Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Facile synthesis of germanium-reduced graphene oxide nanocomposite anode for high performance lithium batteries

Xiongwu Zhong,[a] Jiaqing Wang,[a] Weihan Li,[a] Xiaowu Liu,[a]

Zhenzhong Yang,[b] Lin Gu,[b] Yan Yu[a]

[a] CAS Key Laboratory of Materials for Energy Conversion, Department of Materials Science and Engineering, University of Science and Technology of China, Hefei 230026, Anhui, P. R. China. E-mail: yanyumse@ustc.edu.cn

[b] Beijing National Laboratory for Condensed Matter Physics, The Institute of Physics, Chinese Academy of Sciences, Beijing 100190, P. R. China

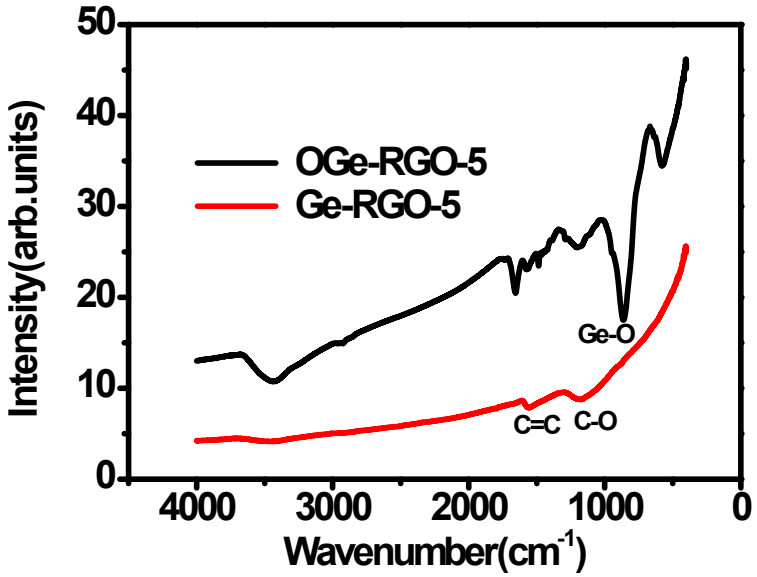

Fig. S1 Fourier transform infrared (FTIR) spectroscopy of the Ge-RGO-5 nanocomposites and the Ge-RGO-5 nanocomposites.

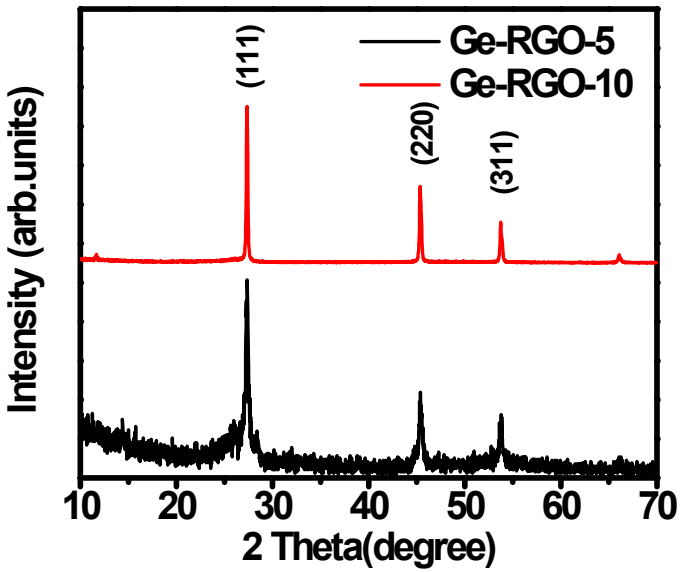

Fig. S2 XRD patterns of the Ge-RGO-5 and Ge-RGO-10 nanocomposites.

