

Supporting Information

Structural and vacancy assisted engineering of cobalt selenide for ultrahigh energy density sodium ion pouch cell

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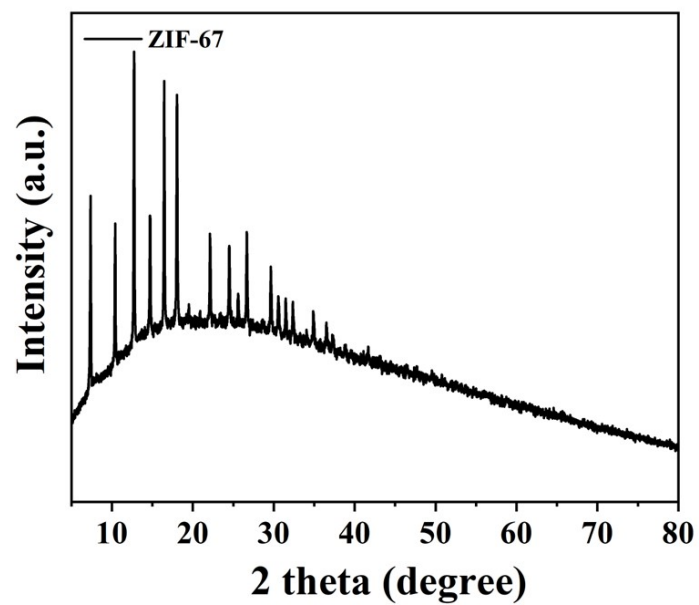


Fig S1. XRD pattern of ZIF-67.

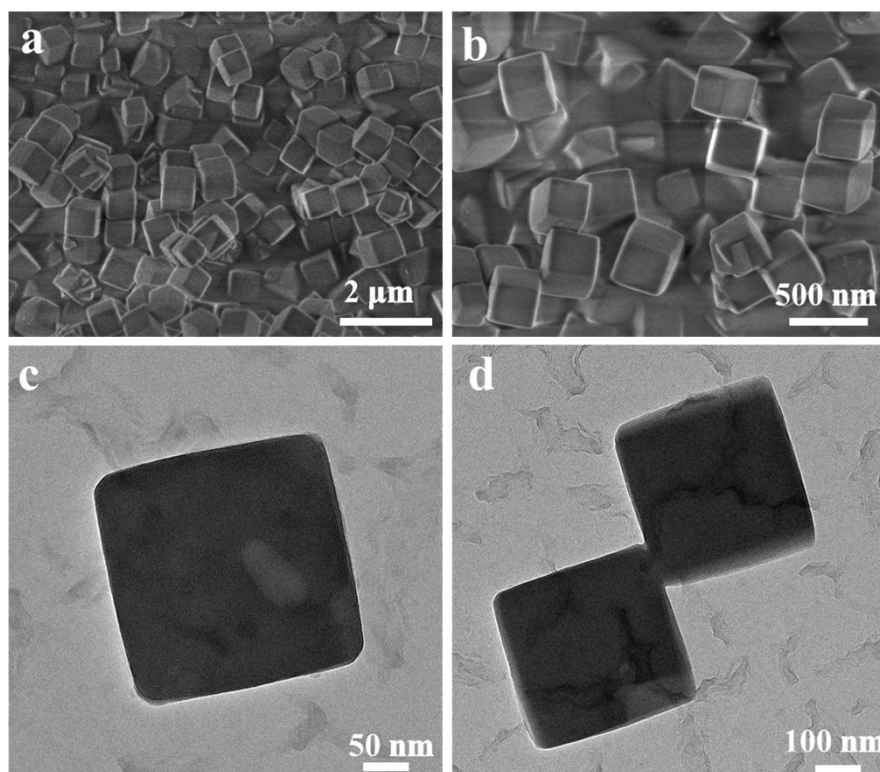


Fig S2. (a, b) SEM images and (c, d) TEM images of ZIF-67.

