

Supplementary Materials

# Preparation and Electrochemical Characterization of Si@C Nanoparticles as an Anode Material for Lithium-Ion Batteries via Solvent-Assisted Wet Coating Process

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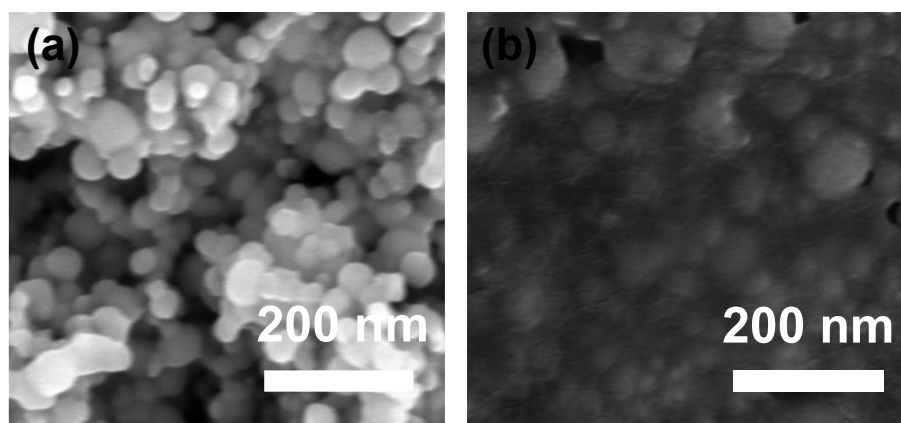
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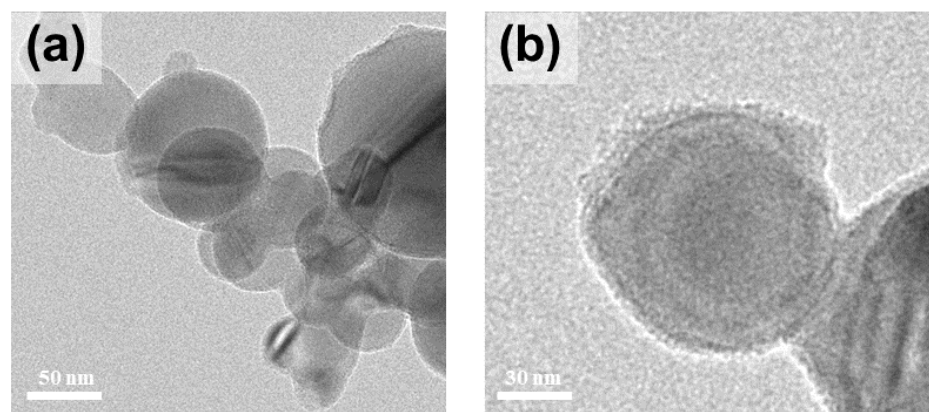
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**Figure S1.** The SEM image of (a) Si NPs and (b) phenolic resin-coated Si NPs.



**Figure S2.** High resolution TEM images of (a,b) Si@C.

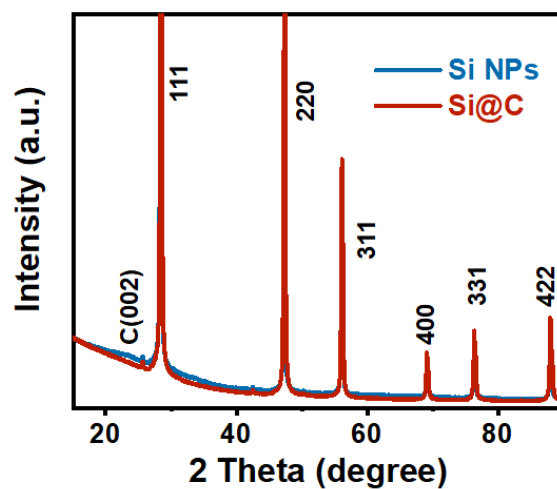


Figure S3. XRD data of Si NPs and Si@C.

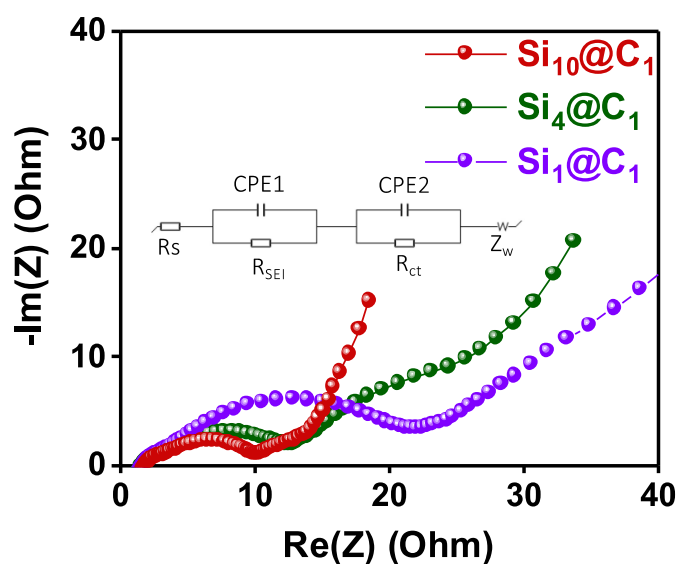


Figure S4. EIS data of Si<sub>10</sub>@C<sub>1</sub>, Si<sub>4</sub>@C<sub>1</sub>, and Si<sub>1</sub>@C<sub>1</sub>.

