Supplementary Information

Enhanced Initial Coulombic Efficiency of Lithium-Ion Battery Silicon-Carbon Anodes with Phosphorus Doping

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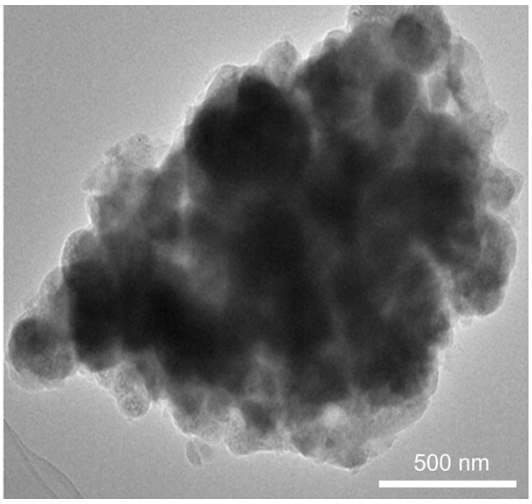

Figure S1. TEM images for P-Si@C.

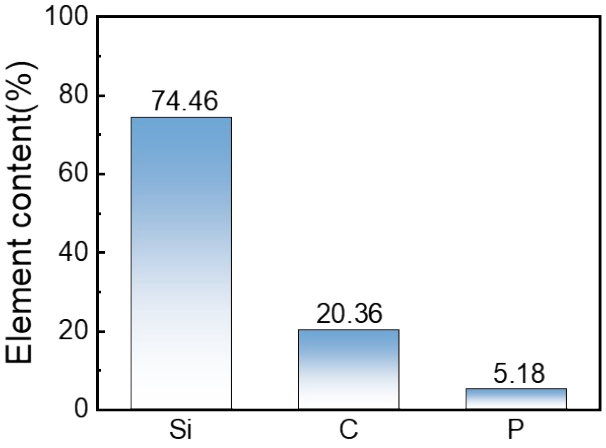

Figure S2. Element content of P-Si@C.

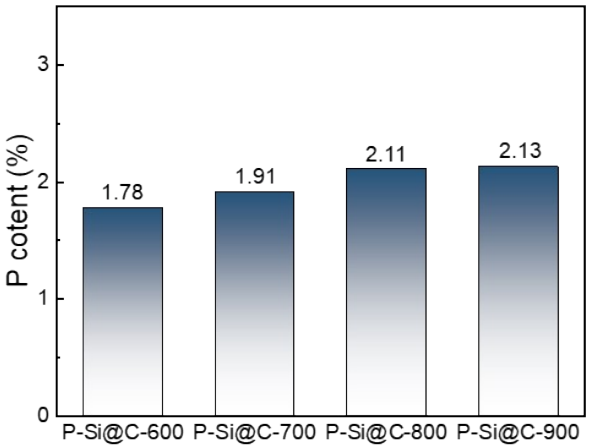

Figure S3. ICP results of P content.

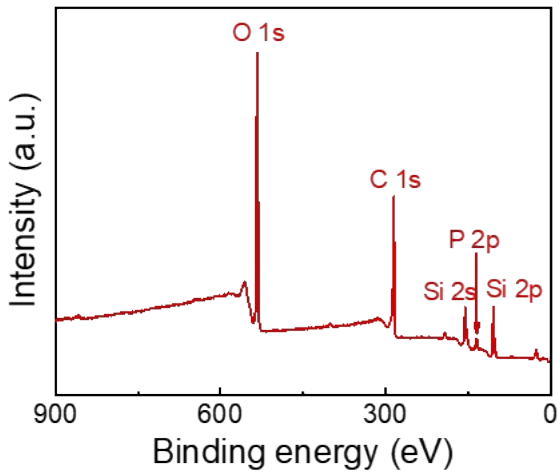

Figure S4. XPS survey of P-Si@C.