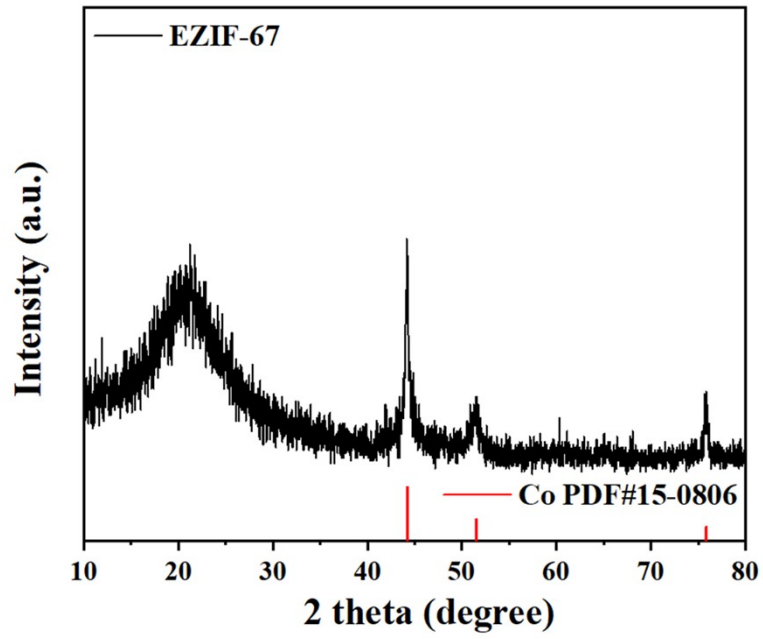


Fig S3. XRD pattern of EZIF-67.

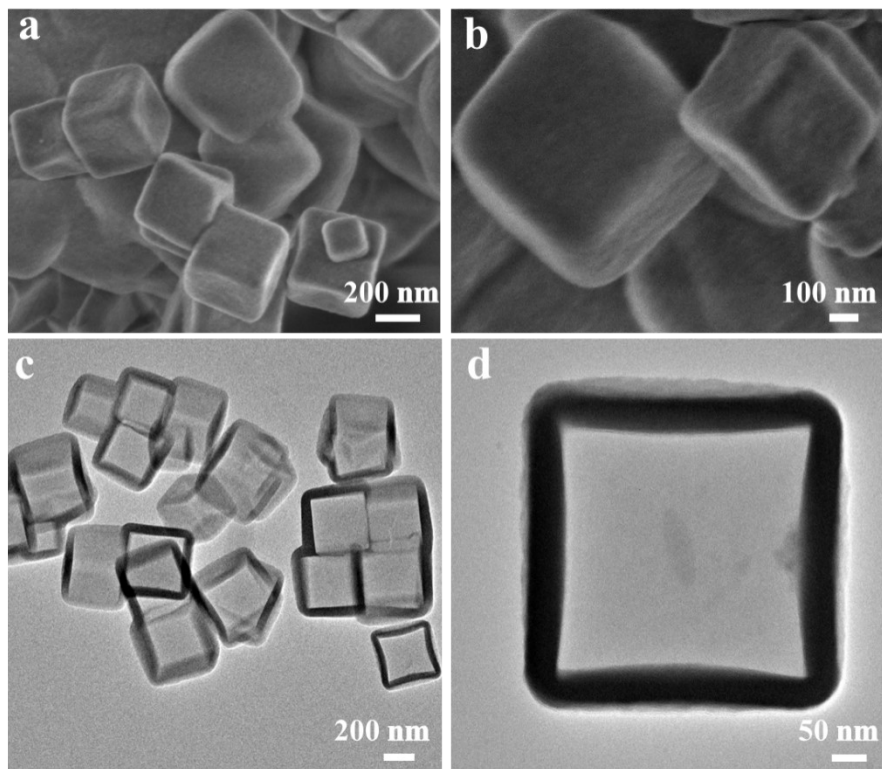


Fig S4. (a, b) SEM images and (c, d) TEM images of EZIF-67.

