Engineering *rhynchostylis retusa*-like heterostructured α-nickel molybdate with enhanced redox properties for high-performance rechargeable asymmetric supercapacitors

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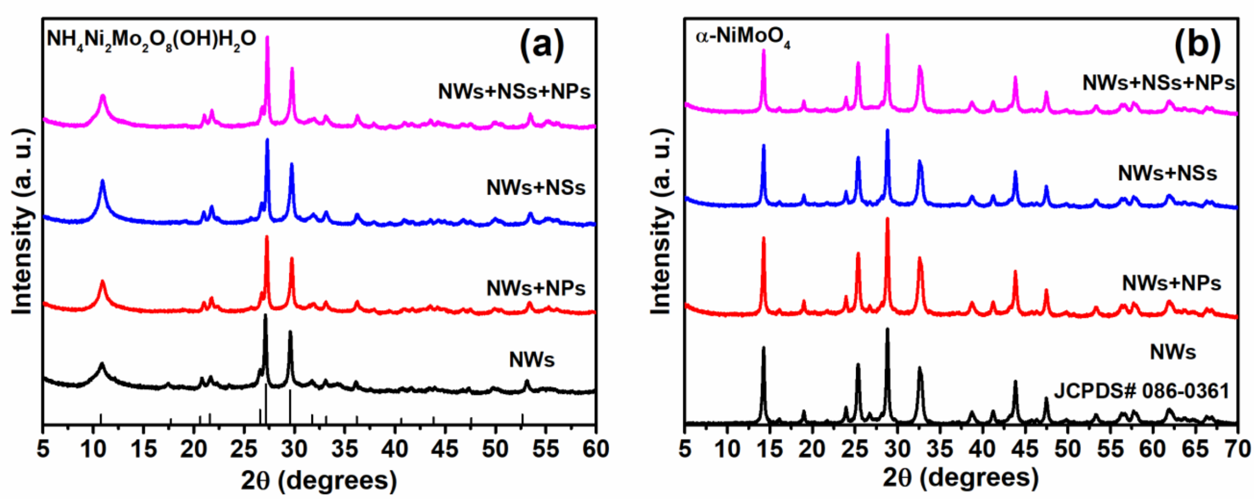

Fig. S1. (a) XRD patterns of the as prepared $NH_4Ni_2Mo_2O_8(OH)H_2O$ as a function of TPAOH and (b) XRD patterns of α-$NiMoO_4$ as a function of the amount of TPAOH, α-$NiMoO_4$ phase was obtained after calcination of $NH_4Ni_2Mo_2O_8$ at 450 C for 3 h in N2 atmosphere. (NWs, NWs+NPs, NWS+NSs+NWs+NSs+NPs were obtained when adding the amount of TPAOH 0, 10, 30, 50, and 70 μl)