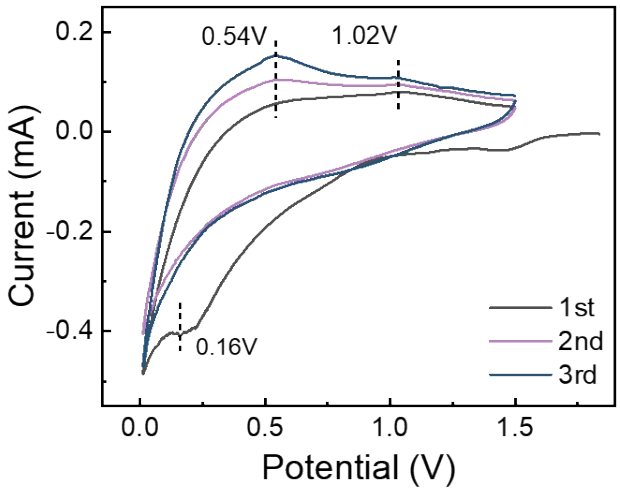

Figure S5. CV profiles of Si@C at 0.1 mV s^{-1}.

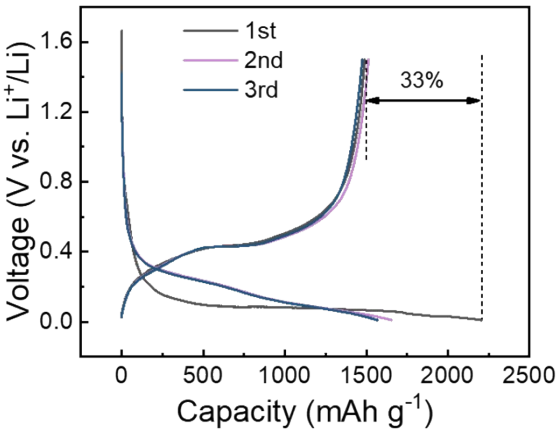

Figure S6. Discharge-charge voltage curves of Si@C at 100mA g^{-1}.

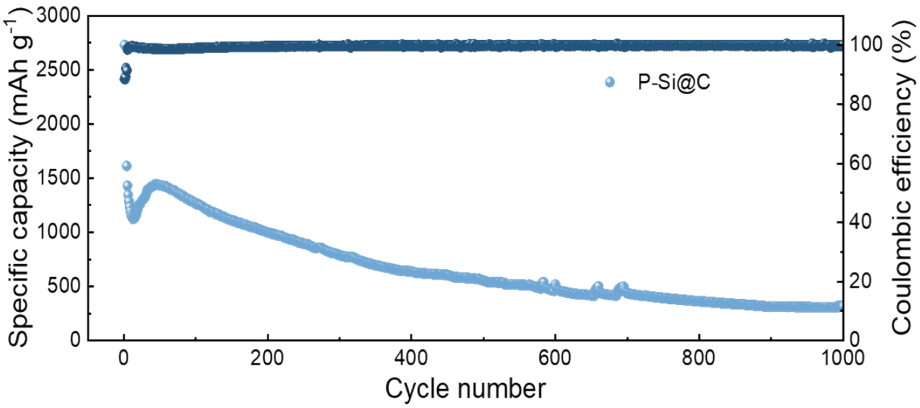

Figure S7. Long-term cycle performance of P-Si@C with the current density of 1.0 A g^{-1}.

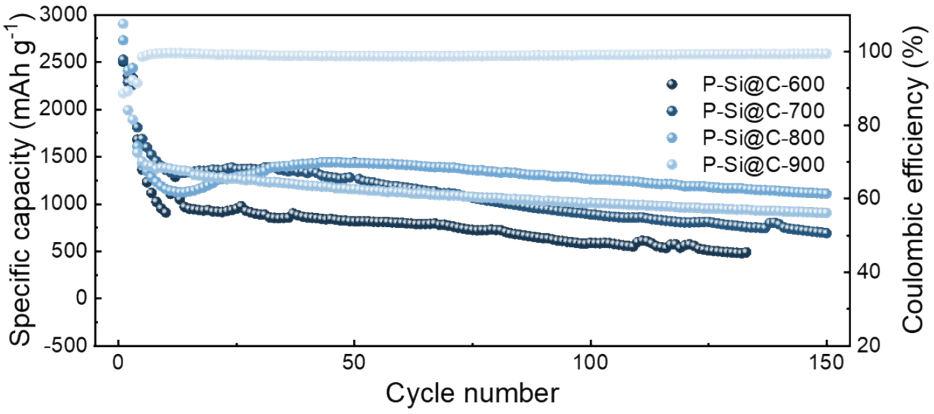

Figure S8. Cycling performance at 1.0 A g^{-1} of P-Si@C-600, P-Si@C-700, P-Si@C-800 and P-Si@C-900.