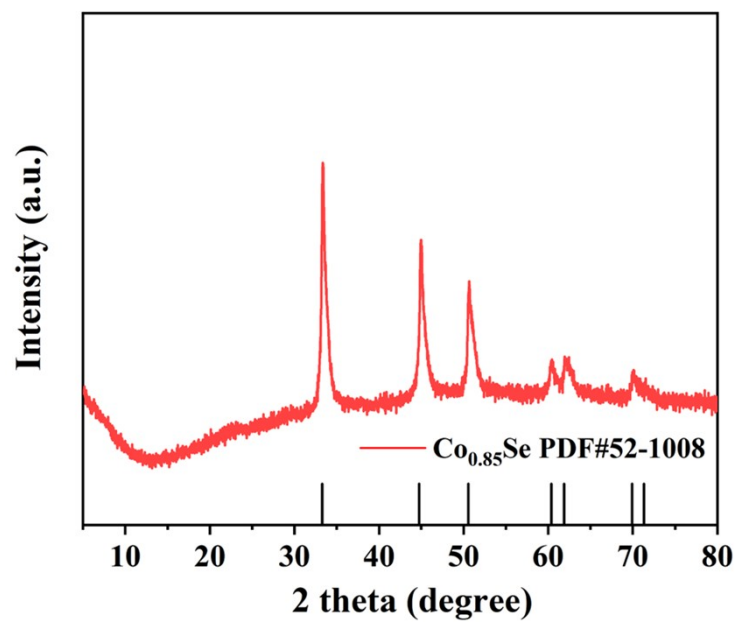


Fig S5. XRD pattern of $\text{Co}_{0.85}\text{Se}@NC$.

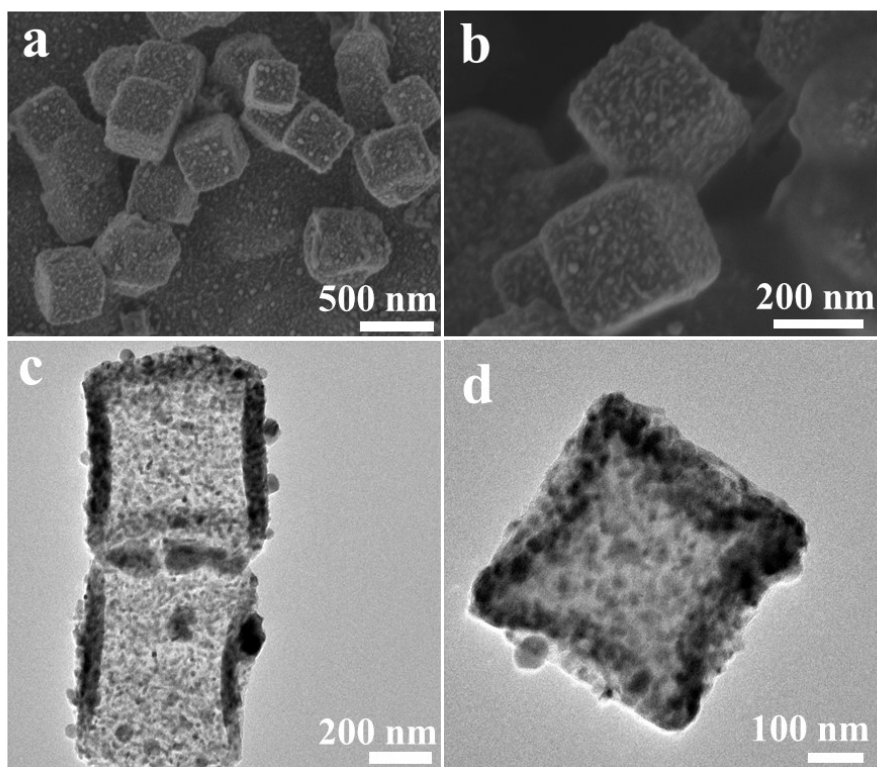


Fig S6. (a, b) SEM images and (c, d) TEM images of $\text{Co}_{0.85}\text{Se}@NC$.

