Electronic Supplementary Information (ESI):

Enhanced electrochemical performances of $Li_3V_2(PO_4)_3$ Microspheres Assembled with Nanoparticles Embedded in Carbon Layer

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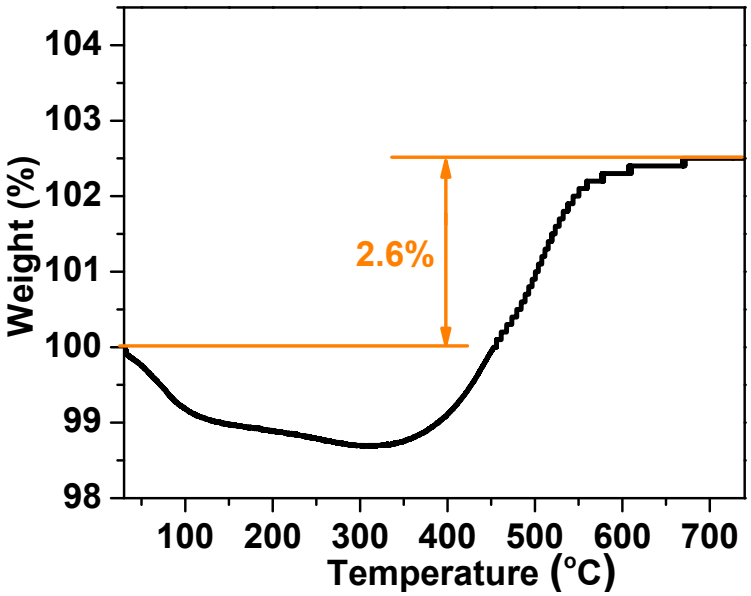

Fig. S1. Thermogravimetric curve of the $Li_3V_2(PO_4)_3$@C composite heated in synthetic air.

Calculation of carbon content: Thermogravimetric analysis was carried out to evaluate carbon content in the composite. $Li_3V_2(PO_4)_3$@C composite was heated from room temperature to 800 °C at a rate of 3 °C min^{-1} to remove carbon completely and oxidize V^{3+} to V^{5+}. And the mass change is caused by the above two factors. According to the reported method,[1-2] First, assume the carbon content as x, then LVP was 100-x, when 1 mol LVP was oxidized, 1 mol of oxygen was consumed, and the mass increase 7.8%(100-x). According to the mass conservation law, we can list the equation: 100-x+7.8%(100-x) = 102.6. Thus the carbon content (x) can be estimated as about 5%. And it is in consistent with the result of ICP-OES about 6%.

