Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Electronically Supplementary Information (ESI)

High-performance Sodium Anode Comprised of Few-Layer of $MoSe_2$ and N, P Doped Reduced Graphene Oxide Composites

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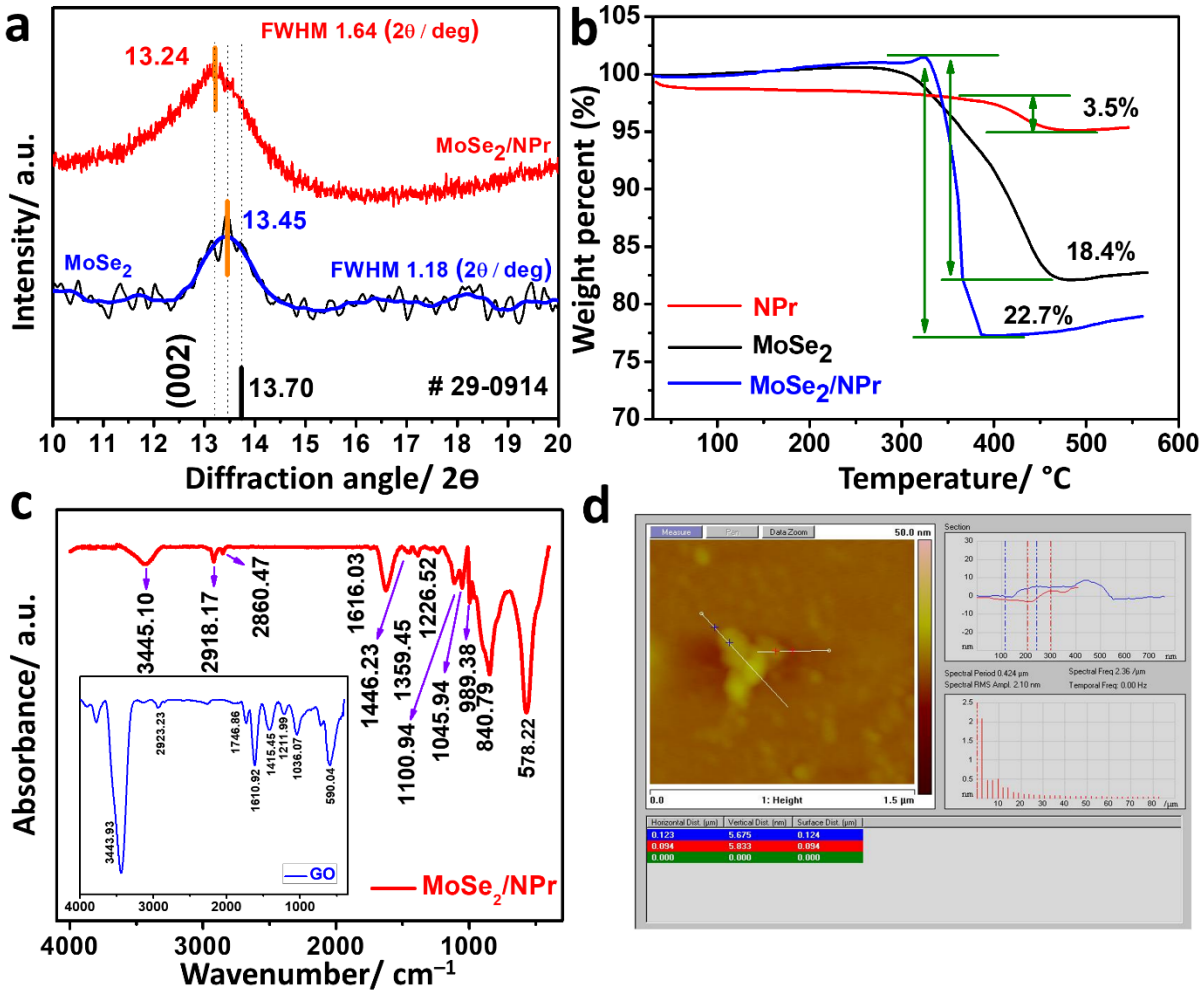


