Electronic Supplementary Information

LiV_3O_8 as an Intercalation-type Cathode for Aqueous Aluminum-Ion Batteries†

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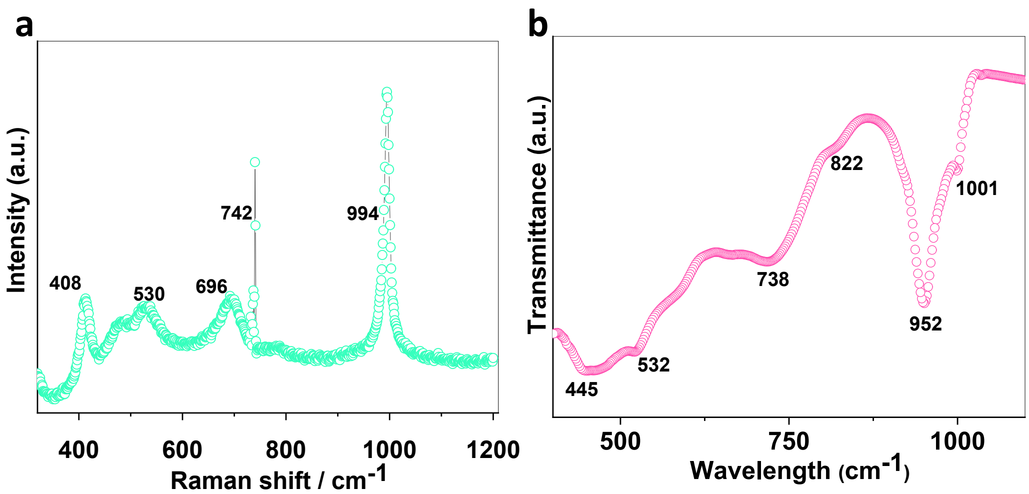

Fig. S1 (a) Raman profile of LVO cathode and (b) FTIR output of LVO cathode.

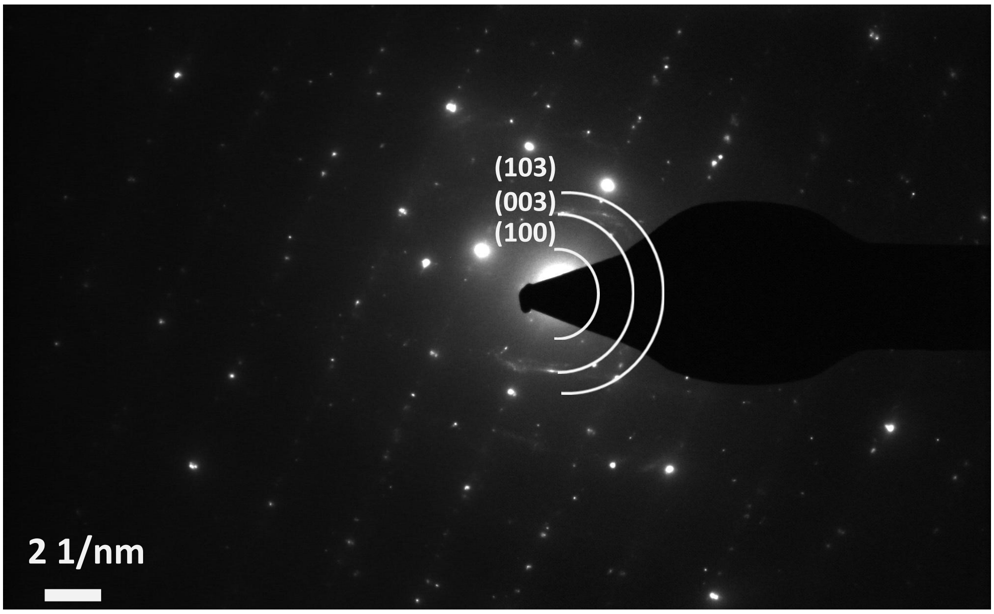

Fig. S2 SAED pattern of LVO sample.

