Appendix. Supplementary materials

Multifunctional integrated VN/V_2O_5 heterostructure sulfur hosts for advanced lithium-sulfur batteries

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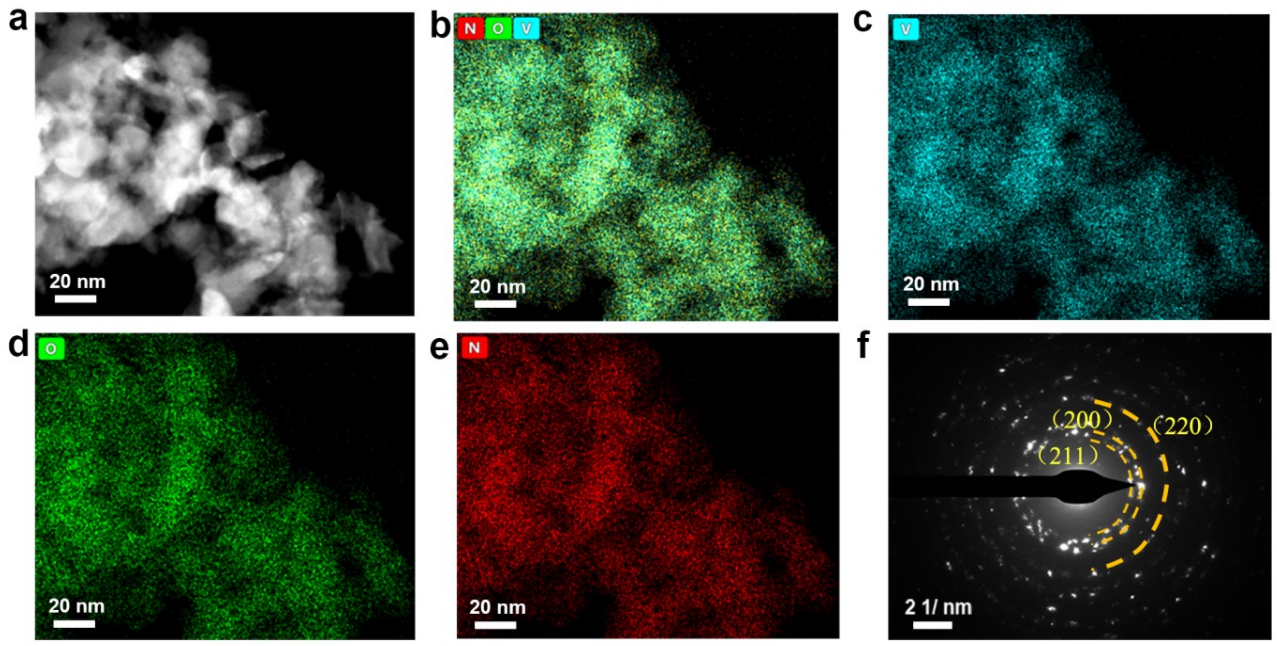

Figure S1. (a-e) HAADF-TEM image and corresponding EELS elemental mapping of VN/V_2O_5 sample, (f) SAED pattern and corresponding V_2O_5 (211), VN (200) and VN (220) crystal plane of VN/V_2O_5 sample.

