Supporting Information

In-situ construction of active interfaces towards improved high-rate performance of $CoSe_2$

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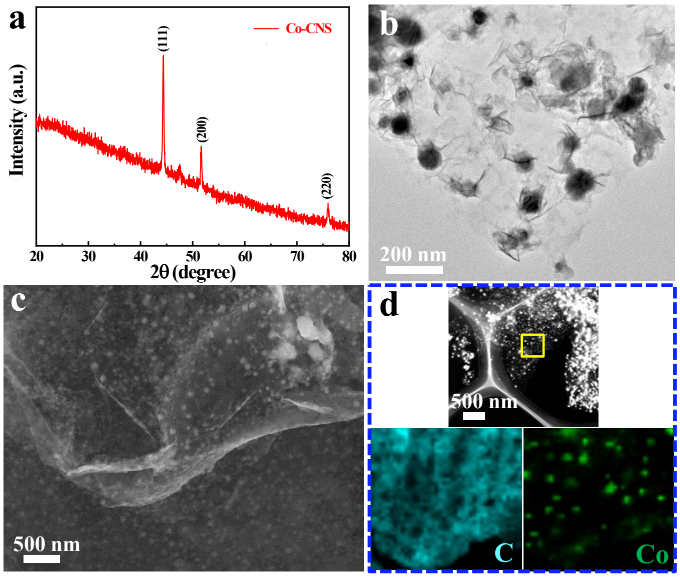

Fig. S1 The microstructure and morphology of Co-CNS. (a) XRD pattern; (b) TEM image; (c) SEM image, (d) HAADF-STEM image and the EDX mappings.

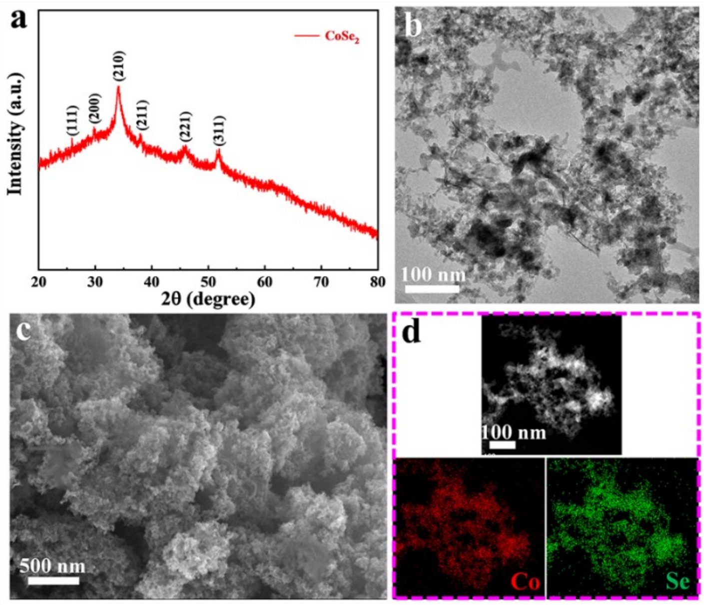

Fig. S2 The microstructure and morphology of pure $CoSe_2$. (a) XRD pattern; (b) TEM image; (c) SEM image, (d) HAADF-STEM image and the EDX mappings.

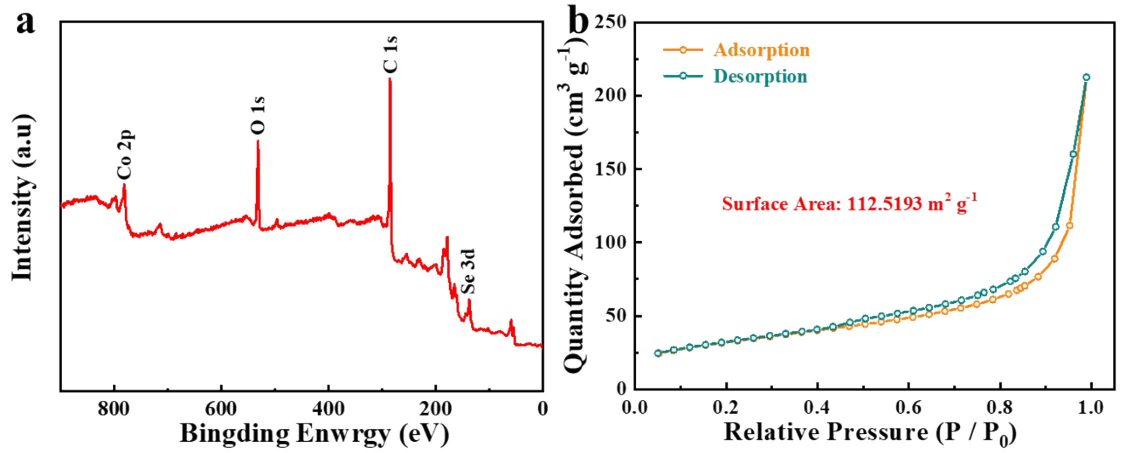

Fig. S3 (a) The XPS survey spectrum and (b) N_2 adsorption/desorption isotherms of $CoSe_2$-CNS.

