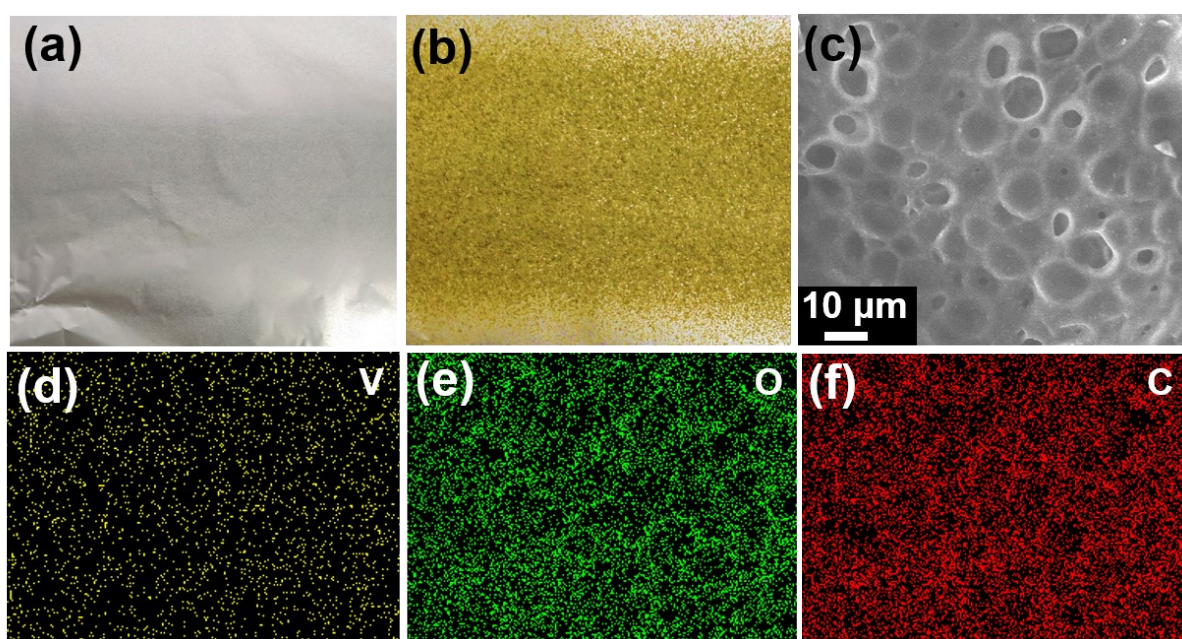


## Boosting high-rate lithium storage in $\text{Li}_3\text{VO}_4$ via honeycomb structure design and electrochemical reconstruction

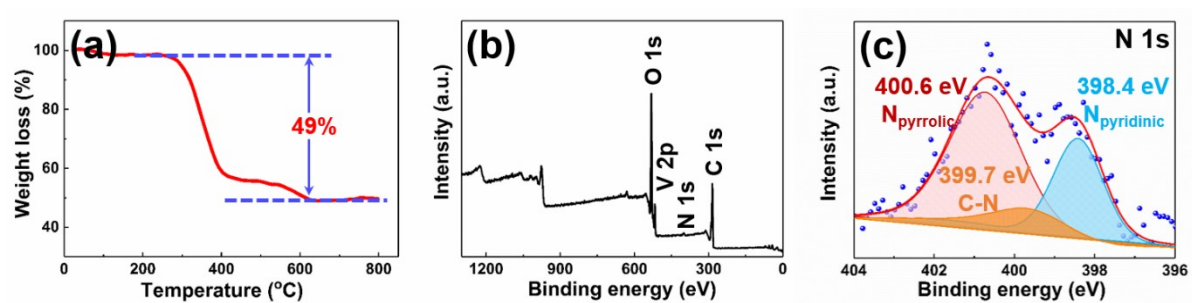
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*College of Materials and Chemical Engineering, Hubei Provincial Collaborative Innovation Center for New Energy Microgrid, Key Laboratory of Inorganic Nonmetallic Crystalline and Energy Conversion Materials, China Three Gorges University, Yichang, 443002, China.*