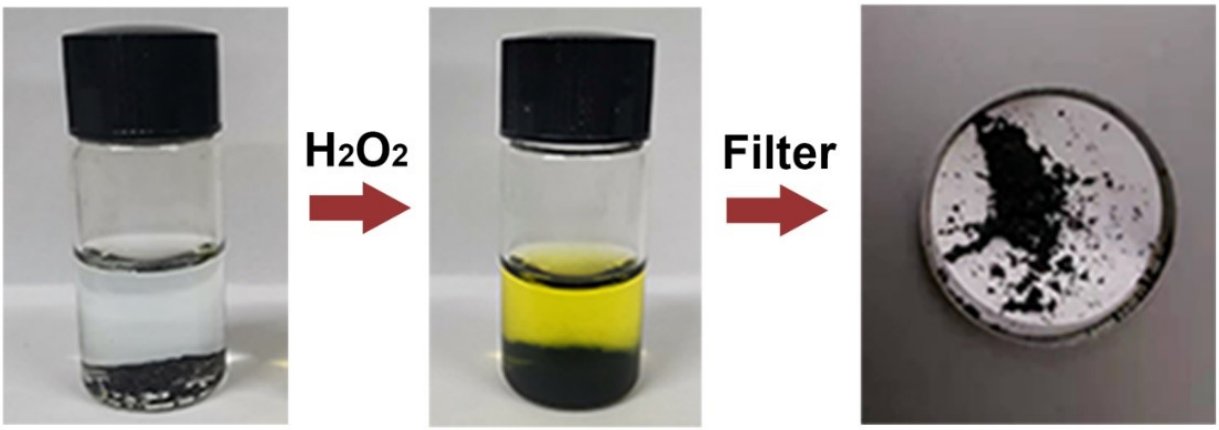

Figure S2. Digital photograph showing the V_2O_5 dissolution test by 5% H_2O_2 treatment. Form the dissolution test result, the actual VN content is ~23.4 wt%.

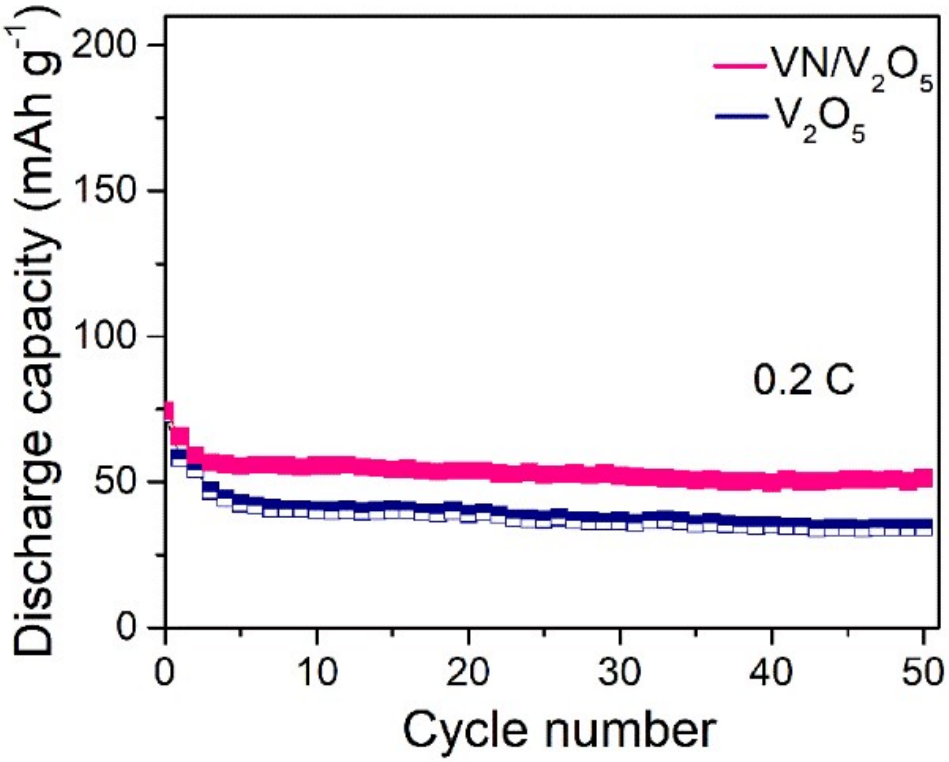

Figure S3. Cyclic performance of VN/V_2O_5 and V_2O_5 cathodes without sulfur loading.

