

***Electronic supplementary information (ESI)***

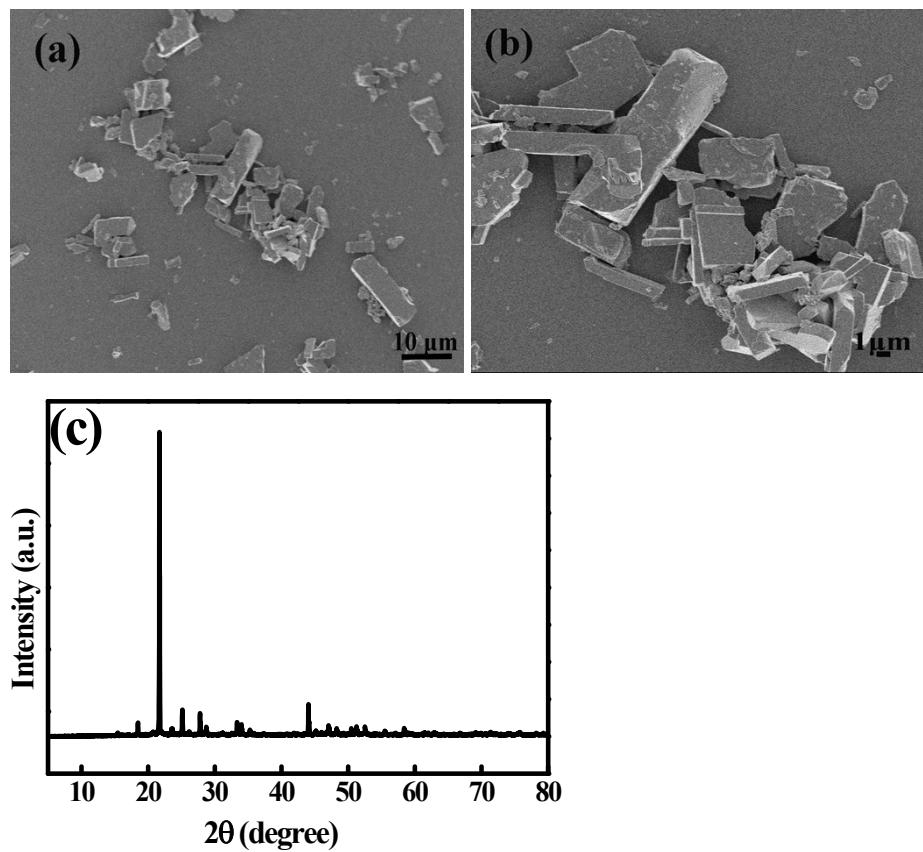
**MoV<sub>2</sub>O<sub>8</sub> nanostructures: controlled synthesis and lithium storage mechanism**

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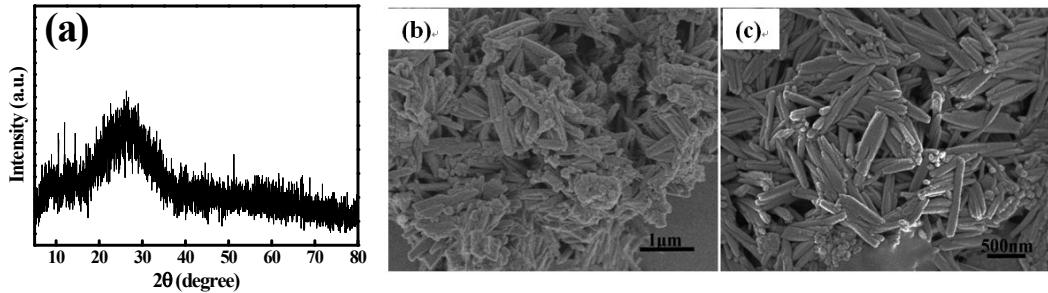
Key Laboratory of Cluster Science, Ministry of Education of China, Beijing Key Laboratory of Photoelectronic/Electrophotonic Conversion Materials Department of Chemistry, Beijing Institute of Technology, Beijing 100081, P. R. China.

