Supporting information for Ionic liquid electrodeposition of 3D germanium–acetylene black–Ni foam nanocomposite electrodes for lithium-ion batteries

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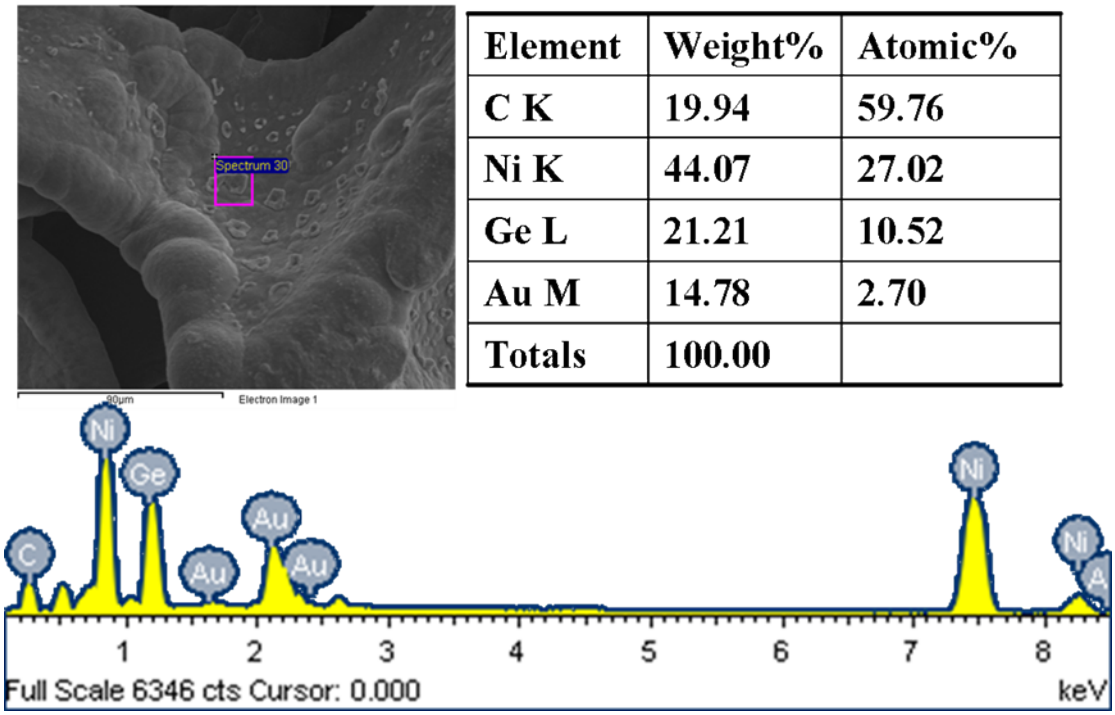
Materials Characterization.

The 3D Ge–acetyleneblack–Ni foam nanocomposite were characterized by scanning electron microscopy (SEM), energy-dispersive X-rayspectroscopy (EDS), powder X-ray diffraction (XRD) and nitrogen BET surface area. SEM was performed on a Hitachi S-4800 scanning electron microscope operating at 20 kV. XRD analysis of the composite was done by XRD using monochromatic Cu Ka radiation with a D8 Bruker diffractometer. X-ray scan is with an increment of 0.01° with time per step and the incident angle is 0.5°. Nitrogen adsorption surface area measurements were performed after drying of single samples (150 °C, 3 h) using a 3H-2000PS1 (Beishide Instrument Technology). The apparent nitrogen surface area was calculated using the BET equation for a pressure range p/p^0 =0.04-0.32.

Figures



Element	Weight%	Atomic%
C K	19.94	59.76
Ni K	44.07	27.02
Ge L	21.21	10.52
Au M	14.78	2.70
Totals	100.00	

Fig.S1. EDS Spectrum of the 3D germanium–acetylene-black–Ni foam nanocomposite anode.

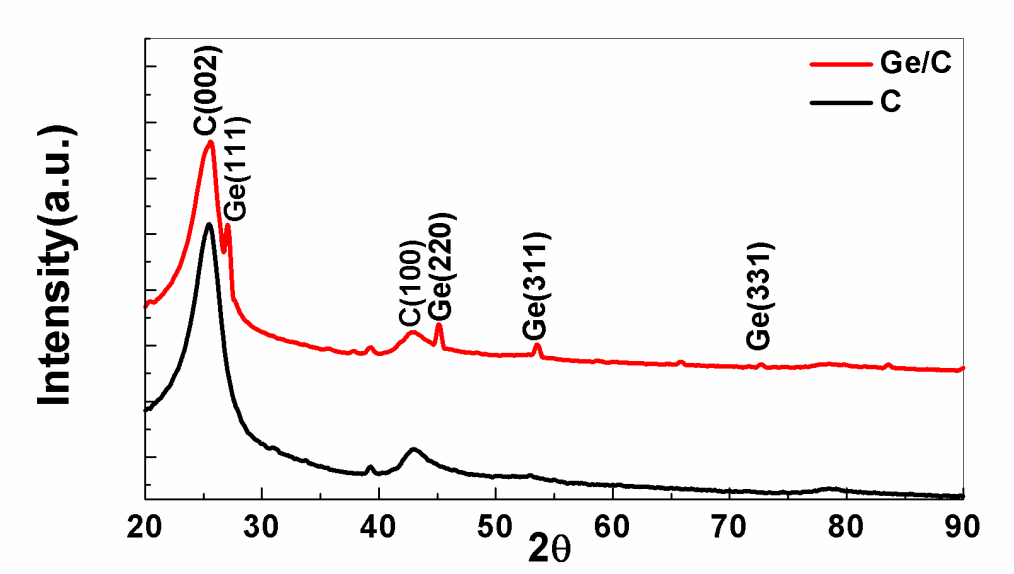


Fig. S2. The XRD patterns of Ge on acetylene-black substrate by ionic liquid electrodeposition.

Tab.S1. BET surface area

sample	S_{BET} (m^2/g)
C	93.8674
Ge/C	82.7768

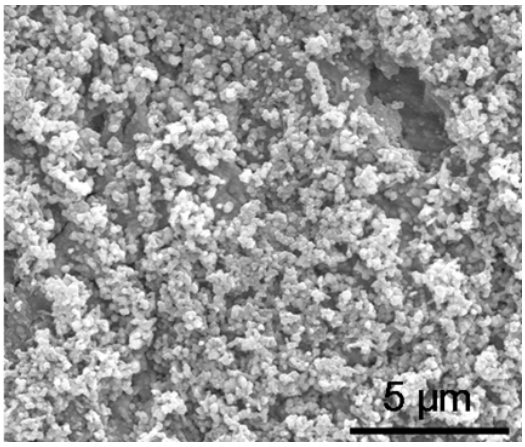


Fig.S3. SEM images of the 3D germanium–acetylene-black–Ni foam nanocomposite anode after 100 cycles at a rate of 0.1 C.