

ELECTRONIC SUPPORTING INFORMATION

Two Dimensional Layered $\text{Co}_{0.85}\text{Se}$ 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)

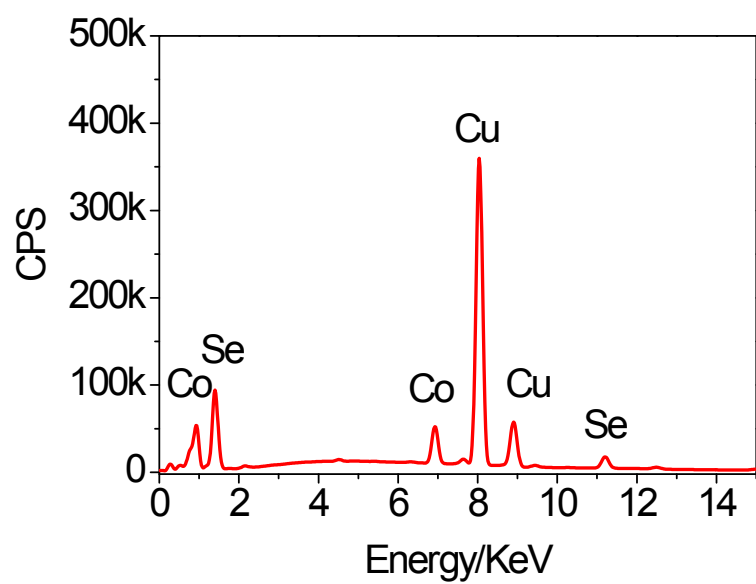


Figure S1. EDS spectrum of layered $\text{Co}_{0.85}\text{Se}$ nanosheets.

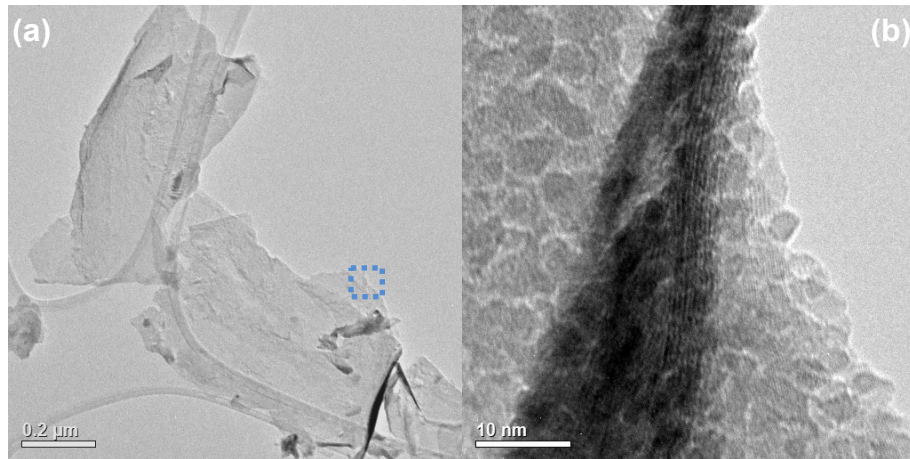


Figure S2. (a) TEM image of layered $\text{Co}_{0.85}\text{Se}$ nanosheets and (b) HRTEM image of $\text{Co}_{0.85}\text{Se}$ nanosheets in the selected area in the blue box of image (a).

