

## Highly-dispersed Ge quantum dots in carbon frameworks for ultra-long-life sodium ions batteries

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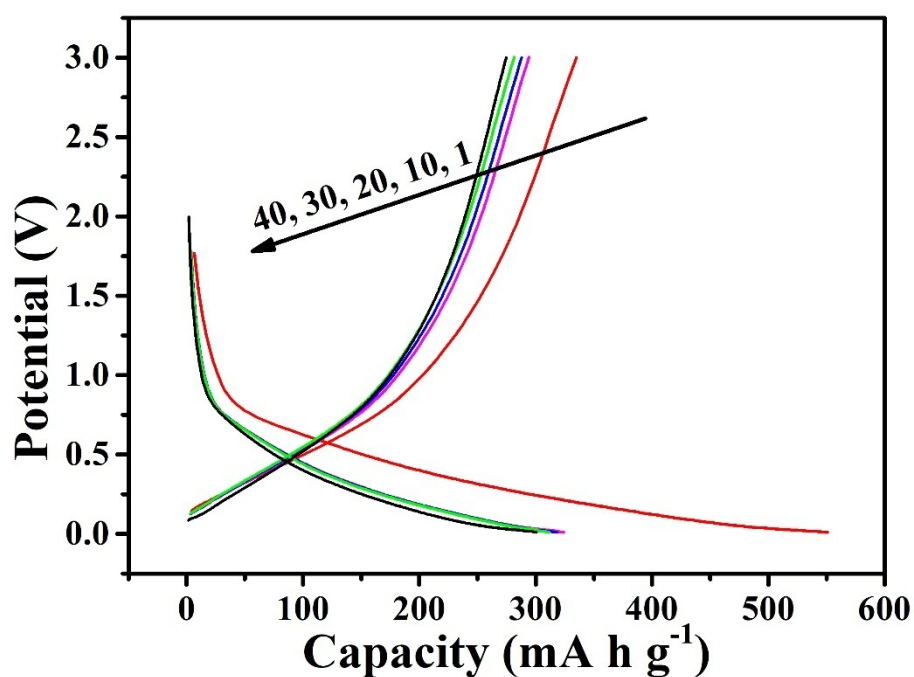


Figure S1. The charge-discharge curves of carbon matrix.

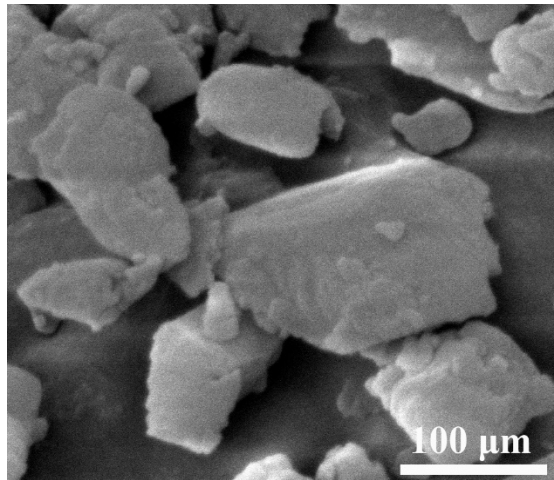


Figure S2. SEM image of commercial bulk Ge powder, it can be seen that Ge powder consists of irregular particles with a particle size range from 10 to 200  $\mu\text{m}$ .

