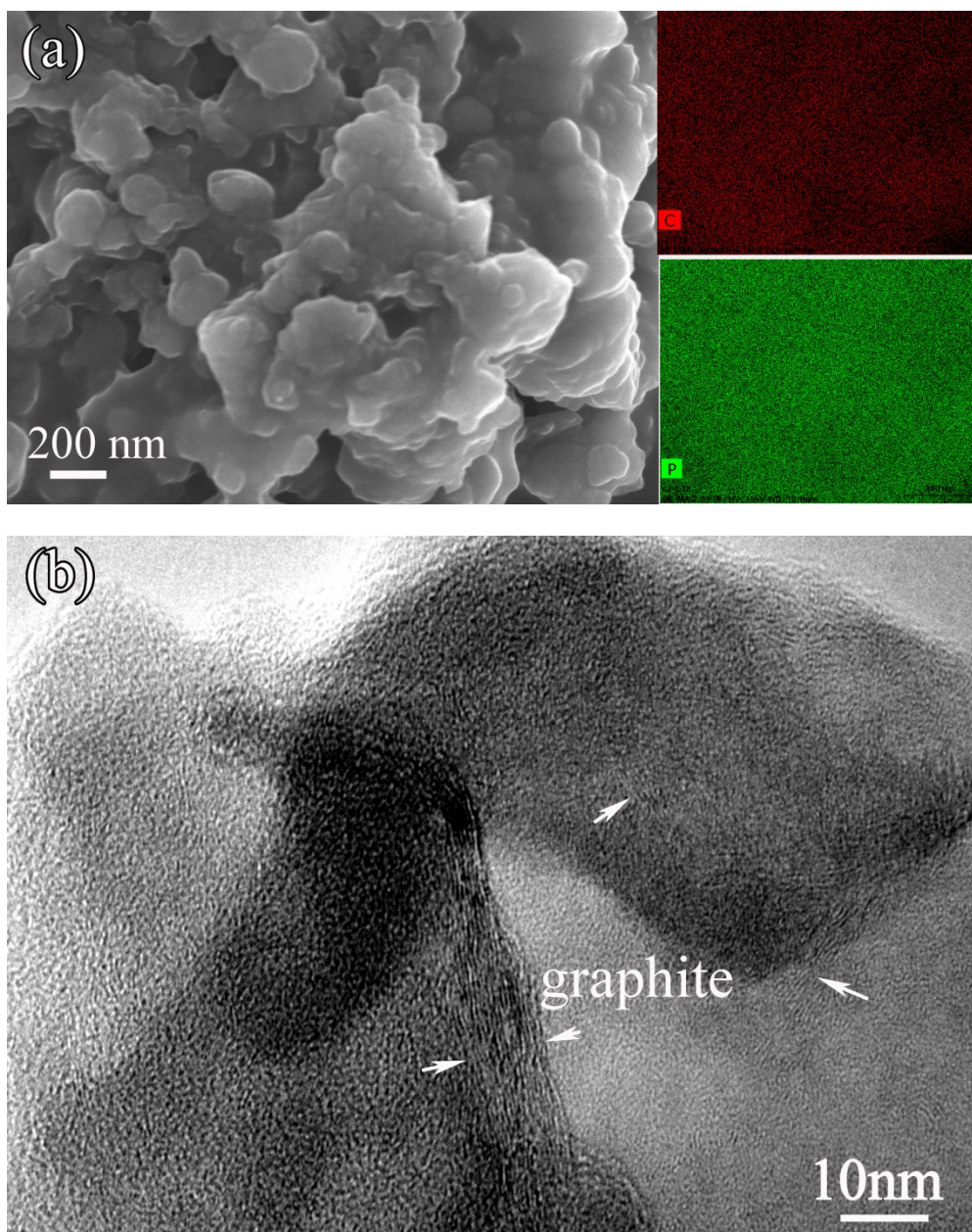


Figure S3. (a) SEM image with corresponding EDS mapping, and (b) TEM image of P/GnPs

-300.

