Electronic Supporting Information

Microwave-assisted Synthesized of Novel Nanostructured $Zn_3(OH)_2V_2O_7\cdot 2H_2O$ and $Zn_2V_2O_7$ as Electrode Materials for Supercapacitors

Comment [□□□]: Microwave-assisted synthesis of novel nanostructured $Zn_3(OH)_2V_2O_7\cdot 2H_2O$ and $Zn_2V_2O_7$ as electrode materials for supercapacitors

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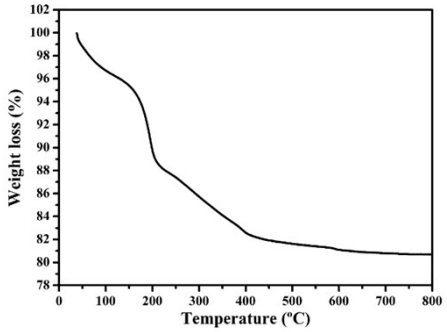

Fig. S1 TGA curve of the as-synthesized precursor $Zn_3(OH)_2V_2O_7\cdot 2H_2O$.

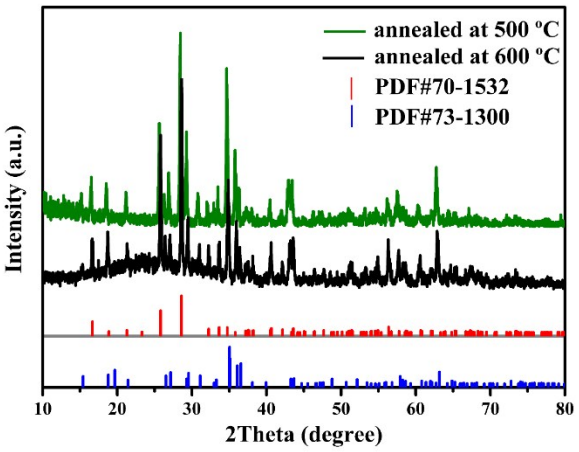

Fig. S2 XRD patterns of the post-calcination products obtained at 500 ℃ and 600 ℃.

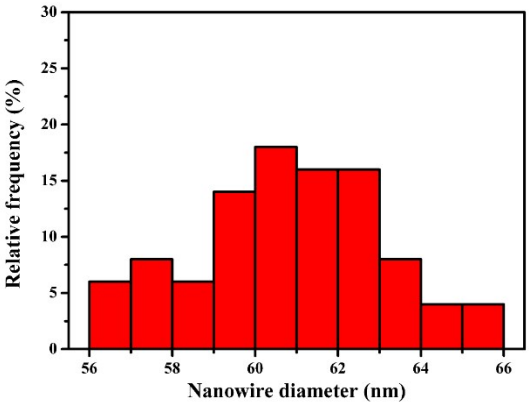

Fig. S3 Statistical analysis of nanowire diameter of $Zn_3(OH)_2V_2O_7 \cdot 2H_2O$.