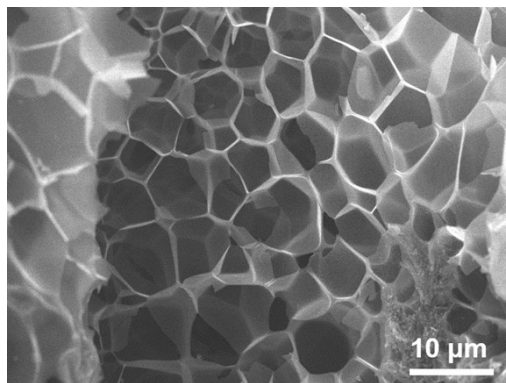
† Corresponding author. Fax: 86-717-6397505 E-mail: [zhangdm@ctgu.edu.cn](mailto:zhangdm@ctgu.edu.cn); [shibingni07@126.com](mailto:shibingni07@126.com).



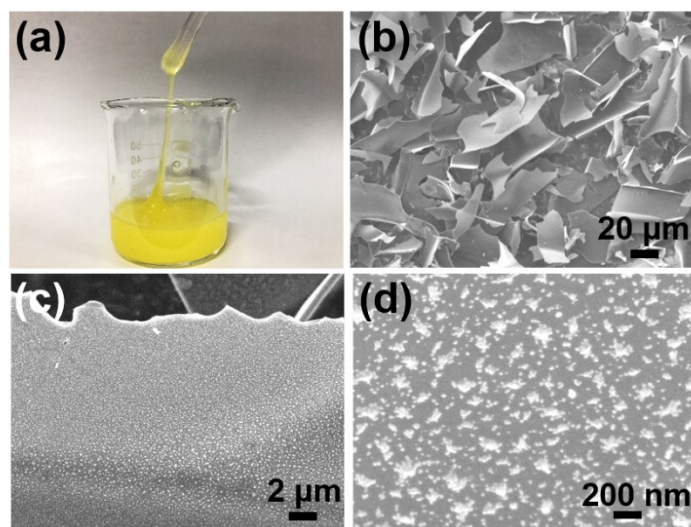
**Fig. S1** (a, b) Digital photos, (c) SEM image of the LVO/C Hs precursor and (d-f) EDS element mappings for V, O and C in the LVO/C Hs precursor.



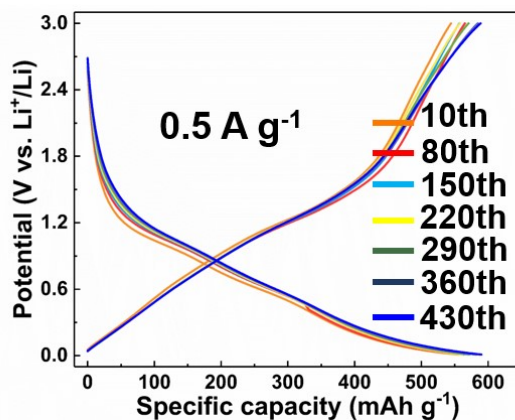
**Fig. S2** (a) TG curve, (b) survey XPS spectrum and (c) high-resolution XPS spectra of N 1s of the LVO/C Hs.