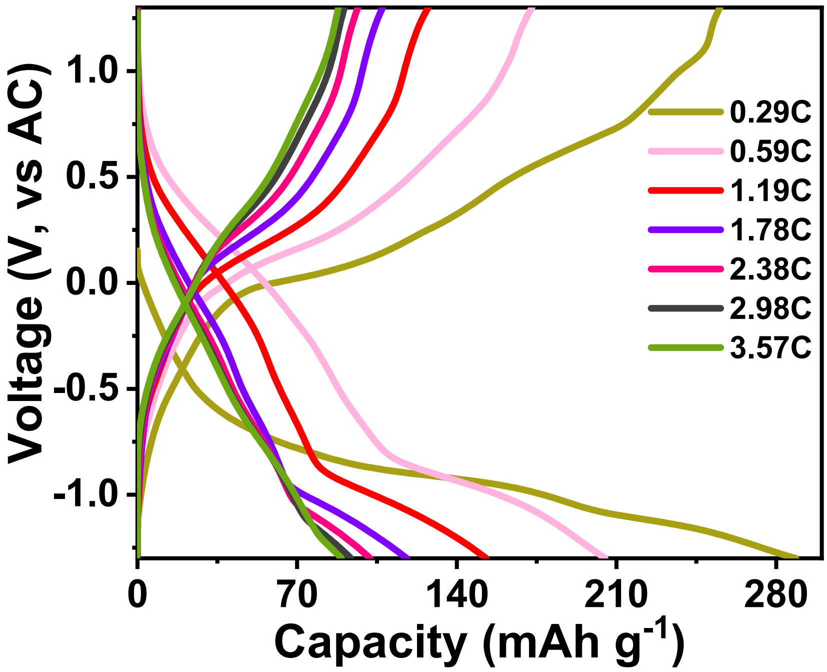

Fig. S3 Selected charge/discharge profile of LVO cathode at different C rates.

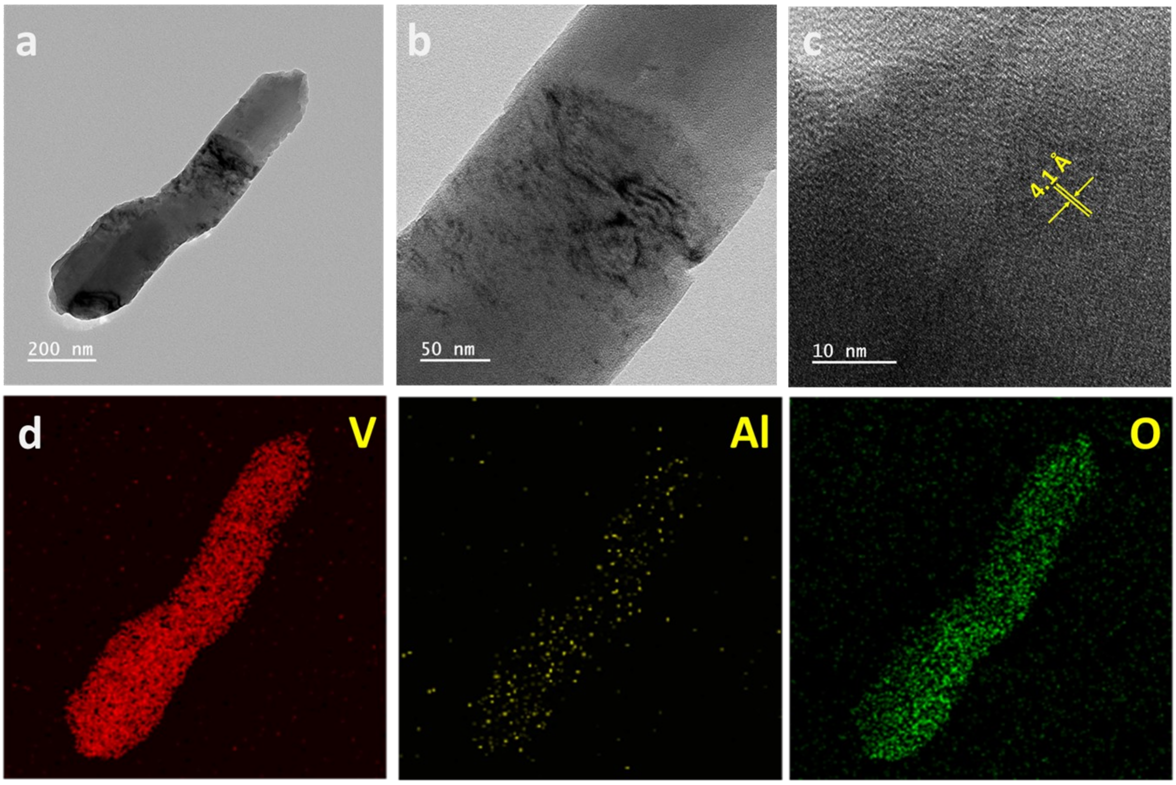

Fig. S4 Ex situ TEM analysis of LVO cathode after the 1st discharge process.

