Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Oxygen Vacancies of $NiMoO_4$ Nanoneedle on Ni Foam for High-Performance Asymmetric Supercapacitors

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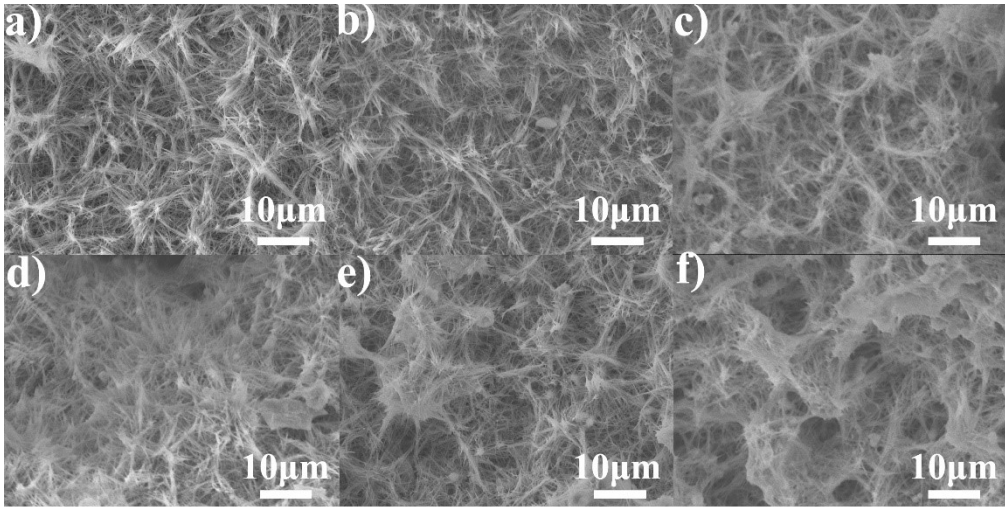

Figure S1. Ov-$NiMoO_4$@NF with different immersion times. a) 2min, b) 3min, c) 5min, d) 8min, e) 10min, f) 15min.

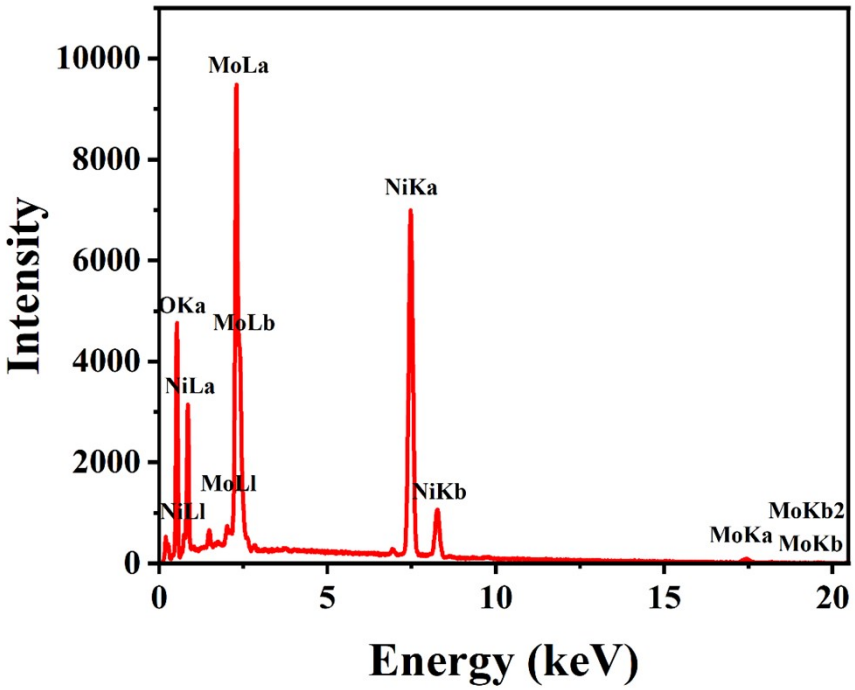

Figure S2. Energy spectrum chart of $NiMoO_4$@NF.