**Fig. S3** Low-magnification SEM image of the LVO/C Hs hybrid.

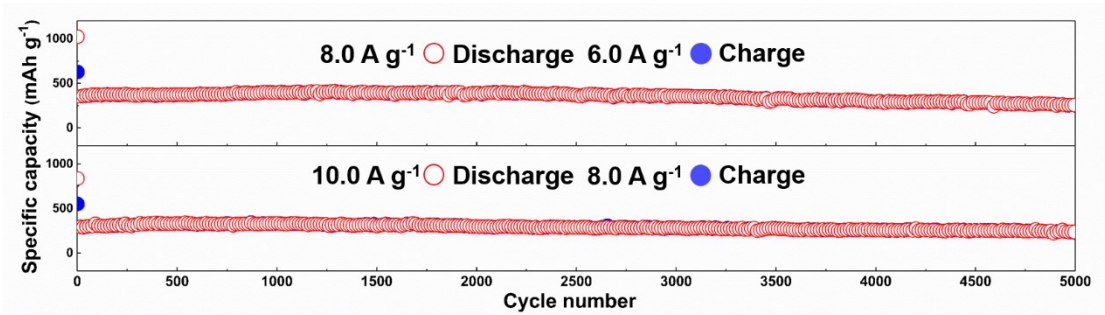


**Fig. S4** (a) Digital photo of the LVO/C NSs precursor solution. (b-d) SEM images of the LVO/C NSs.

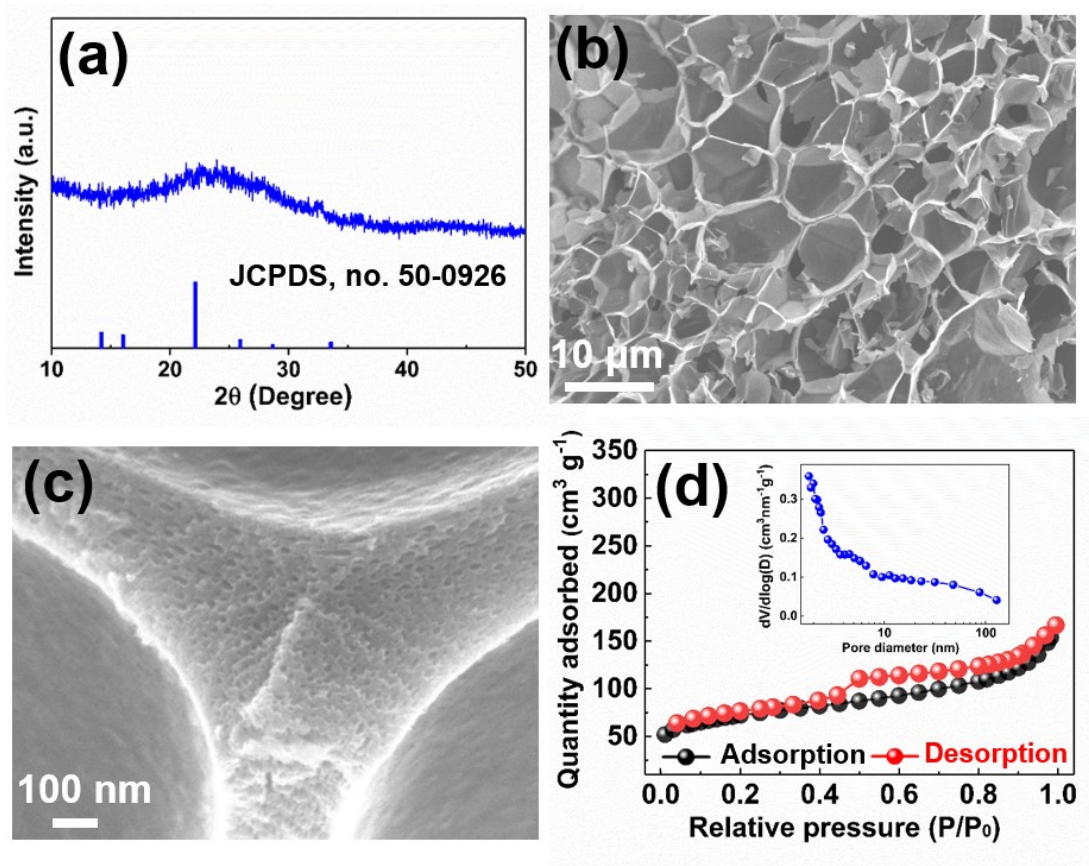


**Fig. S5** Representative charge/discharge curves of the LVO/C Hs electrode at a specific current of  $0.5 \text{ A g}^{-1}$  during the 6 periodic rate tests.