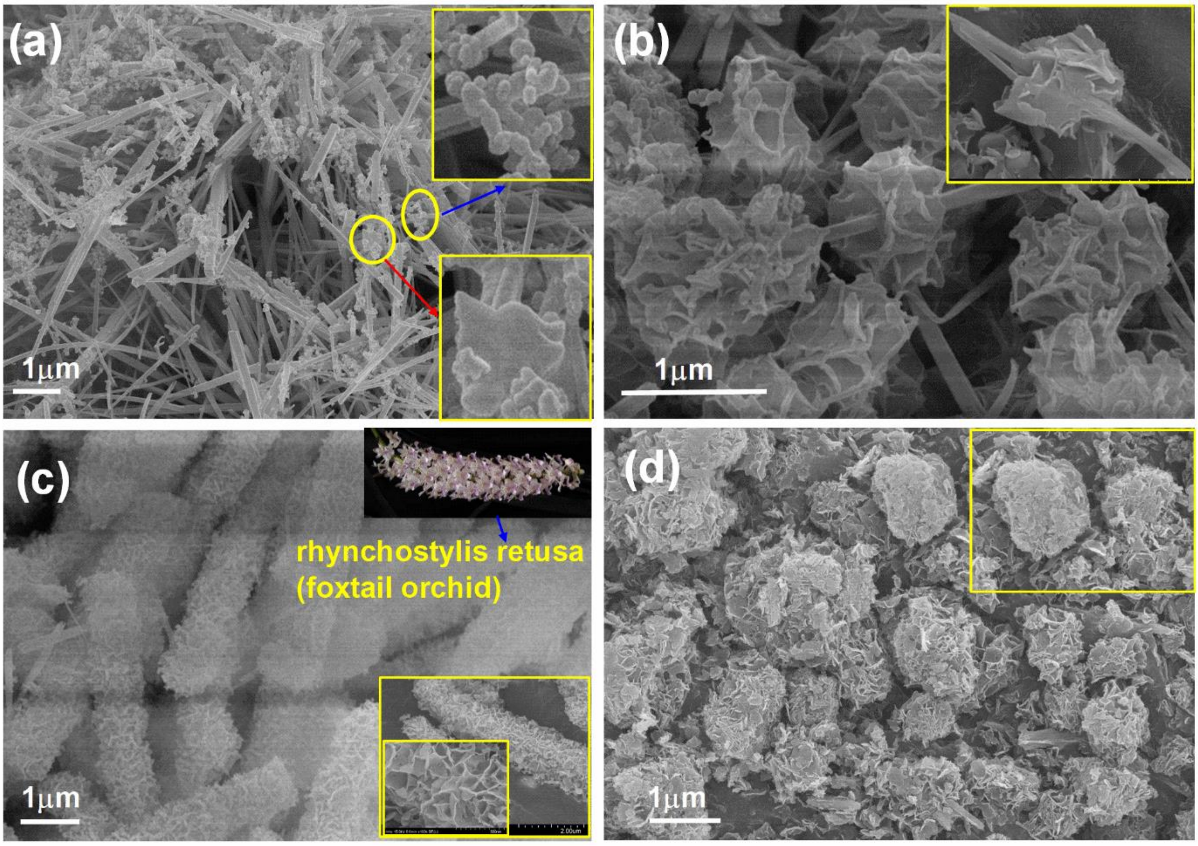

Fig. S2. HR-SEM images of α-$NiMoO_4$ nanostructures at different amounts of TPAOH (a) 10 µl (b) 30 µl (c) 50 µl (d) 70 µl, which clearly shows the influence of TPAOH on the morpholgies of α-$NiMoO_4$.

Table S1: Crystallographic data with atomic parameters of α-$NiMoO_4$

Atom	Wyckoff position	Site	Atomic coordinates x/a	y/b	z/c	U (Å^2)
Mo1	4i	m	0.2168	0.0000	0.3659	0.0073
Mo2	4g	2	0.0000	0.2156	0.0000	0.0128
Ni1	4i	m	0.8264	0.0000	0.1613	0.0158
Ni2	4h	2	0.0000	0.1927	0.5000	0.0197
O1	8j	1	0.0020	0.1555	0.2505	0.0202
O2	8j	1	0.1542	0.3395	0.0714	0.0150
O3	8j	1	0.3332	0.1668	0.4087	0.0458
O4	4i	m	0.2186	0.0000	0.5662	0.0428
O5	4i	m	0.1536	0.0000	0.0751	0.0414

Phase: α-$NiMoO_4$ (monoclinic)   Space group: C2/m (12)

