Electronic Supplementary Material (ESI) for Chemical Communications

Nanoporous selenium as a cathode material for rechargeable lithium batteries of high capacity

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Electronic supplement information (ESI)

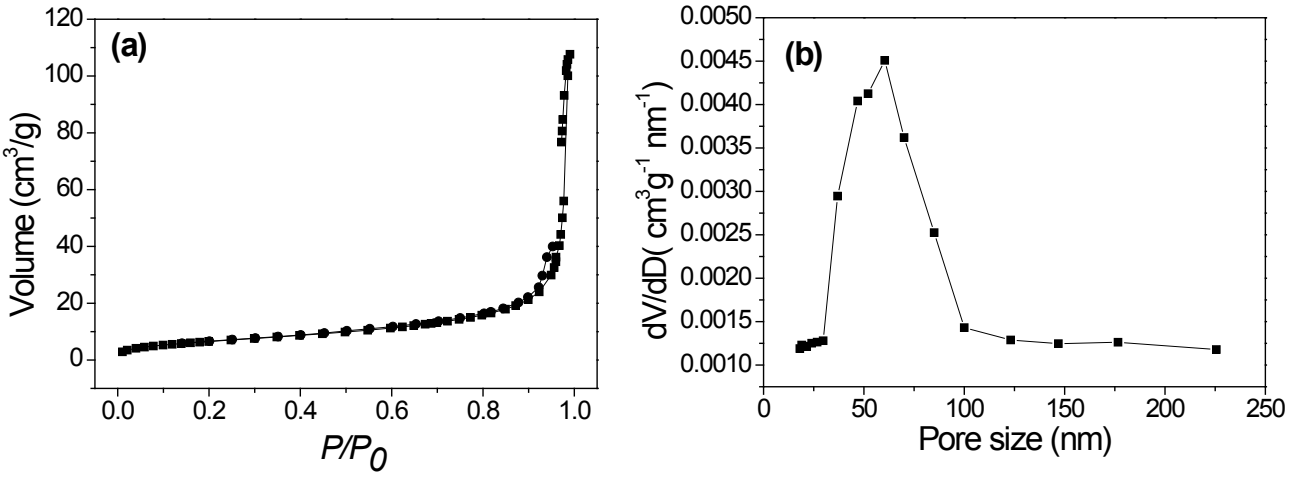

Fig. S1 (a) N_2 adsorption–desorption isotherms, and (b) pore-size distribution of NP-Se.

N_2 adsorption-desorption isotherms and pore-size distribution of nanoporous carbon is shown in Fig.S1. Pore-size distribution indicates that there are lots of pores with average size of 50 nm in the nanoporous Se, which is near to the particle size of the nano-$CaCO_3$. The BET surface area is 40.89 m^2/g.

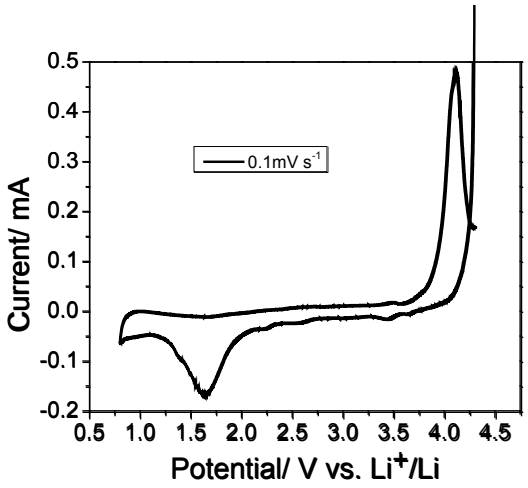

Fig. S2 Cyclic voltammogram of the CP-Se at a scan rate of 0.1mV s^{-1} in the voltage range 0.8-4.3 V.

The cyclic voltammogram of the CP-Se at a scan rate of 0.1 mV s^{-1} in the voltage range 0.8-4.3 V is shown in Fig. **S2**. One pair of redox peaks situated at 1.6 V and 4.1 V (vs. Li^+/Li) were observed for the CP-Se, corresponding to the insertion and extraction of lithium ions into and from the electrode material, respectively

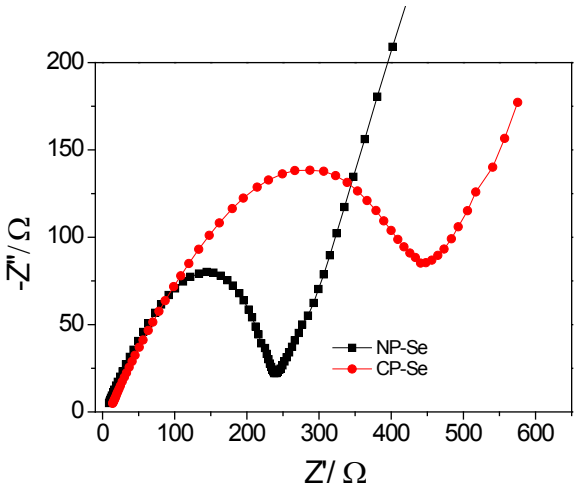

Fig. S3 Nyquist plots of the NP-Se and CP-Se.

Nyquist plots in Fig. S3 shows the superiority of the NP-Se to the CP-Se particles. The diameter of the semi-circle at high frequencies is remarkably reduced in the plot of the NP-Se, compared with that of the CP-Se particles, indicating the greatly decreased charge-transfer resistance at the electrode/electrolyte interface. Meanwhile it can be obviously observed that the Li^+ ion diffusion coefficient of the NP-Se is larger than that of the CP-Se from the lines in the low frequency range that indicates the solid-state diffusion process of lithium ions.