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

A Facile Approach to Enhance Hydrogen Evolution Reaction of Electrodeposited MoS_2 in Acidic Solutions

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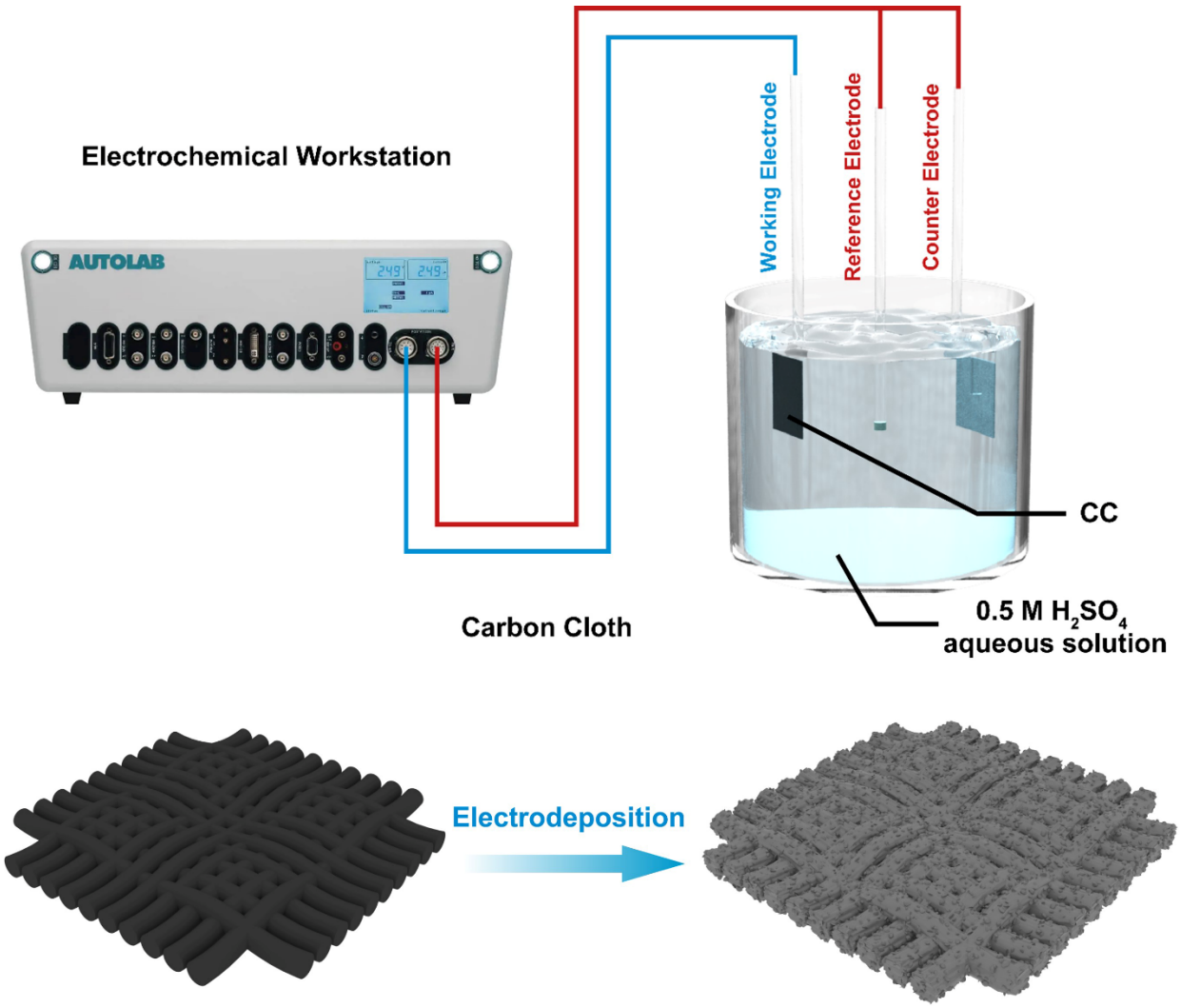

Fig. S1. Schematic illustration of syntheses and electrochemical measurements of MoS_2 and $Ni_xMo_{1-x}S_2$ on carbon fiber cloth.