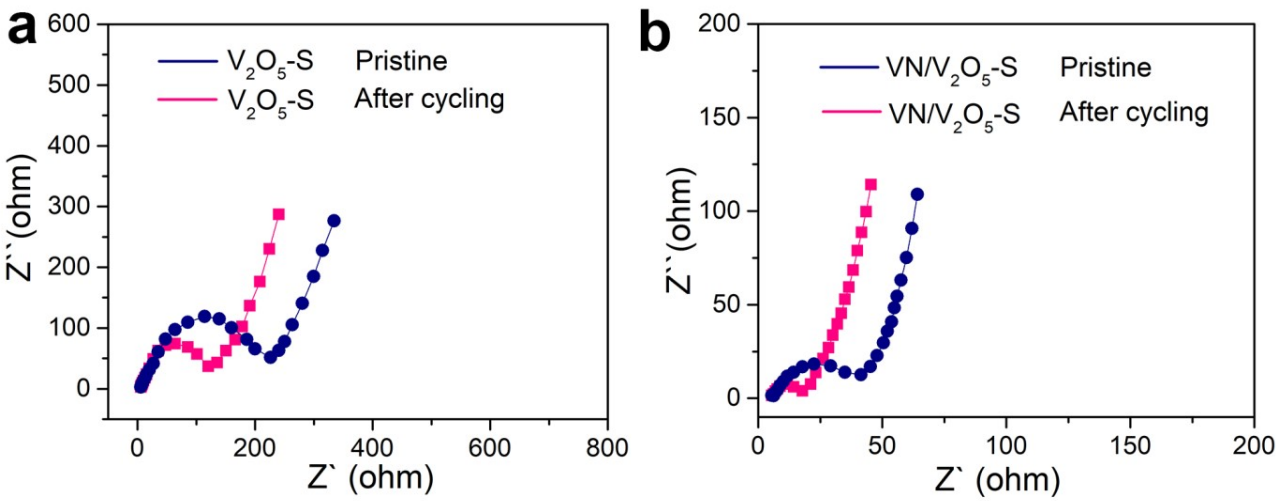

Figure S4. EIS curves of (a) V_2O_5-S and (b) VN/V_2O_5-S cathodes before/after cycling.

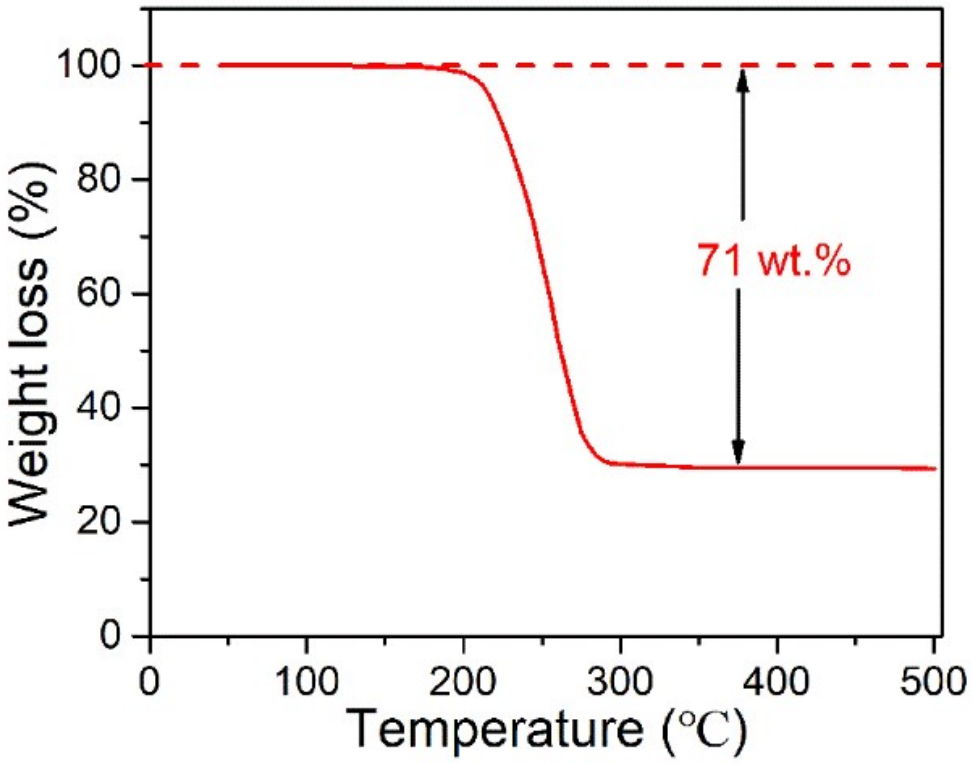

Figure S5. TGA curve of VN/V_2O_5-S in N_2 atmosphere heated from room temperature to 500 °C with the ramping rate of 10 °C min^{-1}.

