

Electronic Supplementary Information for
**Semimetallic Vanadium Molybdenum Sulfide For High-
Performance Battery Electrodes**

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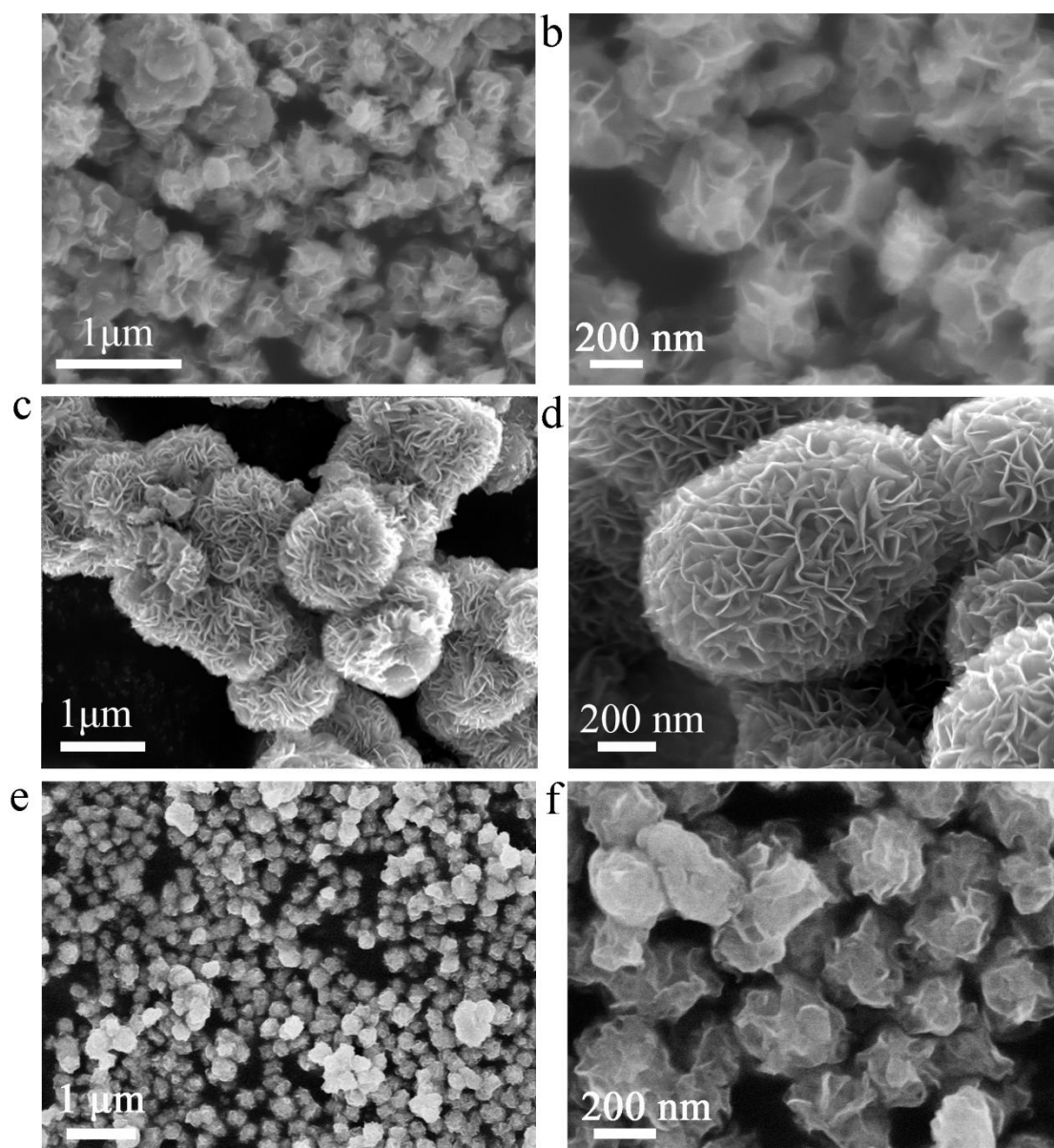


