# Supporting information

## Facile synthesis of hierarchical porous flowerlike $NiCo_2O_4$ with superior lithium storage properties

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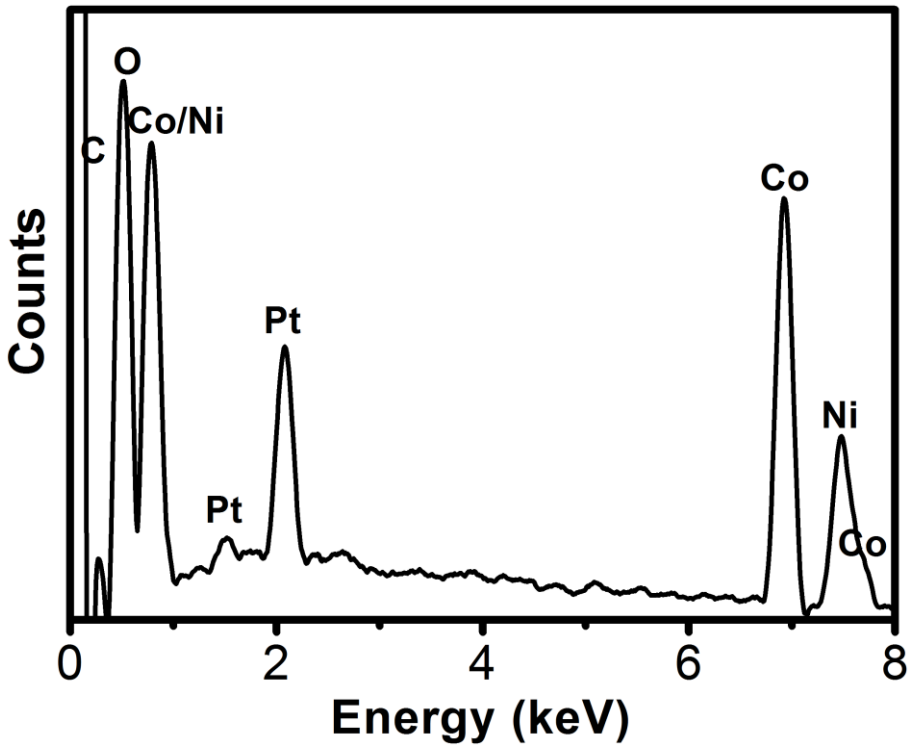