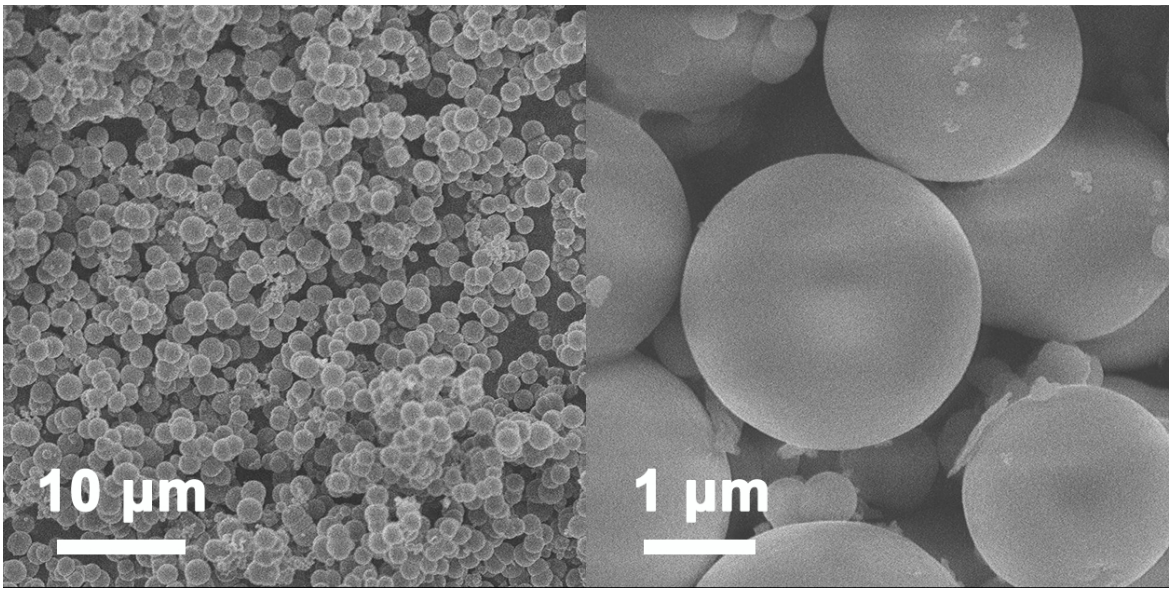

Fig. S2 SEM image of LVP precursor.

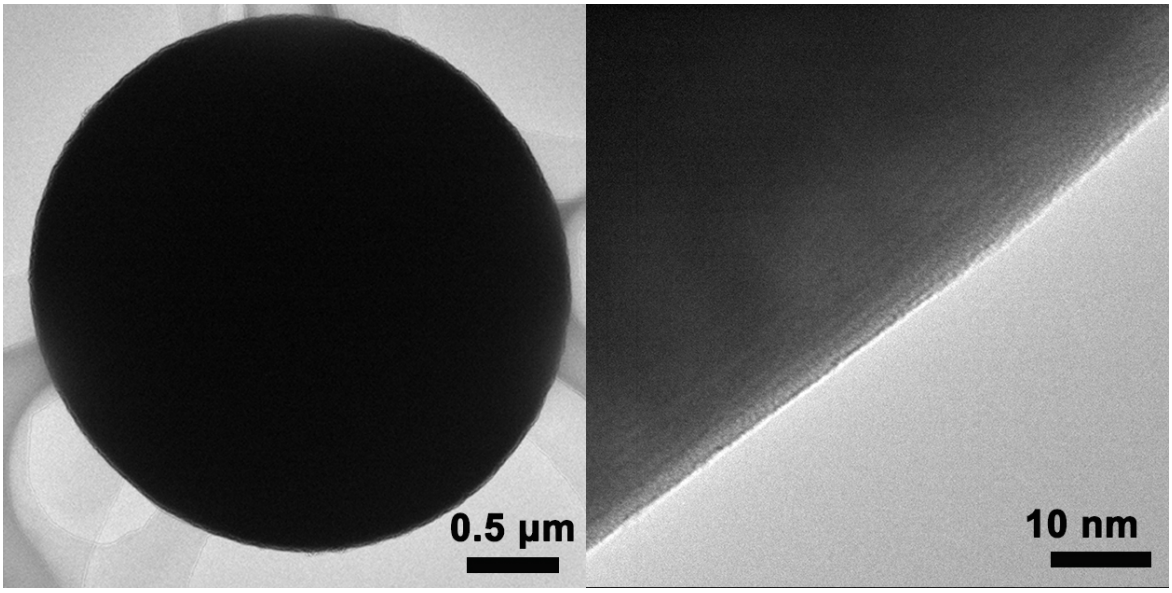

Fig. S3 TEM image of LVP precursor.

