Supporting Information

Germanium Nanoparticles Encapsulated in Flexible Carbon Nanofibers as Self-Supported Electrodes for High performance Lithium-ion Batteries

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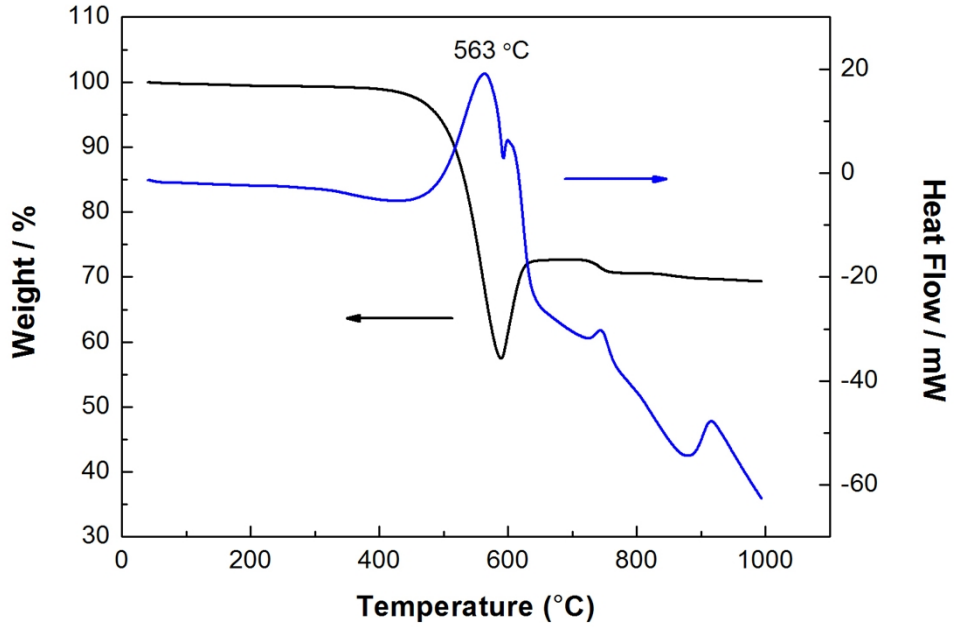

Fig. S1 Thermogravimetric analysis (TGA) and Differential scanning calorimetry (DSC) of the Ge-CNFs. The content of Ge in the Ge-CNFs estimated from the TGA is ca. 48.1 wt%. (Note: Ge was totally oxidized into GeO_2). This analysis was taken in air with a heating rate of 10 °C min^{-1}.[1]

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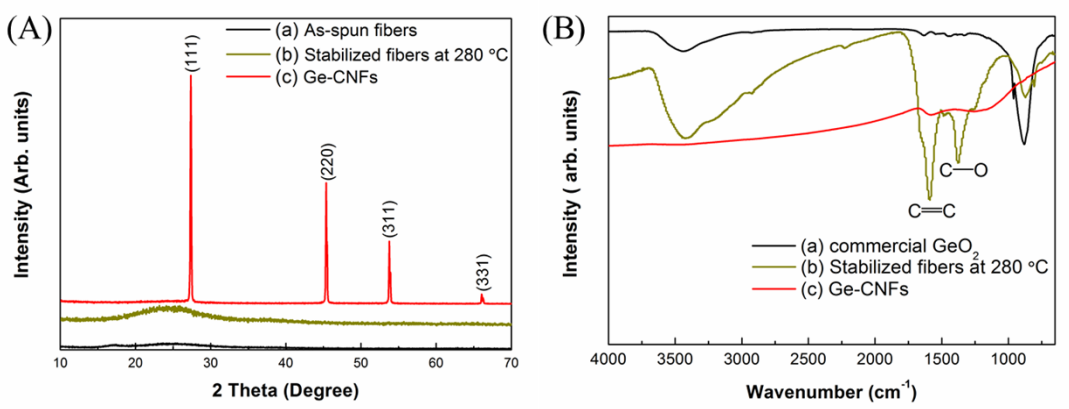

Fig. S2 (A) XRD patterns of as-spun fibers (a), stabilized fibers (b) and Ge-CNFs (c). (B) Fourier transform infrared (FTIR) spectroscopy of commercial GeO_2 (a), stabilized fibers (b) and Ge-CNFs (c).