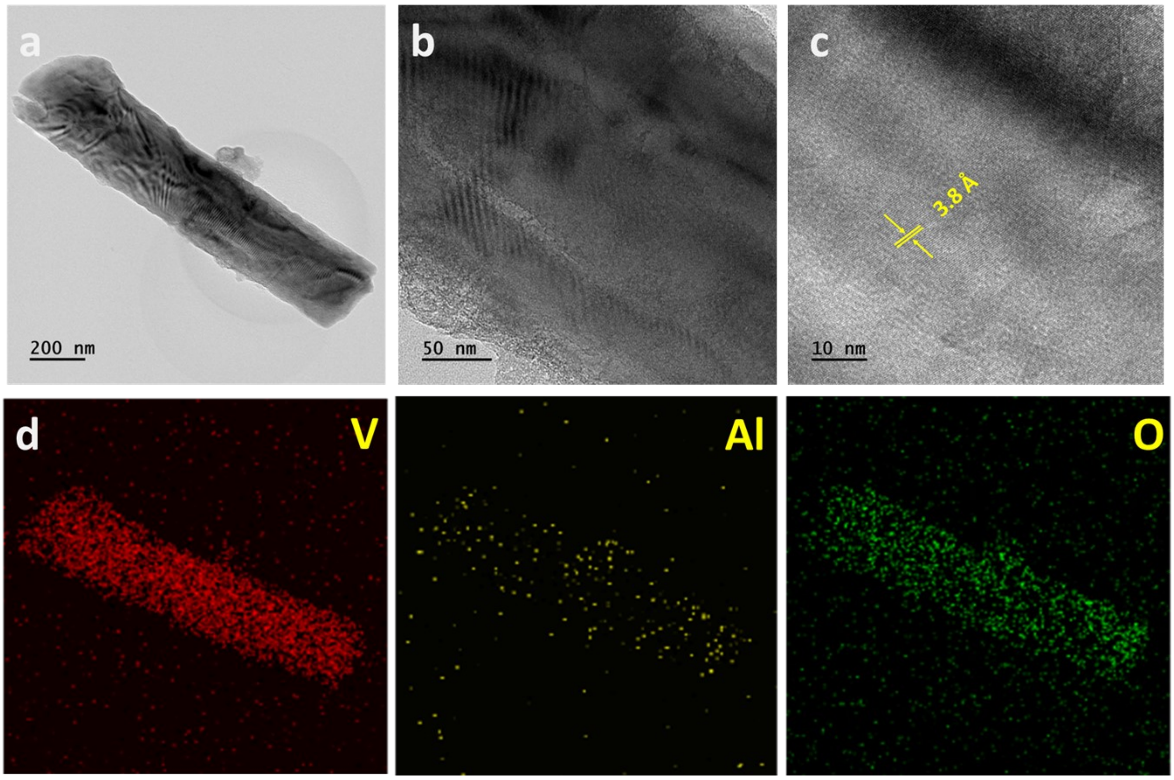

Fig. S5 Ex situ TEM analysis of LVO cathode after the 1st charge process.

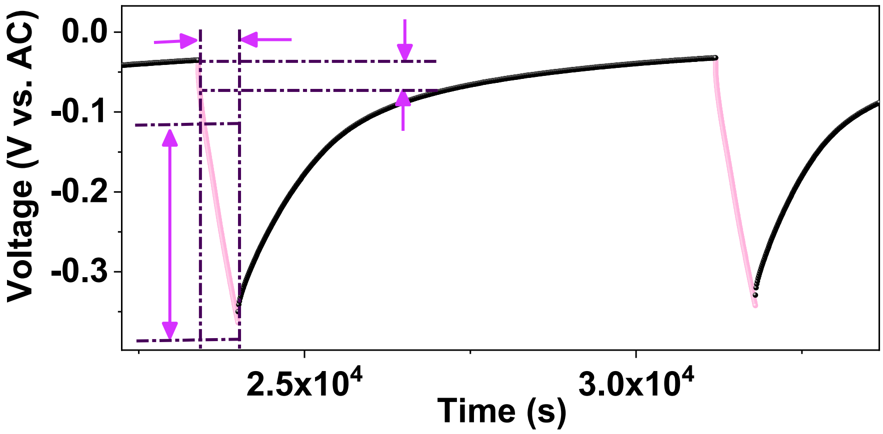

Fig. S6 The plot of single-stage GITT output for the 1st discharge curve.