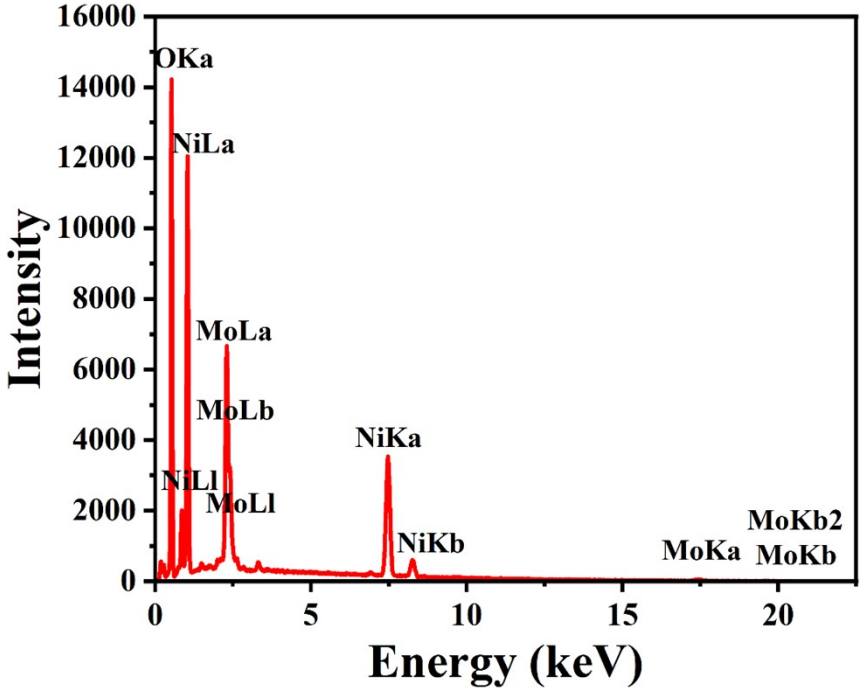

Figure S3. Energy spectrum chart of 5-Ov-$NiMoO_4$@NF

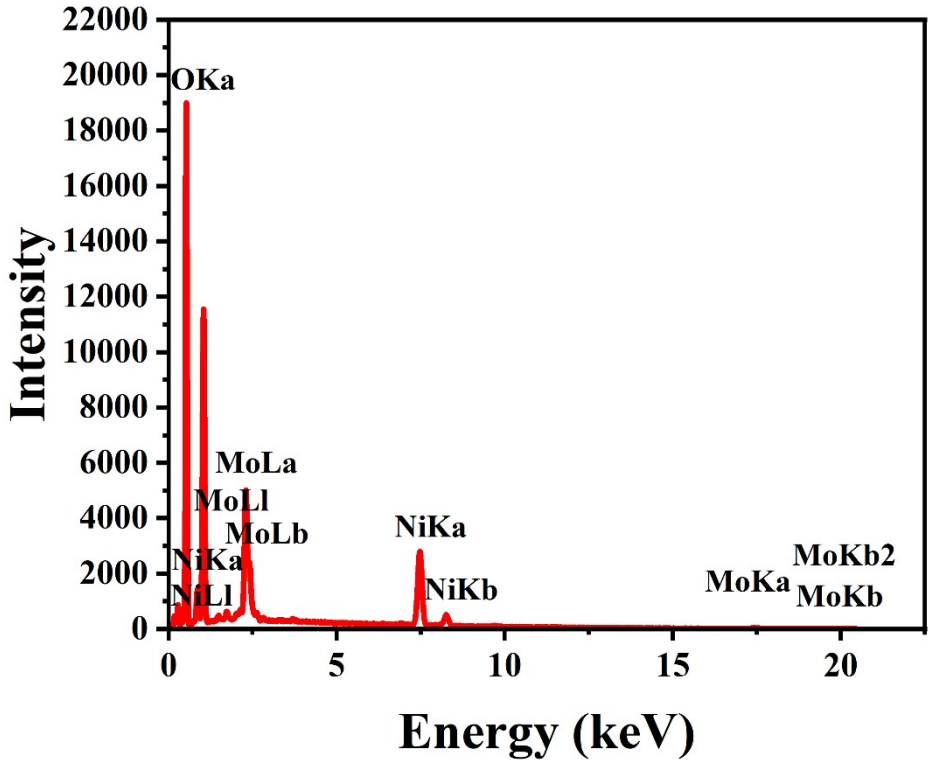