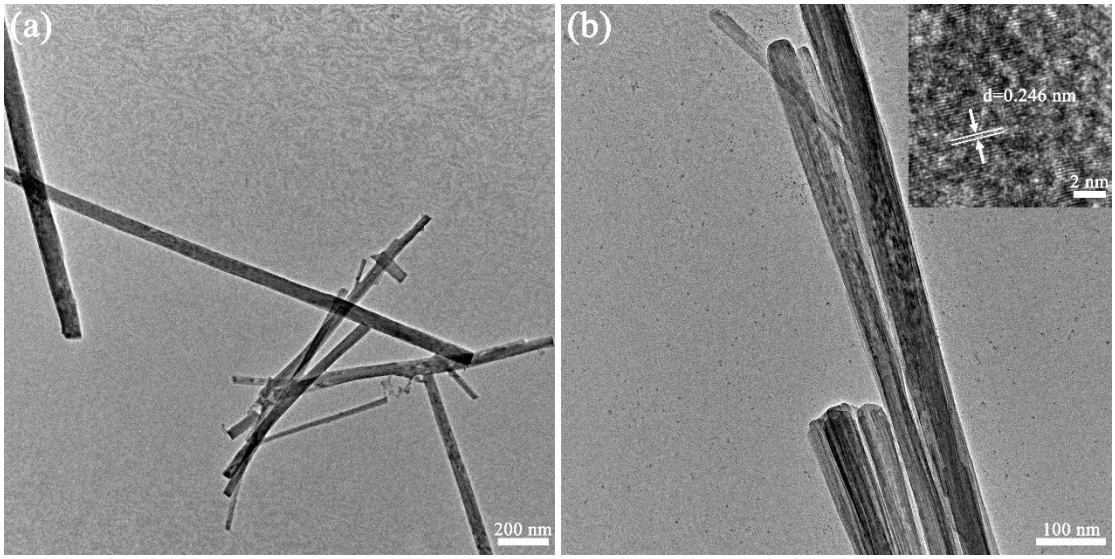

Fig. S4 TEM (a and b) and HRTEM (inset b) images of $Zn_3(OH)_2V_2O_7 \cdot 2H_2O$.

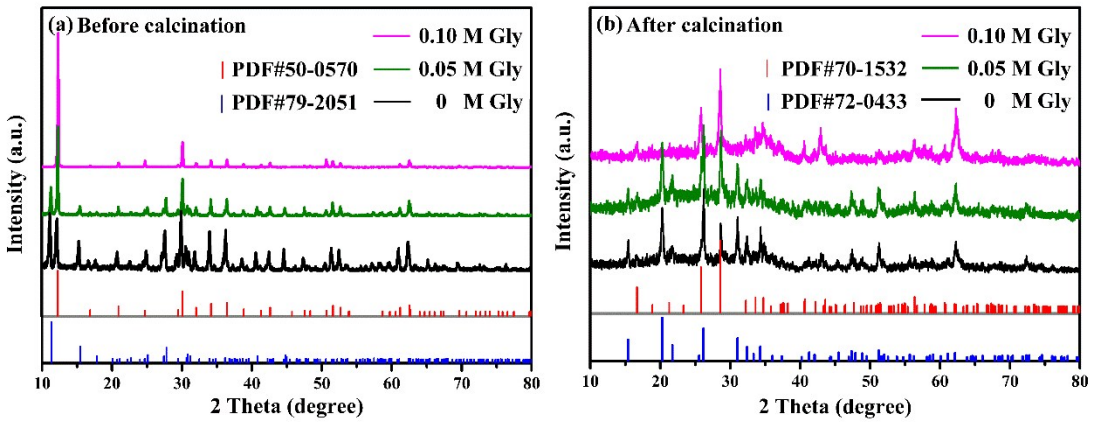

Fig. S5 XRD patterns of (a) $Zn_3(OH)_2V_2O_7{\cdot}2H_2O$ and (b) $Zn_2V_2O_7$ with glycine concentration: 0, 0.05, 0.1 M.

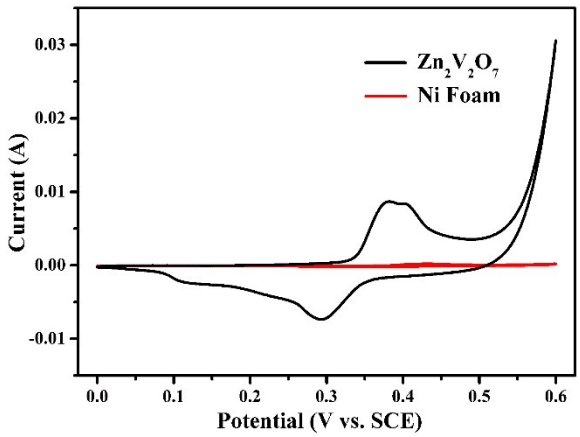

Fig. S6 Cyclic Voltammetry (CV) curves of $Zn_2V_2O_7$ and nickel foam at 5 mV s^{-1}.

As shown in Fig. S7, we compared the typical cyclic voltammogram (CV) curves of the pure nickel foam and nickel foam with active materials $Zn_2V_2O_7$ at the same scan rate of 5 mV s^{-1} in the potential window of 0 to 0.6 V. According to the CV curves, the capacitive current of the Ni foam was almost a straight line, while there was a strong pair of redox peaks in the CV curves of the $Zn_2V_2O_7$ electrode, which meant reversible Faraday redox reactions. The strong contrast between the CV curves of the pure nickel foam and the nickel foam with active materials $Zn_2V_2O_7$ had indeed indicated that the influence of the Ni foam can be neglected, and the specific capacitance was really from the nanowire shaped $Zn_2V_2O_7$ materials.