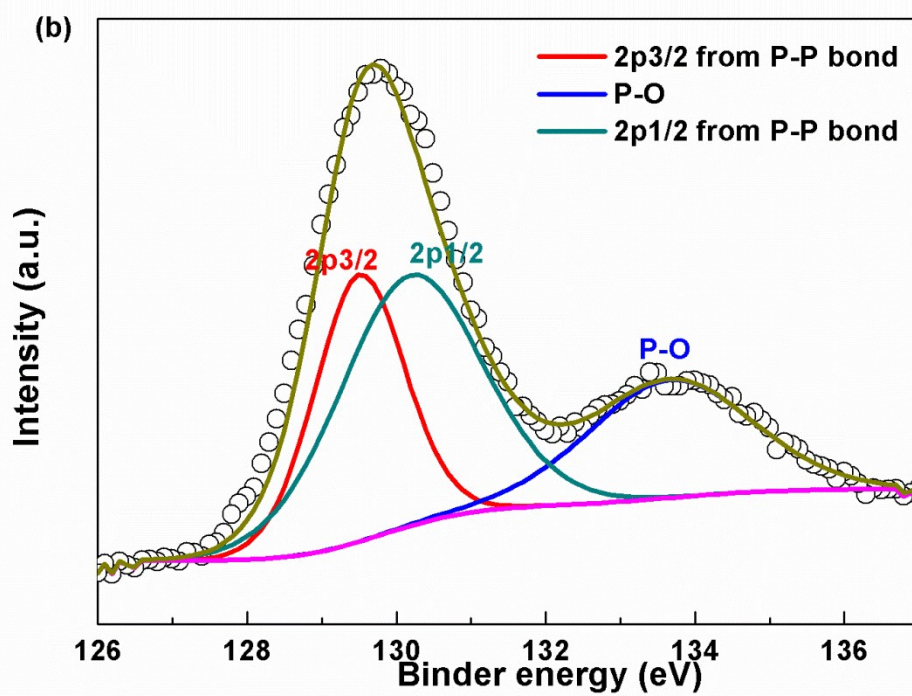
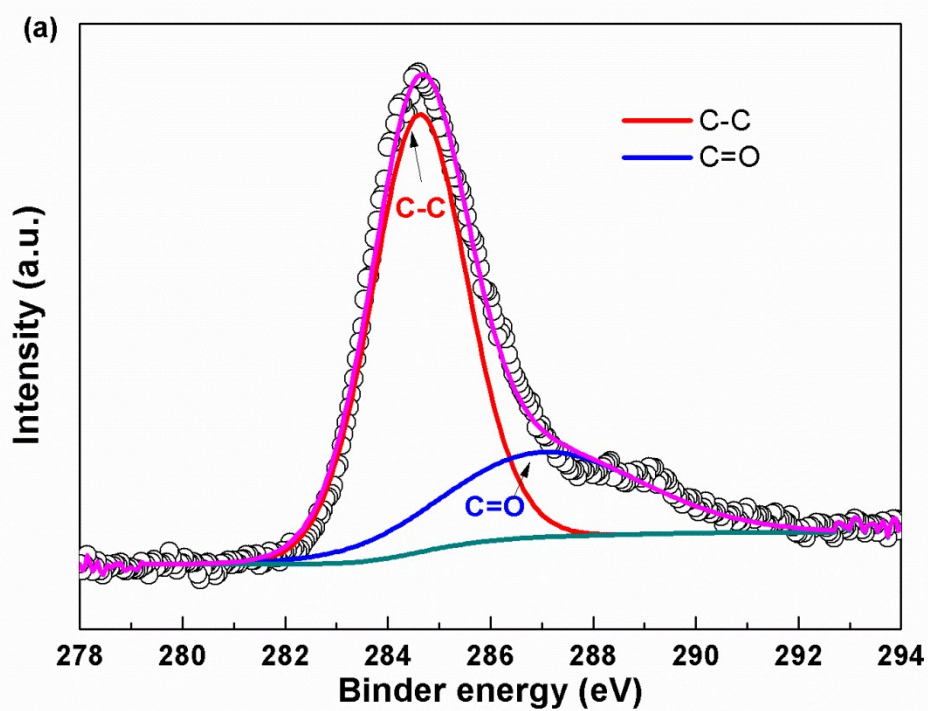


Figure S4. XPS spectra of (a) C1s and (b) P 2p of P/GnPs-300.

