

Supporting Information

Interfacial Nitrogen Stabilizes Carbon-Coated Mesoporous Silicon Particle Anodes

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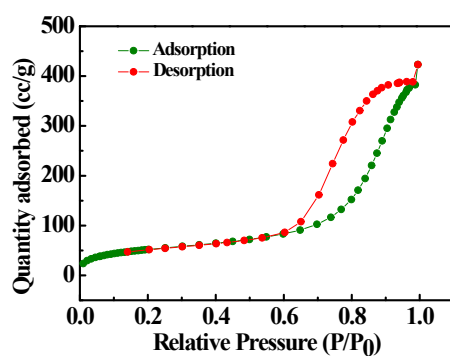


Figure S1. Nitrogen gas adsorption curves of MSP at 77K.

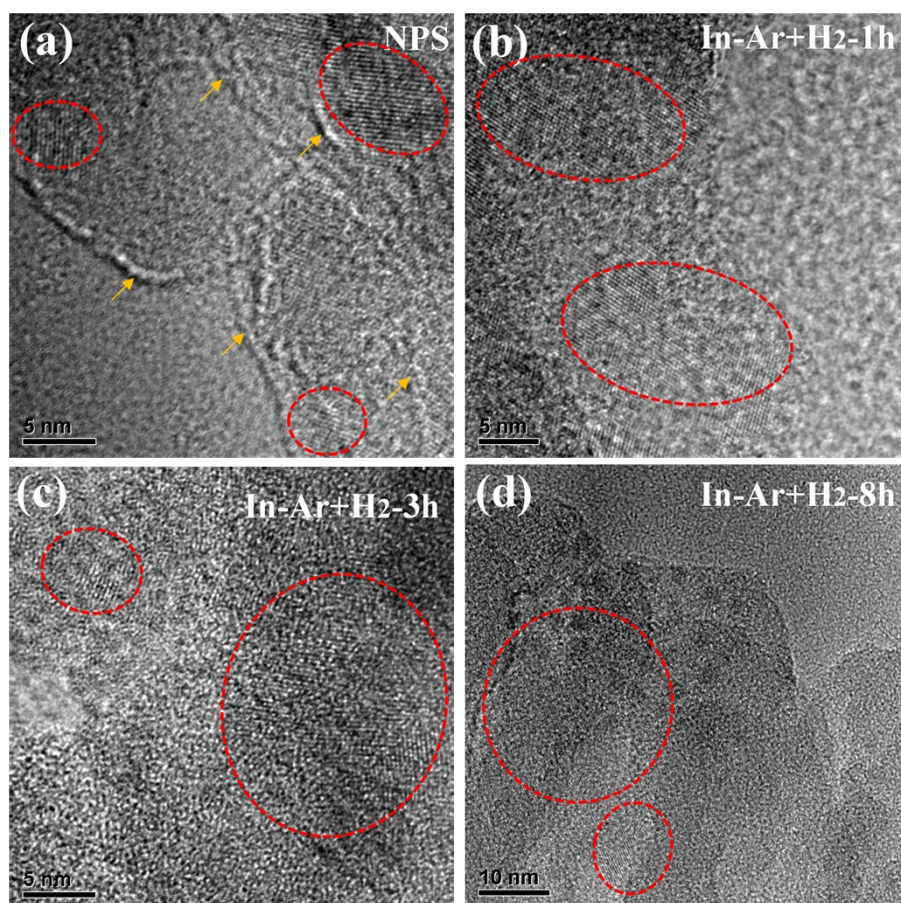


Figure S2. HRTEM images of MSP (a) and carbon-coated MSP annealed in Ar+H₂ for 1h (b), 3h (c) and 8h (d).