**Fig. S1** EDX pattern of flowerlike $NiCo_2O_4$.

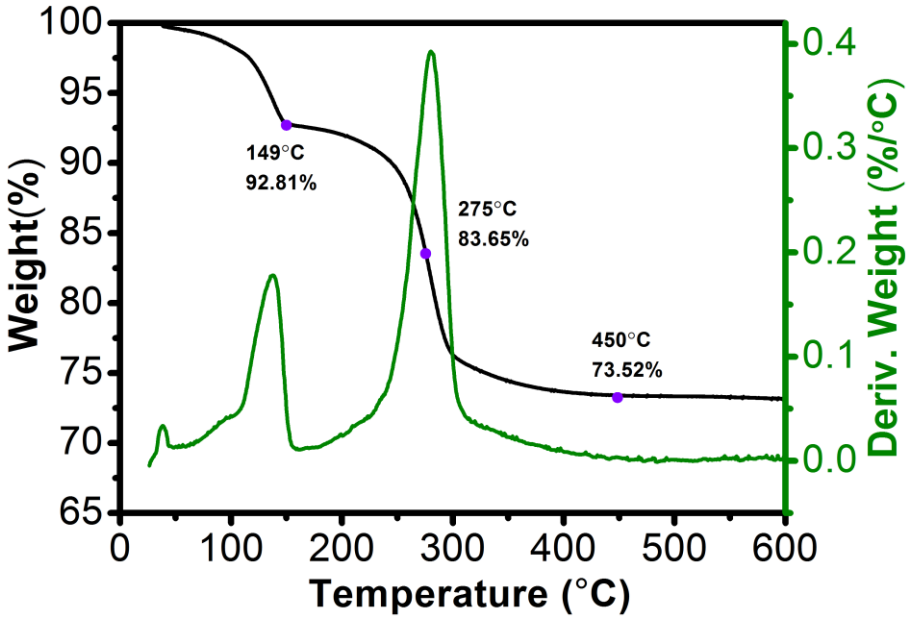



**Fig. S2** TGA curve of Ni-Co-based intermediate.

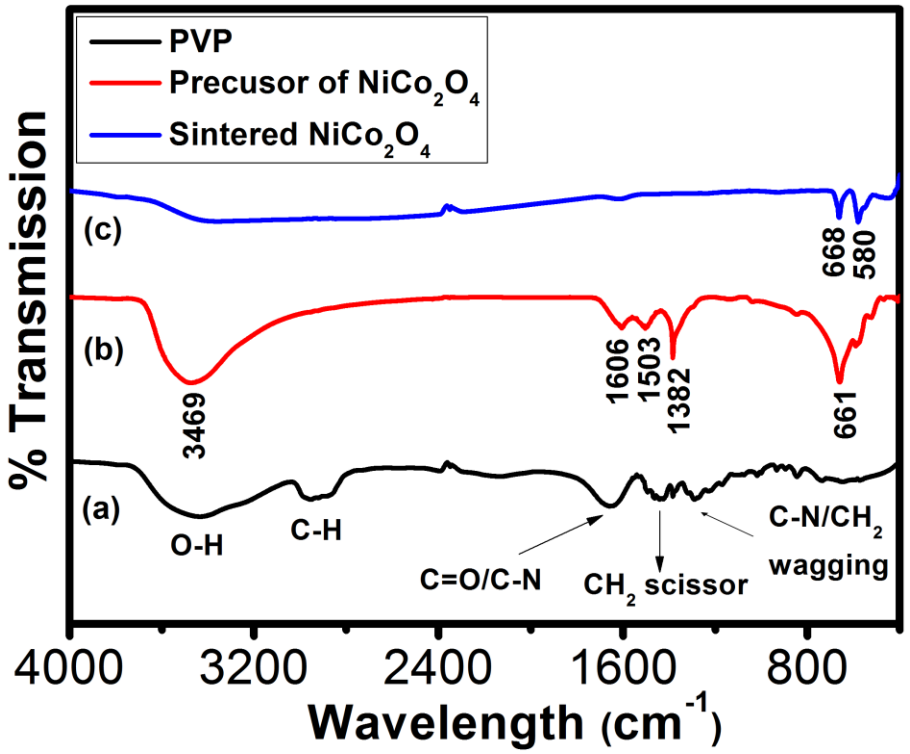



**Fig. S3** FTIR spectra of (a) PVP, (b) Ni-Co-based intermediate, and (c) hierarchical porous flowerlike $NiCo_2O_4$ after calcination at 450 ºC for 1 h in air.

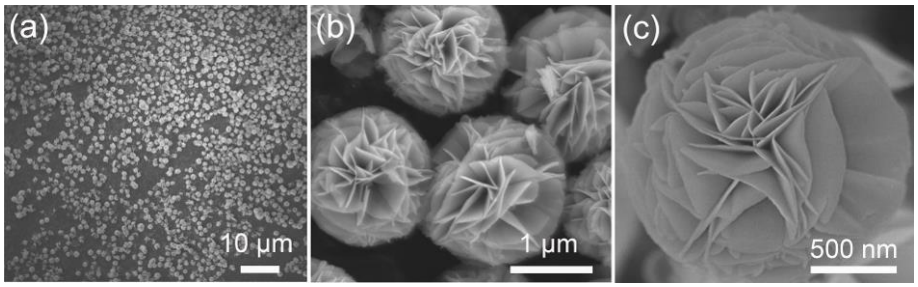



**Fig. S4** FESEM images of the as-prepared Ni-Co-based intermediate hydrothermally prepared at 180 °C for 20 h using 0.1 g PVP.

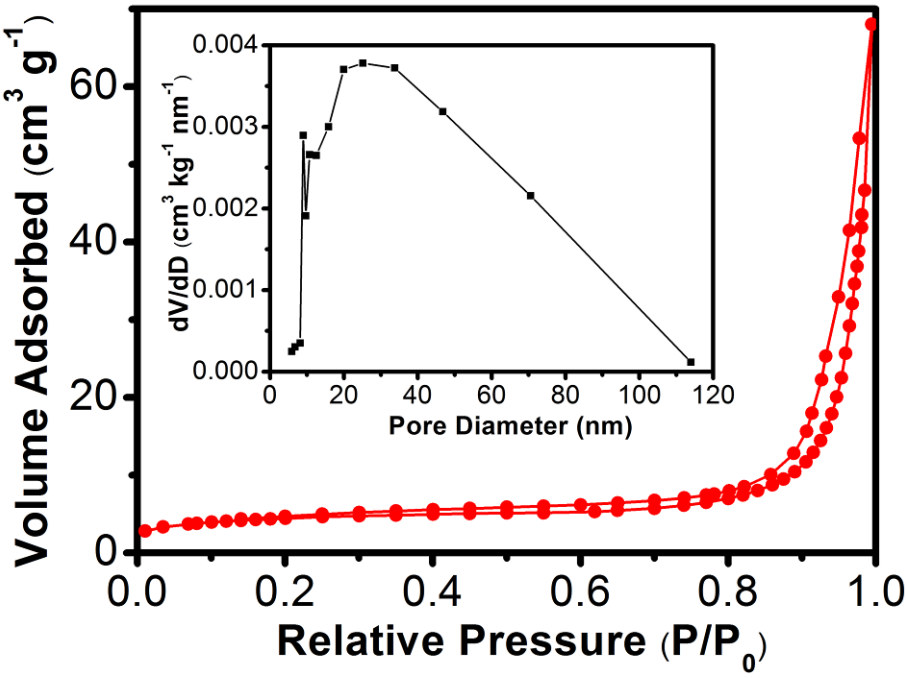



**Fig. S5** $N_2$ adsorption/desorption isotherm curve of Ni-Co-based intermediate. The inset is the corresponding pore size distribution.

