Supporting Information

SnO$_x$S$_{2-x}$/GNS nanocomposites for reversible and high-capacity lithium-ion batteries

Ke Yang [a], Changyu Yan [a], Xuejiao Liu [a], Qihan Chen [b], Boxu Dong [a], Hongran Guo [a], Xuefeng Qian [*a]

a. *Shanghai Electrochemical Energy Devices Research Center, School of Chemistry and Chemical Engineering, State Key Laboratory of Metal Matrix Composites, Shanghai Jiao Tong University, Shanghai, 200240, P. R. China.*

b. *Denison University, Granville, Ohio 43023, USA.*

* Corresponding author.

E-mail: xfqian@sjtu.edu.cn (Xuefeng Qian)

Tel: +86-21-54743262
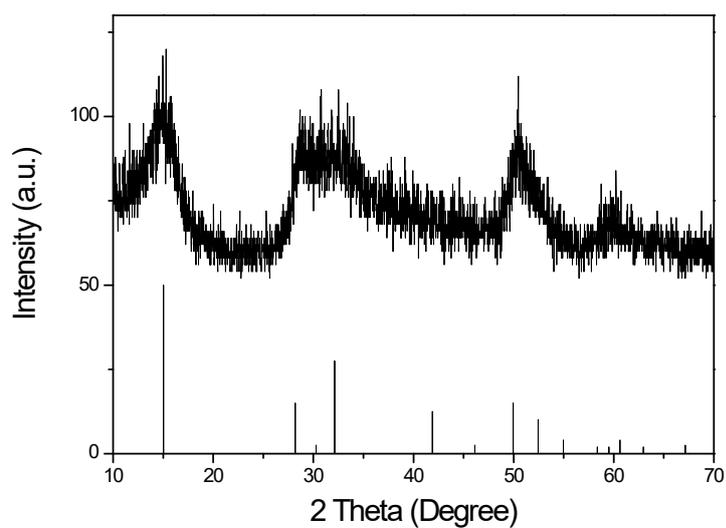
