Supporting Information

Synergistic effect of cocatalytic $NiSe_2$ on stable 1T- MoS_2 for hydrogen evolution

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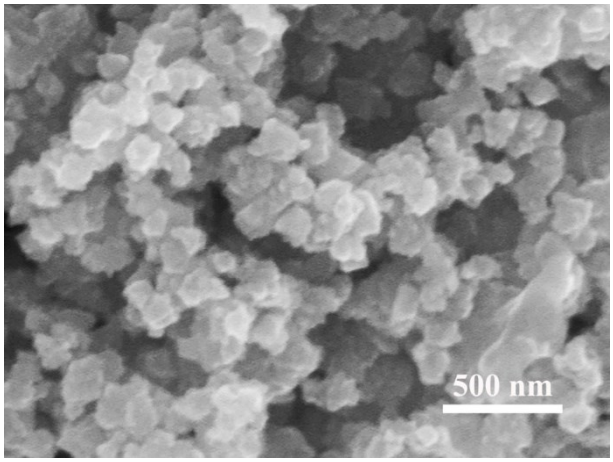

Fig. S1. SEM image of $NiSe_2$

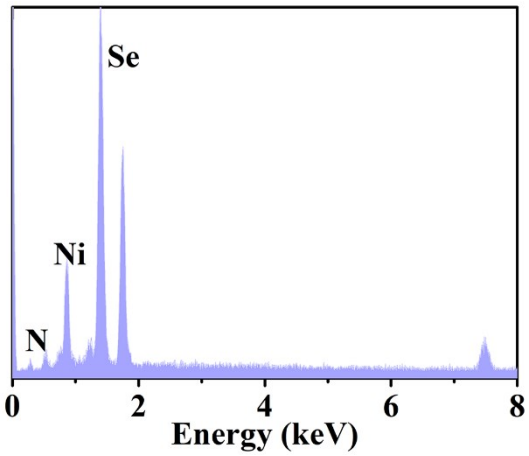

Fig. S2. EDS spectrum of bare $NiSe_2$

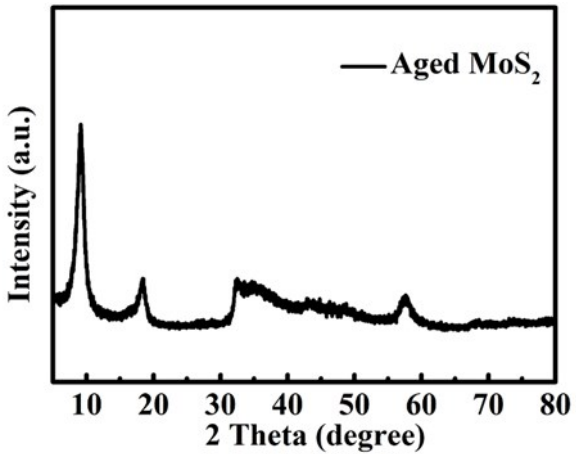

Fig. S3. XRD pattern of three-month aged bare MoS_2

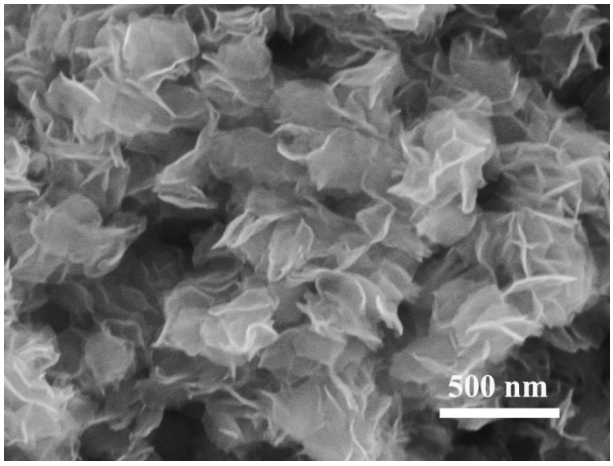

Fig. S4. SEM image of bare MoS_2

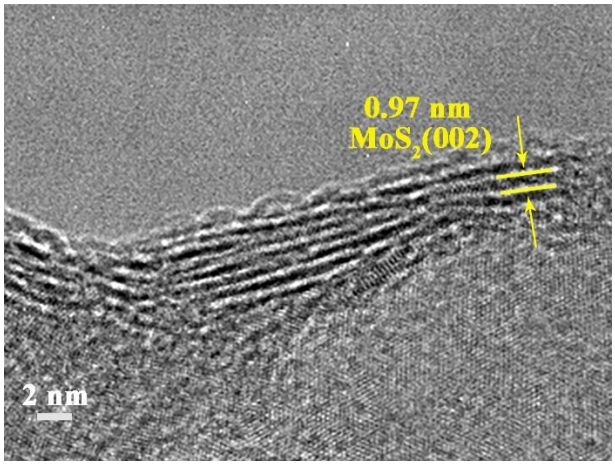

Fig. S5. High-resolution TEM image of bare MoS_2

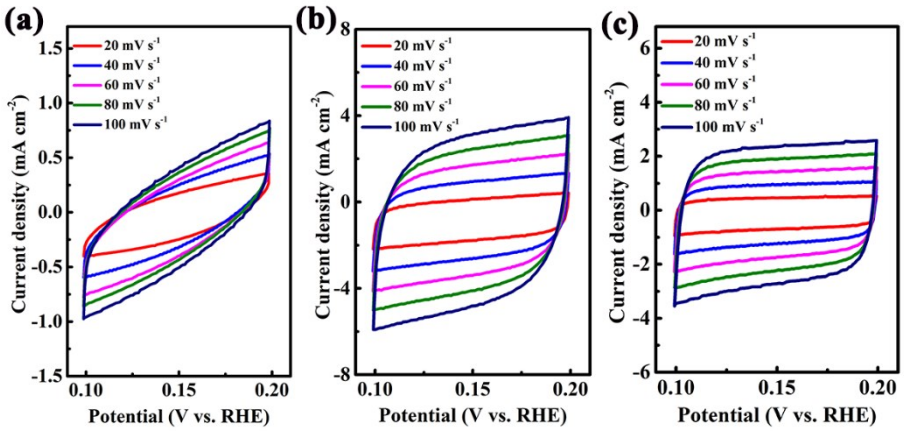

Fig. S6. Cyclic voltammetry (CV) curves of (a) $NiSe_2$, (b) MoS_2, (c) $MoS_2/NiSe_2$ at different scan rate: 20, 40, 60, 80 and 100 mV s^{-1}. Experiments were performed in 0.5 M H_2SO_4 by sweeping the potential in non-faradic region.

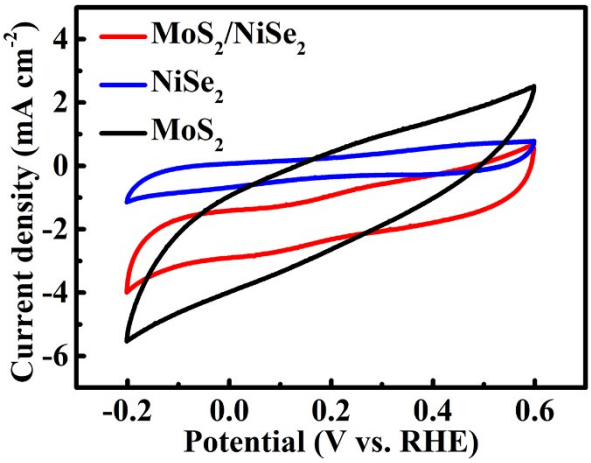