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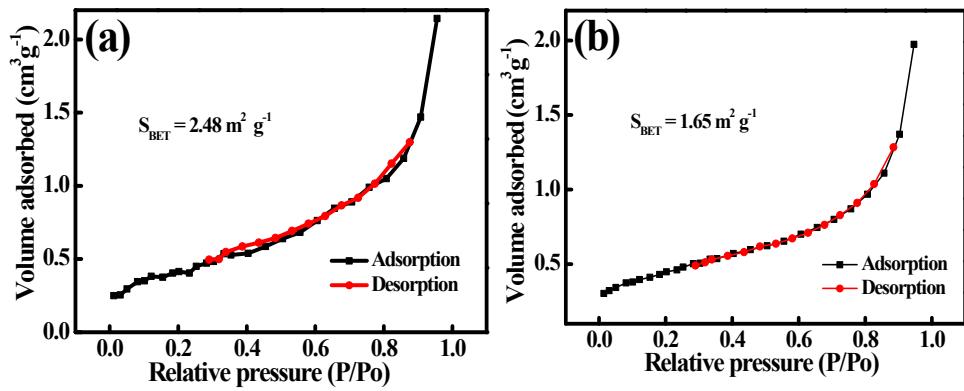
E-mail: [caomh@bit.edu.cn](mailto:caomh@bit.edu.cn)



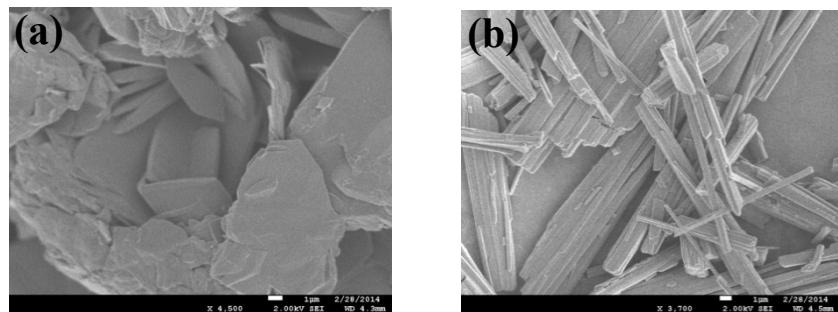
**Fig. S1** (a,b) SEM images and (c) XRD pattern of bulk  $\text{MoV}_2\text{O}_8$ .



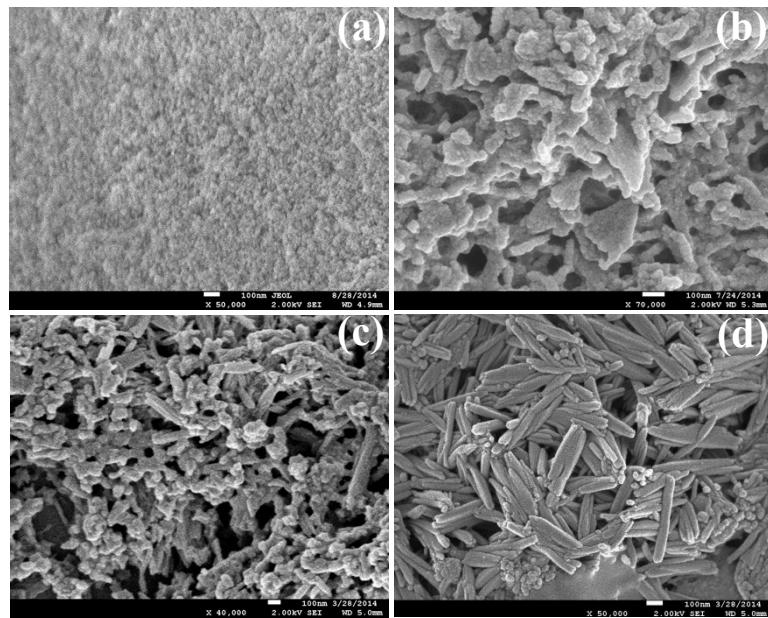
**Fig. S2** (a) XRD pattern and (b,c) SEM images of the Mo-V-based precursor.