Figure S1. XRD pattern of $SnO_{0.3}S_{1.7}$/GNS composites synthesized with 0.1 g GO by ultrasonic method (top) and standard pattern (bottom) of Berndtite-2 T type SnS_2 (JCPDS card No. 23–667).
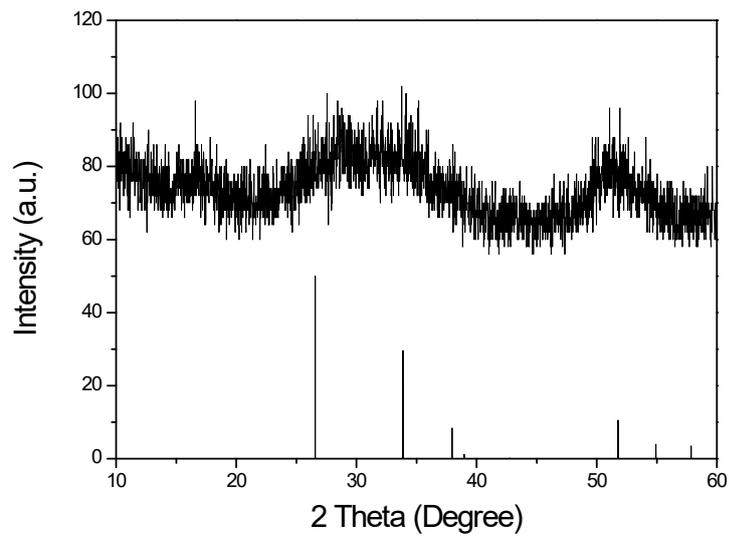
Figure S2. XRD pattern of $SnO_{1.2}S_{0.8}$/GNS composites synthesized with 0.4 g GO by ultrasonic method (top) and standard pattern (bottom) of Cassiterite type SnO_2 (JCPDS No.77-451).
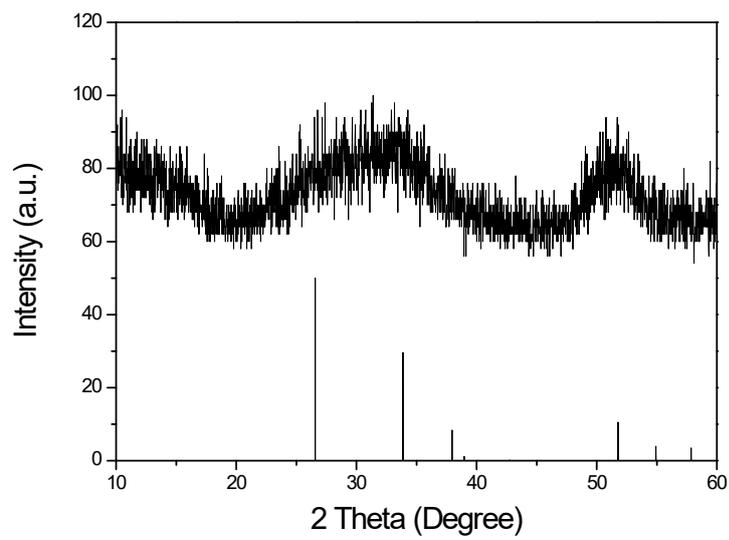
Figure S3. XRD pattern of $SnO_{1.3}S_{0.7}$/GNS composites synthesized with 0.5 g GO by ultrasonic method (top) and standard pattern (bottom) of Cassiterite type SnO_2 (JCPDS No.77-451).
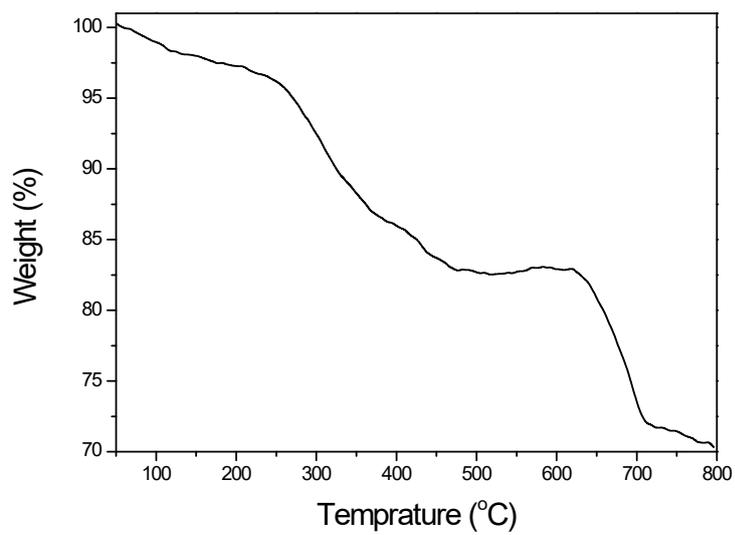