Fig. S1. SEM images of (a-b) Cr-Mo-S NF, (c-d) Co-Mo-S NF and (e-f) pure MoS₂

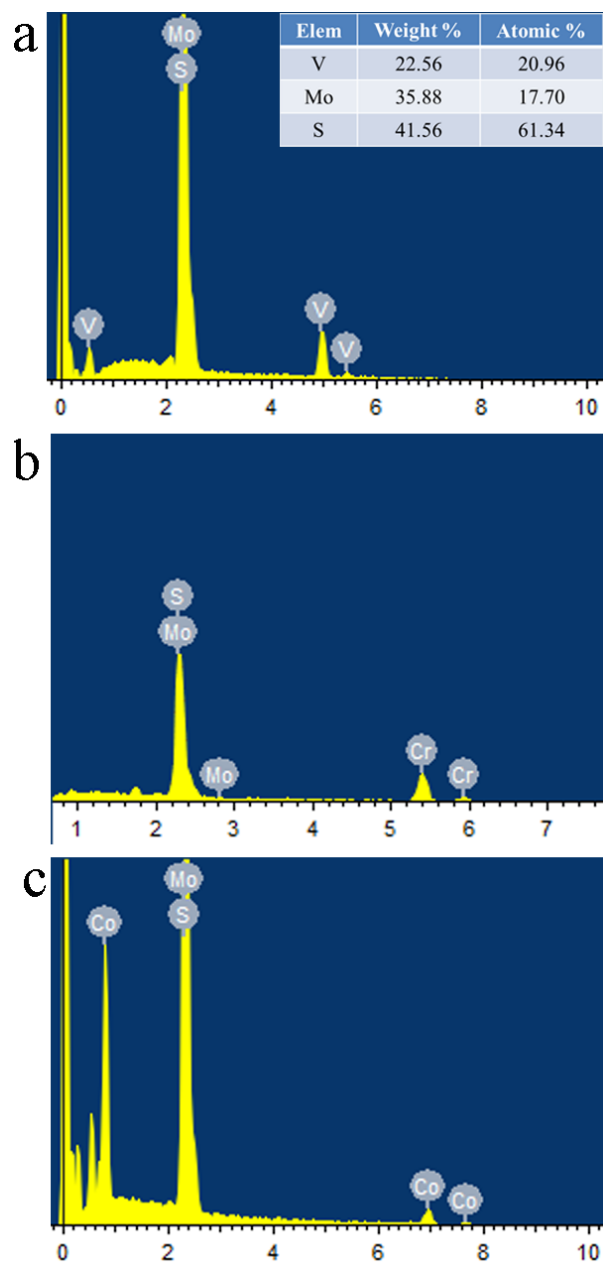


Fig. S2. EDS of (a) V-Mo-S NA, (b) Cr-Mo-S NF and (c) Co-Mo-S NF