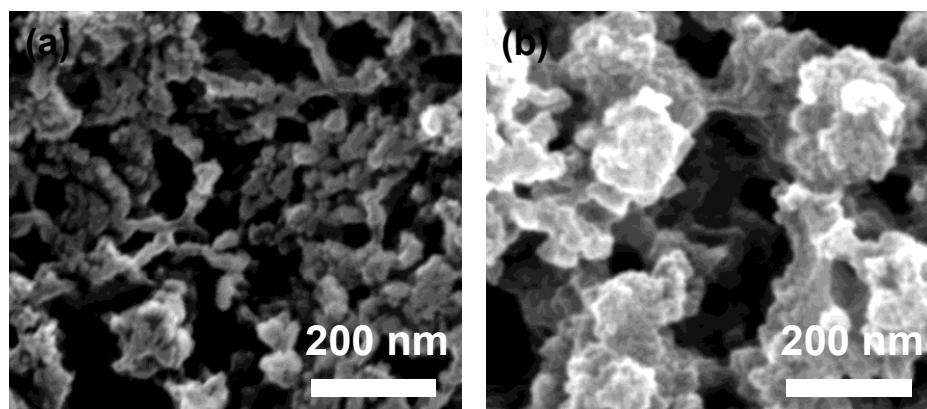


Figure S5. The SEM image of (a) Si NPs electrode and (b) Si<sub>10</sub>@C<sub>1</sub> electrode after 100 cycles.

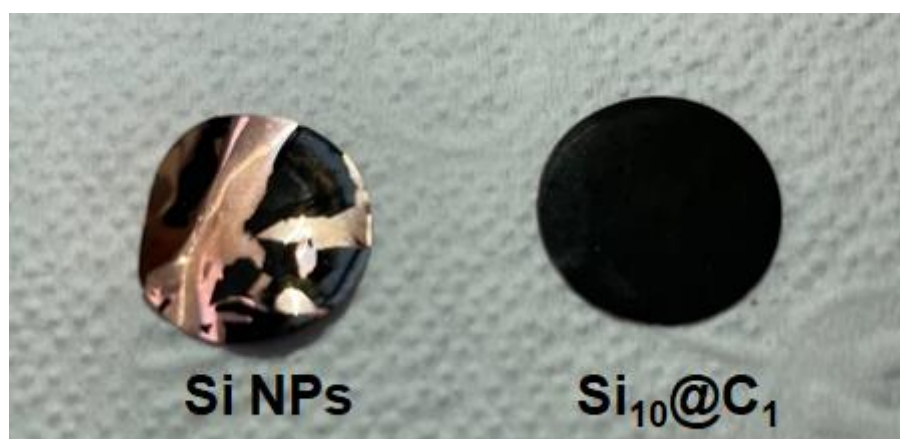


Figure S6. The photo image of Si and Si<sub>10</sub>@C<sub>1</sub> electrodes after 100 cycles.

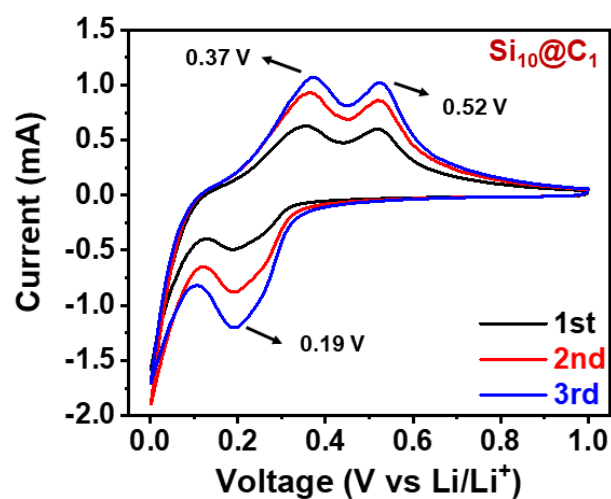


Figure S7. The cyclic voltammetry curves of Si@C anode.

Table S1. EIS data of Si NPs and Si<sub>10</sub>@C<sub>1</sub>.

| Electrodes.                          | $R_s$ | $R_{SEI}$ | $R_{ct}$ |
|--------------------------------------|-------|-----------|----------|
| Si NPs                               | 1.82  | 19.46     | 7.68     |
| Si <sub>10</sub> @C <sub>1</sub> NPs | 1.84  | 10.04     | 3.51     |

Table S2. Comparison of electrochemical performance of various carbon-coated silicon anodes.

| Active Material    | Carbon Precursors       | Discharge Capacity (mA h g <sup>-1</sup> ) | ICE (%) | Retention (%) / Cycles | Capacity after Cycles (mA h g <sup>-1</sup> ) | Ref      |
|--------------------|-------------------------|--|---------|------------------------|---|----------|
| Si NPs (~50 nm)    | Phenolic resin          | 2283                                       | 66.7    | 86.3/50                | 1107  | [1]      |
| Si NPs (~100 nm)   | Dopamine                | 2258                                       | 72.2    | 83/50                  | 804   | [2]      |
| Si NPs             | Graphene/egg white      | 2169                                       | 86.2    | 56/200                 | 1045  | [3]      |
| Si NPs (50~100 nm) | rGO                     | 2200                                       | 61      | 63/200                 | 968   | [4]      |
| Si NPs (~50 nm)    | Reusable phenolic resin | 3092                                       | 83.5    | 100/50                 | 1140  | Our work |

## Reference

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