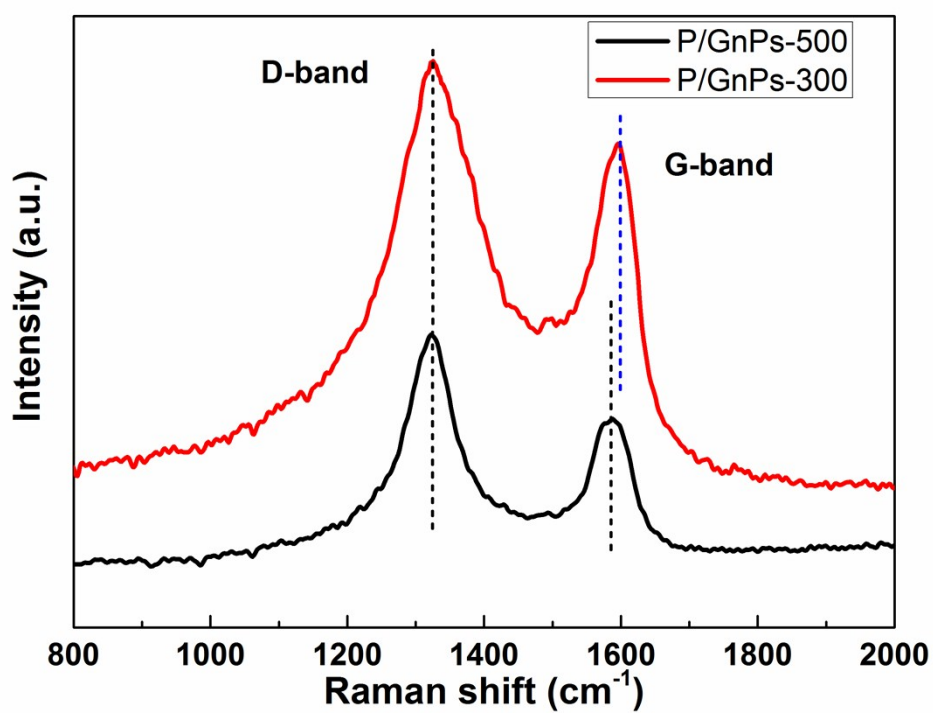


Figure S5. Raman spectra of P/GnP composites milled at different speed

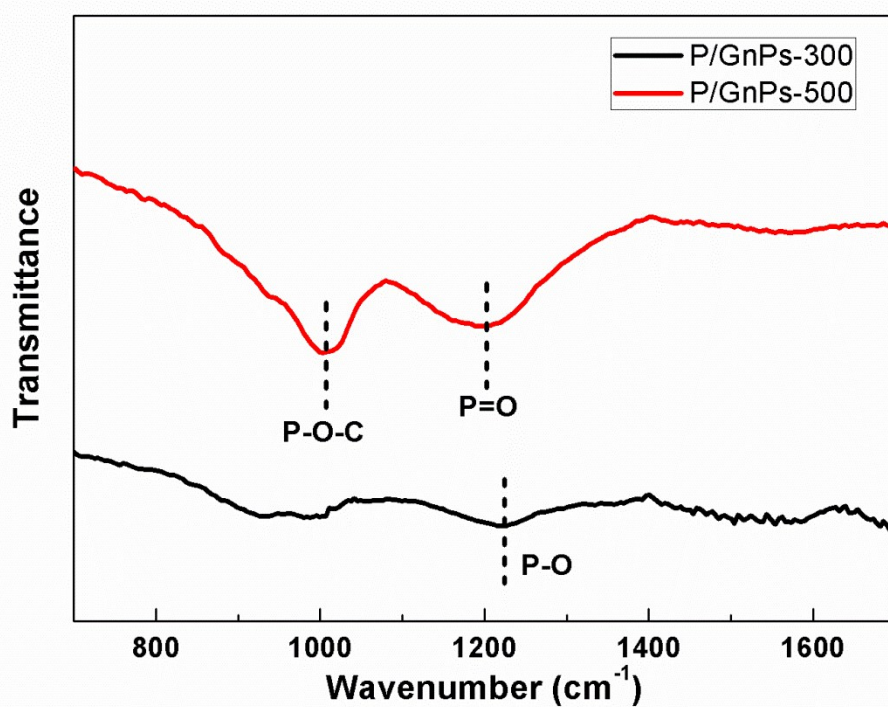


Figure S6. FTIR spectra of P/GnP composites milled at different speeds.