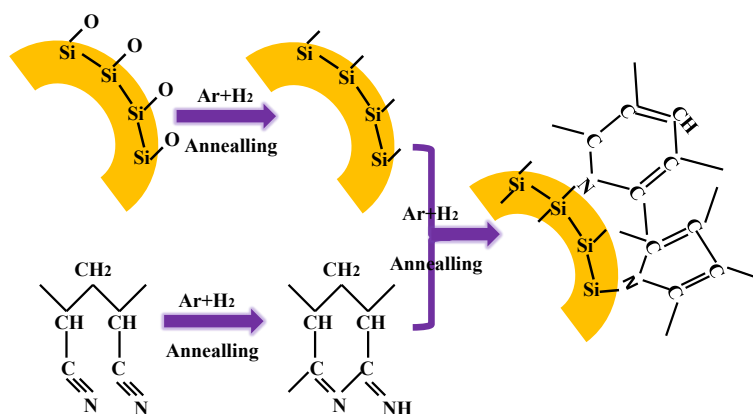


Figure S3. Reaction mechanism of the Si-N-C layer

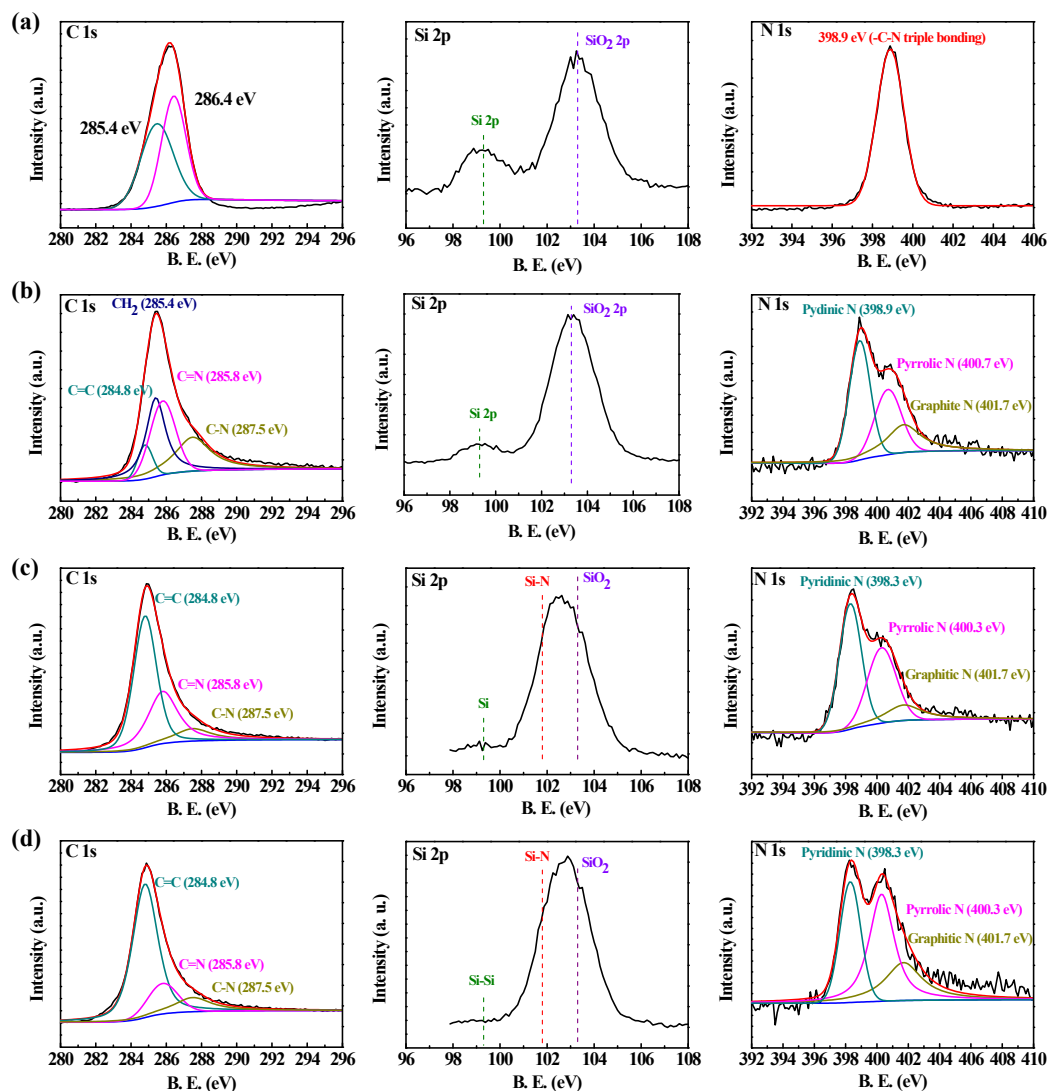


Figure S4. Fitting XPS spectra of PAN-coated MSP (a), carbon-coated MSP annealed in Ar+H₂ for 1h (b), 3h (c) and 8h (d).

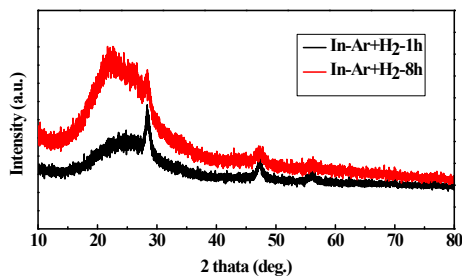


Figure S5. XRD patterns of carbon-coated MSP annealed in Ar+H₂ for 1h (black) and 8h (red).