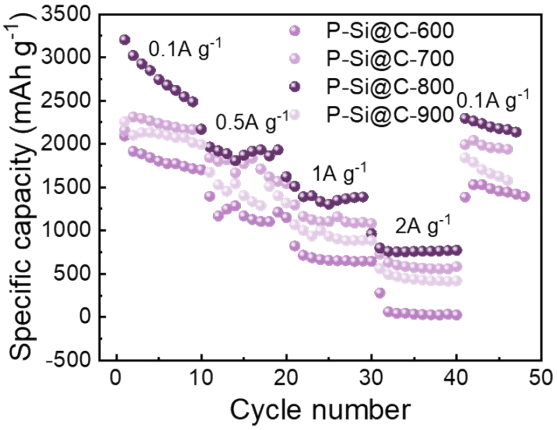

Figure S9. Rate performance at 1.0 A g^{-1} of P-Si@C-600, P-Si@C-700, P-Si@C-800 and P-Si@C-900.

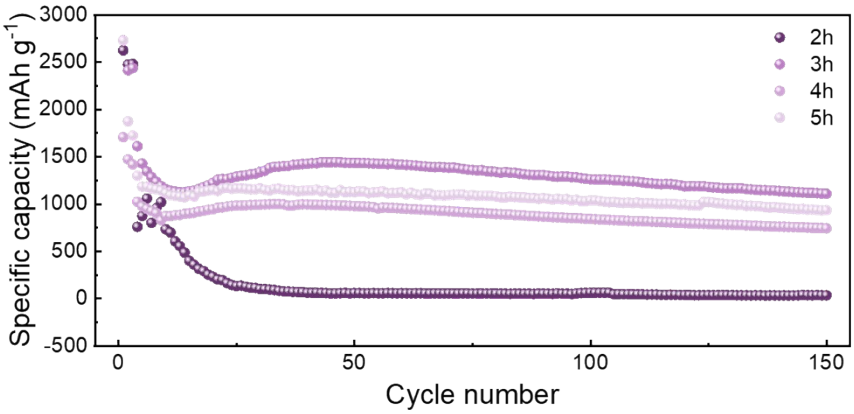

Figure S10. Cycling performance at 1.0 A g^{-1} of 2h, 3h, 4h and 5h.

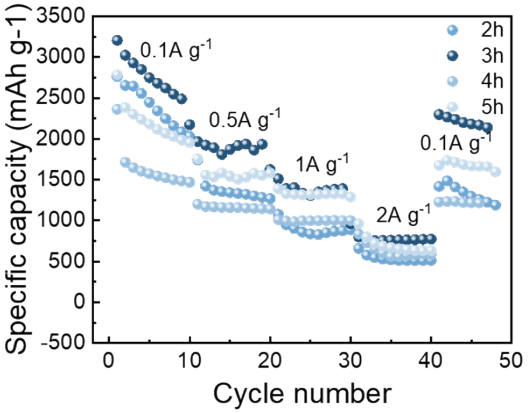

Figure S11. Rate performance at 1.0 A g^{-1} of 2h, 3h, 4h and 5h.

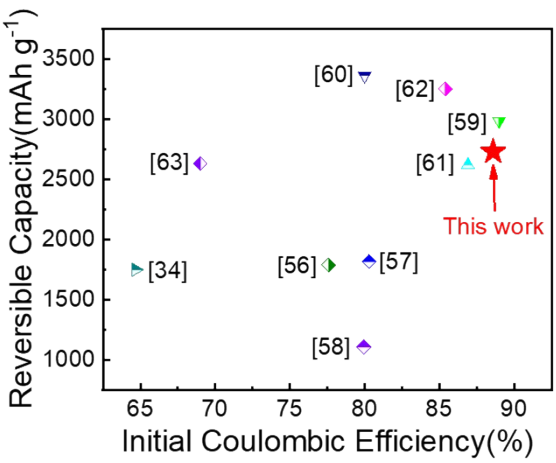

Figure S12. Comparison of the ICE and reversible capacity of silicon anodes with doping methods reported in the literature.