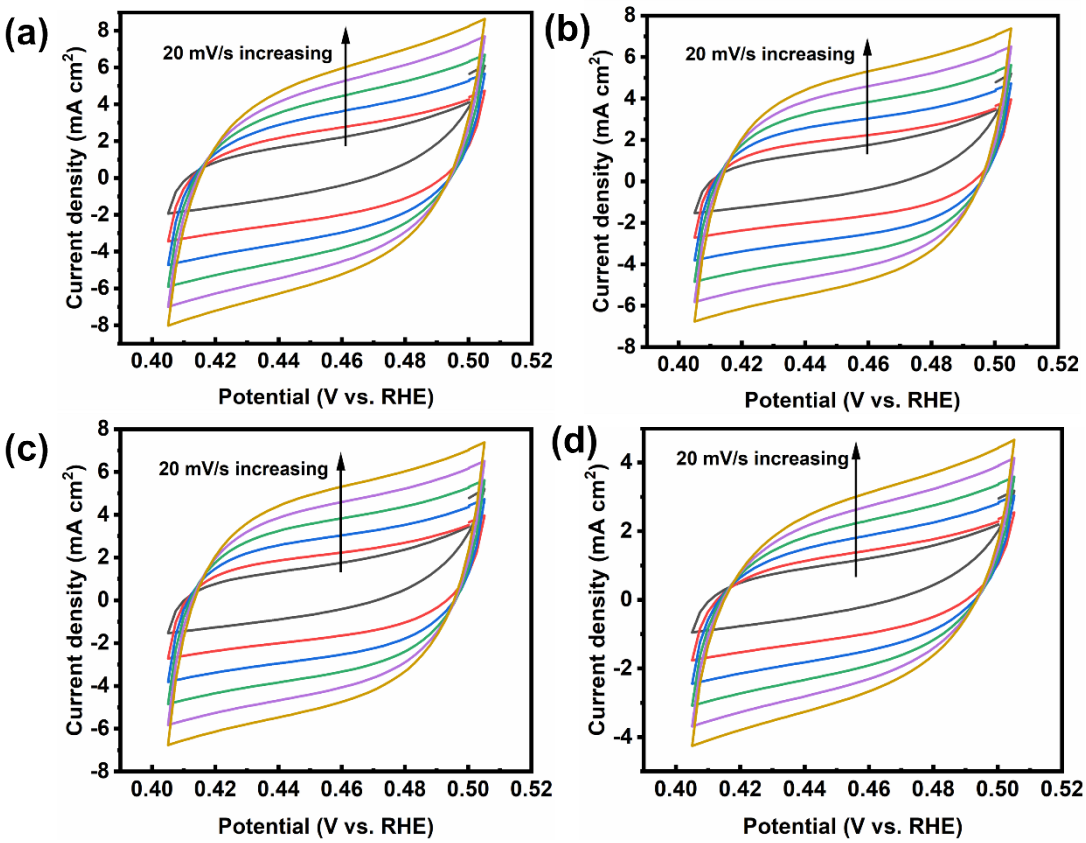

Fig. S2. CV curves in the non-faradaic region at the scan rates of 20, 40, 60, 80, 100 and 120 mV/s for sample (a) MoS_2, (b) $Ni_{0.02}Mo_{0.98}S_2$ (c) $Ni_{0.05}Mo_{0.95}S_2$ and d) $Ni_{0.1}Mo_{0.99}S_2$.

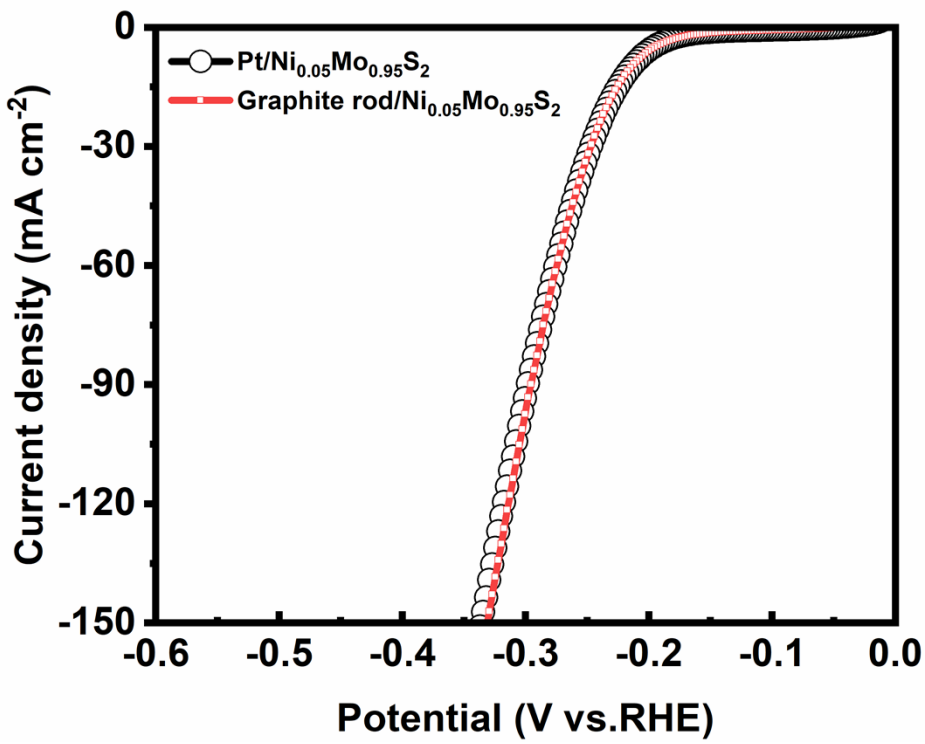

Fig. S3. LSV curves measuring by Pt and graphite rod as counter electrodes for sample $Ni_{0.05}Mo_{0.95}S_2$.