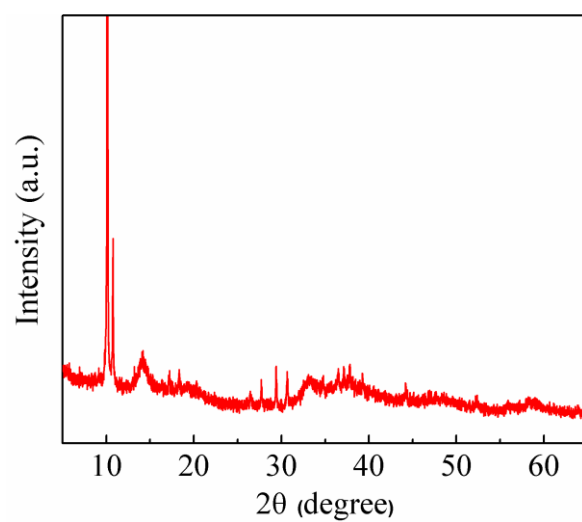


Fig. S3. XRD patterns of Cr-Mo-S NF

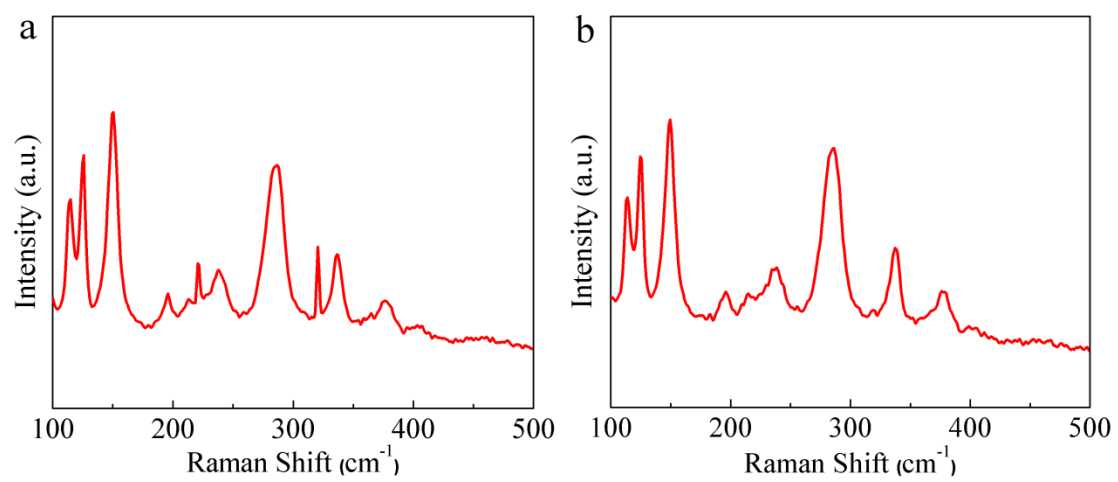


Fig. S4. Raman spectra of (a) V-Mo-S NA (b) Cr-Mo-S NF.

