Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Germanium-based multiphase material as a high-capacity and cycle-stable anode for lithium-ion batteries

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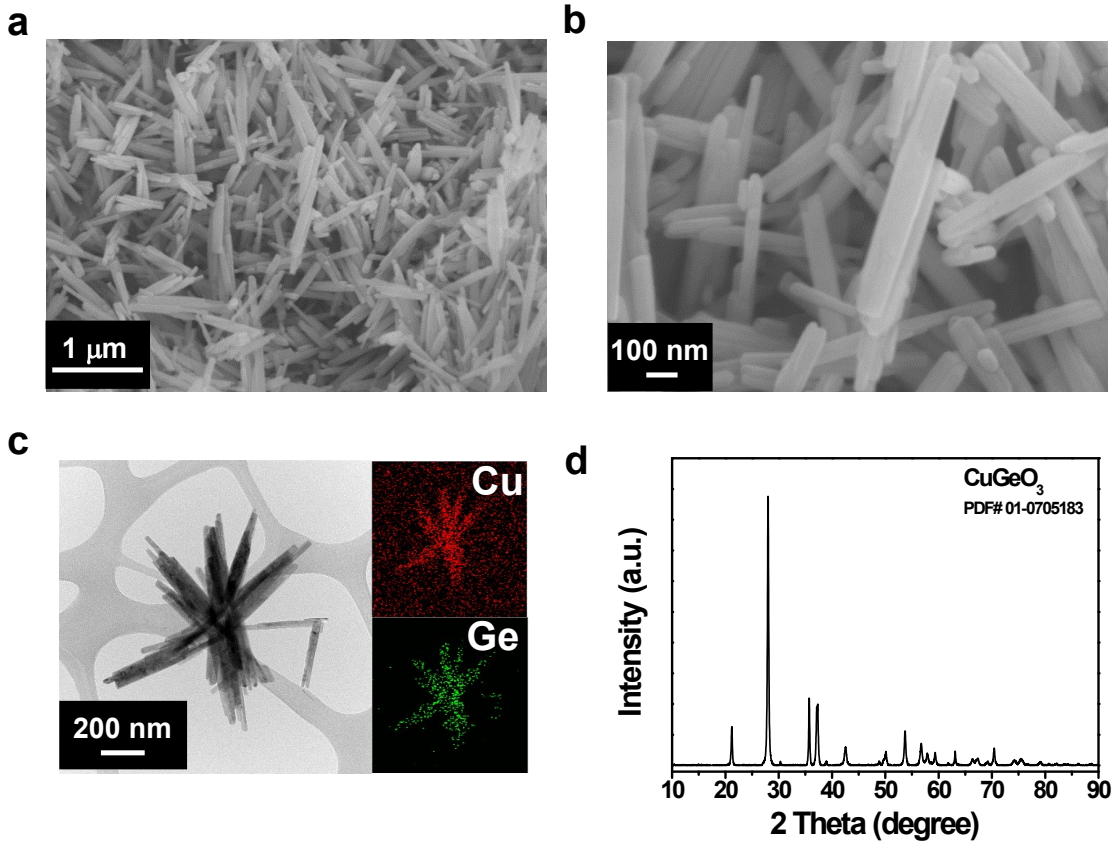

Fig. S1 Characterization of as-synthesized $CuGeO_3$ materials. (a) SEM image of $CuGeO_3$, (b) magnified SEM image of $CuGeO_3$, (c) TEM images and EDS mapping images (Cu and Ge elements) of as-prepared CuGeO3 nanorods, (d) XRD pattern of $CuGeO_3$ materials.

