# Electronic Supplementary Information

## $MnMoO_4 \cdot 4H_2O$ Nanoplates Grown on a Ni Foam Substrate for Excellent Electrochemical Properties

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**Part 1:**

**Fabrication of pure $MnMoO_4$•$4H_2O$ powder materials:**

The reaction solution was obtained by mixing 2 mmol of $MnCl_2$•$4H_2O$ and 2 mmol of $Na_2MoO_4$•$2H_2O$ in 50 mL of distilled water under constant magnetic stirring and then transferred into Teflon-lined stainless steel autoclave liners. The liner was sealed in a stainless steel autoclave and maintained at 150 °C for 8 h and then cooled down to room temperature. After the reaction, the yellow product was taken out from the autoclave and washed by ultra-sonication in deionized water and ethanol for a few minutes in order to remove the residual nanoparticle debris, then dried in an oven at 60 ℃ overnight.

**Calculation of the loading mass on Ni foam:**

The mass loading of the $MnMoO_4$•$4H_2O$ NPs on the foam was calculated as follows: Firstly, a piece of the Ni foam was carefully cleaned with 6 M HCl solution in an ultrasound bath for 25 min to remove a NiO layer on the surface, and then washed by deionized water and absolute ethanol several times, and then we weighed the mass of such cleaned Ni foam substrate by a XS analytical balance (Mettler Toledo; $\delta$ = 0.01 mg), which was labeled for $m_1$. Secondly, the experiment was performed with such Ni foam, and the products on the Ni foam were carefully washed with deionized water and absolute ethanol and then dried at 60 °C overnight. And then we weighted the mass of the $MnMoO_4$•$4H_2O$ NPs on the Ni foam by a XS analytical balance, which was labeled for $m_2$. Finally, the mass of the $MnMoO_4$•$4H_2O$ NPs was calculated according to the equation: $m_{MnMoO_4 \cdot 4H_2O\ NPs} = m_2 - m_1$.

The mass loading of the $MnMoO_4$•$4H_2O$ powder was calculated as follows: Firstly, a piece of Ni foam was carefully cleaned and weighted as the above. The mass of such cleaned Ni foam substrate was labeled for $m_3$. Secondly, after the reaction the

$MnMoO_4$•$4H_2O$ powders were taken out from the autoclave and washed by ultra-sonication in deionized water and ethanol several times, and then dried in an oven at 60 °C overnight. the synthesized $MnMoO_4$•$4H_2O$ powders were mixed with carbon black and polyvinylidene difluoride (PVDF) at a weight ratio of 80 : 15 : 5, and then the mixture was transferred into a bottle with a few drops of ethanol and was stirred by magnetic over 24 hours to become uniform slurry. After that, the slurry was pressed onto cleaned Ni foam substrate and dried at 100 °C in vacuum overnight to remove the solvent. The electrodes were pressed under 10 MPa to enhance contact to the Ni foam. We weighted the mass of the $MnMoO_4$•$4H_2O$ powder/Ni foam by a XS analytical balance, which was labeled for $m_4$. Finally, the mass of the $MnMoO_4$•$4H_2O$ powder was calculated according to the equation: $m_{MnMoO_4 \cdot 4H_2O\ powder} = (m_4 - m_3)*0.8$.

**Calculations of capacitance:**

The specific capacitance ($C_{sp}$) or area specific capacitance ($C_{asp}$) of the electrode was calculated from the C-V curves according to the following equation:[1] $C_{sp} = Q/m \Delta V$ and $C_{asp} = Q/S \Delta V$, where Q (C) is an average charge during the charging and discharging processes, and ΔV (V) is the potential window, m (g) is the mass of the active materials in the electrodes, and S is the geometrical area of the electrode.

The discharge specific capacitance ($C_{sp}$) or area specific capacitance ($C_{asp}$) of the electrode was calculated from the discharge curves using the following equation:[1] $C_{sp} = It/m \Delta V$ and $C_{asp} = It/S \Delta V$, where I (A) is the current used for the charge/discharge, t (s) is the discharge time, m (g) is the total weight of the active electrode, $\Delta V$ (V) is the voltage interval of the discharge, and S is the geometrical area of the electrode.