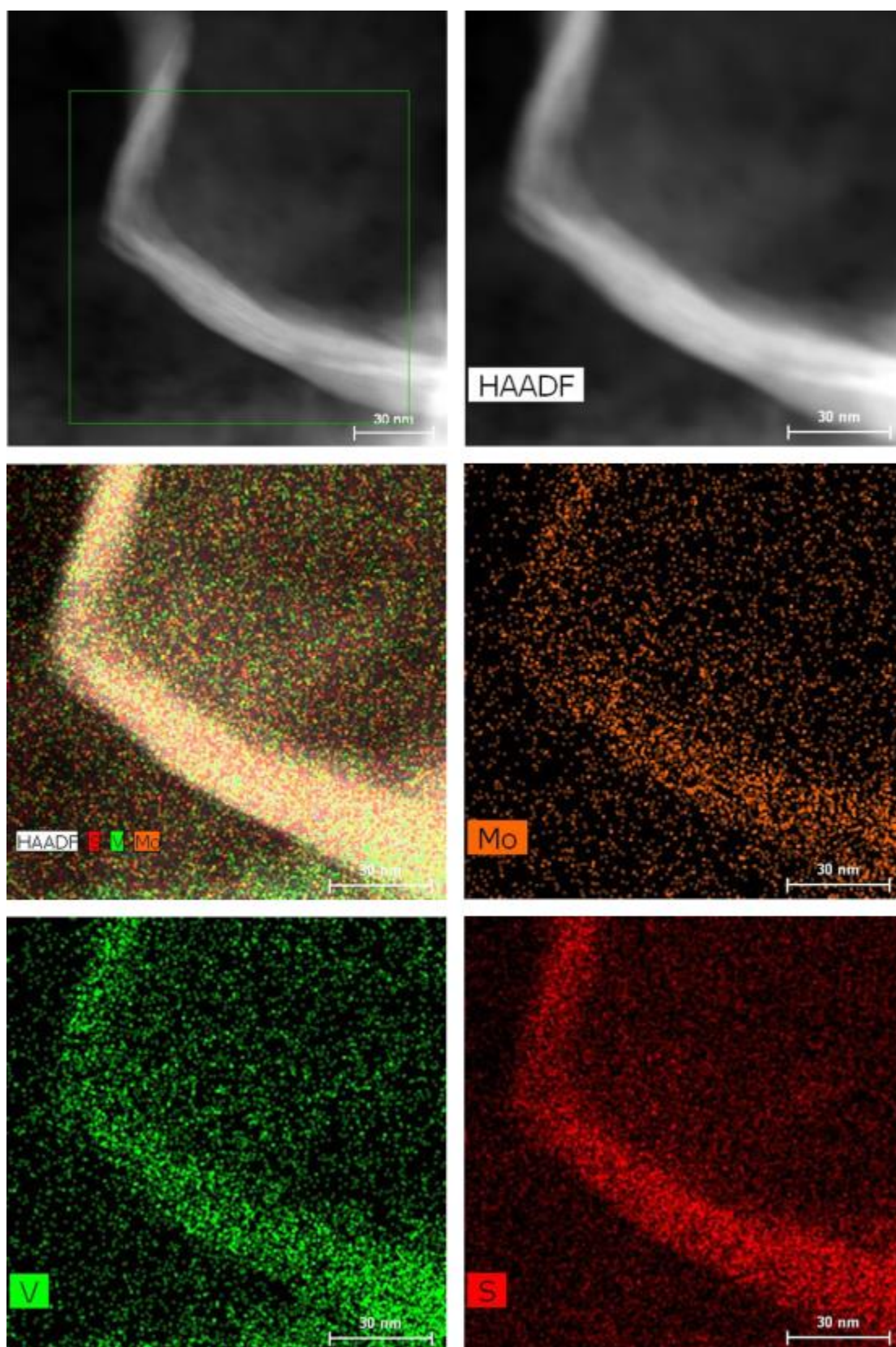


Fig. S5. STEM image of V-Mo-S NA sample and the corresponding EDX mapping images of Mo, V and S elements.

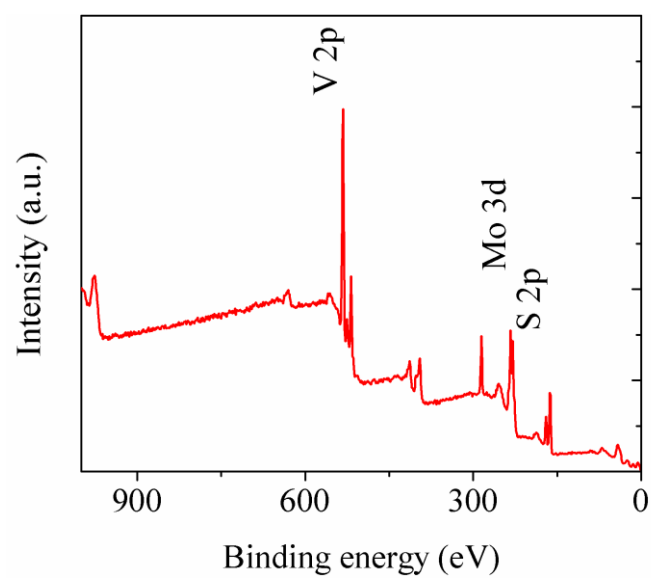


Fig. S6. Survey XPS spectrum of V-Mo-S NA.