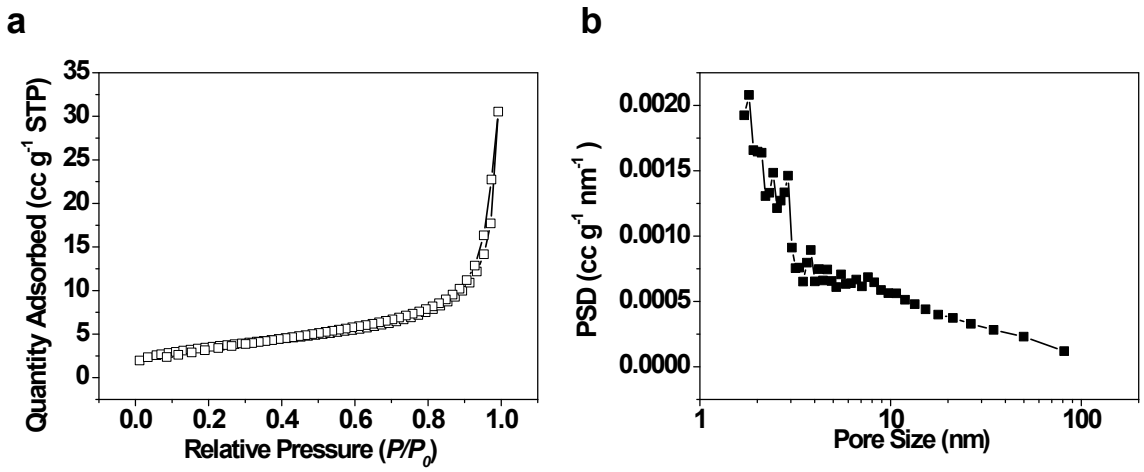

Fig. S2 Characterization of Cu-Ge-600 materials. (a)Nitrogen adsorption-desorption plots and (b) pore-size distribution plots of the Cu-Ge-600 particles obtained by the thermal reduction process at 600 ^{o}C.