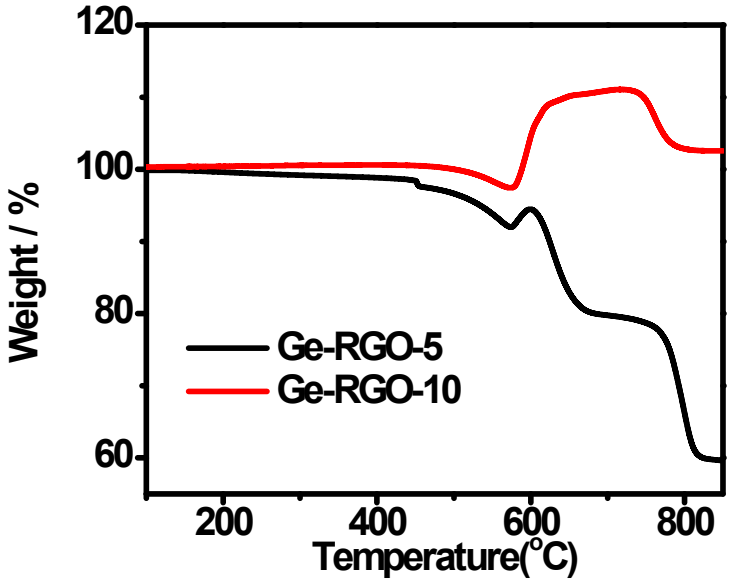

Fig. S3 Thermogravimetric analysis (TGA) of the Ge-RGO-5 and Ge-RGO-10 nanocomposites. The content of Ge in the Ge-RGO-5 and Ge-RGO-10 nanocomposites estimated from the TGA is ca. 39.3 and 70.5 wt%. (Note: Ge was totally oxidized into GeO_2). This analysis was taken in air with a heating rate of 10 °C min^{-1}.

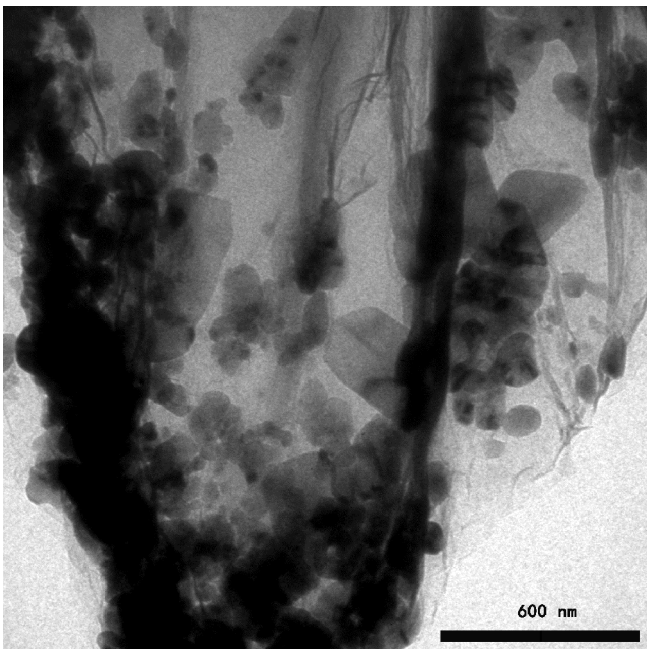

Fig. S4 TEM micrograph of the Ge-RGO-10 nanocomposites.

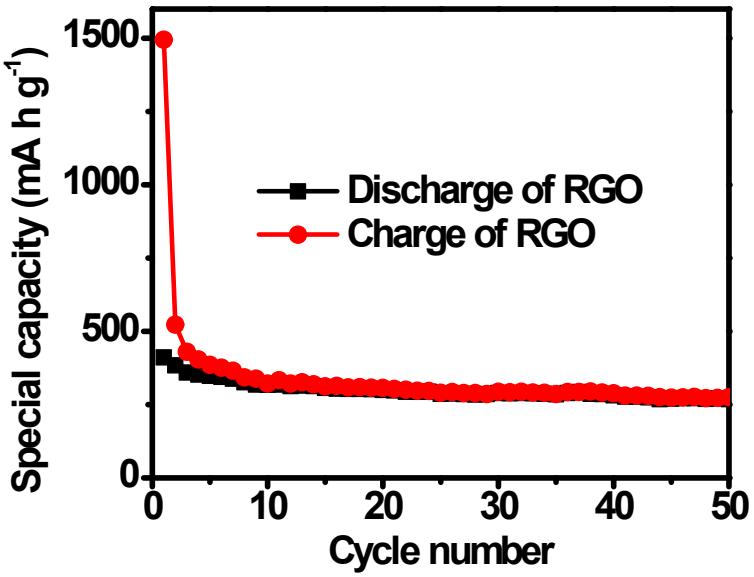

Fig. S5 Cycle performance of RGO electrode cycled between 0.005 V and 1.2 V vs. Li^+/Li at a current density of 0.1 A g^{-1}.

Samples	Ge precursors	Synthetic methods	Capacity [mA h g^{-1}]	Current density [A g^{-1}]
G-GeNW (Ref 31)	GeO_2 powder	Arc discharge method	430 (after 50 cycles)	1.6
			356	3.2
G-GeNP (Ref 32)	Ge powder	Chemical vapour deposition	675 (after 400 cycles)	0.4
			484	2.0
3D G-GeNP (Ref 49)	GeO_2	Chemical reduction	832 (after 50 cycles)	0.16
			400	2.0
GeNPs-GR (Ref 50)	$GeCl_4$	Chemical reduction	532	0.2
Ge-RGO-5 (this work)	TMOG	solvothermal reaction	850 (after 150 cycles)	1
			790 (after 150 cycles)	2

Table S1 Comparison of discharge capability of Ge-RGO nanocomposites with other Ge-RGO nanocomposites electrodes reported recently.