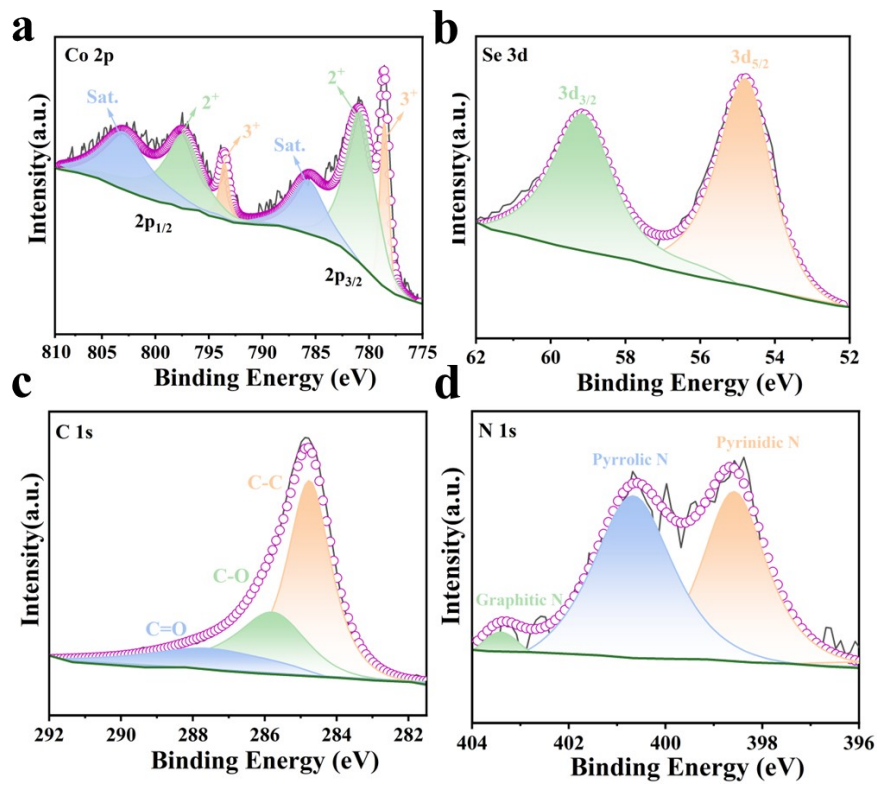


Fig S7. High-resolutions XPS spectra of (a) Co 2p, (b) Se 3d, (c) C 1s, and (d) N 1s of $\text{Co}_{0.85}\text{Se}@NC$.

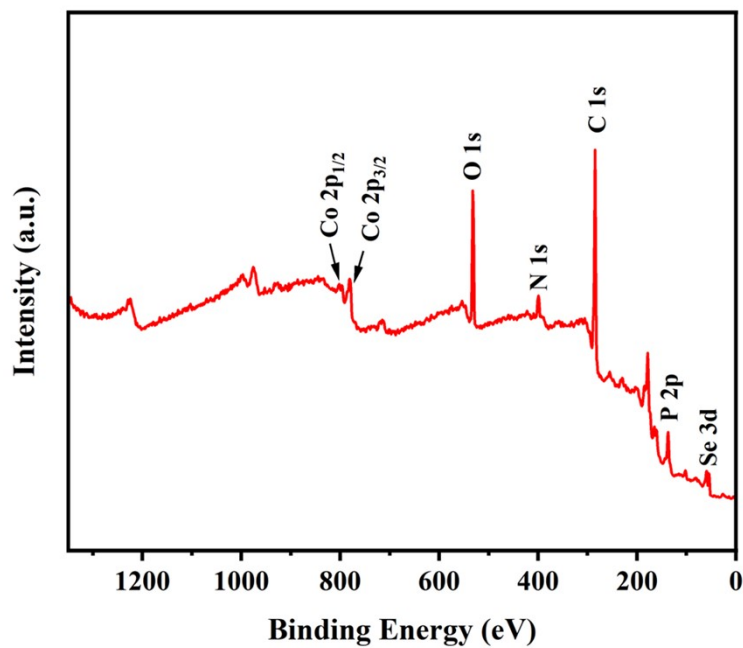


Fig S8. XPS survey spectrum of $\text{P-Co}_{0.85}\text{Se}@PNC$.