Figure S1. (a) Low angle XRD of $MoSe_2$ and $MoSe_2$/NPr, (b) TGA Curve of NPr, $MoSe_2$ and $MoSe_2$/NPr composite at a temperature ramp of 10 °C.min^{-1}in air. (c) FTIR Spectra of $MoSe_2$/NPr composite (inset: FTIR of GO sheets), (d) AMF image of Bulk $MoSe_2$

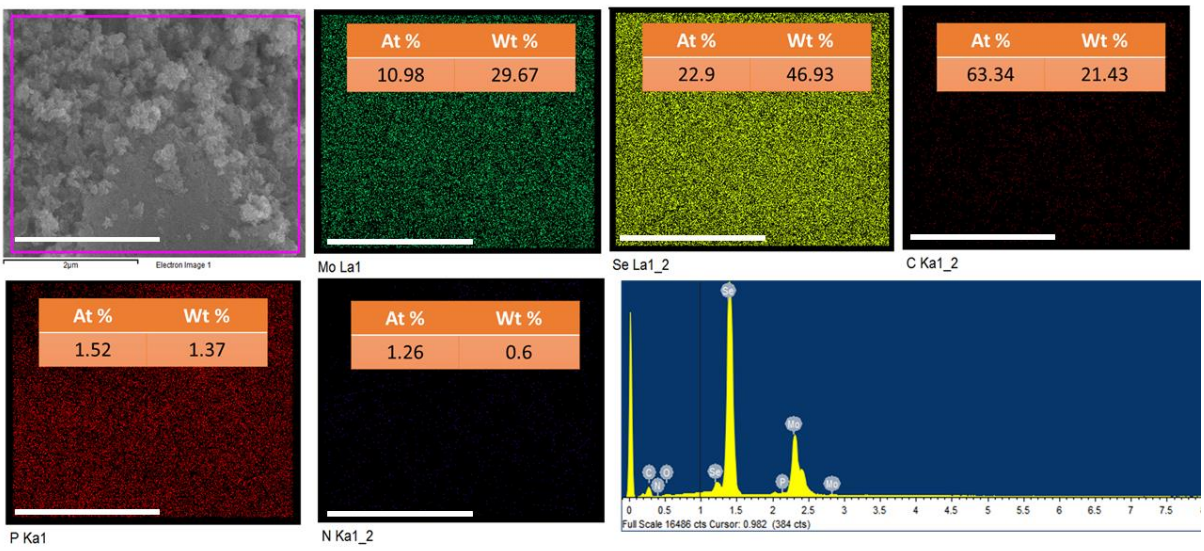


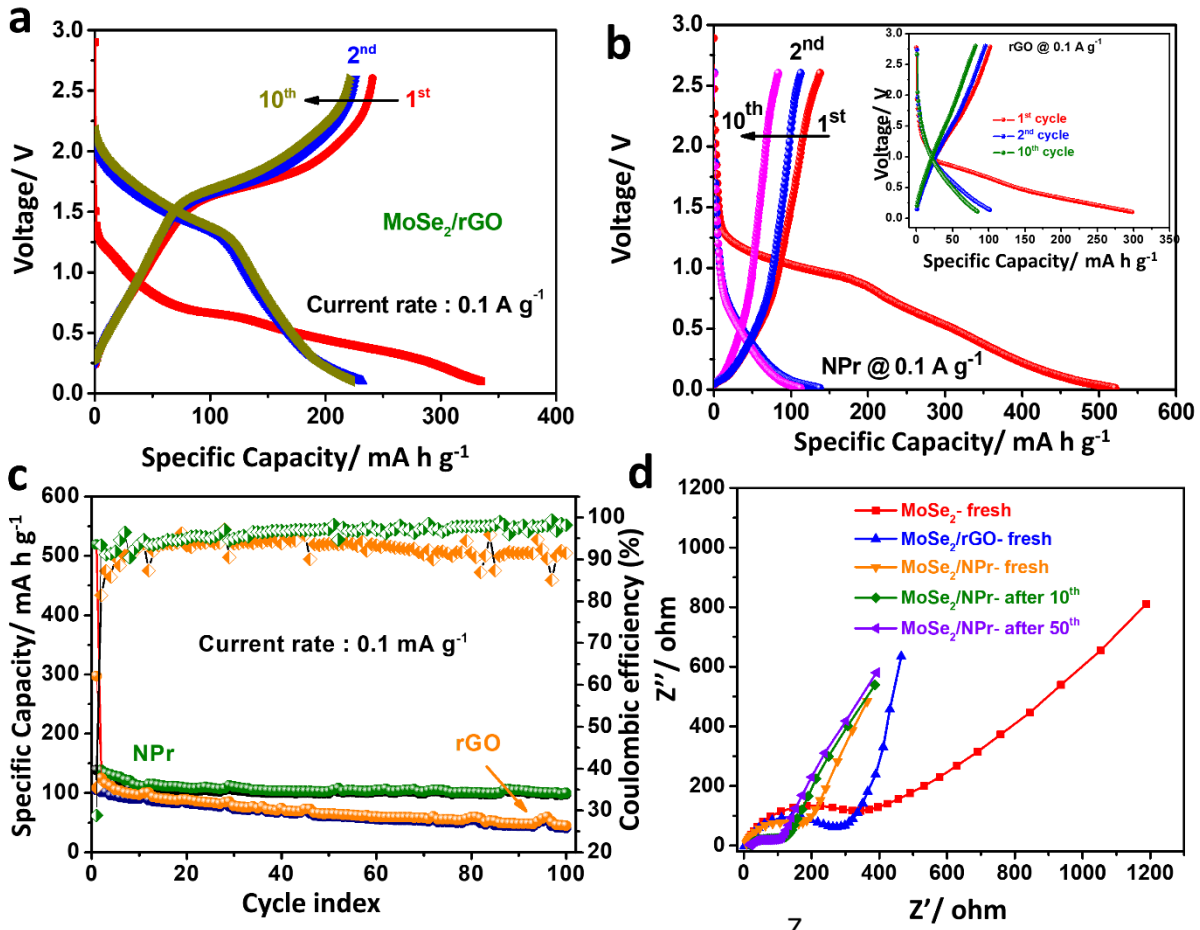
Figure S2: EDX Mapping of Mo, Se, C, P and N in $MoSe_2$/NPr composite (scale bar: 2µm)

Table S1: XPS analysis of NPr, $MoSe_2$ and $MoSe_2$/NPr

Composite	Atomic % C (1s)	Atomic % N (1s)	Atomic % P (2p)	Atomic % O (1s)	Atomic % Mo (3d)	Atomic % Se (3d)
$MoSe_2$	-	-	-	-	33.28	66.72
$MoSe_2$/NPr	50.97	1.07	2.85	8.25	12.54	24.32

Table S2: FTIR of GO sheets [1]:

Characteristic Bonds	Wavenumber (cm^{-1})
O-H vibration	3443.9
Symmetric $-CH_2$	2923.2
Asymmetric $-CH_2$	2860.47
-C=O stretching	1610.9
-C=C stretching	1415.4
Asymmetric C-O-C vibration	1211.9
Symmetric C-O-C vibration	1036



Electrode	$R_s(\Omega)$	$R_f(\Omega)$	$Q_1(\mu F)$	$R_{ct}(\Omega)$	$Q_2(\mu F)$
$MoSe_2$	6.88	22.84	8.23	336.0	965.3
$MoSe_2$/rGO	4.73	4.64	18.77	291.3	32.72
$MoSe_2$/NPr	3.89	9.091	15.03	167.5	322.8

Figure S3: (a) Charge-discharge curve of $MoSe_2$/rGO composite at a current density of 0.1 A g^{-1} (b) Charge-discharge curve of NPr sheets at 0.1 A g^{-1} current rate (inset same plot for rGO sheets) (c) cyclic stability of rGO and NPr sheets at 0.1 A g^{-1} up-to 100 cycles (d) Nyquist plots of the $MoSe_2$, $MoSe_2$/rGO and $MoSe_2$/NPr electrodes at OCV as well as cycled electrode of $MoSe_2$/NPr. (e) Equivalent circuit model of the studied system.

