Supporting Information

Soft chemical topotactic synthesis and crystal structure evolution from two-dimension KV_3O_8 plates to one-dimension V_3O_7 nanobelts

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1. Chemical composition of samples KVO and HVO determined by EDX.

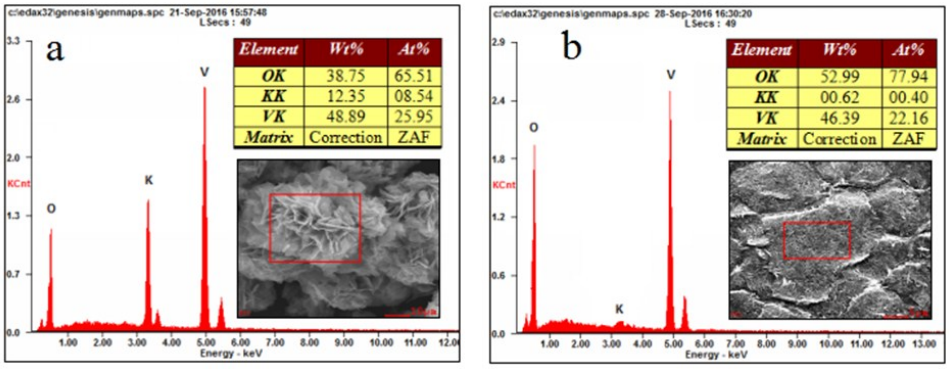

Fig. S1 EDX spectra of the obtained samples KVO (a) and HVO (b).

According to the analysis result of EDX spectra, the chemical formula of KVO sample is KV_3O_8, and that of HVO sample may be $HV_3O_8 \cdot 3H_2O$.

2. Chemical composition of the V_3O_7 sample determined by XPS.

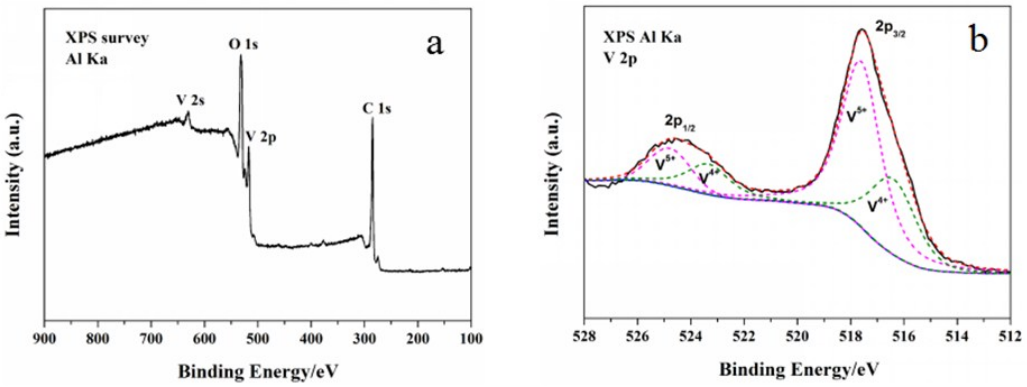

Fig. S2 XPS survey spectrum (a) and V 2p XPS spectrum (b) of the sample obtained by hydrothermally treating HVO nanobelts colloidal solution at 180 ^{o}C for 12 h. The black curve is the experimental result. The dash curves are fitting results.

According to the analysis result (V/O = 9.51/23.46) of XPS spectrum, the chemical formula of the sample obtained by hydrothermally treating HVO nanobelts colloidal solutions at 180 ^{o}C for 12 h is V_3O_7.

3. **FTIR spectrum of the obtained sample HVO.**

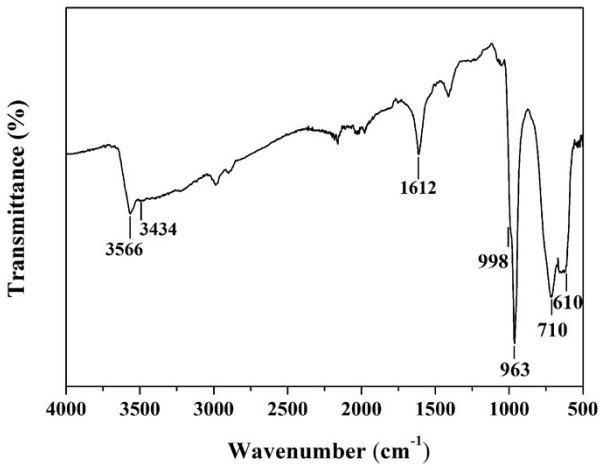

Fig. S3 FTIR spectrum of the obtained sample HVO.

Stretching vibration peaks of V=O bonds: 998, 963 cm^{-1};

Stretching vibration of V-O-V bonds: 710, 610 cm^{-1};

Stretching vibration of O-H bonds: 3566, 3434 cm^{-1};

Bending vibration of H-O-H bond: 1612 cm^{-1}.

4. FE-SEM images of the photoelectrode films of P25 and V_3O_7.

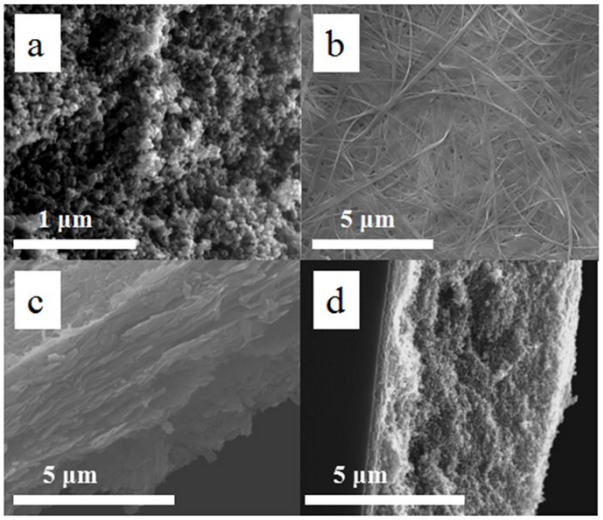

Fig. S4 FE-SEM images of the photoelectrode films of P25(a, d) and V_3O_7(b, c).