Figure S4. Energy spectrum chart of 15-Ov-$NiMoO_4$@NF

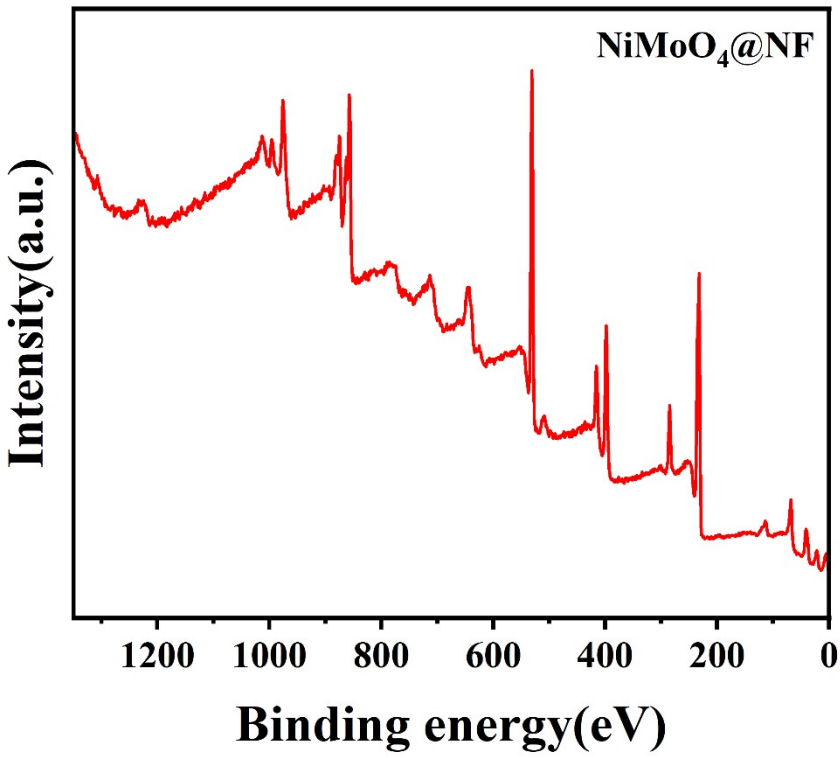

Figure S5. XPS patterns of $NiMoO_4$@NF.

