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+H\textsubscript{2} 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.

Figure 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+H\textsubscript{2} for 3h (black) and 8h (red) after 200 cycles.

Fig. S10 (a) Surface SEM image of the carbon-coated MSP annealed in Ar+H\textsubscript{2} for 8h after 200 cycles. (b) High magnification view of (a). (c) Surface SEM image of the carbon-coated MSP annealed in Ar+H\textsubscript{2} for 4h after 2000 cycles. (d) High magnification view of (c).

<table>
<thead>
<tr>
<th>Sample</th>
<th>C(%)</th>
<th>N(%)</th>
<th>H(%)</th>
<th>Si (%)</th>
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<tbody>
<tr>
<td>In-Ar+H\textsubscript{2}-1h</td>
<td>17.92</td>
<td>4.08</td>
<td>1.06</td>
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<tr>
<td>In-Ar+H\textsubscript{2}-3h</td>
<td>17.56</td>
<td>3.03</td>
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<td>In-Ar+H\textsubscript{2}-8h</td>
<td>20.09</td>
<td>2.92</td>
<td>0.89</td>
<td>76.1</td>
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</tbody>
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Table S1. Elemental contents of Si, C, N, H after annealing