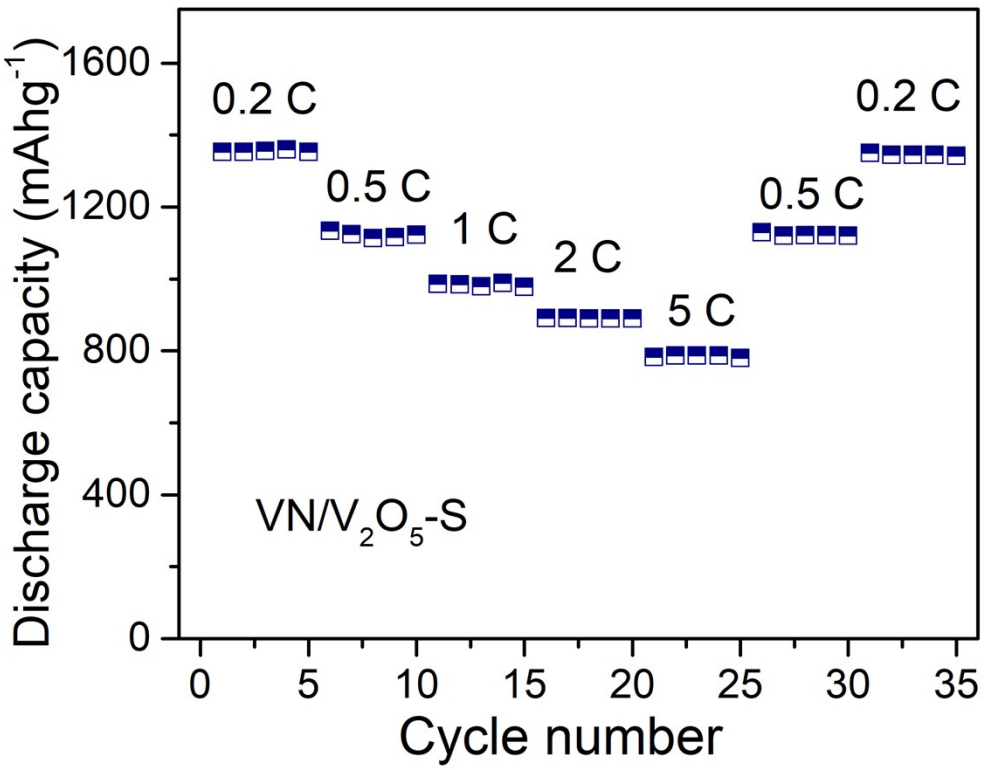

Figure S6. GDC profiles of the high sulfur loading VN/V_2O_5-S cathode at various rates.

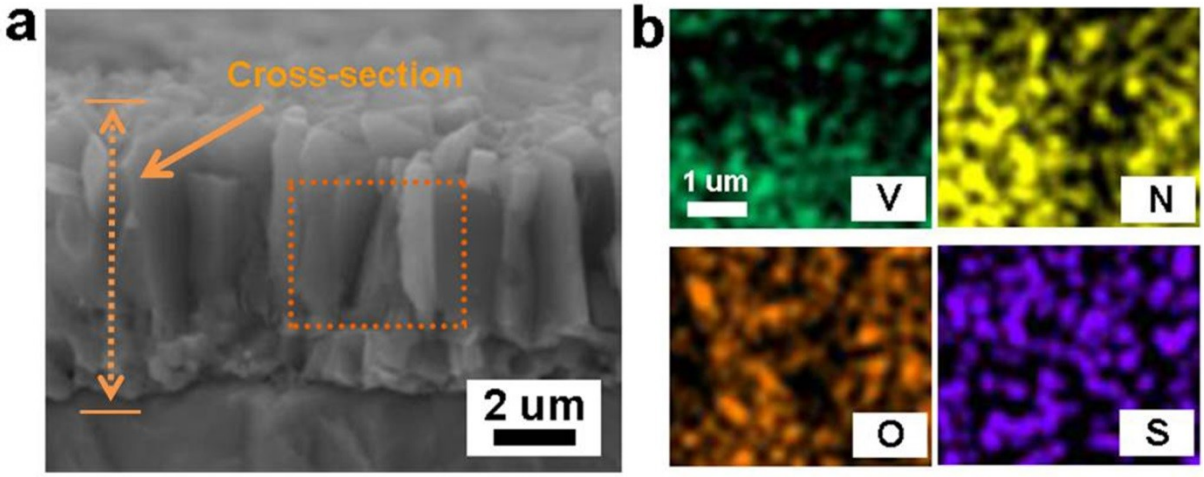

Figure S7. (a) Cross-sectional SEM image of VN/V_2O_5-S cathode, and (b) corresponding element mapping images.