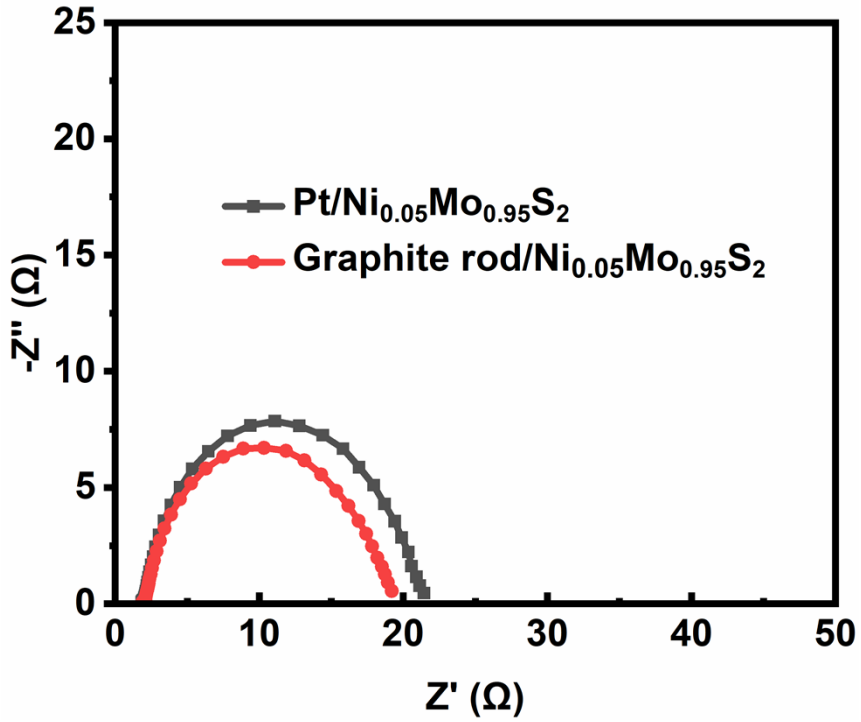

Fig. S4. EIS measurement with Pt and graphite rod as counter electrodes for sample $Ni_{0.05}Mo_{0.95}S_2$.

Table S1. Summary of HER performance for as-prepared samples. R_{ct} is calculated by EIS data. ESCA is calculated by C_{dl} data.

Catalysts	Onset potential (mV)	η (mV) at j=10 mA^{-2}	Rct (Ω)	ECSA (cm^{-2})
MoS_2	197	293	40.45	550
$Ni_{0.1}Mo_{0.9}S_2$	175	232	27.35	972.5
$Ni_{0.05}Mo_{0.95}S_2$	**139**	**215**	**5.96**	**1062.5**
$Ni_{0.02}Mo_{0.98}S_2$	158	241	18.45	990

Table S2. Summary of HER performance for as-prepared sample $Ni_{0.05}Mo_{0.95}S_2$ with Pt and graphite rod as counter electrodes. R_{ct} is calculated by EIS data.

	Pt	Graphite rod
Real Center	11.52	10.48
Imag. Center	-2	-2.06
Diameter	19.58	17.48
Deviation	0.12	0.13
Low Intercept	1.95	1.99
High Intercept	21.1	18.97
Depression Angle	-11.85	-13.65
w max	1.18	1.23
Estimated R (ohms)	19.12	16.98
Estimated C (farads)	0.04	0.05

Table S3. EDS analysis of as-prepared sample $Ni_{0.1}Mo_{0.99}S_2$.

Element	AN	series	Net	[wt.%]	[norm. wt.%]	[norm. at.%]	Error in wt.% (1 Sigma)
Sulfur	16	K-series	258889	17.05879	47.48971	72.62935	0.635963
Nickel	28	K-series	5398	0.586278	1.63213	1.363713	0.042993
Molybdenum	42	L-series	167426	18.27596	50.87816	26.00693	0.673986
			Sum:	35.92102	100	100	

The ratios of Ni and Mo in the electrodeposited samples were measured by EDS in SEM, since EDS cannot detect incorporation below 0.5%, we detected 1% Ni samples, the at% of Ni is 1.36%, which is close to the nominal doping concentration and the fluctuation may be caused by the incomplete reaction of Mo and accuracy of EDS.