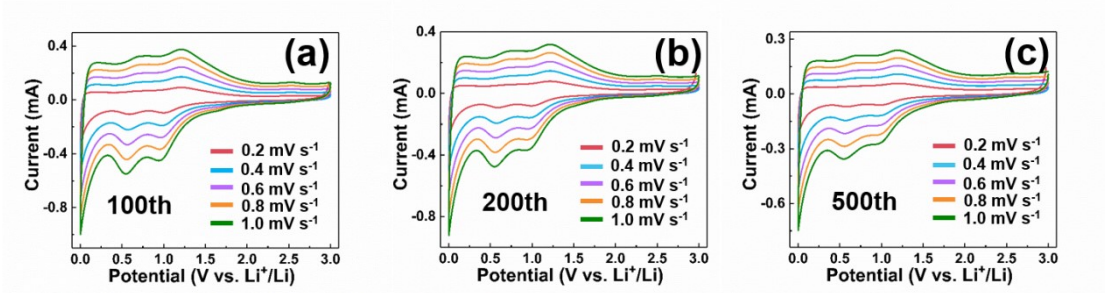




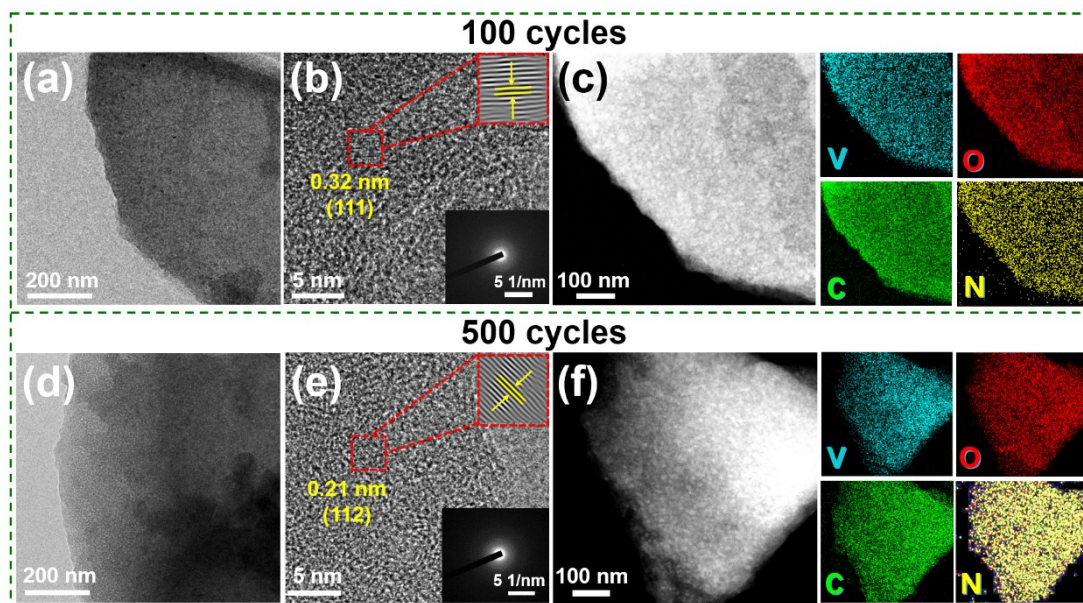
**Fig. S6** Long-term cycling performances at charge/discharge currents of 6.0/8.0 A g<sup>-1</sup> and 8.0/10.0 A g<sup>-1</sup> of the LVO/C Hs electrode.



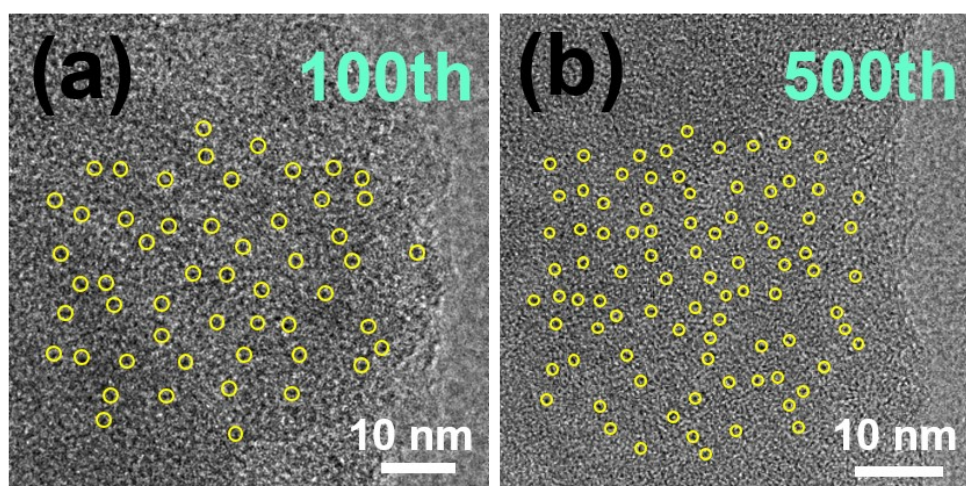
**Fig. S7** (a) XRD pattern, (b, c) SEM images, (d) N<sub>2</sub> adsorption/desorption isotherm and pore size distribution of the C Hs.