Figure S4. TGA curve of $SnO_{0.3}S_{1.7}$/GNS composites synthesized with 0.1 g GO
by ultrasonic method.
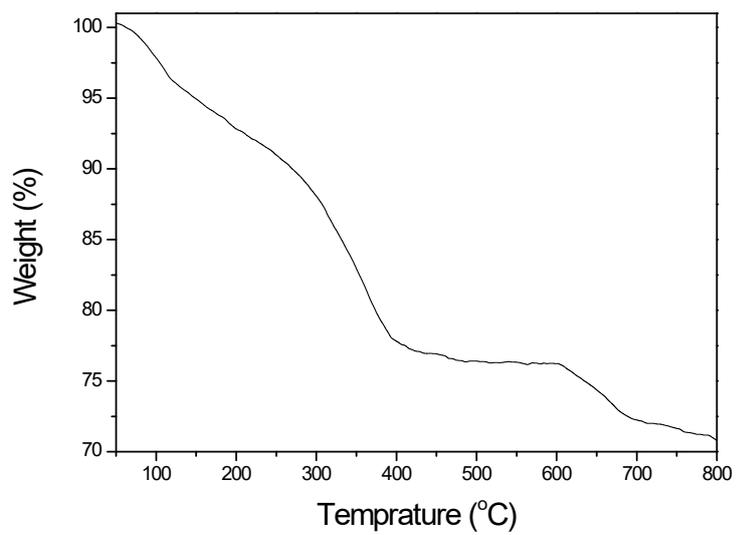
Figure S5. TGA curve of $SnO_{1.2}S_{0.8}$/GNS composites synthesized with 0.4 g GO by ultrasonic method.
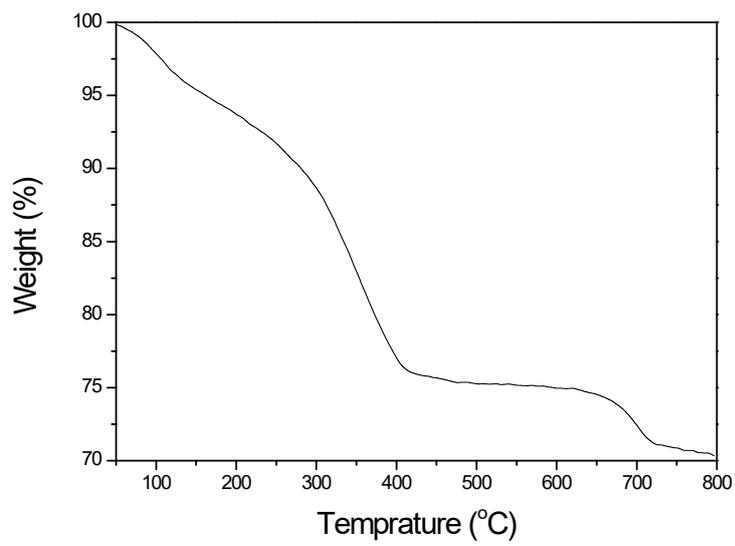
Figure S6. TGA curve of $SnO_{1.3}S_{0.7}$/GNS composites synthesized with 0.5 g GO by ultrasonic method.
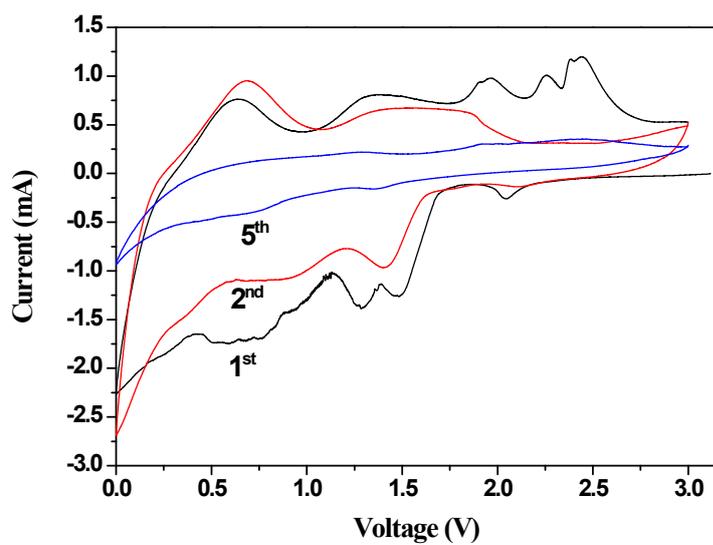
Figure S7. Cyclic voltammograms of composites $SnO_{0.6}S_{1.4}$/GNS cycled between 0.0 V and 3 V at a scan rate of 0.1 mV s^{-1}.
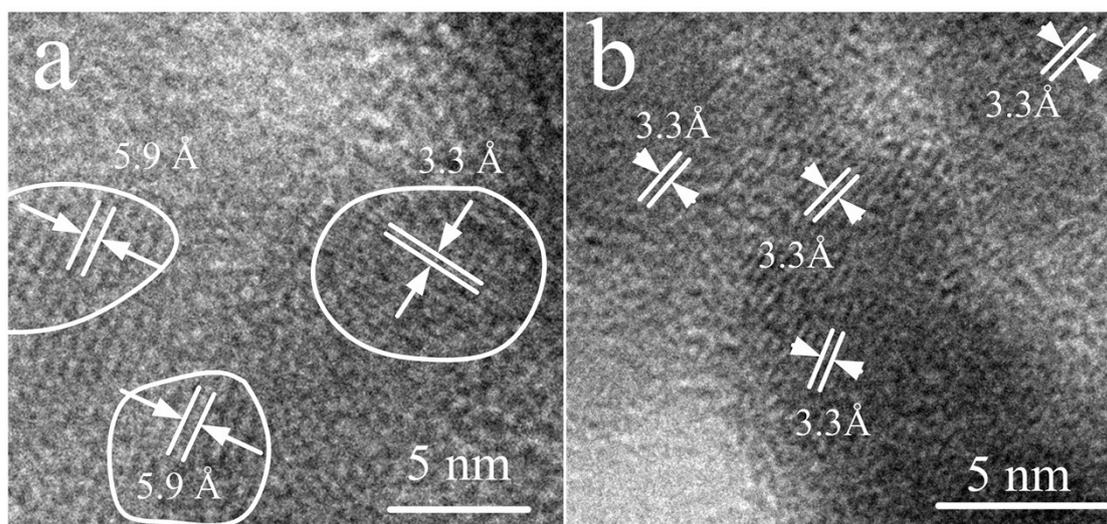
Figure S8. HRTEM images of composites SnOS/GNS (a) and $SnO_{1.2}S_{0.8}$/GNS;