Lattice constants a =9.6112 Å b= 8.7828 Å, c = 7.6728 Å,

Volume: V = 590.721 Å^3, α=90º β=114.21º γ= 90º

R-factors: R_p = 2.28%, R_{wp} = 2.99%, and χ^2 = 2.098

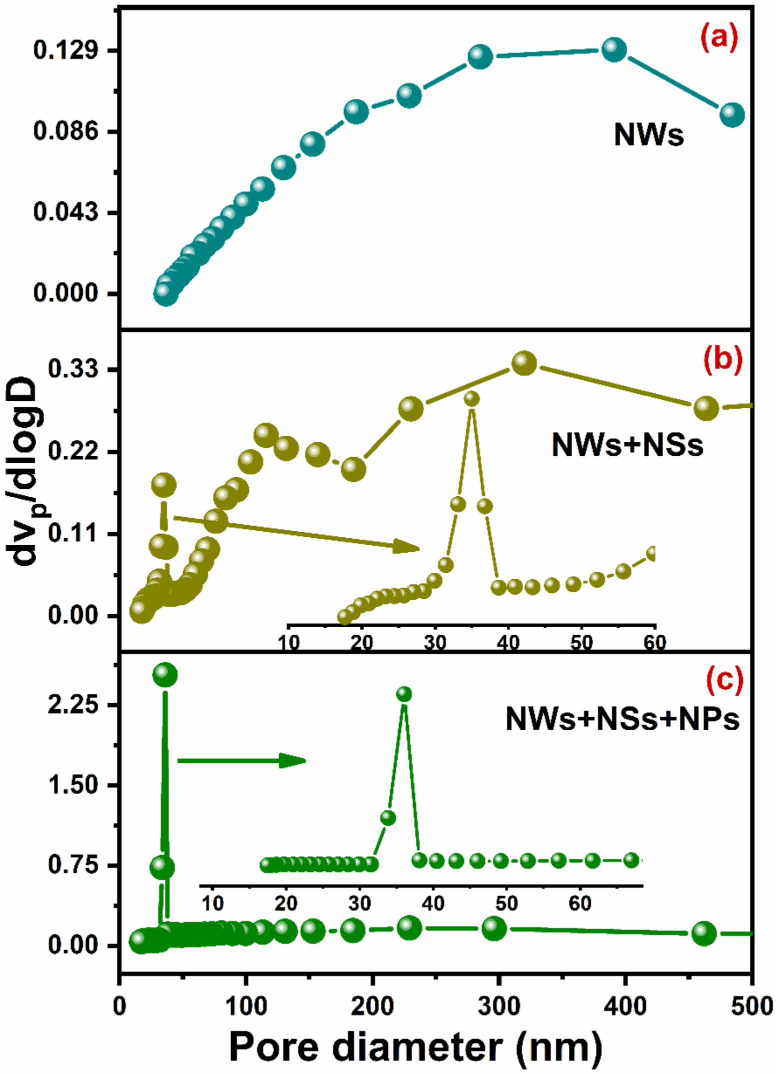

Fig. S3. Pore size distribution curves of the a-$NiMoO_4$ (a) NWs, (b) NWs+NSs, and (c) NWs+NSs+NPs)