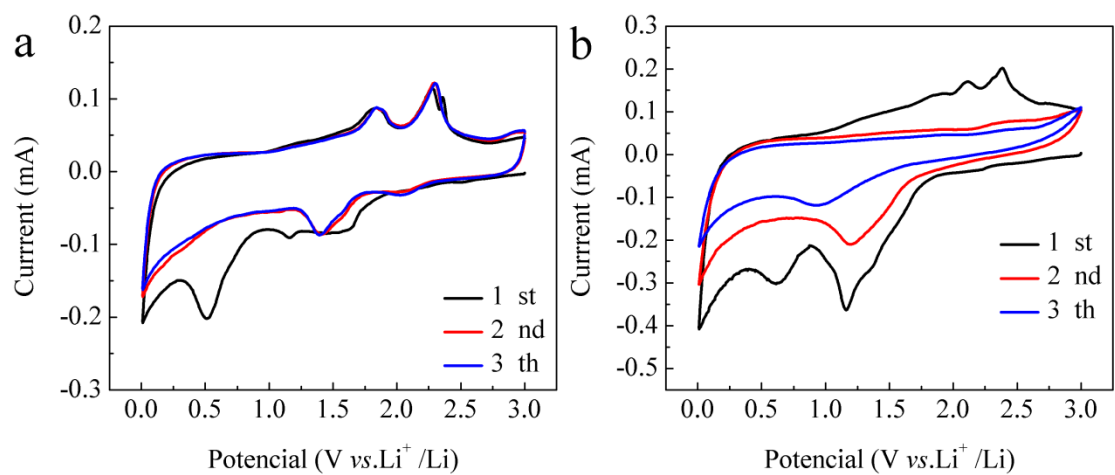


Fig. S7. CV curves of (a) Cr-Mo-S NF and (b) Co-Mo-S NF in the voltage range of 0.01–3 V with a scan rate of 0.2 mV s⁻¹.