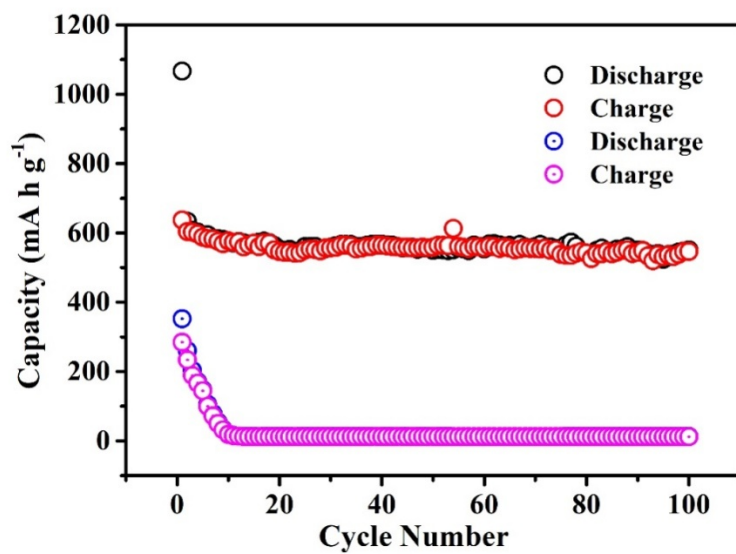


Figure S3. Comparison of capacities vs. cycle number between Ge@C and bulk Ge electrodes.

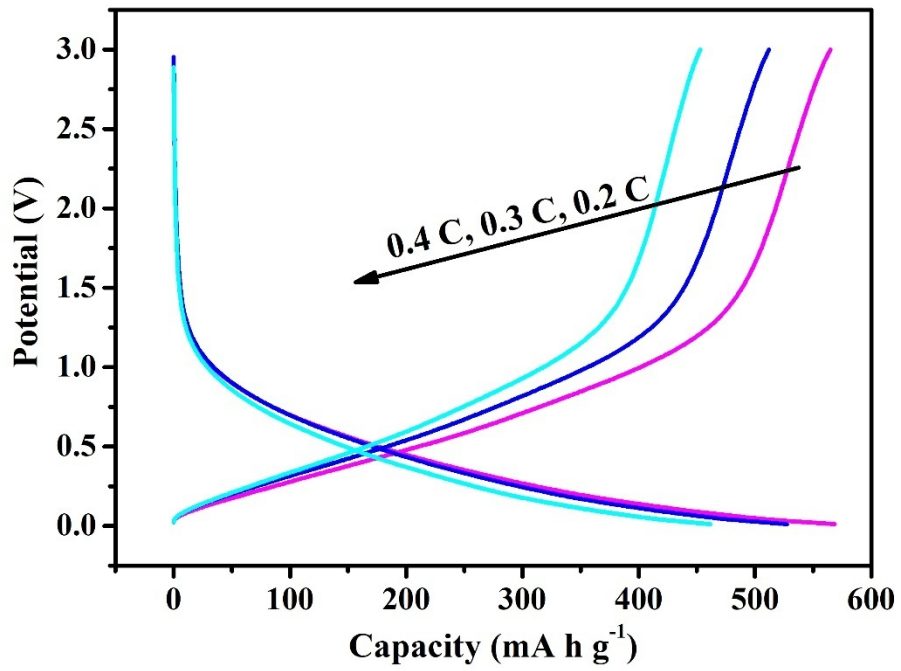


Figure S4. Charge/discharge profiles of Ge@C electrode at current densities of 0.2, 0.3 and 0.4 C (1 C = 500 mA/g).

