

Electronic Supplementary Information

A Rechargeable Aluminum-Ion Battery Based on VS_2 Nanosheets

Cathode

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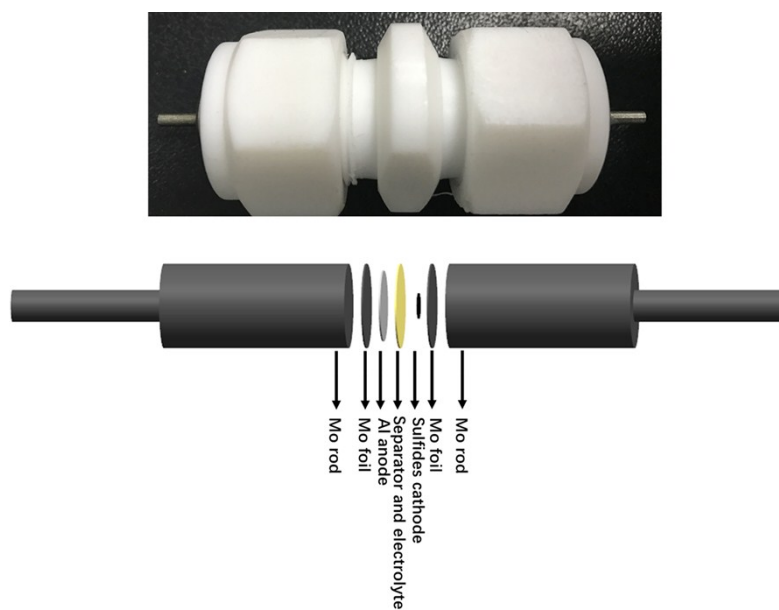


Fig. S1 Schematic of Swagelok-type cell used in this study.

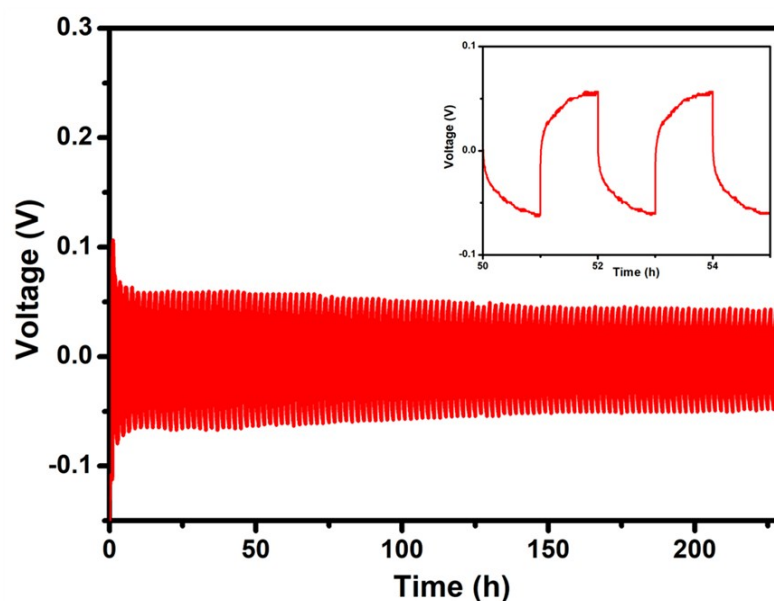


Fig. S2 The voltage-time curves of Al|AlCl₃: [EMIM]Cl=1.3|Al cell in galvanostatic charge/discharge test.