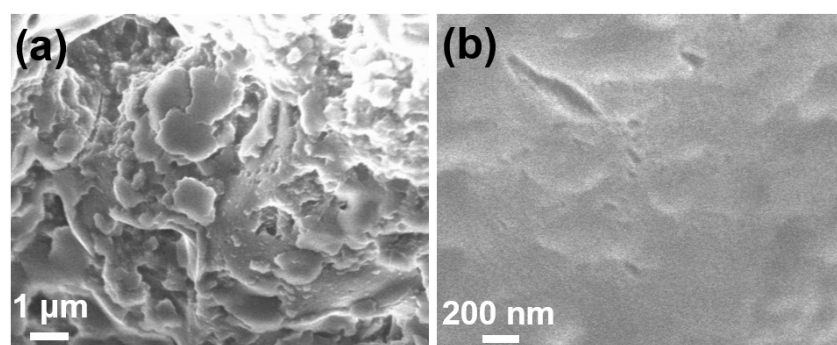
**Fig. S8** (a-c) CV curves of the cycled LVO/C Hs electrode at different scan rates.



**Fig. S9** (a) TEM image, (b) HRTEM image, inverse FFT lattice image and SAED pattern, (c) scanning TEM image and element mapping for V, O, C, N after 100 cycles. (d) TEM image, (e) HRTEM image, inverse FFT lattice image and SAED pattern, (f) scanning TEM image and element mapping for V, O, C, N after 500 cycles.