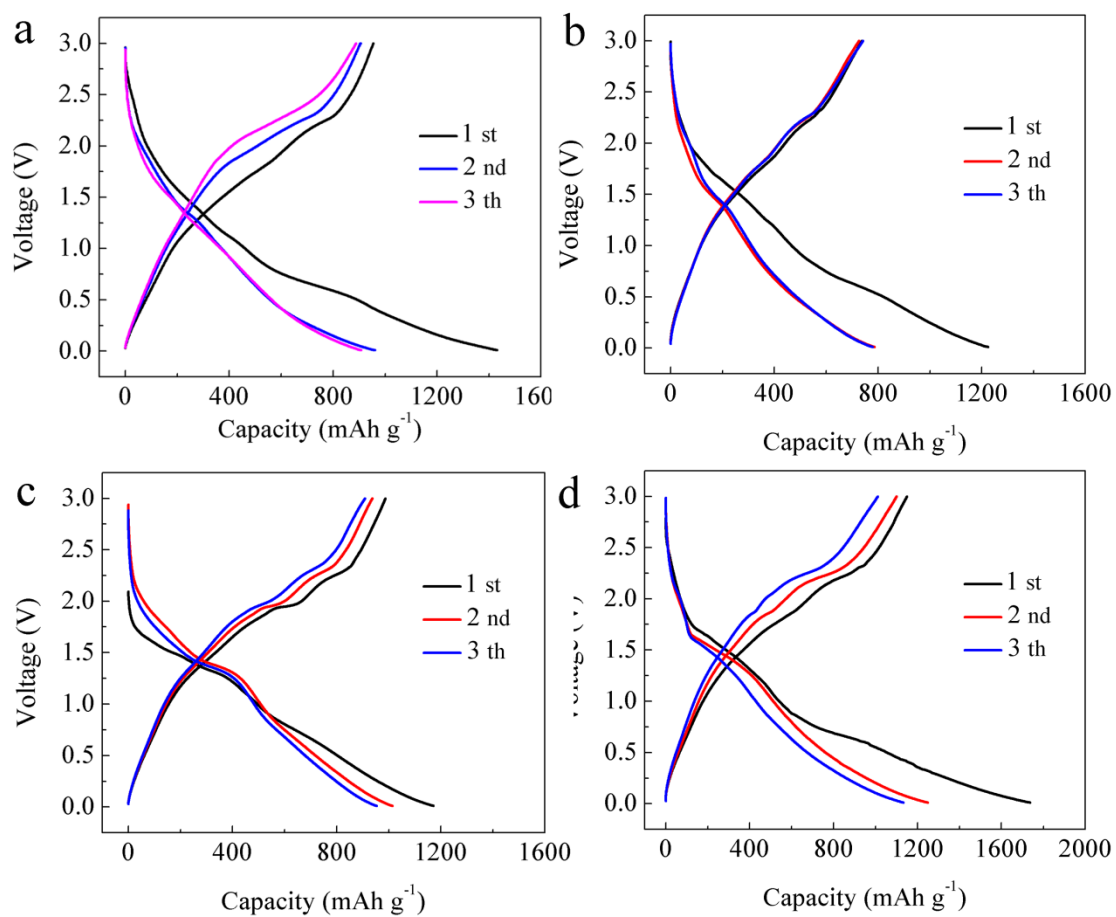


Fig. S8. Galvanostatic charge–discharge curves of (a) V-Mo-S NA, (b) Cr-Mo-S NF, (c) Co-Mo-S NF and (d) pure MoS_2 at a current density of 100 mA g^{-1} .