## Reference

1 J. Yan, E. Khoo, A. Sumboja, P. S. Lee, *ACS Nano*, 2010, **4**, 4247.

**Part 2: Supporting Figures**

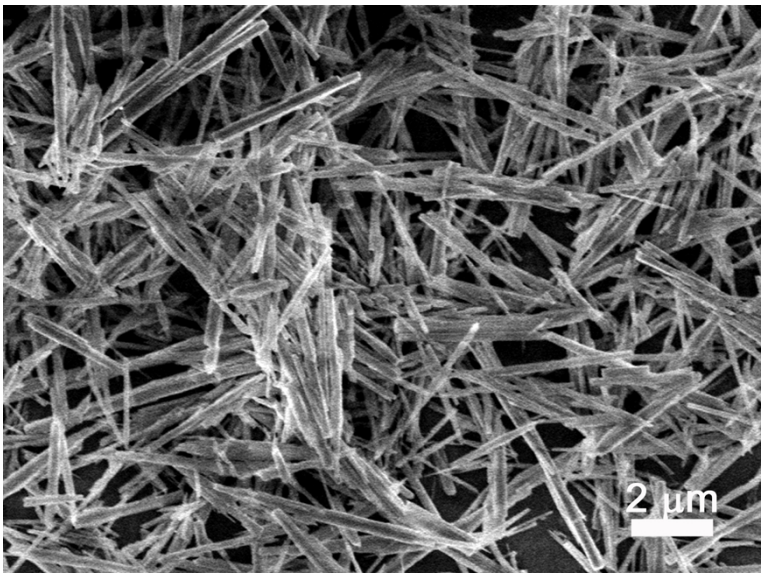


**Fig. S1** SEM image of pure $MnMoO_4 \cdot 4H_2O$ nanorods.

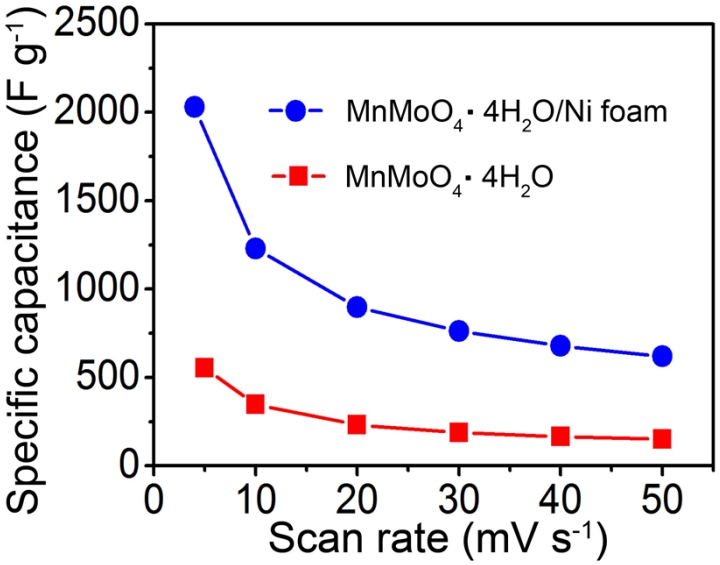


**Fig. S2** Specific capacitances of as-synthesized electrode materials at different scan rates.

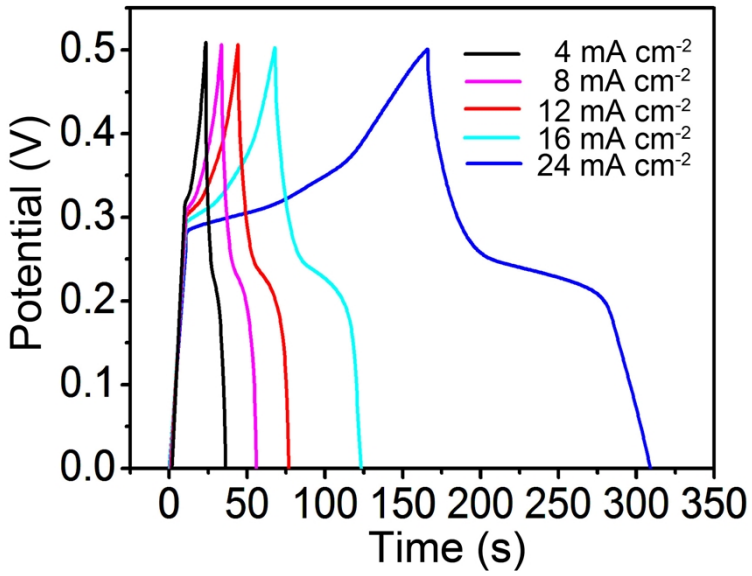


**Fig. S3** Galvanostatic charge-discharge curves of $MnMoO_4 \cdot 4H_2O$ NPs on Ni foam electrode at various current densities.

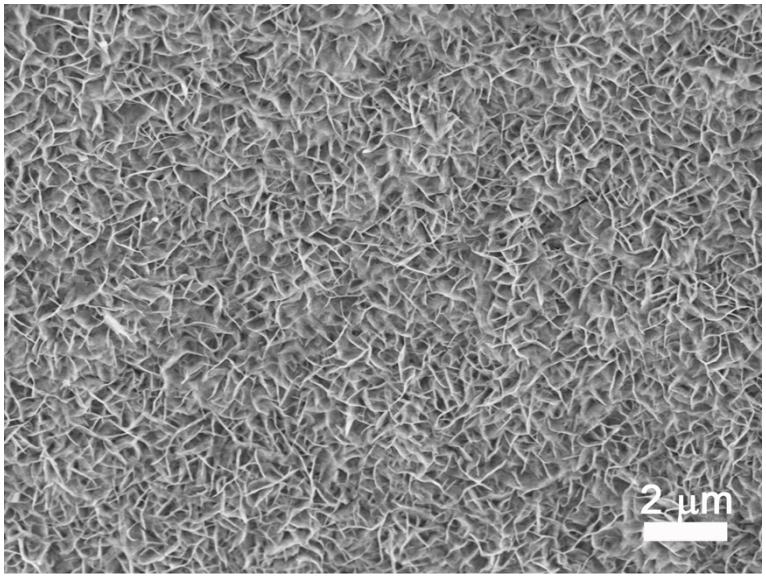


**Fig. S4** SEM image of $MnMoO_4 \cdot 4H_2O$ NPs after 3000 cycles.