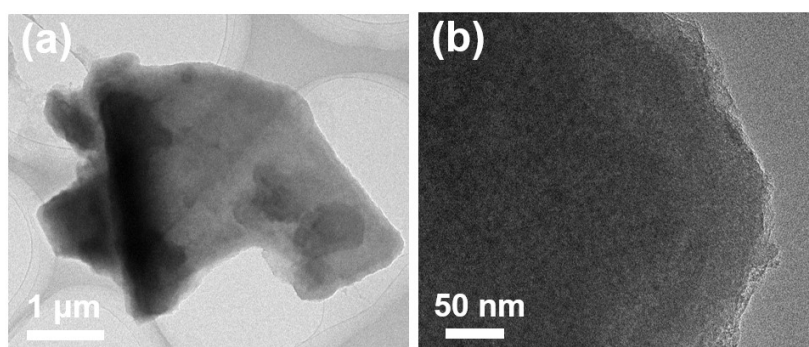


**Fig. S10** HRTEM images of the LVO/C Hs after different cycles.

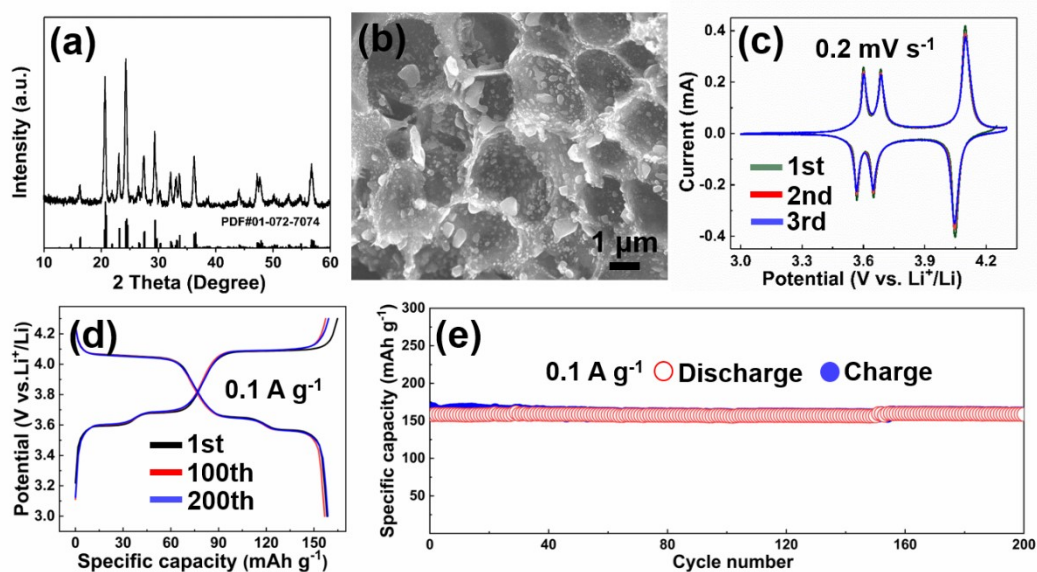


**Fig. S11** (a-b) SEM images of the LVO/C Hs after 4000 cycles.

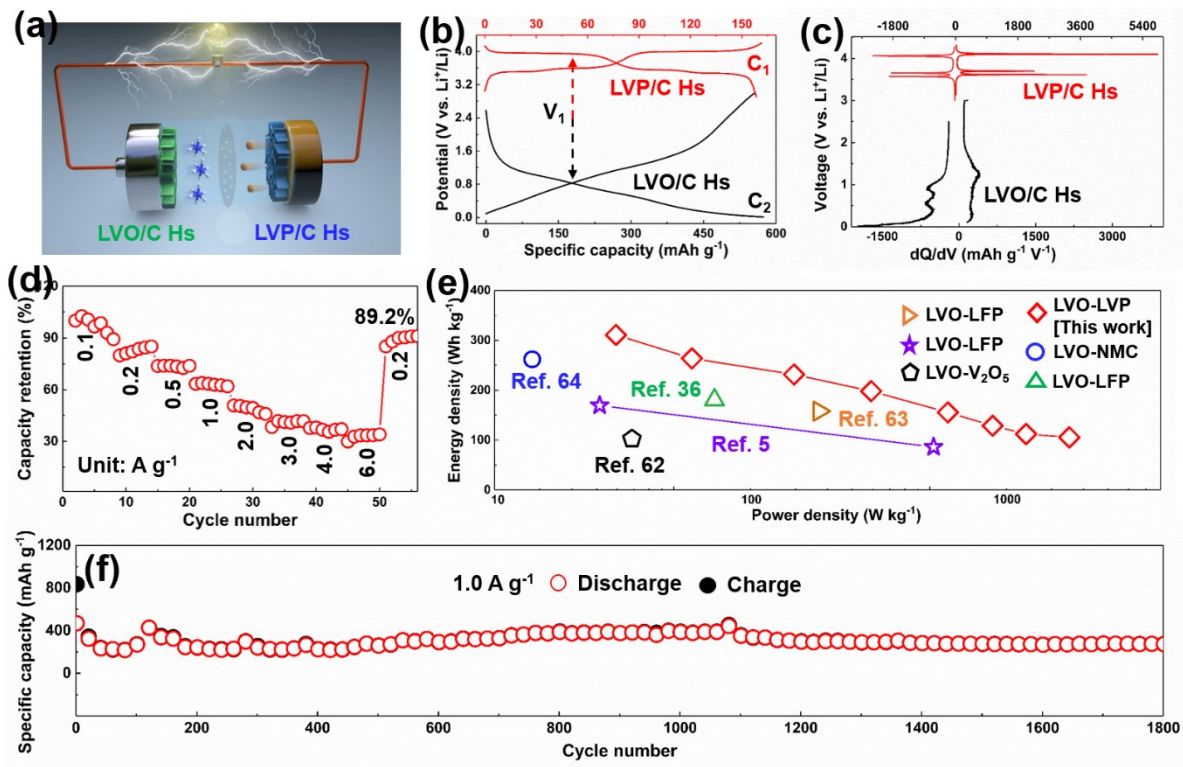




**Fig. S12** (a-b) TEM images of the LVO/C Hs hybrid after 4000 cycles.



**Fig. S13** (a) XRD pattern and (b) SEM image of the LVP/C Hs. (c) The initial three CV curves, (d) representative charge/discharge curves and (e) cycling performance of the LVP/C Hs electrode.



**Fig. S14** Electrochemical properties of the LVO/C Hs//LVP/C Hs full cell. (a) Schematic diagram of the full cell. (b) Representative charge/discharge profiles of the LVO/C Hs anode and LVP/C Hs cathode. (c) dQ/dV curves of the LVO/C Hs and LVP/C Hs electrodes. (d) Rate property. (e) Comparison of the energy density and power density with the reported LVO-based full cell. (f) Cycling performance at 1.0 A g<sup>-1</sup>.