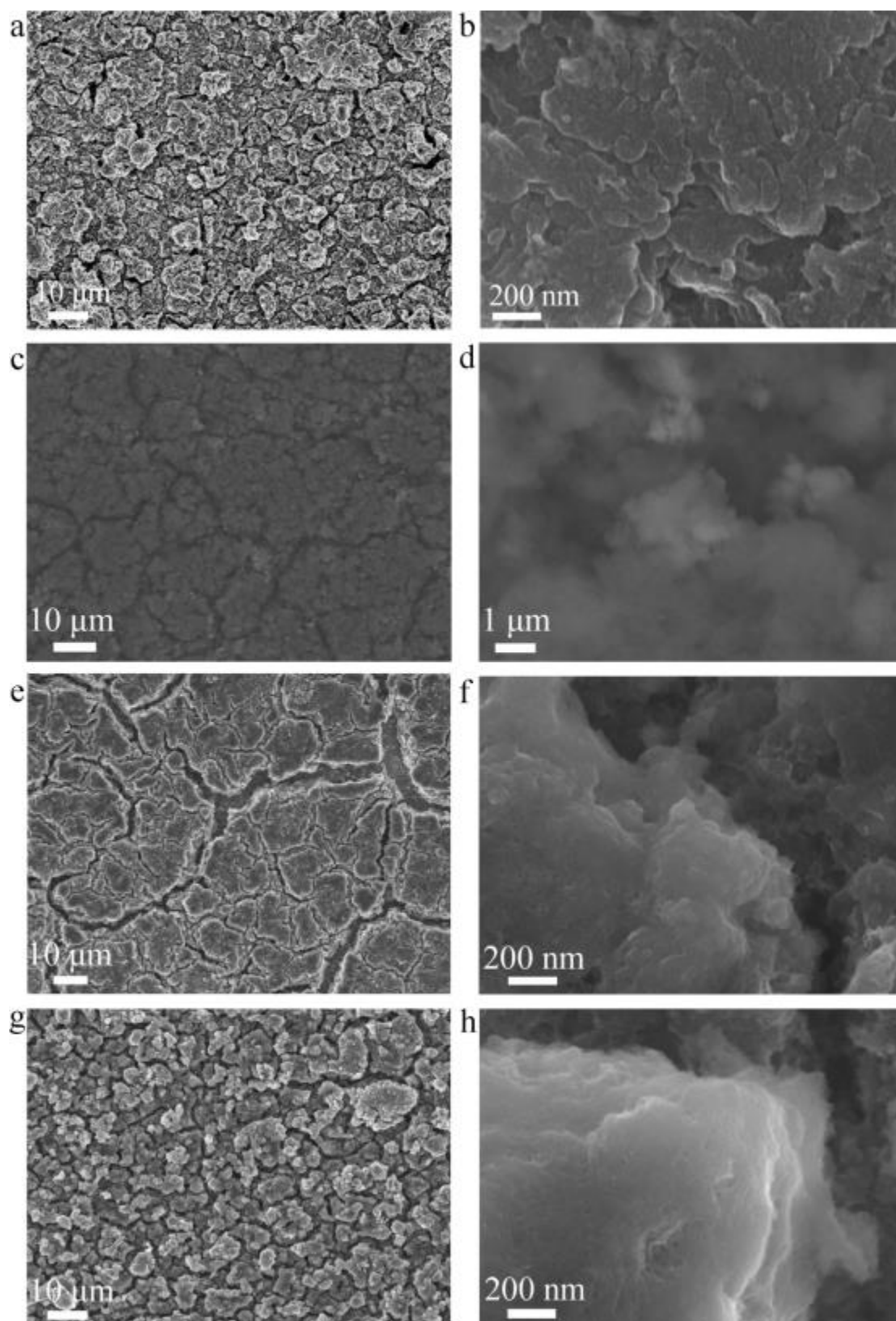


Fig. S9. SEM images of (a and b) V-Mo-S NA, (c and d) Cr-Mo-S NF, (e and f) Co-Mo-S NF and (g and h) pure MoS₂ electrodes after 200 cycles at 1000 mA g⁻¹.

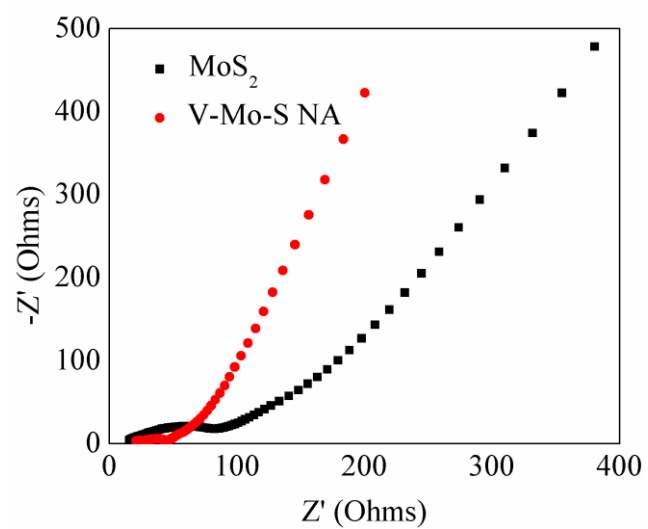


Fig. S10. Nyquist plots of the AC impedance spectra for the electrodes of V-Mo-S NA and pure MoS_2 after 200 cycles.