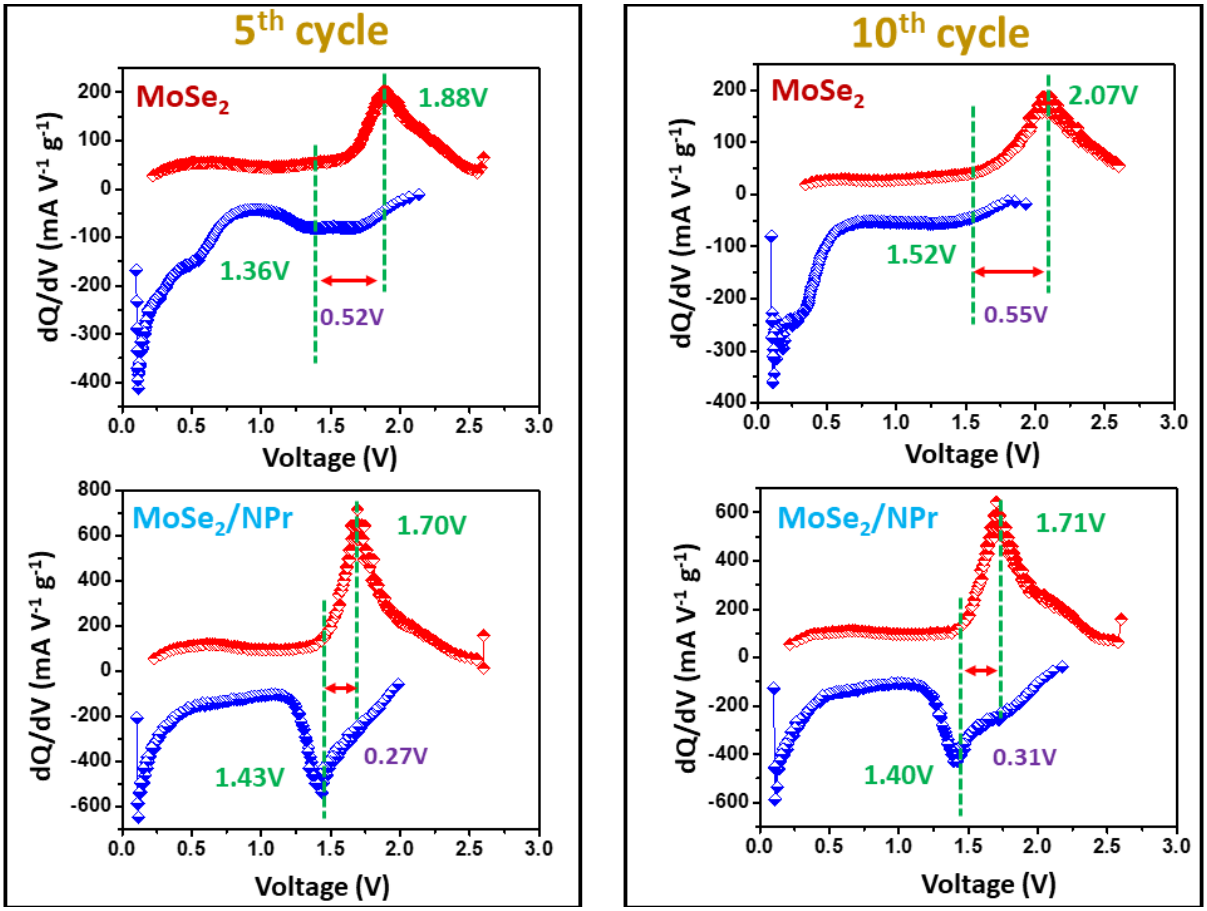


Figure S4: dQ/dV *vs* Voltage plot (Voltage hysteresis) of $MoSe_2$ (a,b) and $MoSe_2$/NPr (c,d) electrode after 5^{th} and 10^{th} cycle.

REFERENCES

(1) N. Hu, Z. Yang, Y. Wang, L. Zhang, Y. Wang, X. Huang, H. Wei, L. Wei and Y. Zhang, *Nanotechnology*, 2014, **25 (2)**, 025502.