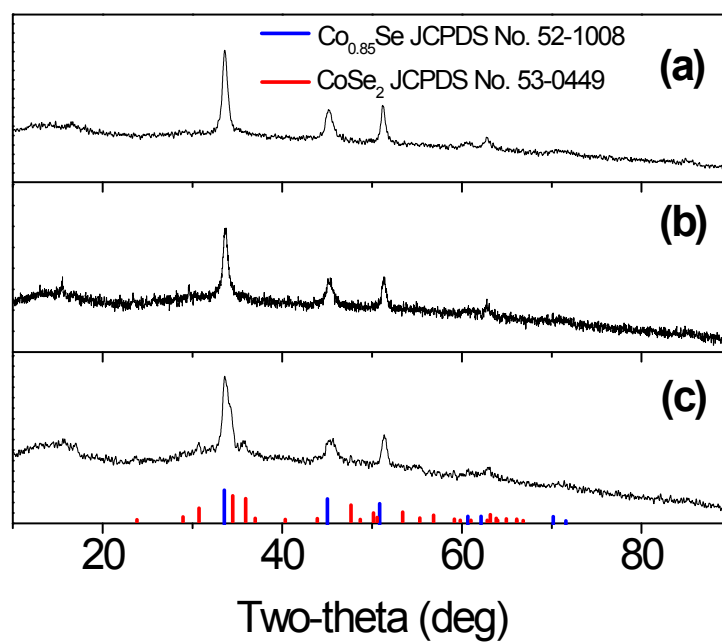


Figure S3. XRD patterns of the samples prepared at various mole ratios of precursors $\text{Co}(\text{AC})_2/\text{Na}_2\text{SeO}_3$: (a) 1:0.5, (b) 1:0.75 and (c) 1:1.5.

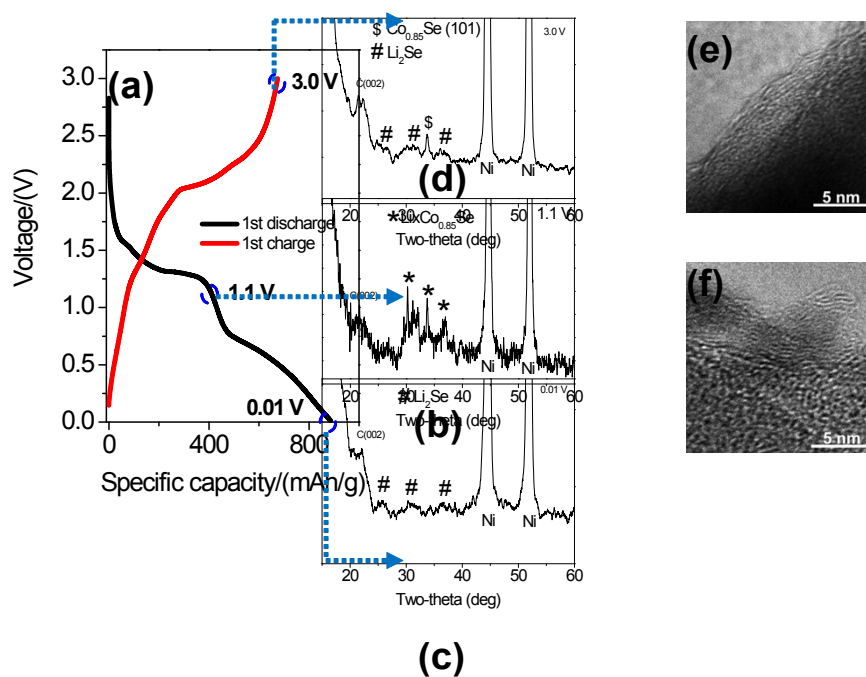


Figure S4. (a) Initial discharge/charge curves of $\text{Co}_{0.85}\text{Se}$ nanosheets at the current density of 100 mA g^{-1} ; XRD patterns of $\text{Co}_{0.85}\text{Se}$ nanosheet electrode at various voltage of (b) 1.1 V, (c) 0.01 V, and (d) 3.0 V; and HRTEM image of $\text{Co}_{0.85}\text{Se}$ nanosheet at (e) 1.1 V and (f) 3.0 V.