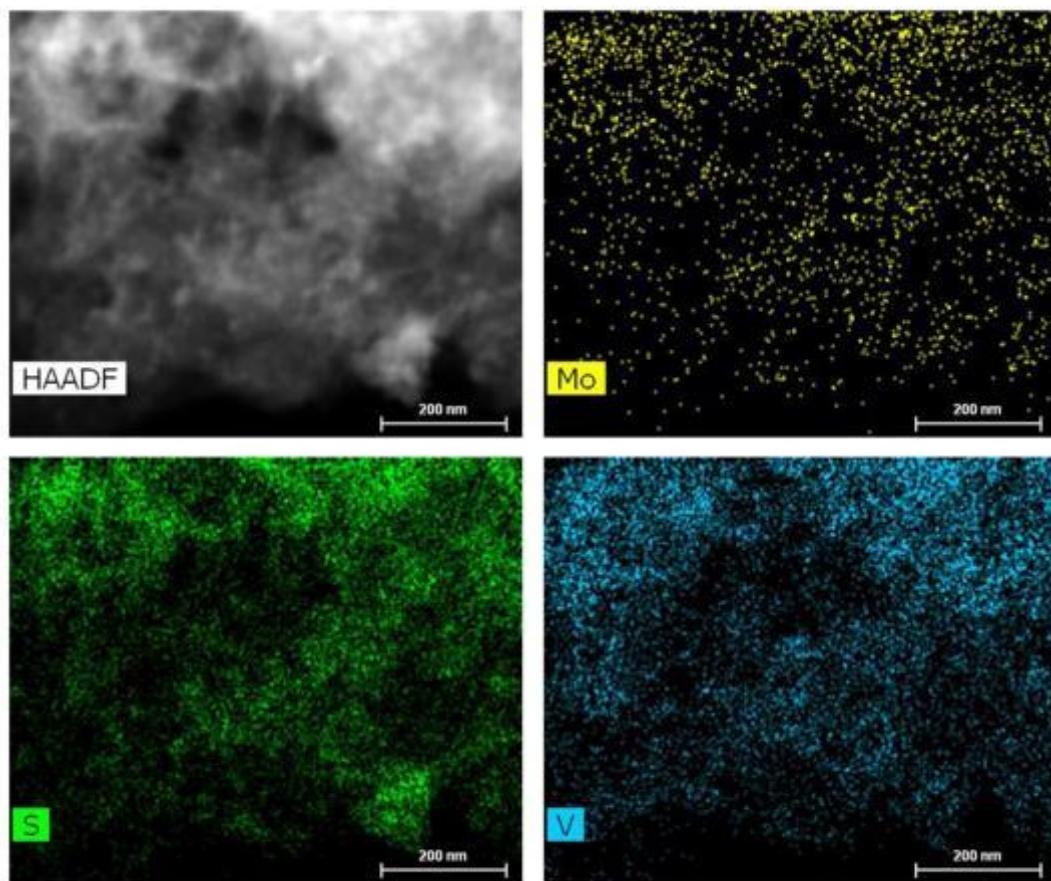


Fig. S11. STEM image of V-Mo-S NA sample and the corresponding EDX mapping images of Mo, V and S elements after 200 cycles at 1000 mA g^{-1} .

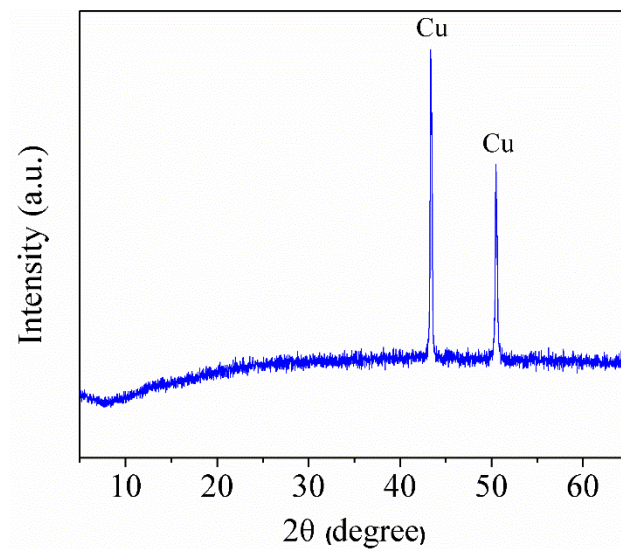


Fig. S12 XRD patterns of V-Mo-S NA after the cycles.

Table S1. Summary of electrochemical performance data of the reported relevant MoS₂ electrode materials.

Materials	Voltage range (V)	Current density (mA g ⁻¹)	Cycle number	Specific capacity (mAh g ⁻¹)	Reference
V-Mo-S NA	0.01-3.0	1000	700	1047	This work
MoS ₂ /TiNb ₂ O ₇	0.01-3.0	1000	200	739	1
Optimized G/UT-TiO ₂ @C/MoS ₂	0.005-3.0	1000	400	648	2
1T-MoS ₂ /CFC	0.01-3.0	1000	140	850	3
Defect-rich MoS ₂ /C/TiO ₂ nanosheet	0.005-3.0	100	100	805	4
MoS ₂ -on-MXene	0.01-3.0	100	100	509	5
MoS ₂ nanotubes	0.01-3.0	100	130	934	6
MoO ₃ @MoS ₂ nanowires	0.01-3.0	100	100	781	7
MoS ₂ nanosheets /graphene	0.01-3.0	1000	400	900	8
mesoporous carbon/MoS ₂	0.01-3.0	100	300	1400	9
MoS ₂ /VGNS	0.01-3.0	200	100	1109	10
MoS ₂ @C Nanotubes	0.01-3.0	500	300	1058.4	11

Supplementary References:

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