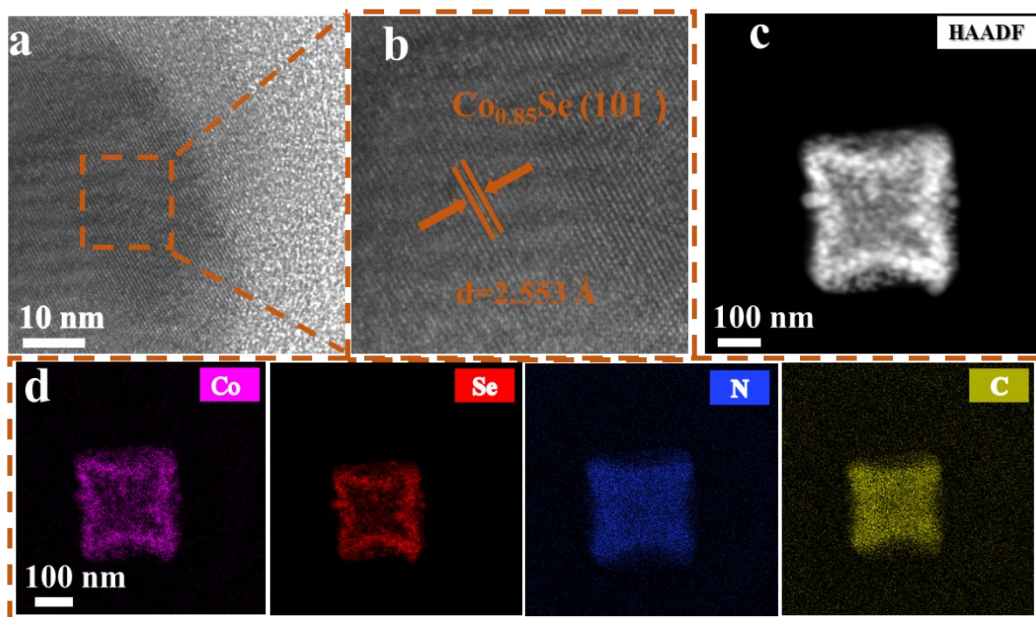


Fig S9. The morphology of $\text{Co}_{0.85}\text{Se}@NC$. (a, b) HRTEM image. (c, d) HAADF image and corresponding EDS elemental mapping images.

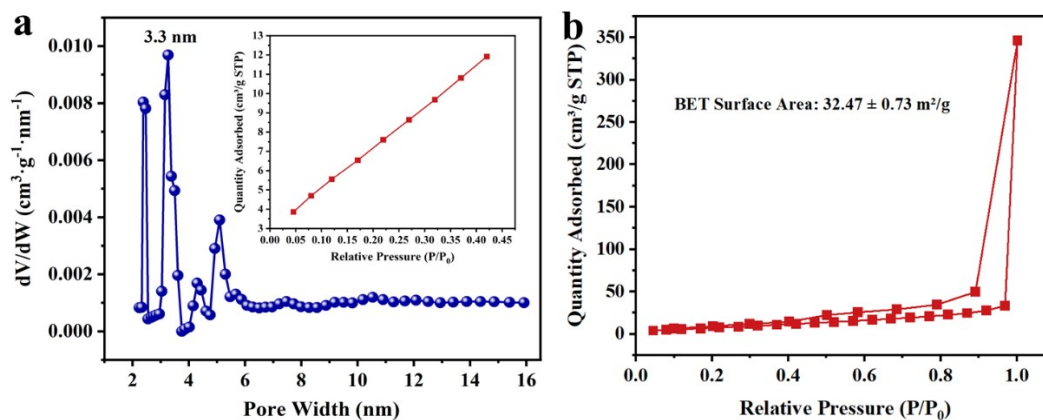


Fig S10. (a) Aperture distribution curve (insert: Corresponding specific surface area transfer curve) and (b) N_2 adsorption-desorption isotherm of $\text{P-Co}_{0.85}\text{Se}@PNC$.