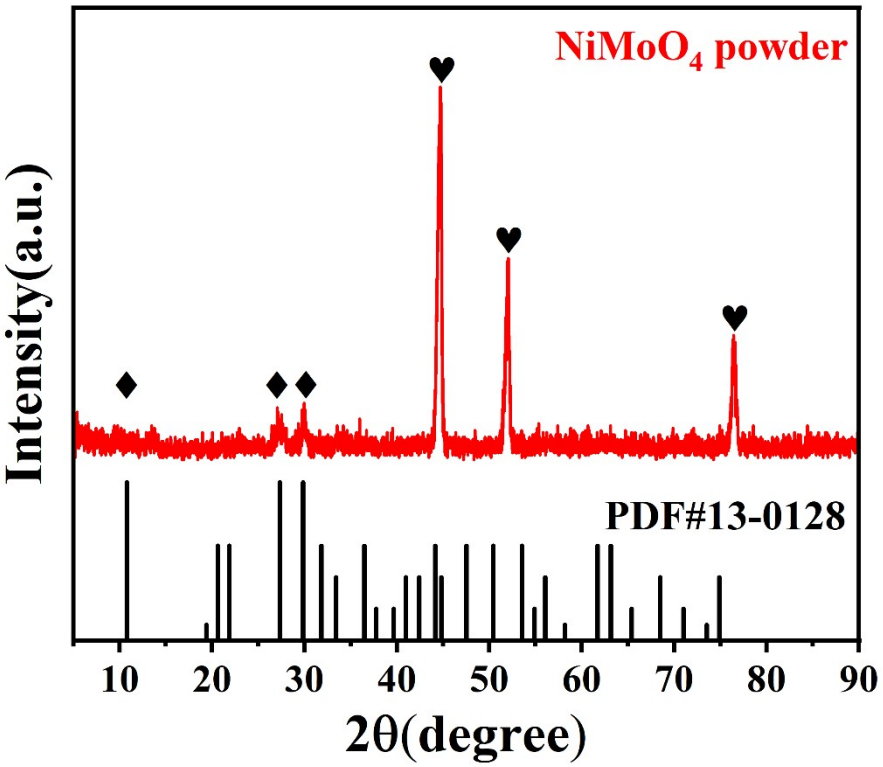

Figure S6. XRD of $NiMoO_4$ powder

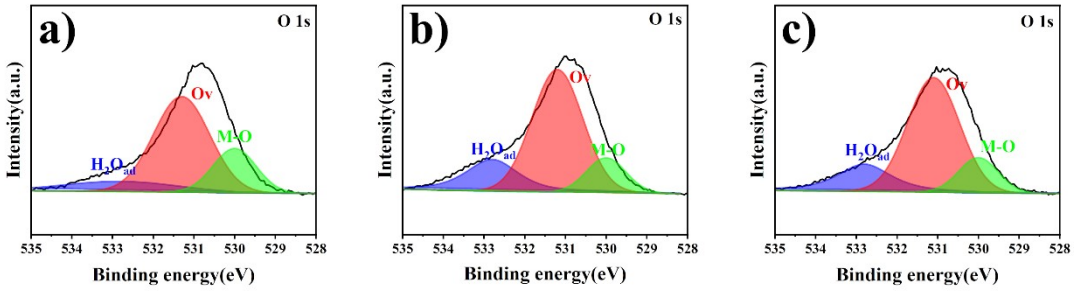

Figure S7. XPS spectrum of reduction for a) 5 min, b) 10 min, c) 15 min.

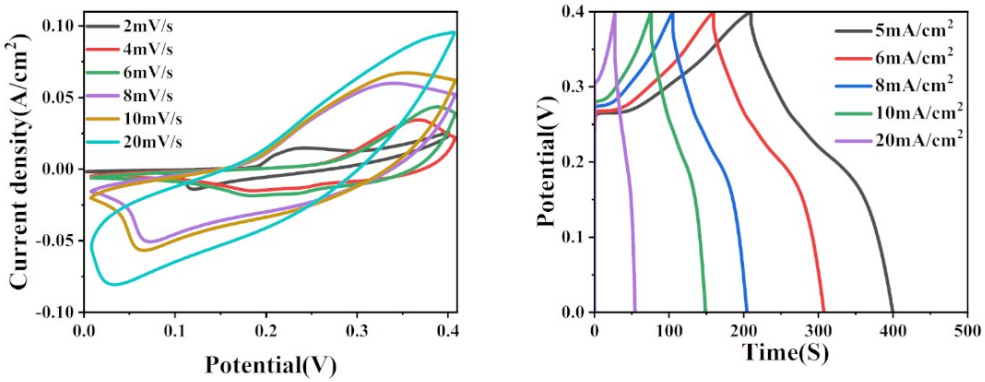

Figure S8. CV and GCD of $NiMoO_4$@NF.

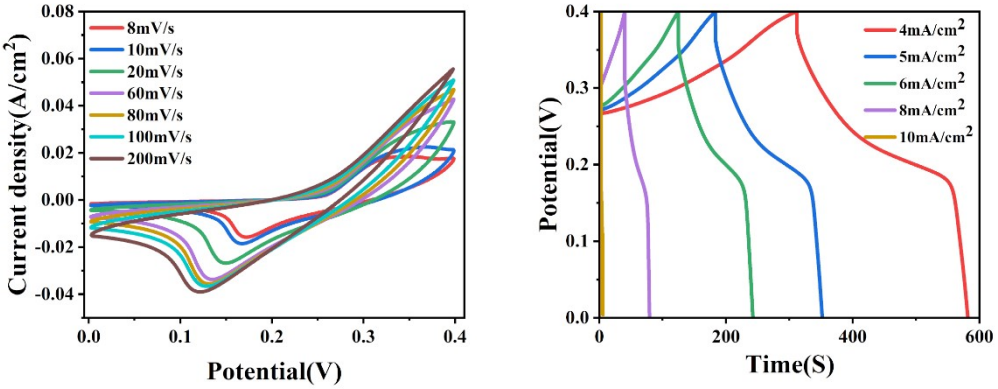

Figure S9.CV and GCD of 5-Ov-$NiMoO_4$@NF.