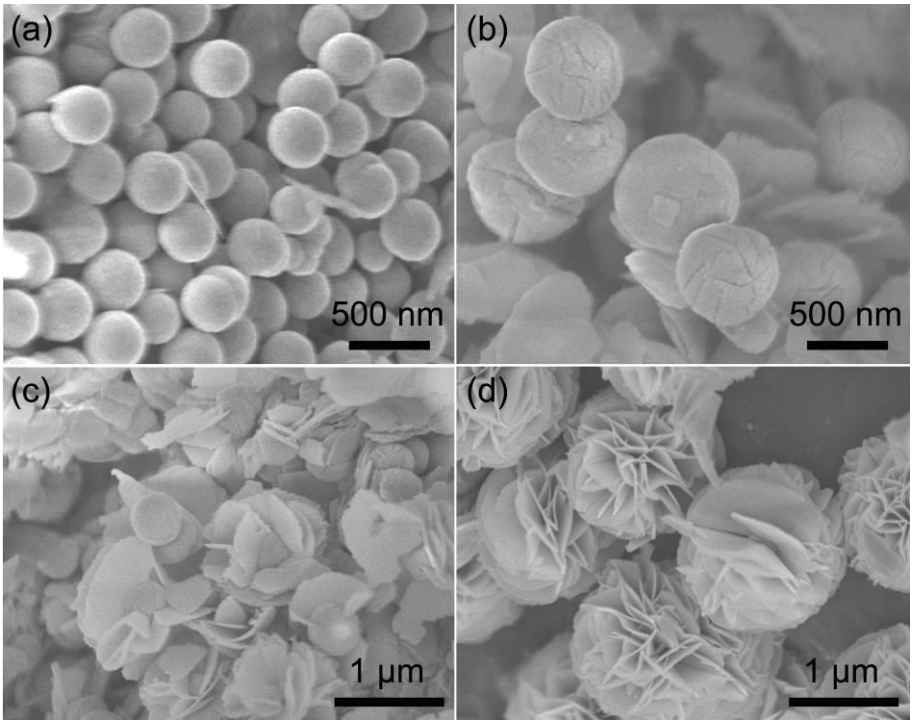



**Fig. S6** FESEM images at low-magnification of Ni-Co-based intermediate obtained at 180 ºC with different time duration: a) 1 h; b) 3 h; c) 8 h; d) 15 h.