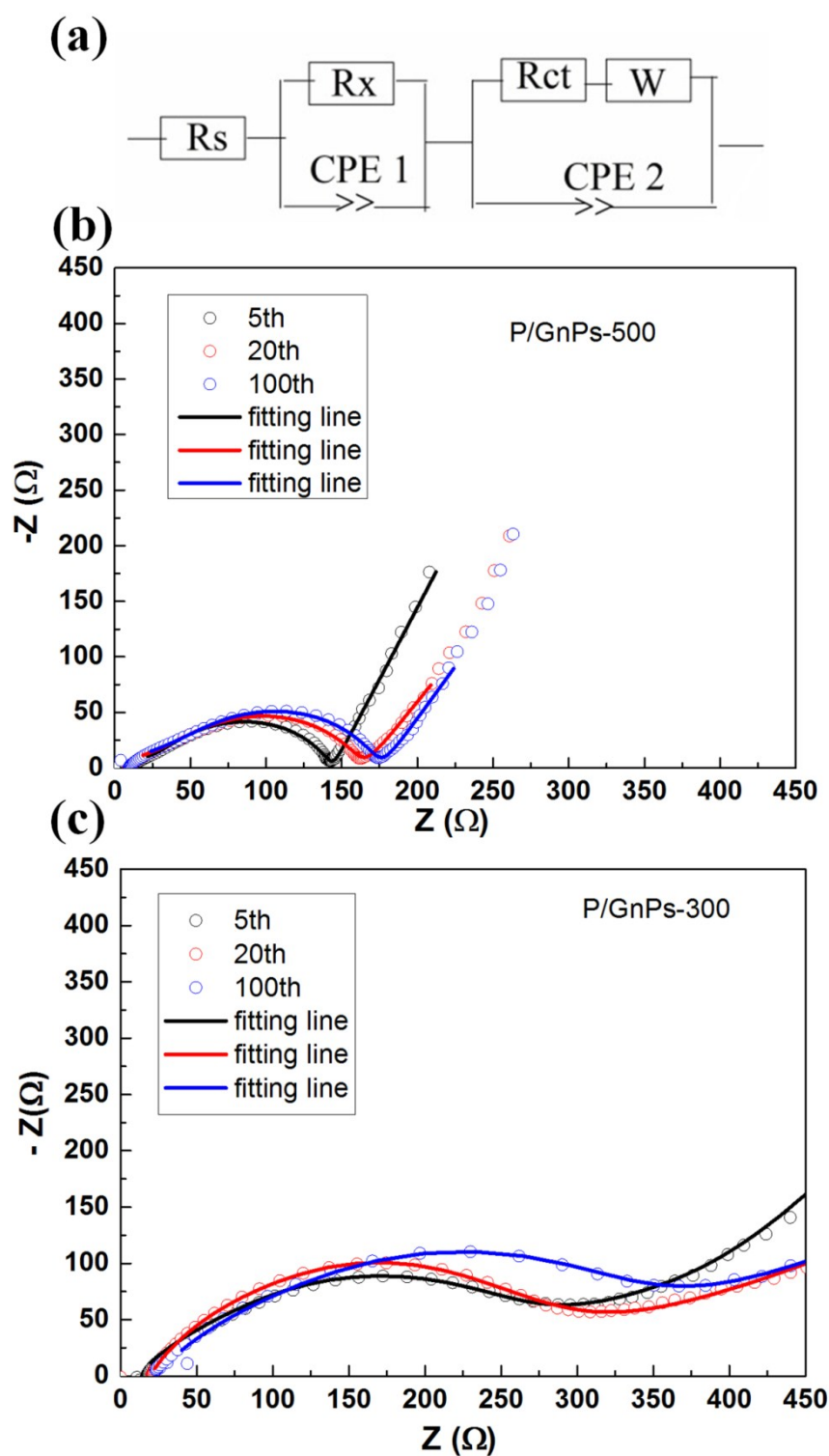


Figure S7. Electrochemical impedance spectra of P/GnPs – 500 (b) compared with P/GnPs - 300 (c) in the charged state at 0.6 V in the 5th, 20th, and 100th cycles. (a) Equivalent circuit used to interpret the results.

Table S1. R_{ct} (Ω) and R_x (Ω) of the P/GnPs electrodes after different cycles.

	5 th cycle		20 th cycle		100 th cycle	
	R_x	R_{ct}	R_x	R_{ct}	R_x	R_{ct}
P/GnPs -500	49	95	70	96	79	106
P/GnPs -300	32	147	64	168	139	277

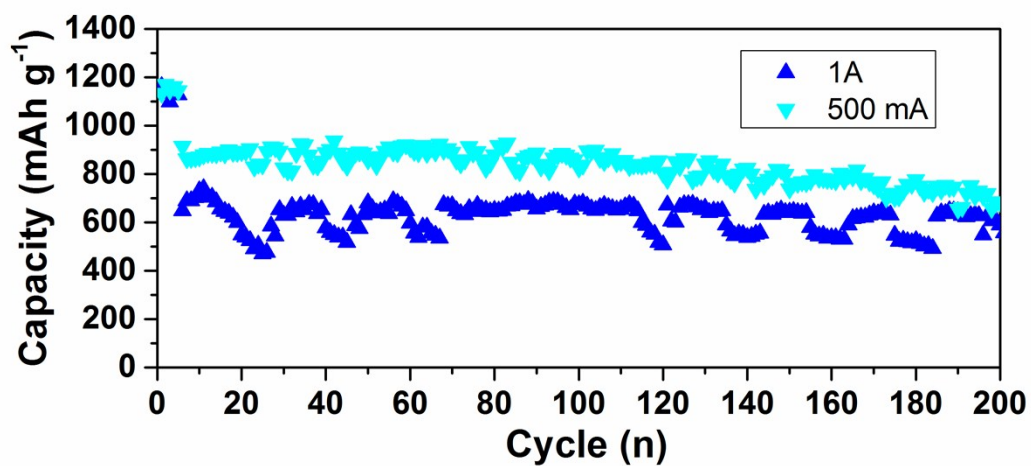


Figure S8. Cycling performance of the P/GnPs -500 composite electrode at the high current densities of 500 mA g^{-1} and 1 A g^{-1} (the current density is 100 mA g^{-1} in the first 5 cycles).