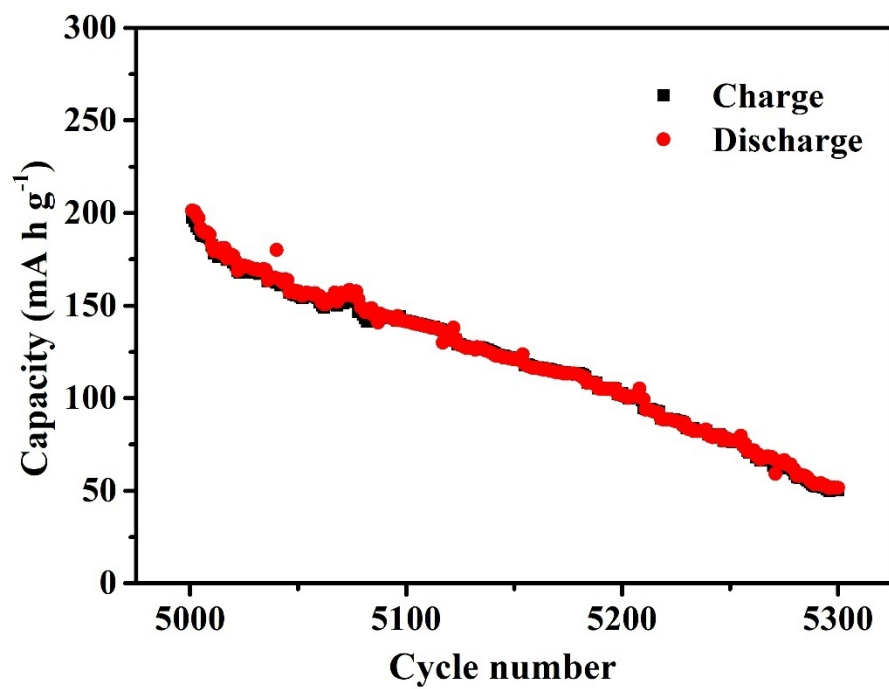


Figure S5. Capacities vs. cycles from 5001 to 5300 under the current density of 3 C.

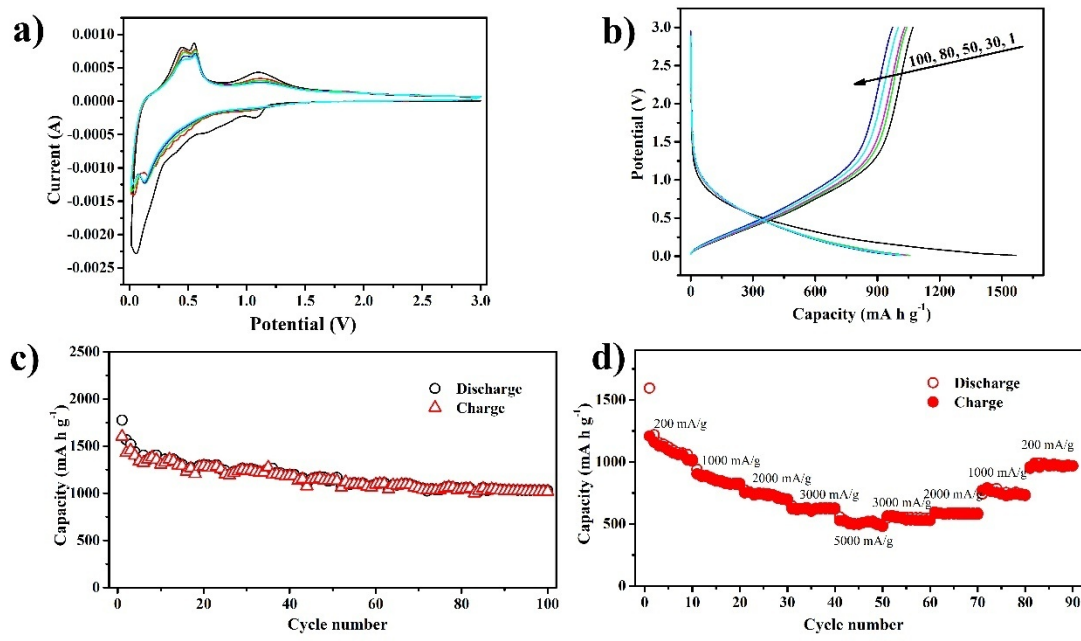


Figure S6. Li storage performance of the Ge@C electrode. (a) Cyclic voltammograms for 1 ~ 5 cycles at a scanning rate of 0.1mV s<sup>-1</sup>; (b) Charge/discharge- profiles for selected cycles under the current density of 200 mA g<sup>-1</sup>; (c) Cycling performance under the current density of 200 mA g<sup>-1</sup>;(d) Rate performance of the Ge@C electrode.