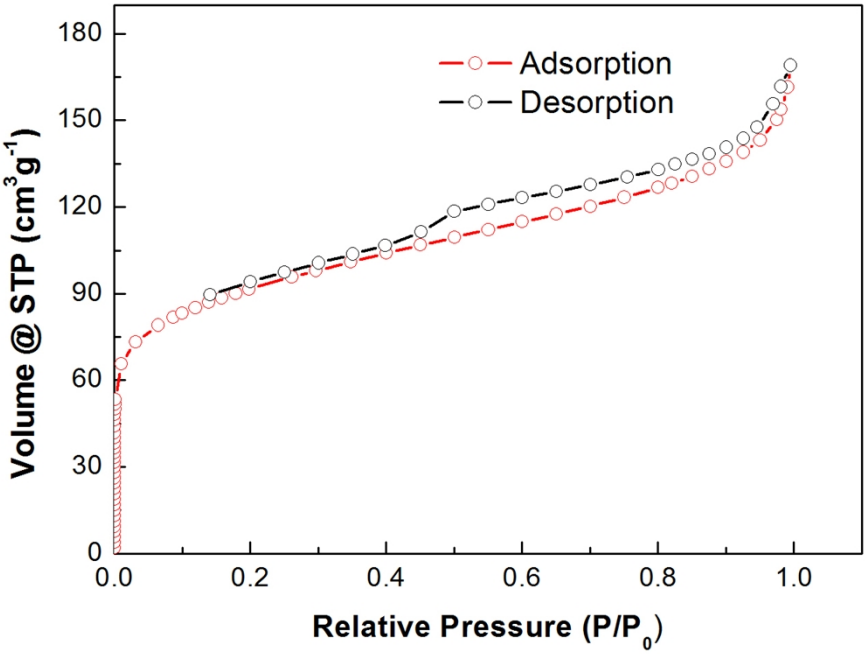

Fig. S3 N_2 sorption/desorption isotherm of Ge-CNFs.The Brunauer-Emmett-Teller (BET) specific surface of the P-CNFs investigated here as 299.15 m^2g^{-1}.

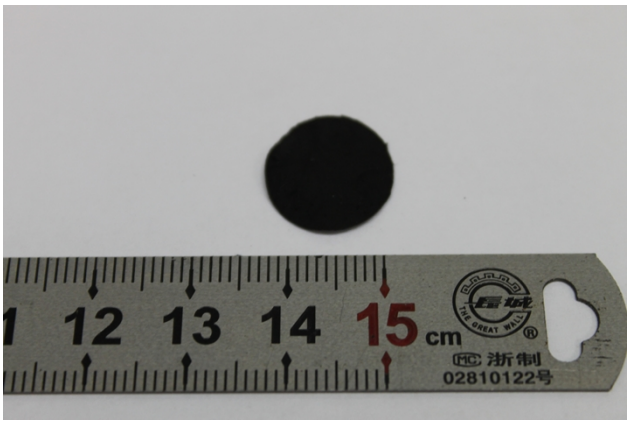

Fig. S4 Photograph of free-standing and flexible carbon nanofibers electrode.

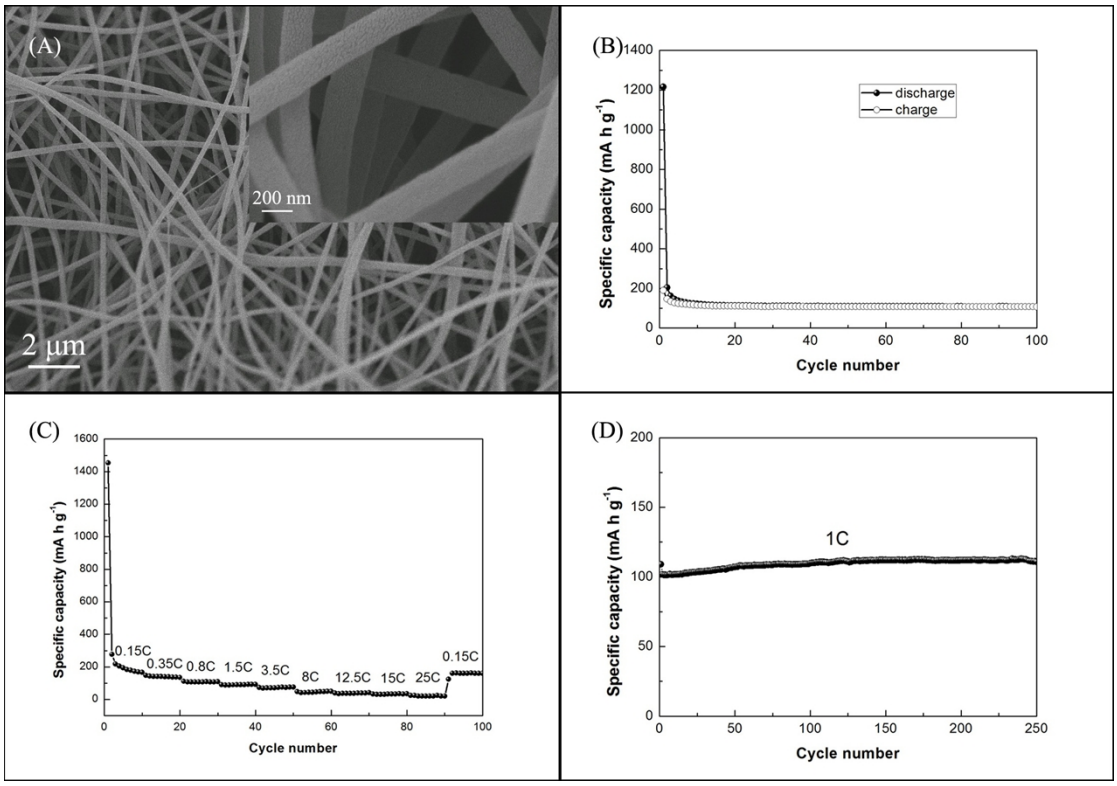

Fig. S5 (A) FESEM micrographs of electrospun carbon fibers generated from pure PAN. Electrochemical performance of carbon nanofibers cycled between 0.005 V and 1.2 V vs. Li^+/Li. (B): Capacity-cycle number curves of carbon nanofibers at a cycling rate of 0.15 C; (C): Discharge capacity of carbon nanofibers electrodes as a function of discharge rate (0.15C ~ 25C); (B): Capacity-cycle number curves of carbon nanofibers at a cycling rate of 1 C;

[1] J. G. Ren, Q. H. Wu, H. Tang, G. Hong, W. Zhang, S. T. Lee, Journal of Materials Chemistry A 2013, 1, 1821.