A facile hydrazine-assisted hydrothermal method for the deposition of monodisperse SnO$_2$ nanoparticles onto graphene for lithium ion batteries

Seung-Keun Park,$^a$‡ Seung-Ho Yu,$^b$‡ Nicola Pinna,$^{bc}$ Seunghee Woo,$^d$ Byung-Chul Jang,$^a$ Young-Hoon Chung,$^b$ Yong-Hun Cho,$^e$ Yung-Eun Sung*$^b$ and Yuanzhe Piao*$^af$

$^a$Department of Nano Science and Technology, Graduate School of Convergence Science and Technology, Seoul National University, Suwon, 443-270, Korea. Fax: +82-31-8889148; Tel: +82-31-8889141; E-mail: parkat9@snu.ac.kr

$^b$World Class University (WCU) program of Chemical Convergence for Energy & Environment (C2E2), School of Chemical and Biological Engineering, College of Engineering, Seoul National University (SNU), Seoul 151-744, Korea. E-mail: ysung@snu.ac.kr

$^c$Department of Chemistry, CICECO, University of Aveiro, 3810-193 Aveiro, Portugal.

$^d$Department of Chemistry, Seoul National University, Seoul 151-747, Republic of Korea.

$^e$School of Advanced Materials Engineering, Kookmin University, Seoul 136-702, Republic of Korea.

$^f$Advanced Institutes of Convergence Technology, 864-1 Iui-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do 443-270, Republic of Korea.

‡ These authors contributed equally to this work
**Fig S1.** TGA curve of GO-S

**Fig S2.** (a) A TEM and (b) HRTEM image of SnO$_2$ nanoparticles
**Fig S3.** XPS spectra: survey scan of (a) GO-S, (B) GNS, (C) GO

**Fig S4.** XPS spectrum: high-resolution Sn 3d of GO-S
Fig S5. HRTEM images of (a) GO-S and (b) SnO$_2$ nanoparticles after cycle for 20 cycles. The cells were cycled at a current density of 100 mA g$^{-1}$ for the first cycle and at a current density of 400 mA g$^{-1}$ for the remaining 19 cycles.