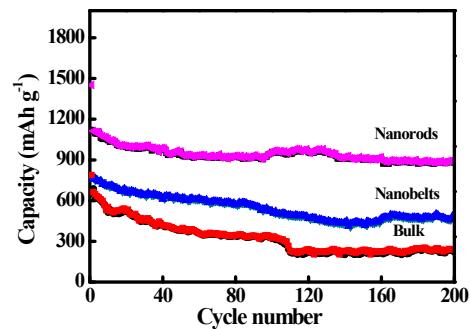
**Fig. S3** N<sub>2</sub> adsorption-desorption isotherms. (a) MoV<sub>2</sub>O<sub>8</sub> nanobelts. (b) bulk MoV<sub>2</sub>O<sub>8</sub>.



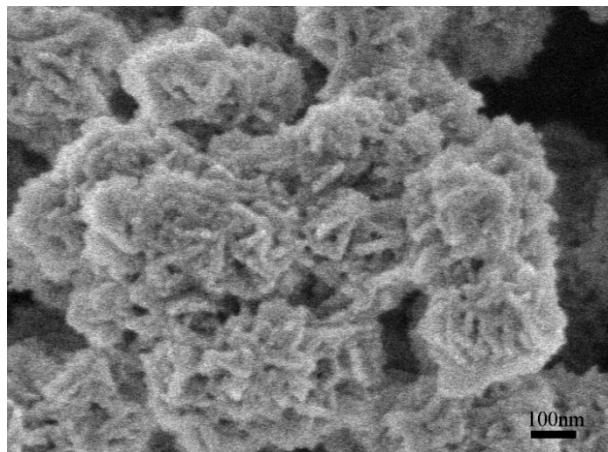
**Fig. S4** SEM images of the precursors obtained in different solvents: (a) Ethylene glycol and (b) N,N-dimethylformamide.



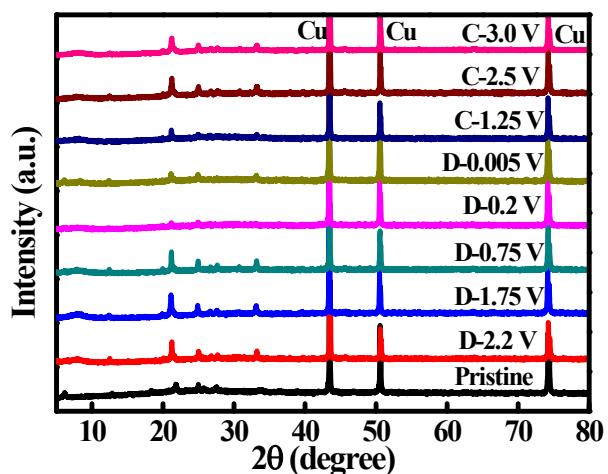
**Fig. S5** SEM images of the precursors obtained in different reaction times: (a) 3h, (b) 12h, (c) 24h, and (d) 36h.



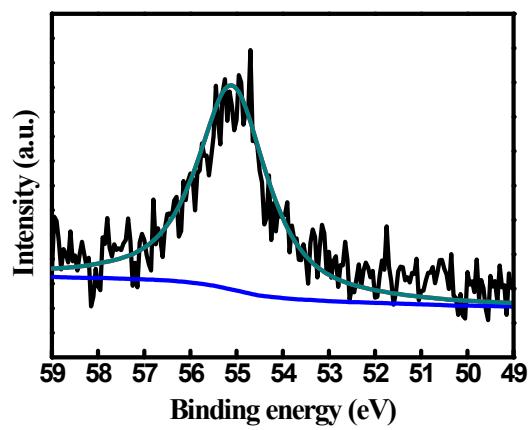
**Fig. S6** Cycling performance of  $\text{MoV}_2\text{O}_8$  nanorods, nanobelts and bulk at the current density of  $0.8 \text{ A g}^{-1}$  for 200 cycles.



**Fig. S7** SEM image of MoV<sub>2</sub>O<sub>8</sub> nanorod electrode after 50 cycles at a current density of 0.2 A g<sup>-1</sup>.



**Fig. S8** XRD patterns of MoV<sub>2</sub>O<sub>8</sub> nanorod electrodes under different charge and discharge voltages.



**Fig. S9** High resolution Li 1s XPS spectra.