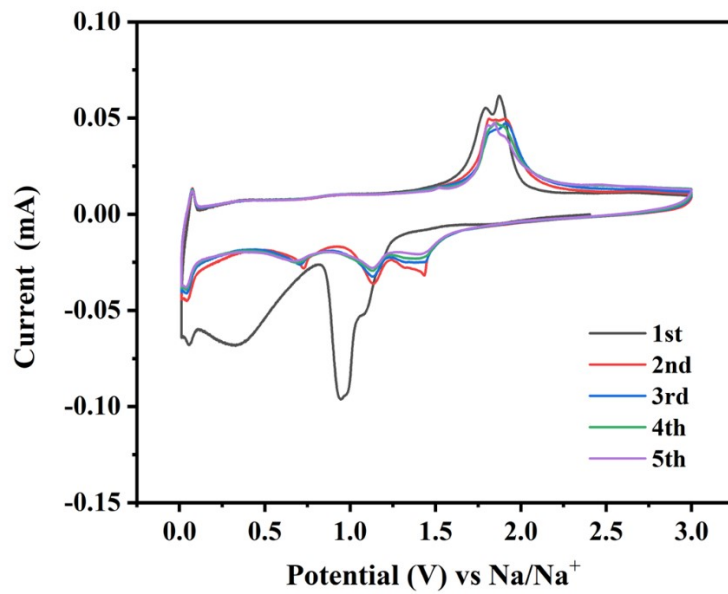


Fig S11. CV curves at a sweep rate of 0.1 mV s^{-1} in the range of 0.01-3.0 V of $\text{Co}_{0.85}\text{Se@NC}$.

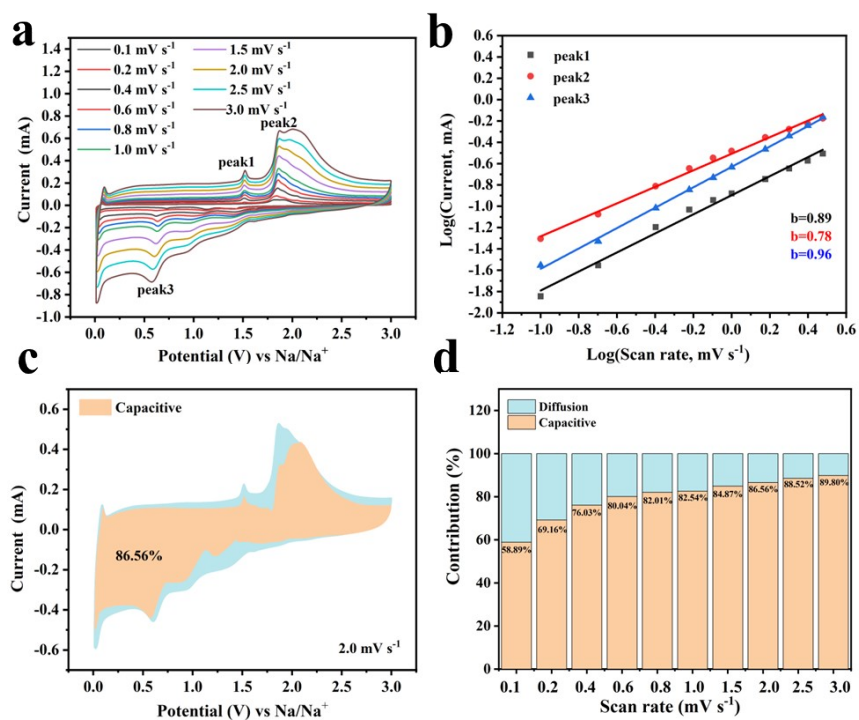


Fig S12. Kinetic analyses of Co_{0.85}Se@NC electrode material. (a) CV curves at different scan sweeps from 0.1 mV s⁻¹ to 3.0 mV s⁻¹. (b) The corresponding log *i* versus ν plots. (c) The capacitive contribution in CV curves at 2.0 mV s⁻¹. (d) Contribution of pseudocapacitive at various scan rates.