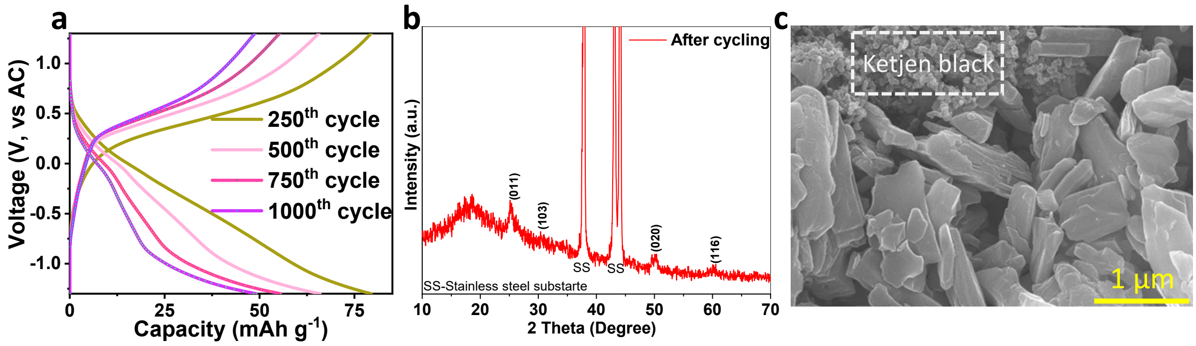

Fig. S7 (a) Galvanostatic charge/discharge profile at 3.57C, Post-mortem outputs of the LVO cathode at 3.57C after 1000 cycles (b) ex-situ XRD profile, and (c) ex-situ SEM images.

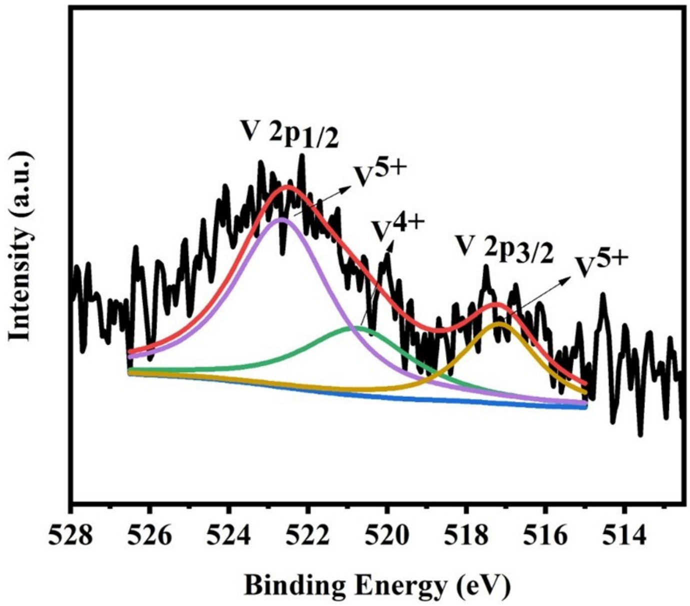

Fig. S8 Ex-situ XPS analysis of LVO cathode after the 1000^{th} cycle.

Table. S1 Comparison of vanadium-based cathodes established for AAIBs.

S.No	Cathode	Counter/ Reference electrode	Electrolyte	Reversible capacity/ Current density	Cycle number/ capacity retention
1	$VOPO_4.2H_2O$[1]	Aluminium foil	$Al(CF_3SO_3)_3$	125.4 mAh g^{-1}/20 mA g^{-1}	40/ 60%
2	$VOPO_4$[2]	Pt sheet / Ag/AgCl	$Al(NO_3)_3$	80.1 mAh g^{-1}/1 A g^{-1}	2800/86.2%
3	$FeVO_4$[3]	Carbon paper/ Ag/AgCl	$AlCl_3$	350 mAh g^{-1}/60 mA g^{-1}	1
4	VO_2-B[4]	Graphite paper/ Ag/AgCl	$Al(TOf)_3$	234 mAh g^{-1}/150 mA g^{-1}	1000/77.2%
5	VO_2[5]	Carbon rod / saturated calomel electrode (SCE)	$Al(TOf)_3$	235 mAh g^{-1}/200 mA g^{-1}	200/32%
6	V_2O_5[6]	Aluminum foil	$Al(TOf)_3$	200 mAh g^{-1}/40 mA g^{-1}	50/60%
7	LiV_3O_8 (This work)	Activated Carbon (AC)	$Al(CF_3SO_3)_3$	147 mAh g^{-1}/ 0.57C or 0.5 A g^{-1}	500/77.3%

Reference

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