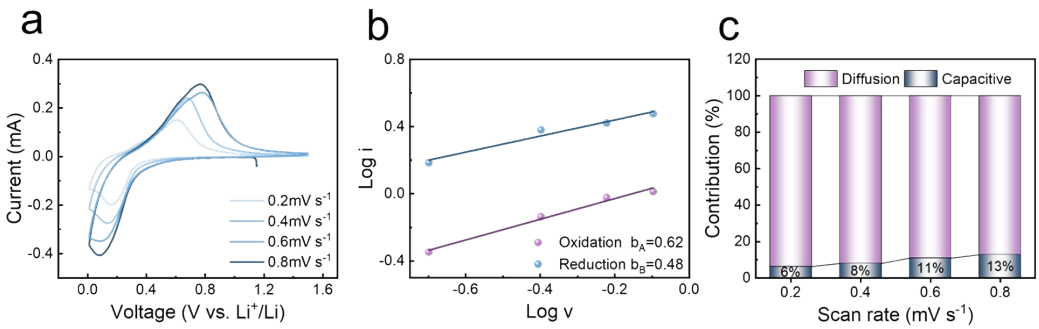

Figure S13. (a) CV curves of the electrode at different scan rates of Si@C. (b) Log i vs Log v Plots for electrode kinetics analysis of Si@C. (c) Capacitive and diffusion contributions to electrode charge storage at varied scan rates of Si@C.

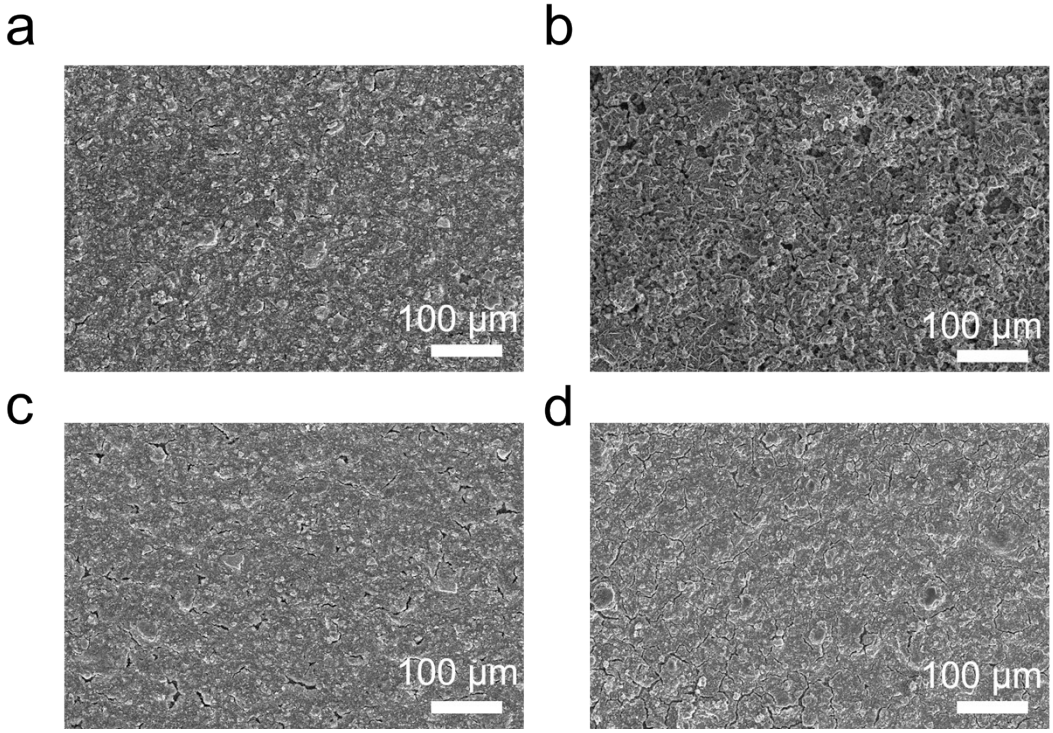

Figure S14. (a) Surface topography of Si@C before cycling. (b) Surface topography of P-Si@C after 100 cycles. (c) Surface topography of Si@Cbefore cycling. (d) Surface topography of P-Si@C after 100 cycles.