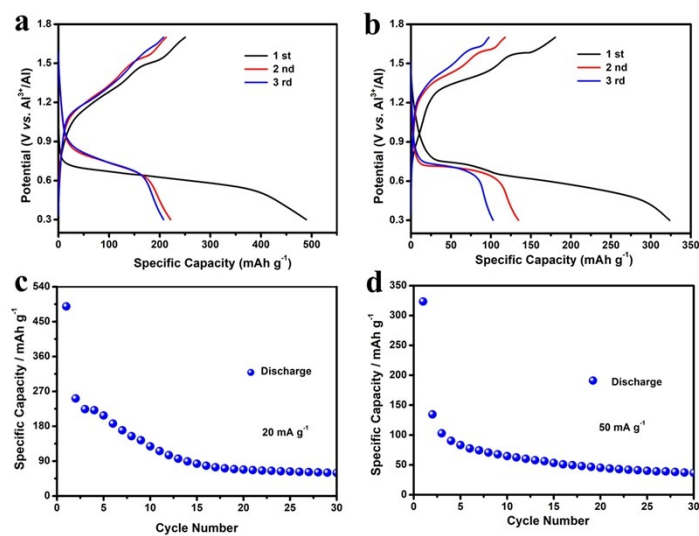


Fig. S3 (a-b) The charge-discharge curves of G-VS₂ at 20 and 50 mA g⁻¹ in the first three cycles, respectively, (c-d) Cycling performance of G-VS₂ at 20 and 50 mA g⁻¹, respectively.