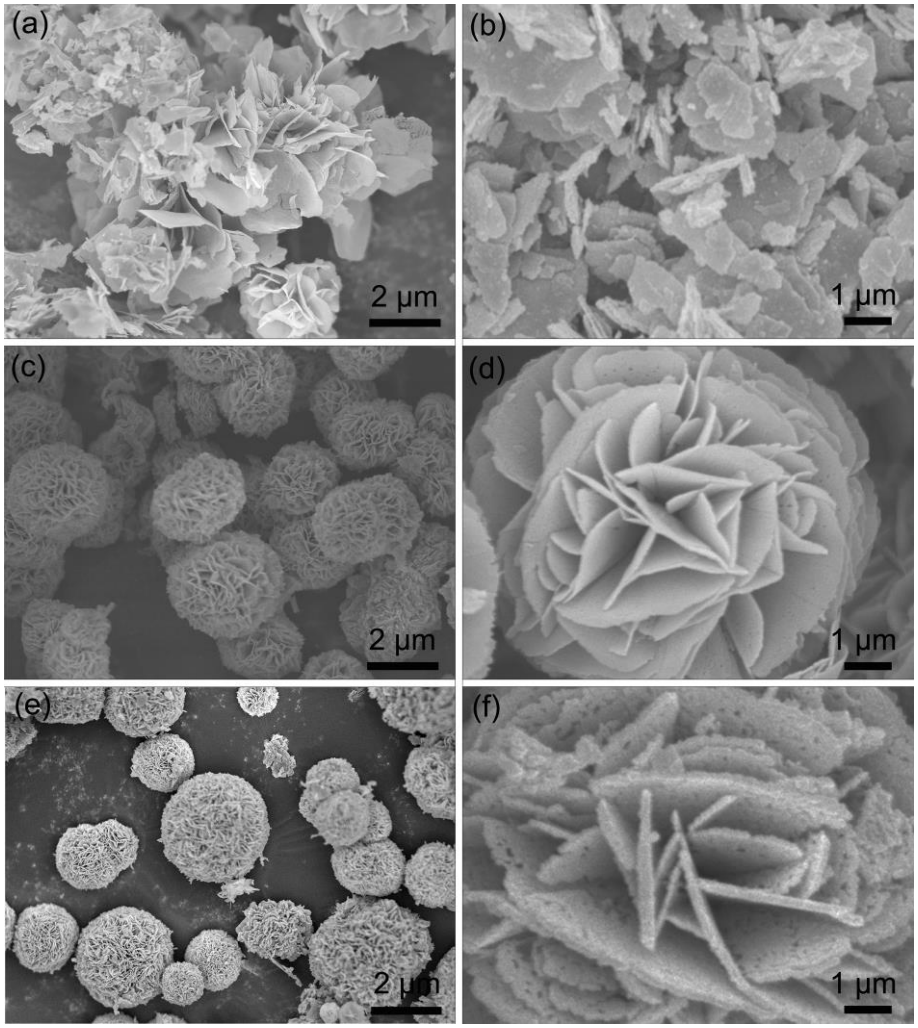



**Fig. S7** FESEM images of the sample prepared with different amounts of PVP after calcination at 450 °C for 1h: (a, b) 0 g; (c, d) 0.05 g; and (e, f) 0.2 g. Other conditions are unchanged.

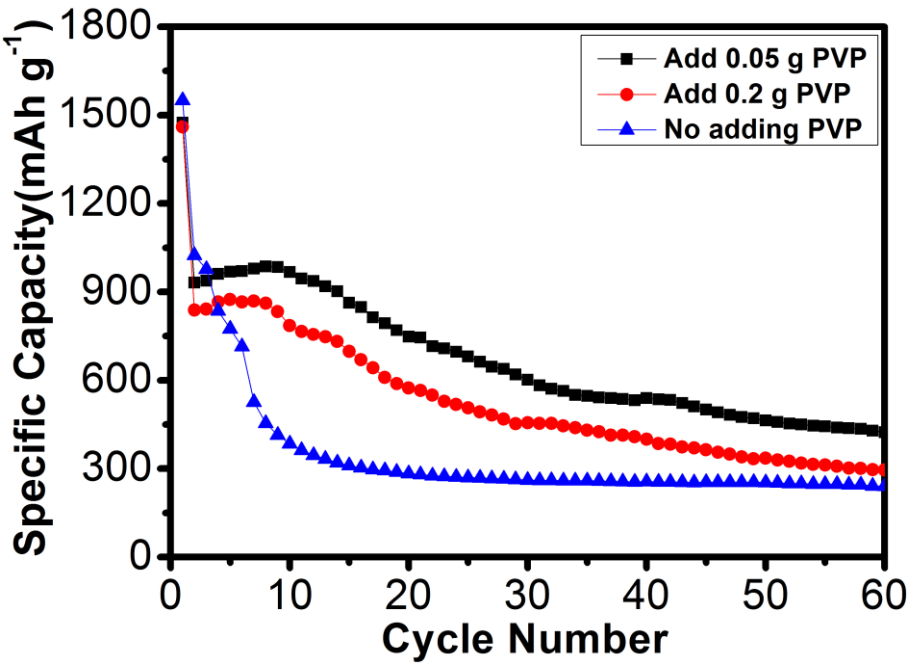
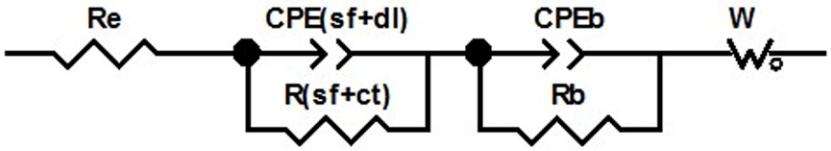



**Fig. S8** Comparative cycling performance of different sample at the same current density of 100 mA $g^{-1}$.

(a)




(b)

| Cycle Number | $R_{(sf+ct)}/\Omega$ | $CPE_{(sf+dl)}/\mu F$ | $R_b/\Omega$ | $CPE_b/mF$ |
|---|---|---|---|---|
| Fresh | 16 | 27 | – | – |
| 5th | 43 | 30 | 25 | 0.017 |
| 10th | 61 | 31 | 23 | 0.009 |
| 20th | 66 | 31 | 18 | 0.011 |

**Fig. S9** (a) The equivalent circuit which is used to fit the experimental data; (b) Fitted data extracted from EIS spectra in different cycles.