Fig. S7. Cyclic voltammetry curves of $NiSe_2$, MoS_2, $MoS_2/NiSe_2$ at pH = 7 phosphate buffer with a scan rate of 50 mV s^{-1}.

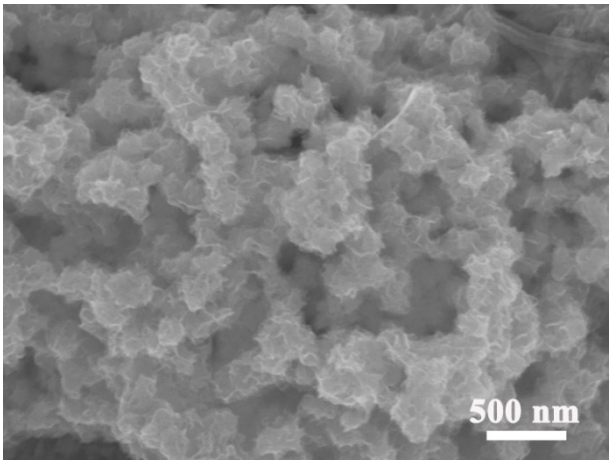

Fig. S8. SEM of $MoS_2/NiSe_2$ after stability measurement.

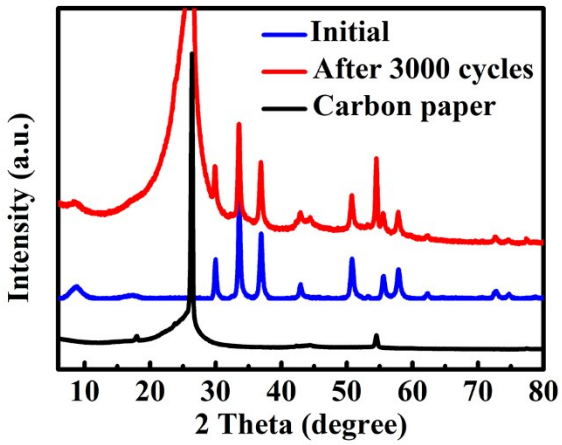

Fig. S9. XRD patterns of $MoS_2/NiSe_2$ before and after stability measurement.

Table S1 Comparison of HER performances in 0.5 M H_2SO_4 solution for $MoS_2/NiSe_2$ with other HER electrocatalysts.

Catalyst	Tafel slope (mV dec^{-1})	Overpotential at 10 mA cm^{-2} (mV)	Catalyst loading (mg cm^{-2})	Ref
MoS_2/MoO_2	129	210	0.28	1
Ni_2P/MoS_2	76	~200	-	2
MoS_2/Graphene	68	142	0.701	3
MoS_2/rGO	77	154	0.17	4
$MoSe_2$-NiSe@carbon	76.3	154	0.285	5
$CoS_2@MoS_2$	85.9	290	0.285	6
$CoS_x@MoS_2$	103	239	0.285	7
NHCS@MoS_2	96	190	0.75	8
S-MoS_2@C	78	136	1	9
MCM@MoS_2–Ni	81	161	0.49	10
defect-rich MoS_2	63	176	2.8	11
MoS_2 nanorods	93	282	0.204	12
$MoS_2/NiSe_2$	58	94	1	Our work

References

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