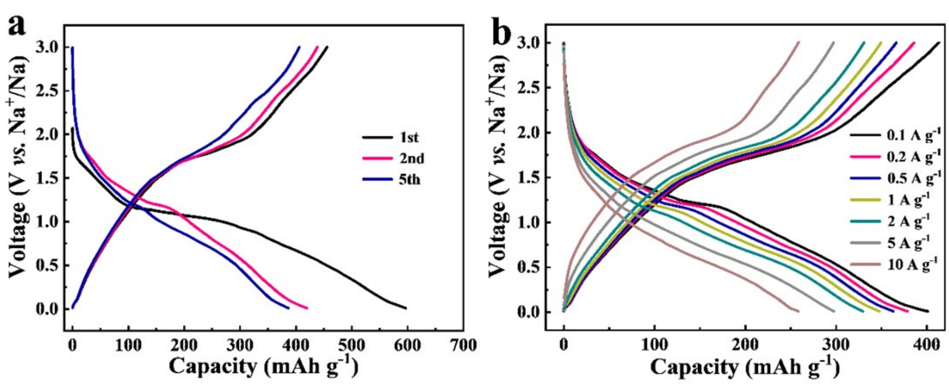

Fig. S4 (a) The GCD curves at 0.2 A g^{-1} and (b) rate capacities at current densities of pure $CoSe_2$.

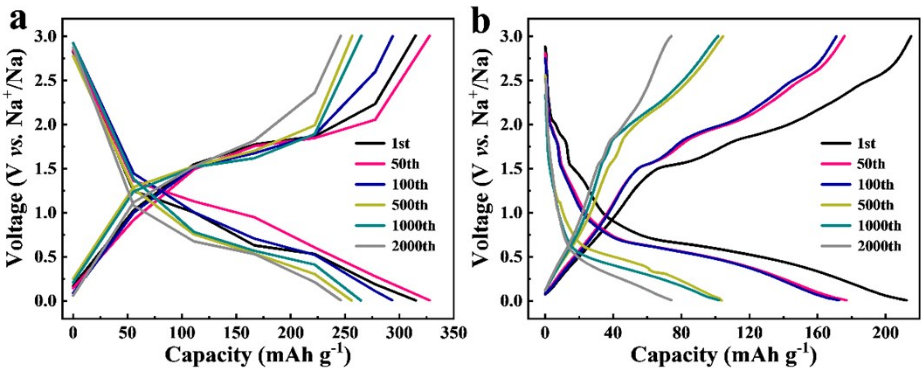

Fig. S5 The GCD curves at 10 A g^{-1} of (a) $CoSe_2$-CNS and (b) pure $CoSe_2$.

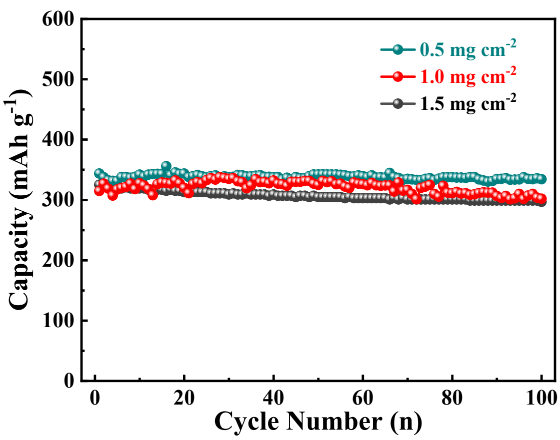

Fig. S6 Comparative cycling performance of the $CoSe_2$-CNS electrode at 10 A g^{-1} with different mass loadings (the cells were initially activated at 0.2 A g^{-1} for 20 cycles).

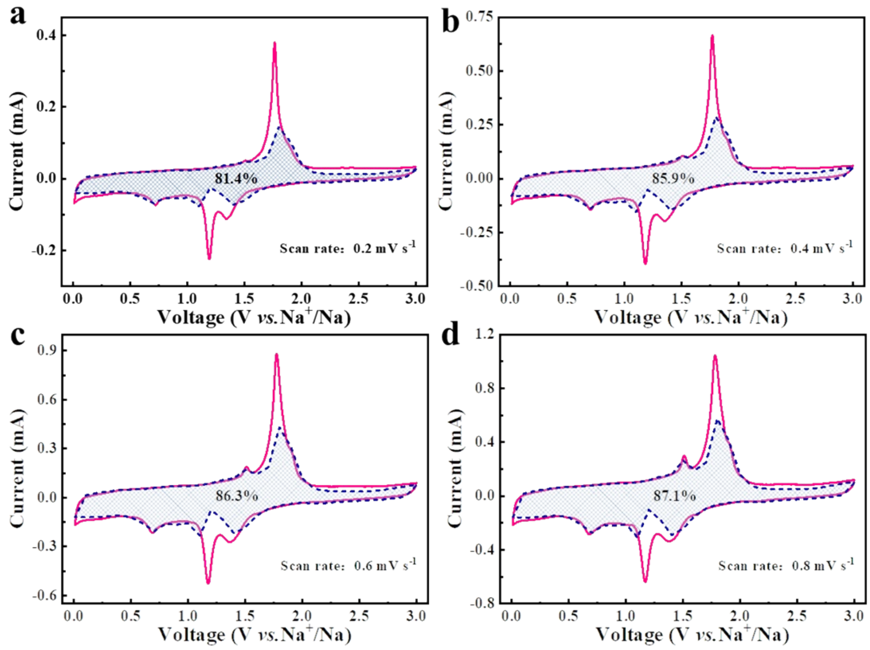

Fig. S7 Separation of the capacitive (shaded region) and diffusion currents at different scan rates.