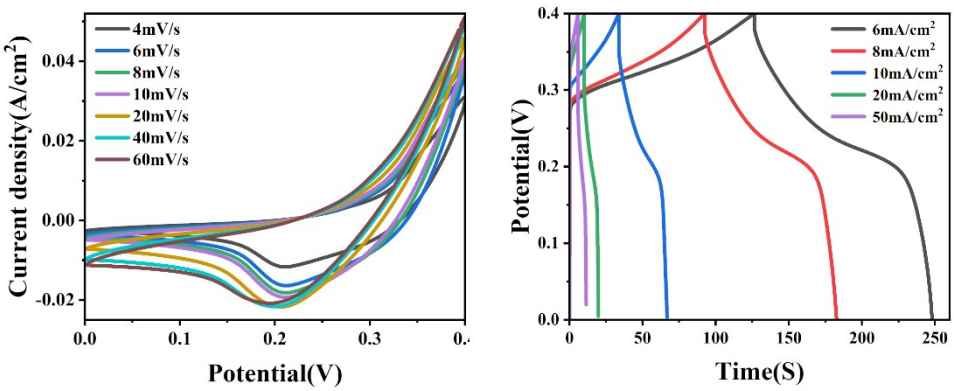

Figure S10. CV and GCD of 15-Ov-$NiMoO_4$@NF.

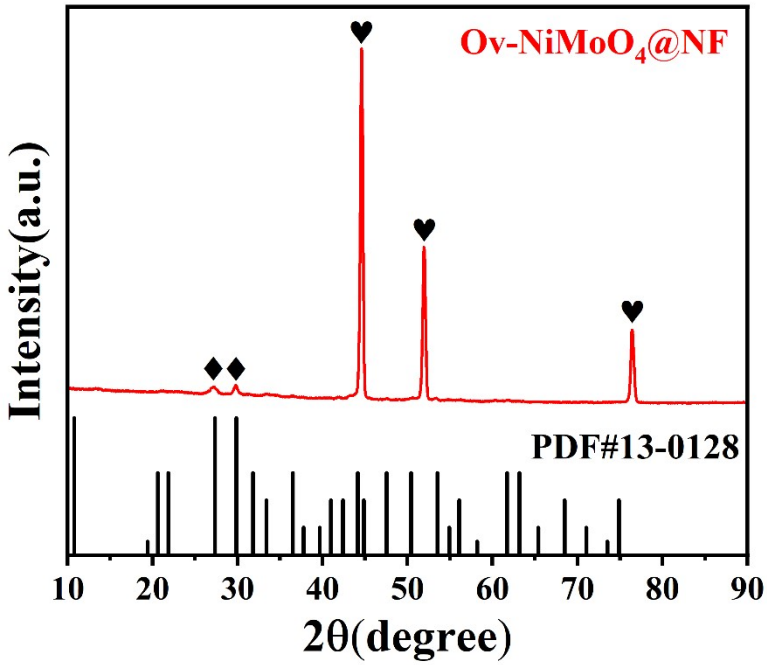

Figure S11. XRD of Ov-$NiMoO_4$@NF after 10000 cycles.