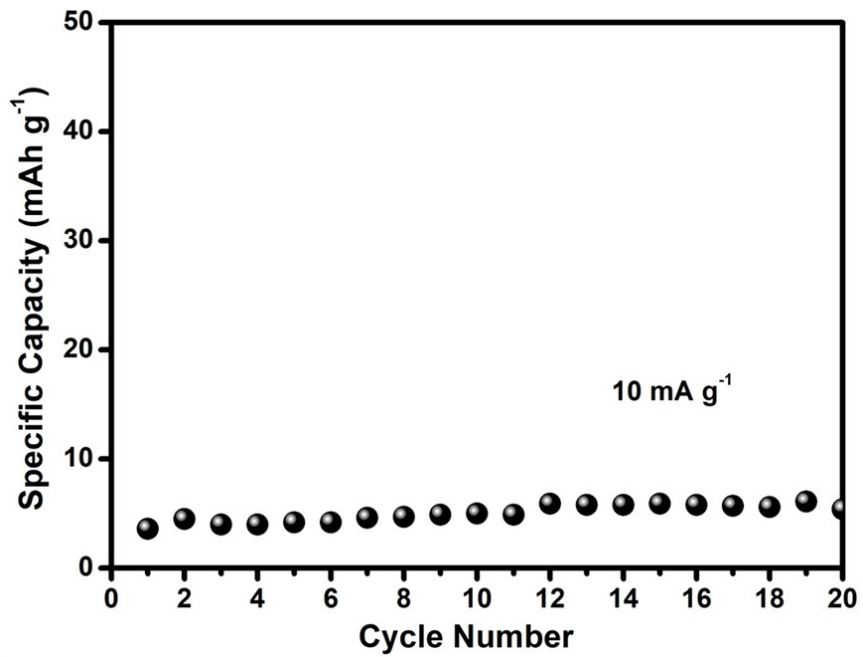


Fig. S4 Cycling performance of GO at 10 mA g⁻¹

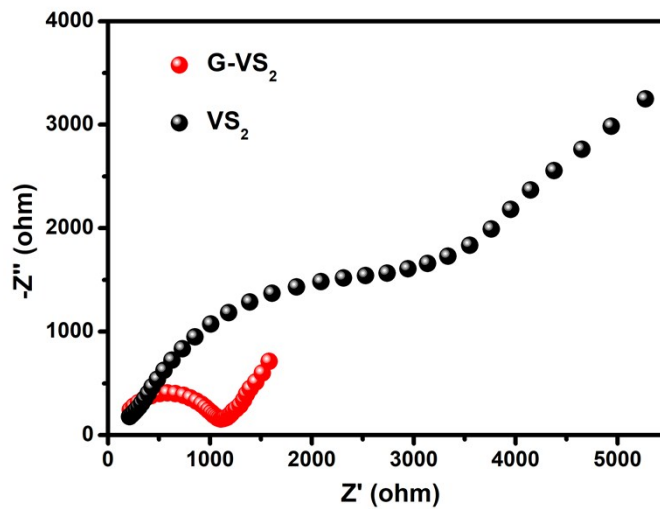
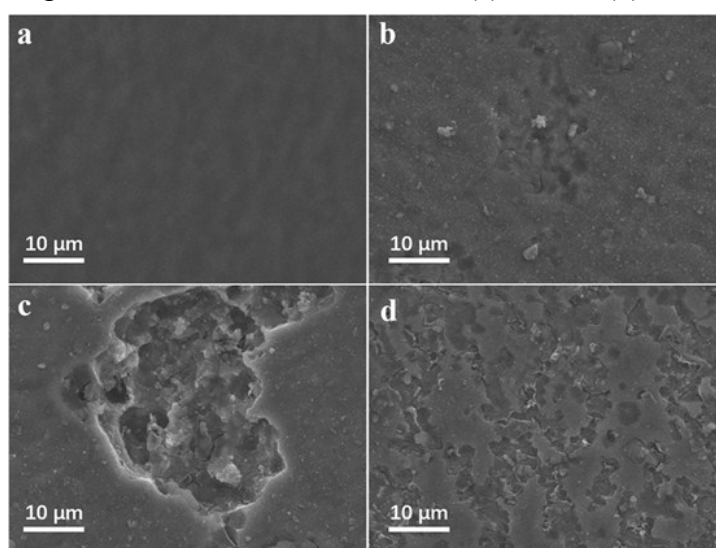


Fig. S5 EIS spectra of VS₂ and G-VS₂

Fig. S6 SEM images of Al foil at different states. (a) Initial, (b) Discharged to 0.3 V,



(c) Charged to 1.7 V, (d) After 50 cycles.

Fig. S7 HRTEM image of the fully charged electrode.

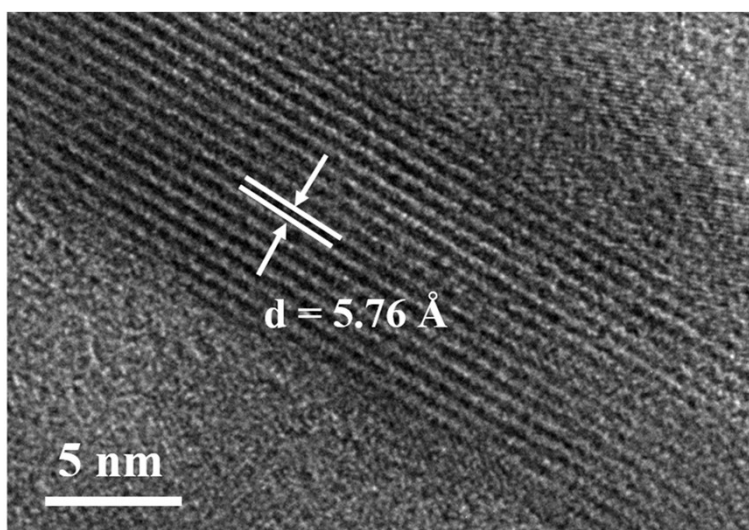


Table S1. Elemental analysis for C, H, N and S of G-VS₂.

Element	C	H	N	S
Weight Ratio (wt%)	6.320	0.415	0.960	43.778

Table S2. Comparison of Al-ion storage capacity of layered TMDs materials to the state-of-the-art reported transition metal sulfide in AIBs.

Number	Cathode	Discharge capacity (mAh g ⁻¹)	Discharge voltage (V)	Ref
1	G-VS ₂	493	0.70	This work
2	Ni ₃ S ₂	350	1.00	1
3	NiS	104.7	0.90	2
4	CuS@C	214.6	0.80	3
5	SnS ₂	392	0.70	4
6	Co ₉ S ₈	315	0.95	5
7	MoS ₂	253.8	0.80	6
8	Mo ₆ S ₈	148	0.50/0.36	7
9	TiS ₂	80	0.60	8
10	VS ₄	491.5	0.85	9

Reference

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