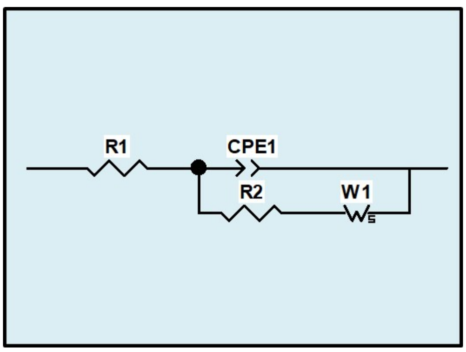

Fig. S8 The equivalent circuits for the $CoSe_2$-CNS and pure $CoSe_2$ electrodes. R_1 is the ohmic resistance, R_2 is the charge transfer resistance, CPE_1 is the constant phase element, and W_1 is the Warburg impedance. The fitted result shows that the R_2 value of the $CoSe_2$-CNS electrode is 9 Ω, which was much lower than that of the pure $CoSe_2$ electrode (13 Ω), indicating a much faster charge transport kinetics for $CoSe_2$-CNS nanosheets.

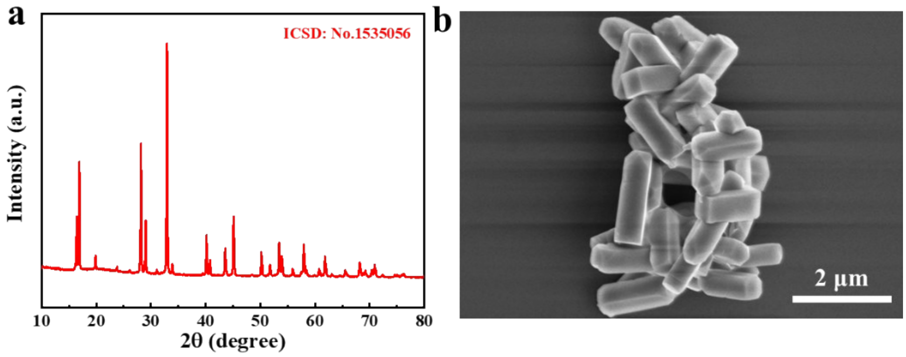

Fig. S9 (a) XRD and (b) SEM image of the NVPOF.

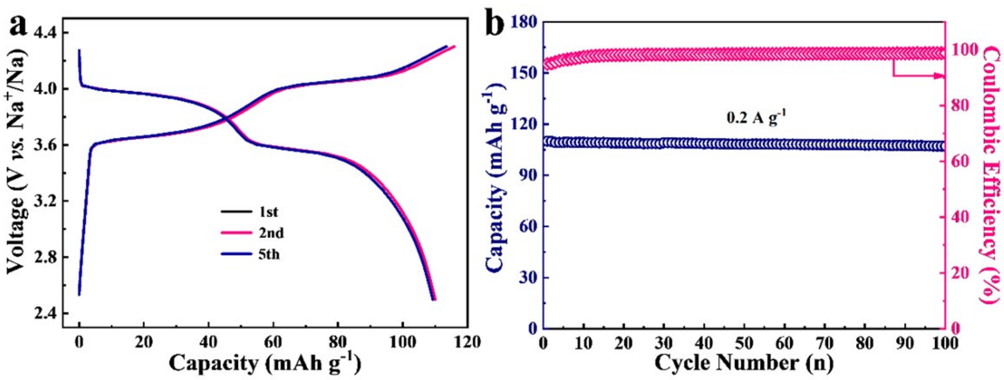

Fig. S10 The cycle performance at 0.2 A g^{-1} of NVPOF cathode.

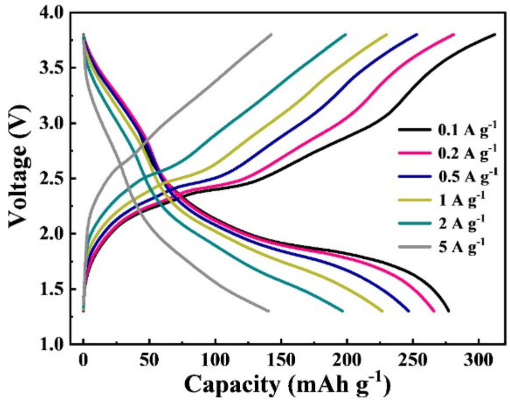

Fig. S11 The GCD curves of $CoSe_2$-CNS//NVPOF full cell at different current densities.