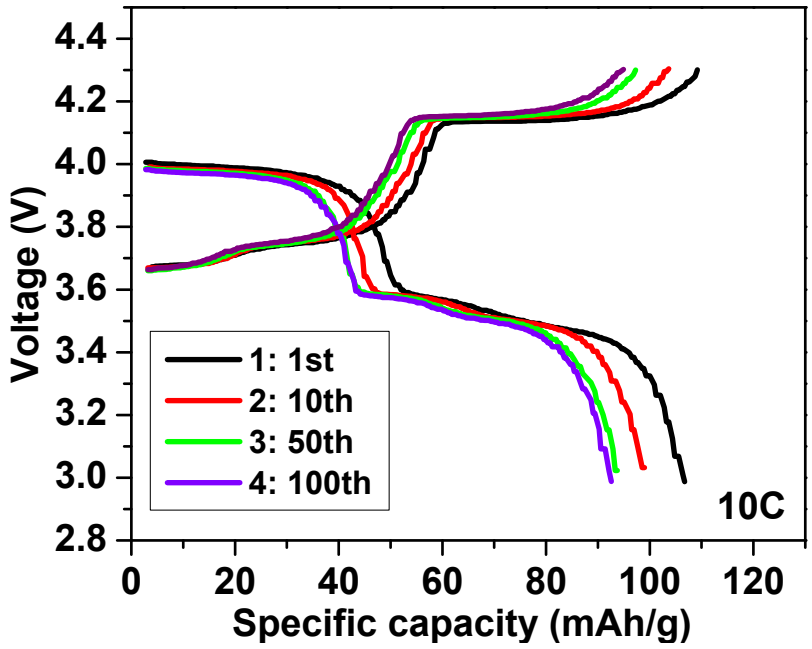

Fig. S4. The 1st, 10th, 50th, and the 100th charge-discharge curves at 10 C over a potential range of 3.0-4.3 V.

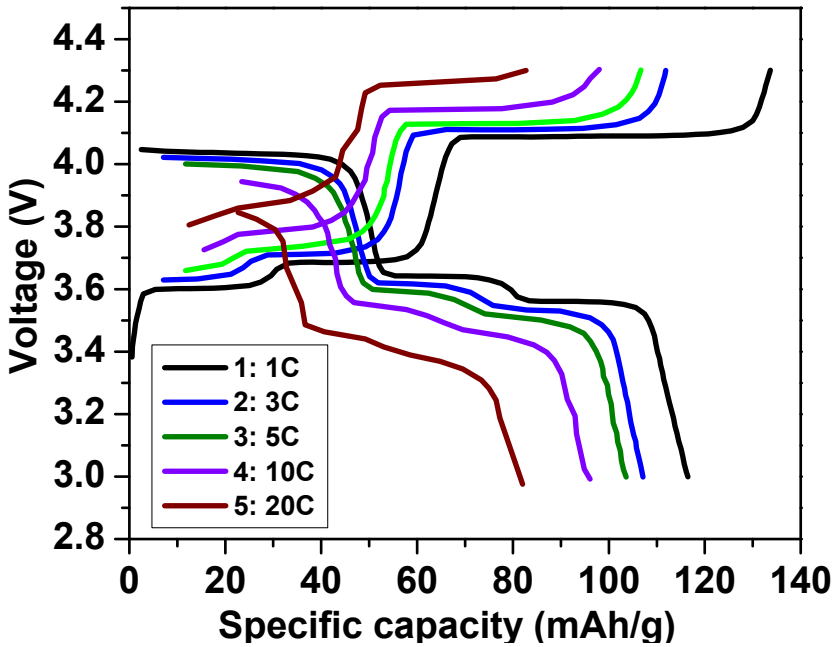

Fig. S5. Charge-discharge curves from 1 C to 20 C over a potential range of 3.0-4.3 V.