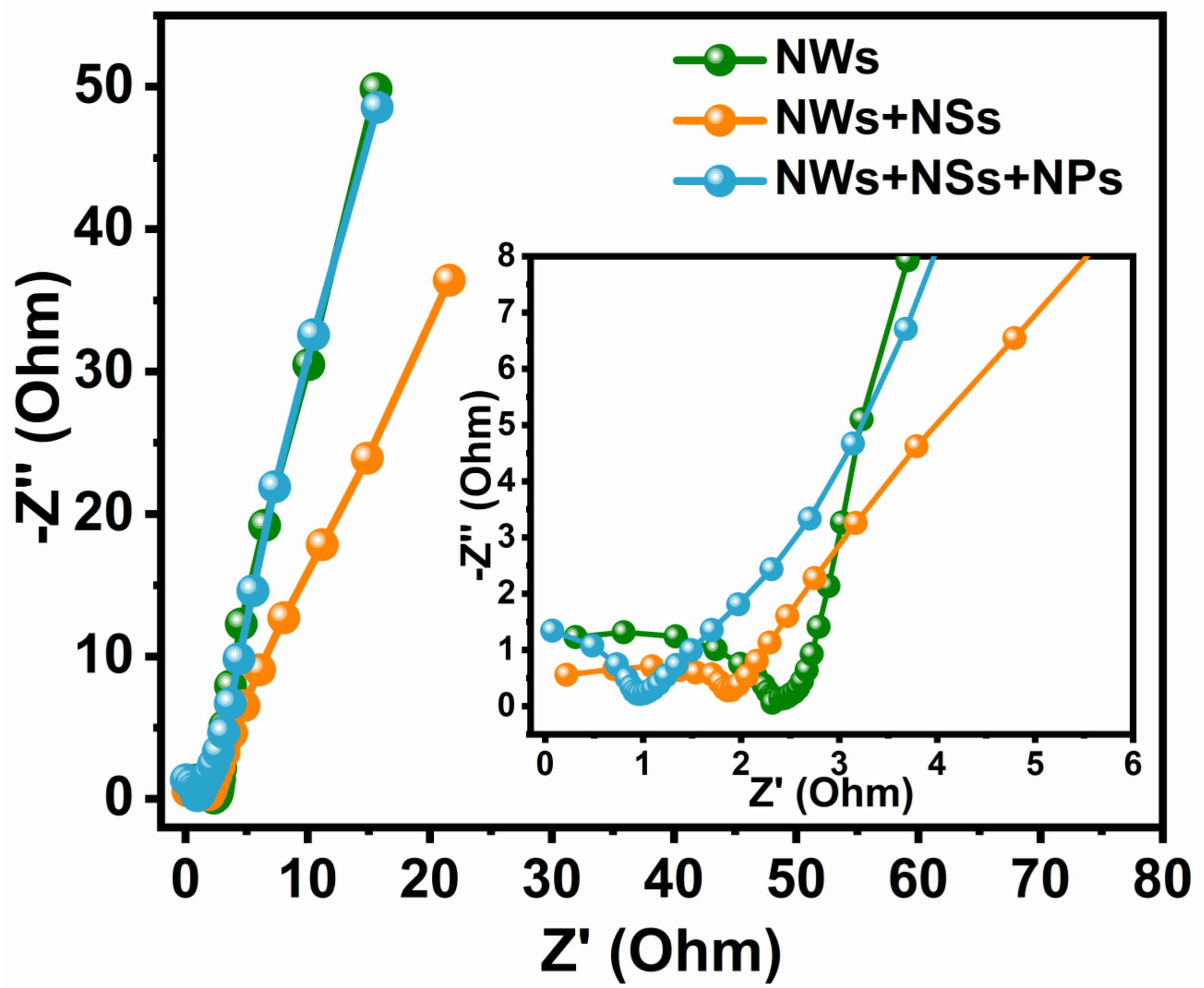

Fig. S4. EIS spectra of α-$NiMoO_4$ NWs, NWs+NSs, NWS+NSs+NPs samples measured in three-electrode system.

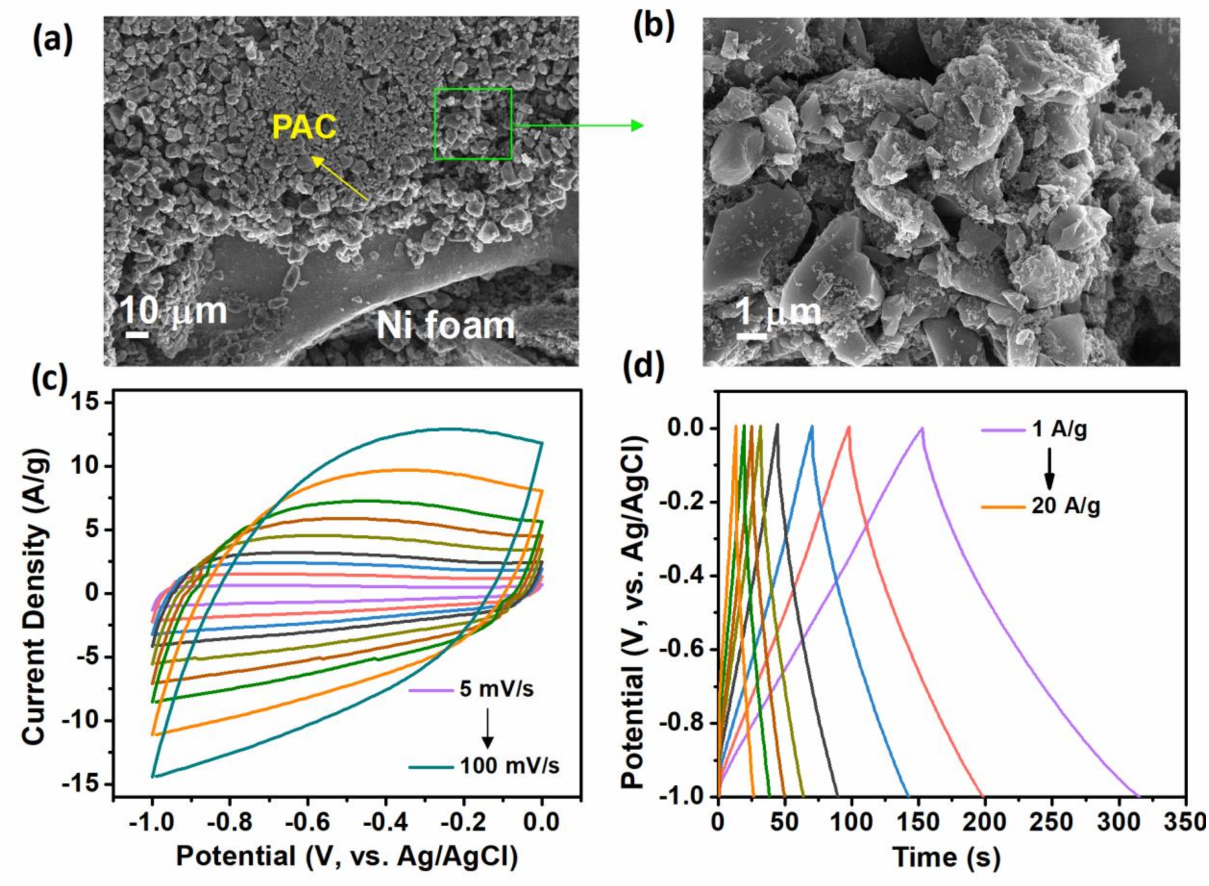

Fig. S5. (a) and (b) low and high magnification SEM images of APC, respectively, (c) CV curves of APC at different scan rates and (d) GCD curves of the APC at different current densities.