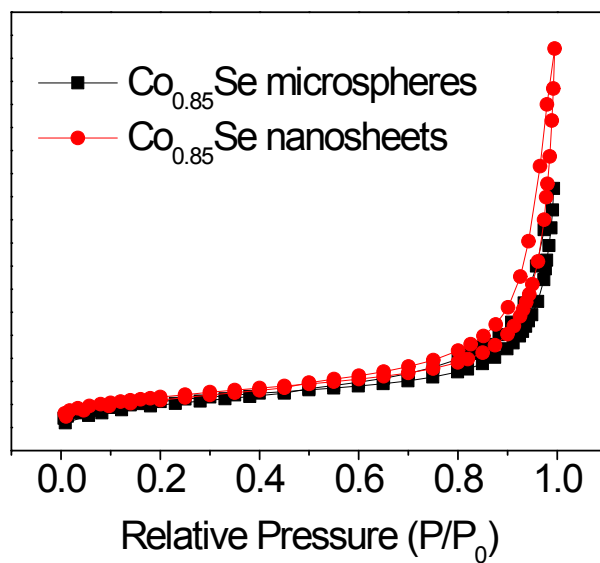


Figure S5. Nitrogen adsorption-desorption isotherms of $\text{Co}_{0.85}\text{Se}$ nanosheets and $\text{Co}_{0.85}\text{Se}$ microspheres.

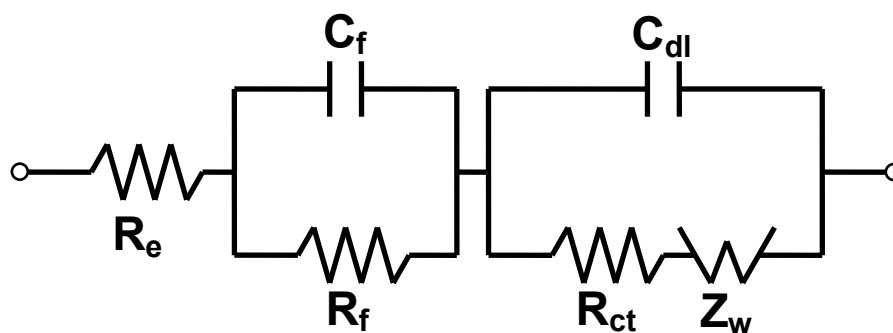


Figure S6. Equivalent circuit: R_e is the electrolyte resistance; C_f and R_f are the capacitance and resistance of the surface film formed on the electrodes, respectively; C_{dl} and R_{ct} are the double-layer capacitance and charge-transfer resistance, respectively; Z_w is the Warburg impedance related to the diffusion of lithium ions into the bulk electrodes.

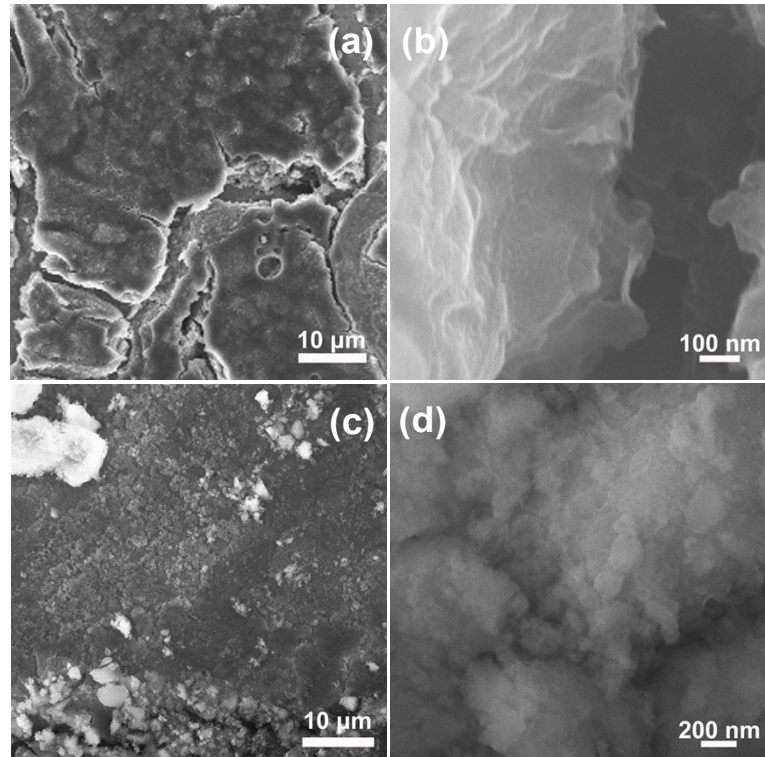


Figure S7. SEM images of (a, b) $\text{Co}_{0.85}\text{Se}$ nanosheets electrode and (c, d) $\text{Co}_{0.85}\text{Se}$ microspheres electrodes.