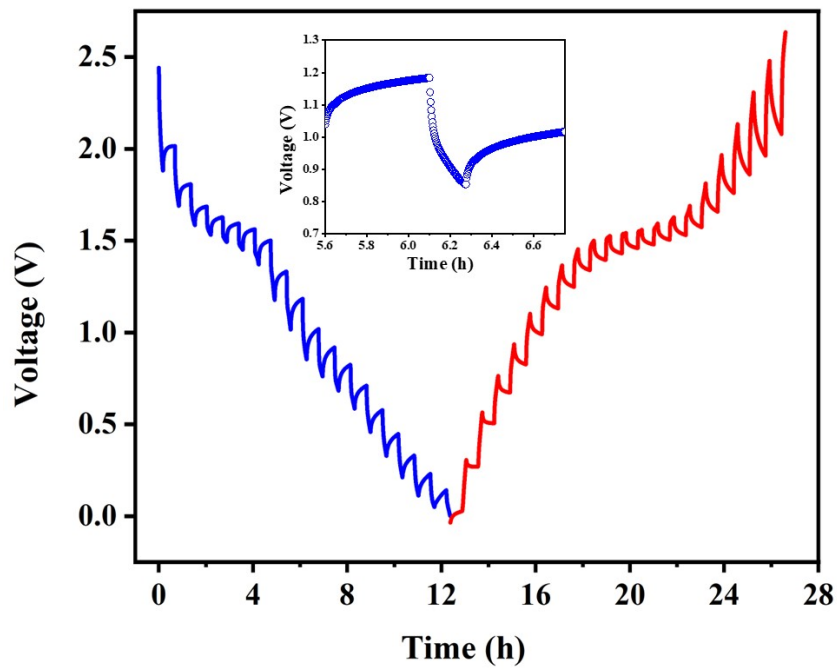


Fig S13. GITT curves (insert: local enlargement) of $\text{Co}_{0.85}\text{Se}@NC$ electrode material.

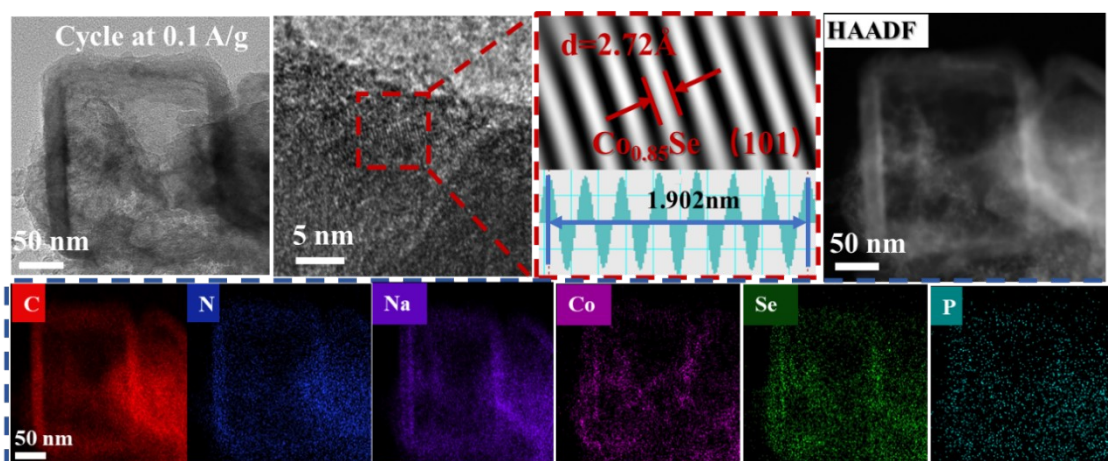


Fig S14. The morphology characterization of P-Co_{0.85}Se@PNC electrode material cycles 100 times at the current density of 0.1 A g⁻¹. (a) TEM image. (b and c) HRTEM images. (d and e) the corresponding EDS elemental mapping images.