(b) after discharge-charge 50 cycles between 0.0 V and 3 V at 200 mA g^{-1}.
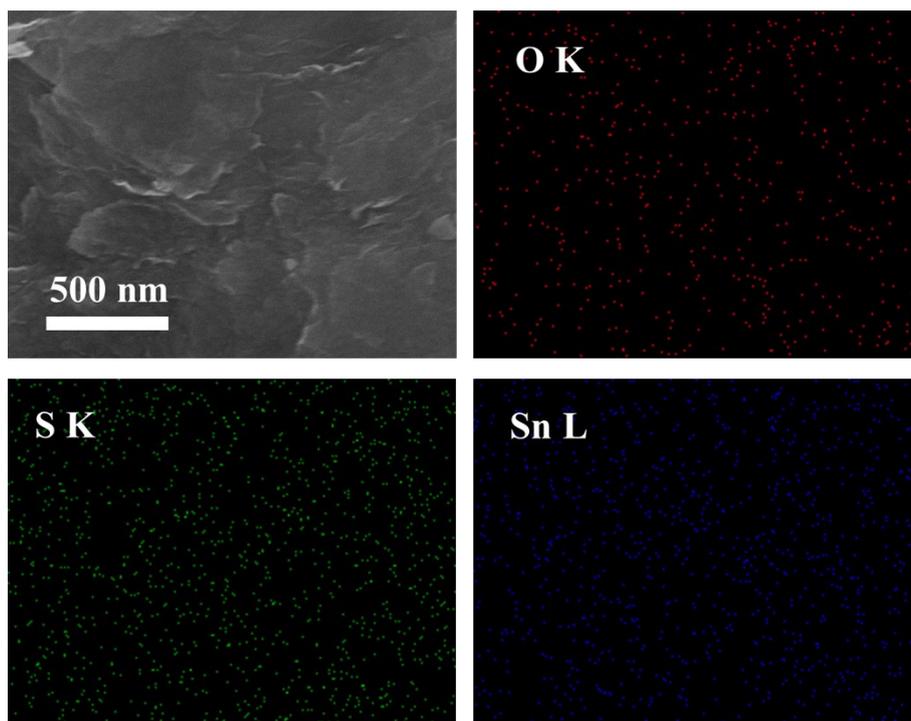
Figure S9. EDX images of SnOS/GNS nanocomposite.