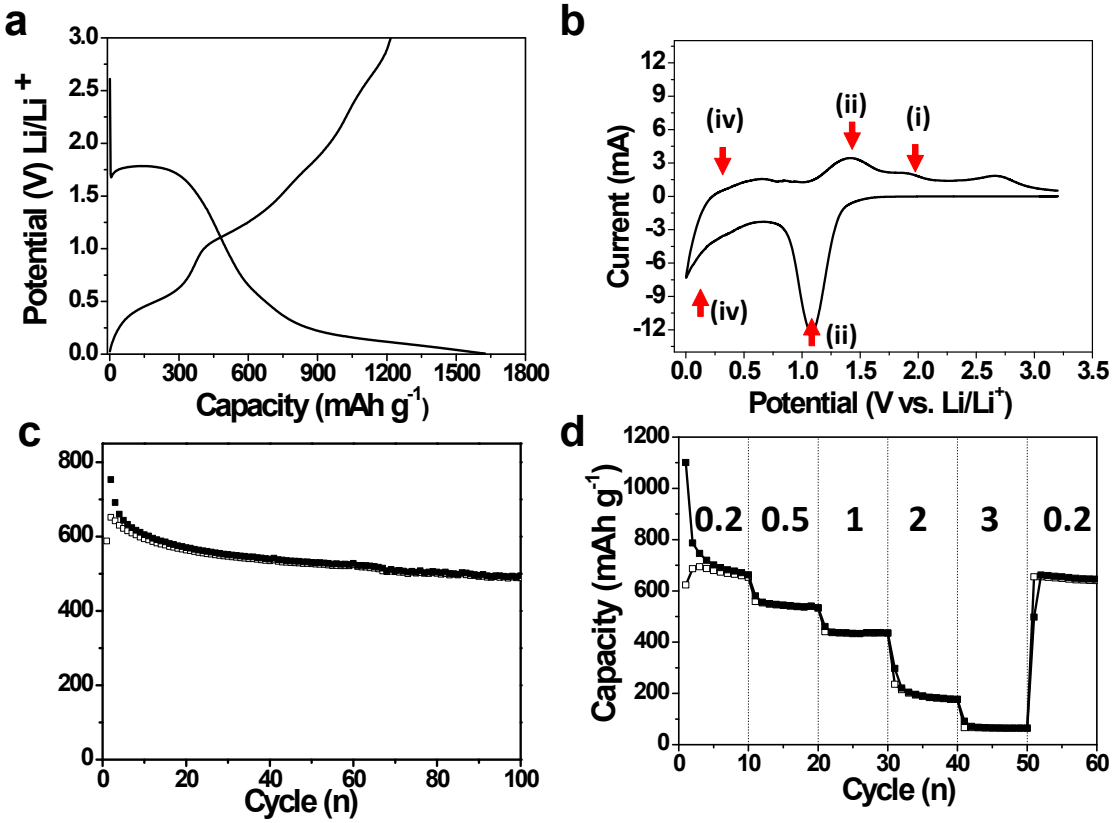

Fig. S3 Electrochemical performances of as-synthesized $CuGeO_3$ electrodes. (a) The first cycle voltage profile of $CuGeO_3$ electrode obtained at a rate of C/20, (b) cyclic voltammogram of $CuGeO_3$ electrode tested at a scan rate of 1mV/s, (c) cycle performances of $CuGeO_3$ electrode tested at rates of C/5, (d) rate capability of the electrode tested at various c-rate (same charge and discharge rates).

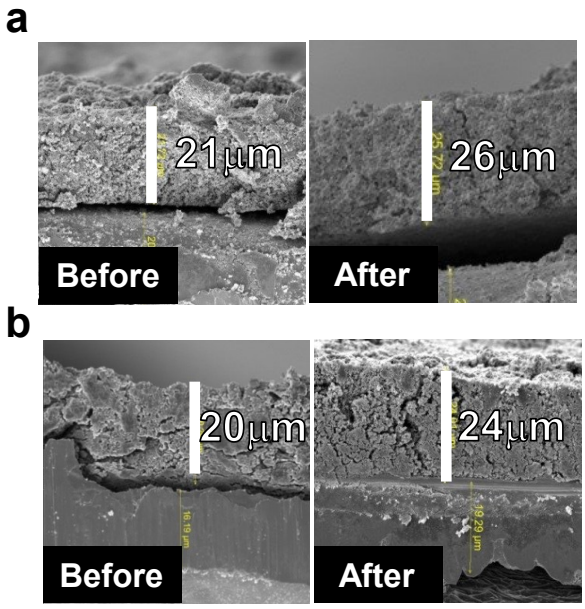

Fig. S4 Cross-sectional SEM images of two Cu-Ge composite electrodes before electrochemical test and after 100 cycles. (a) Cu-Ge-700, and (b) Cu-Ge-900 electrodes.

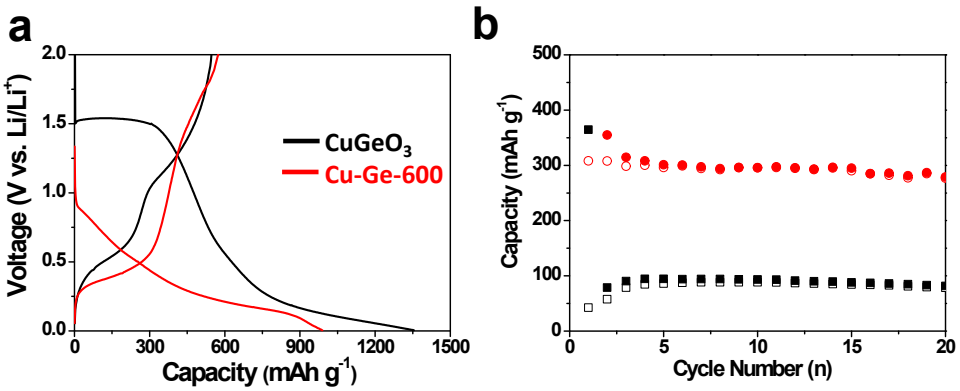

Fig. S5 Electrochemical performances of $CuGeO_3$ (black) and Cu-Ge-600 (red) anodes without any conducting agent such as carbon nano powders. (a) The first cycle voltage profile of at a rate of C/20, (b) cycle performances of two electrodes tested at rates of C/5.