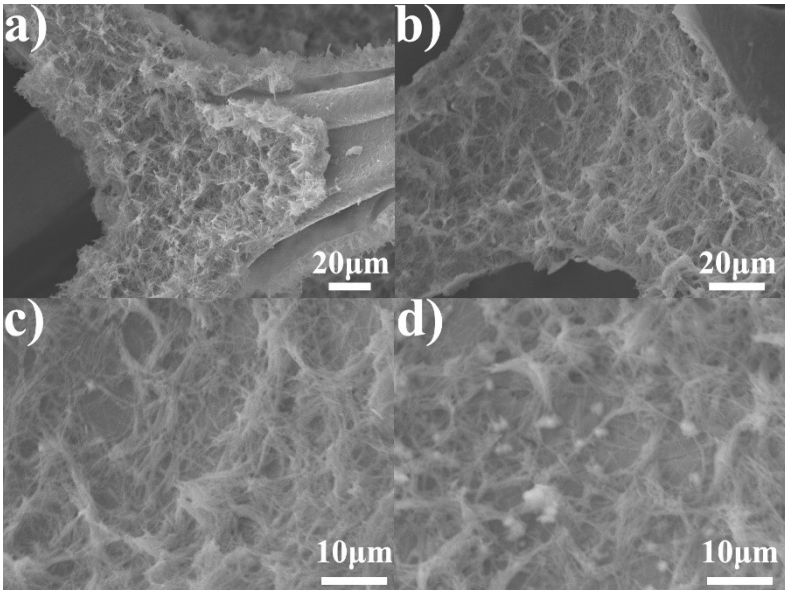

Figure S12. SEM images of Ov-$NiMoO_4$@NF electrode after cycling.

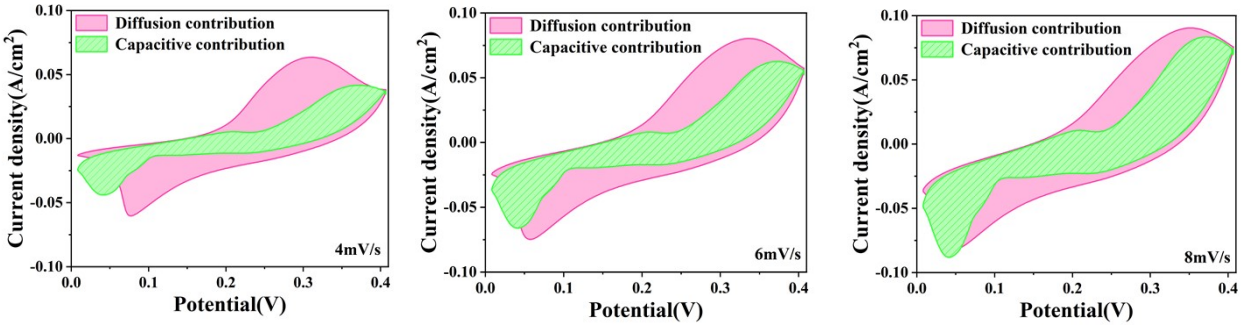

Figure S13. the capacity contribution from the surface-controlled process at a scanning rate of (4/6/8) mV/s for Ov-$NiMoO_4$@NF

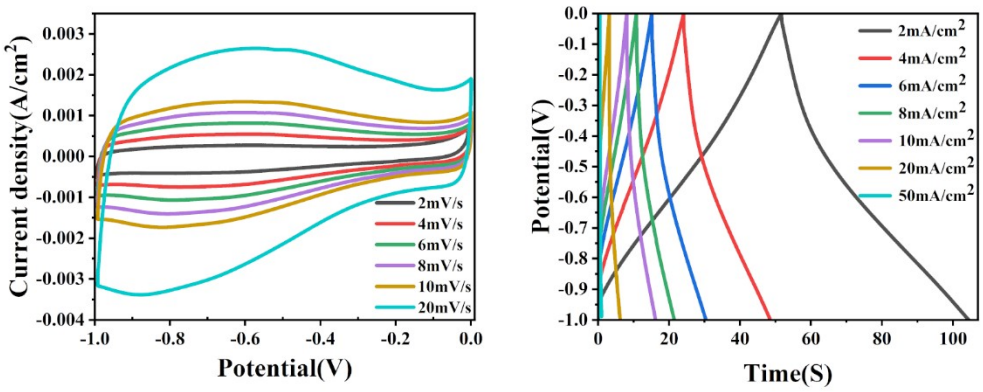

Figure S14. CV and GCD of the AC@NF.

The specific capacity (C_s,mF cm^{-2}) of the materials was calculated from the GCD curves using Eq. S1, as follow:

$$C_s = \frac{I \times \Delta t}{s \times \Delta V} \quad \text{(S1)}$$

where I is the discharge current density (mA cm^{-2}); S represents the area of the electrode (cm^{-2}); Δt is the discharge time (s); and ΔV is the potential window (V).

Figure S15. Testing of lit devices.