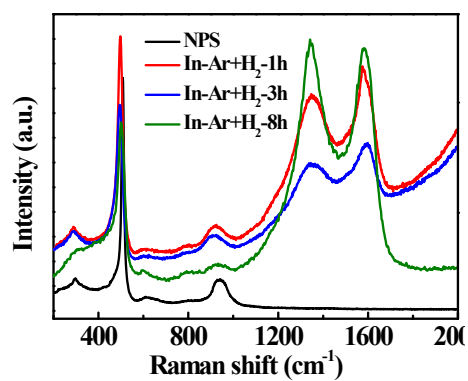


Figure S6. Raman Spectrum of carbon-coated annealed in Ar+H₂.

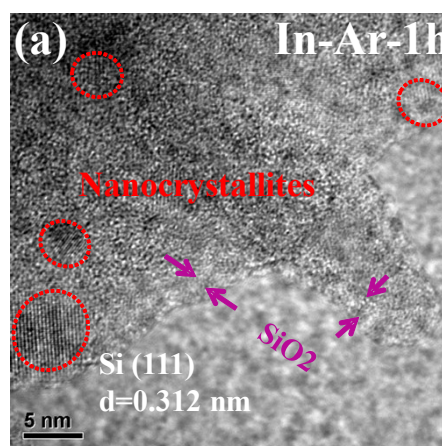


Fig. S7 TEM image of carbon coated MSP annealed in Ar for 1 h.

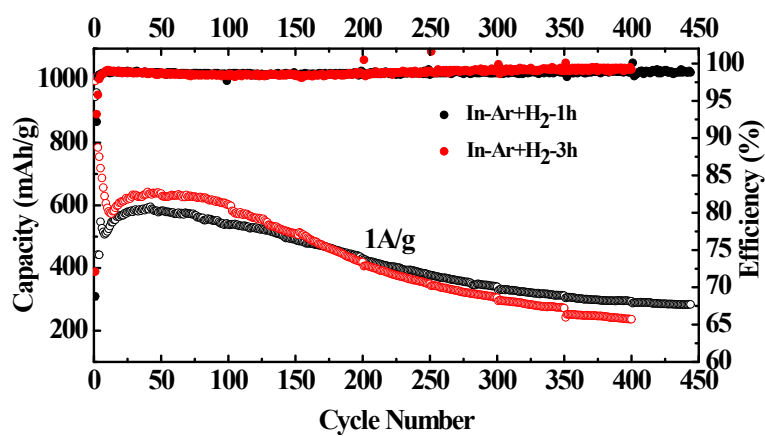


Figure S8. Galvanostatic cycling performance of carbon-coated MSP annealed in Ar+H₂ for 1h (black) and 3h (red) at 1 A g⁻¹.

