ELECTRONIC SUPPORTING INFORMATION

Two Dimensional Layered Co$_{0.85}$Se Nanosheets as a high-capacity anode for Lithium-ion batteries

Jisheng Zhou,$^{a,b,‡}$ Ye Wang,$^{a,‡}$ Jun Zhang,$^c$ Tupei Chen,$^c$ Huaihe Song,$^b*$ Hui Ying Yang,$^a*$

$^a$ Pillar of Engineering Product Development, Singapore University of Technology and Design, 8 Somapah Road, 487372, Singapore

$^b$ State Key Laboratory of Chemical Resource Engineering, Key Laboratory of Carbon Fiber and Functional Polymers, Ministry of Education, Beijing University of Chemical Technology, Beijing, P. R. China.

$^c$ School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore 639798, Singapore

‡ These authors contribute equally to this work.

*Corresponding author. Tel.: +65 6303 6663; Fax: +65 6779 5161. E-mail address: songhh@mail.buct.edu.cn (H. H. Song); yanghuiying@sutd.edu.sg (H. Y. Yang)
**Figure S1.** EDS spectrum of layered Co$_{0.85}$Se nanosheets.
Figure S2. (a) TEM image of layered Co$_{0.85}$Se nanosheets and (b) HRTEM image of Co0.85Se nanosheets in the selected area in the blue box of image (a).
**Figure S3.** XRD patterns of the samples prepared at various mole ratios of precursors Co(AC)₂/ Na₂SeO₃: (a) 1:0.5, (b) 1:0.75 and (c) 1:1.5.

**Figure S4.** (a) Initial discharge/charge curves of Co₀.₈₅Se nanosheets at the current density of 100 mAg⁻¹; XRD patterns of Co₀.₈₅Se nanosheet electrode at various voltage of (b) 1.1 V, (c) 0.01 V, and (d) 3.0 V; and HRTEM image of Co₀.₈₅Se nanosheet at (e) 1.1 V and (f) 3.0 V.
Figure S5. Nitrogen adsorption-desorption isotherms of Co$_{0.85}$Se nanosheets and Co$_{0.85}$Se microspheres.

Figure S6. Equivalent circuit: $R_e$ is the electrolyte resistance; $C_f$ and $R_f$ are the capacitance and resistance of the surface film formed on the electrodes, respectively; $C_{dl}$ and $R_{ct}$ are the double-layer capacitance and charge-transfer resistance, respectively; $Z_w$ is the Warburg impedance related to the diffusion of lithium ions into the bulk electrodes.
Figure S7. SEM images of (a, b) Co$_{0.85}$Se nanosheets electrode and (c, d) Co$_{0.85}$Se microspheres electrodes.