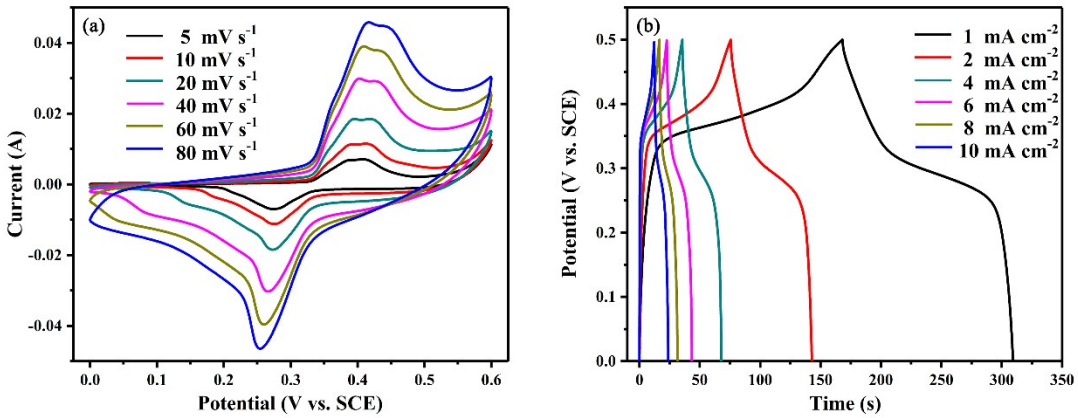

Fig. S7 Comparison of electrochemical properties of $Zn_3(OH)_2V_2O_7 \cdot 2H_2O$ nanowires: (a) CV curves at scan rates of 5, 10, 20, 40, 60, 80 mV s^{-1}. (b) CD curves at current densities of 1, 2, 4, 6, 8, 10 mA cm^{-2}.

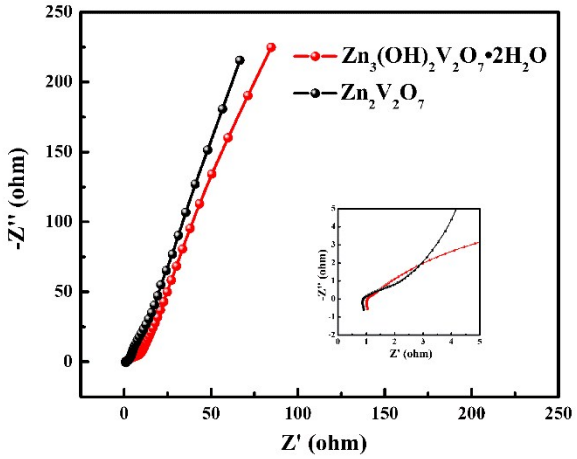

Fig. S8. EIS curves of the $Zn_3(OH)_2V_2O_7 \cdot 2H_2O$ and $Zn_2V_2O_7$ electrodes in 6 M KOH solution (the inset shows the magnified electrochemical impedance spectrum).

Table S1 The comparison results of electrochemical performance for the $Zn_2V_2O_7$ materials and other similar zinc compounds electrodes.

Electrode materials	Specific capacitance	Energy density	Power density	Ref.
$Zn_2V_2O_7$	427.7 F g^{-1} (1 mA cm^{-2})	18.7 W h kg^{-1}	272.7 W kg^{-1}	Our work
ZnO/carbon nanotube	48 F g^{-1} (1 mA cm^{-2})	13.1 W h kg^{-1}	792 W kg^{-1}	46
PPy/GO/ZnO nanocomposite	94.6 F g^{-1} (1 A g^{-1})	10.65 W h kg^{-1}	258.26 W kg^{-1}	47
$ZnCo_2O_4$ nanorod	10.9 F g^{-1} (30 mV s^{-1})	76 mW h kg^{-1}	1.9 W kg^{-1}	48