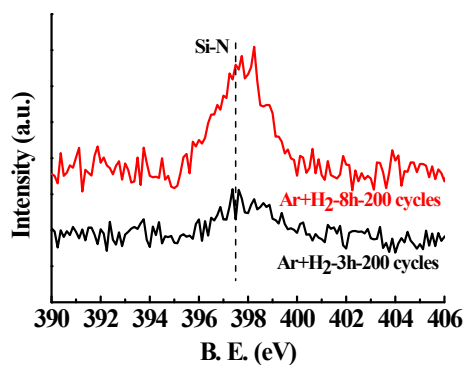


Fig.S9 XPS spectra of carbon-coated MSP annealed in Ar+H₂ for 3h (black) and 8h (red) after 200 cycles.

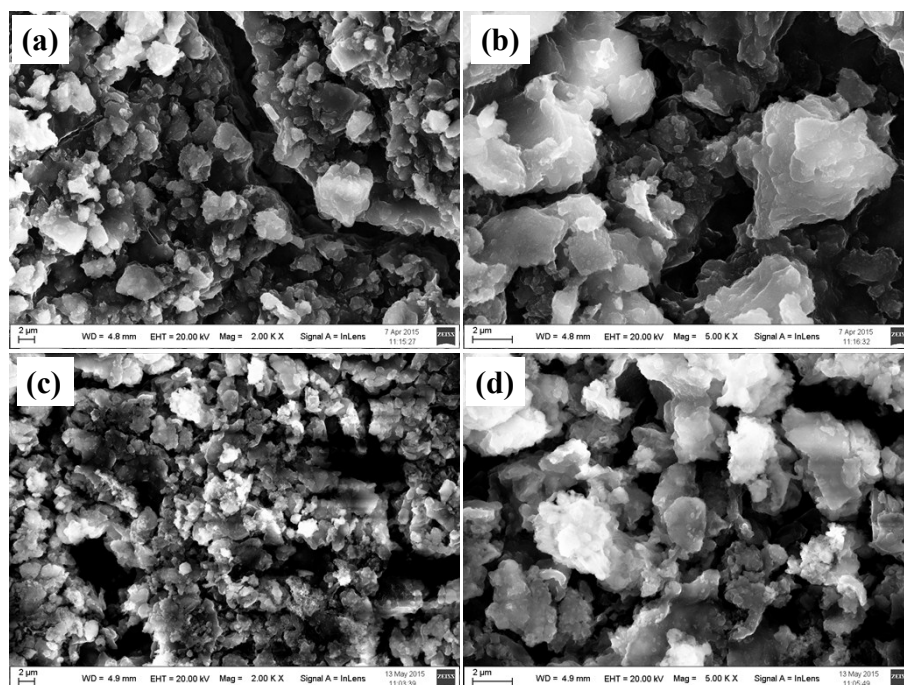


Fig. S10 (a) Surface SEM image of the carbon-coated MSP annealed in Ar+H₂ for 8h after 200 cycles. (b) High magnification view of (a). (c) Surface SEM image of the carbon-coated MSP annealed in Ar+H₂ for 4h after 2000 cycles. (d) High magnification view of (c).

Elemental	C(%)	N(%)	H(%)	Si (%)
Sample				
In-Ar+H ₂ -1h	17.92	4.08	1.06	72.55
In-Ar+H ₂ -3h	17.56	3.03	0.85	78.56
In-Ar+H ₂ -8h	20.09	2.92	0.89	76.1

Table S1. Elemental contents of Si, C, N, H after annealing