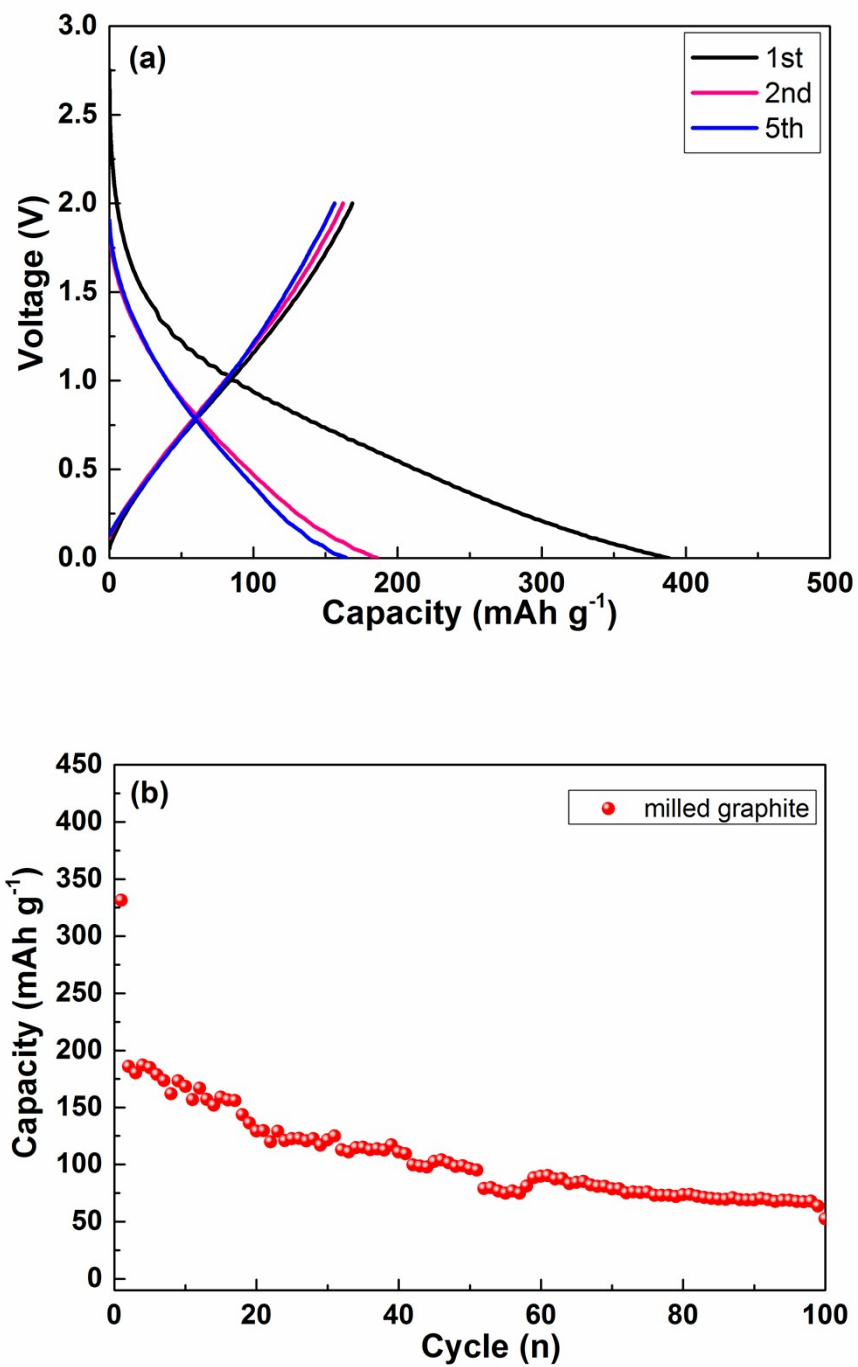


Figure S9. (a) Charge-discharge curves for selected cycles, and (b) cycling performance of the graphite milled for 40 h.



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