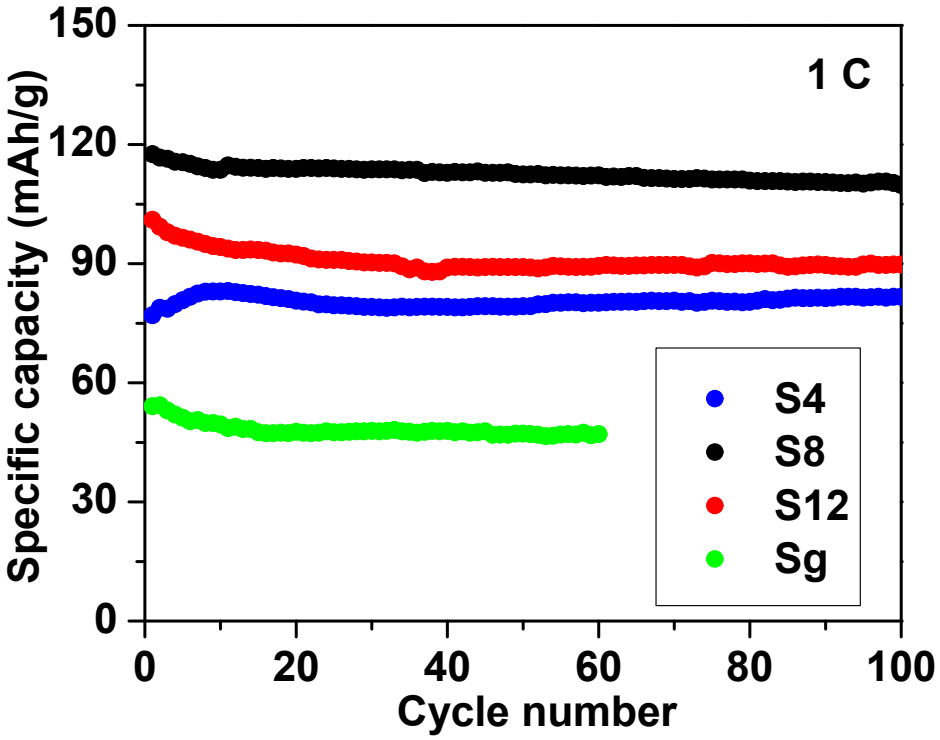

Fig. S6. The cycling performance of S4, S8, S12 and Sg at rates of 1 C over a potential range of 3.0-4.3 V for 100 cycles.

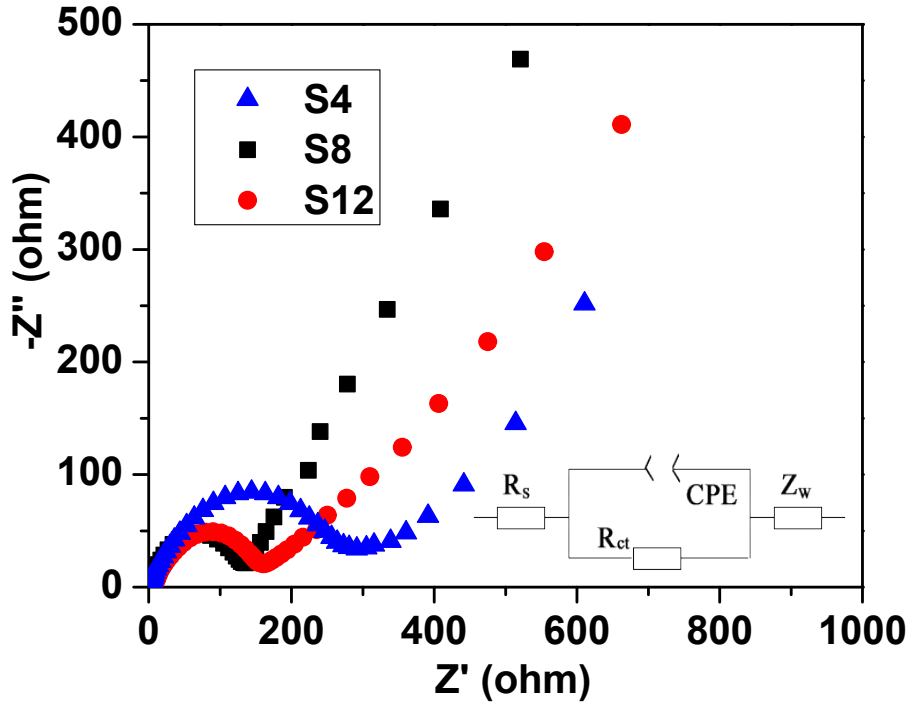

Fig. S7 AC-impedance spectra of S4, S8 and S12.

Reference：

1. J. Chen and M. Whittingham, *Electrochem. Commun.*, 2006, **8**, 855–858.

2. L. Fei, W. Lu, L. Sun, J. Wang, J. Wei, H. L. W. Chan and Y. Wang, *RSC Adv.*, 2013, **3**, 1297–1301.