Supplementary Materials: Hydrogen Evolution Reaction of γ-$Mo_{0.5}W_{0.5}C$ Achieved by High Pressure High Temperature Synthesis

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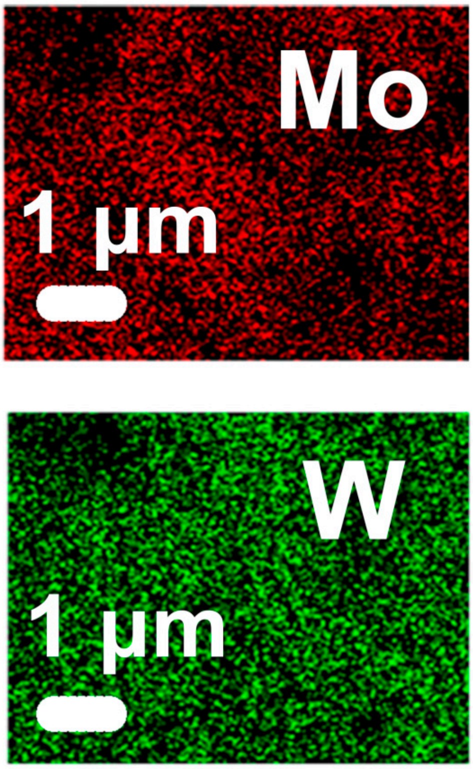

Figure S1. Energy dispersive spectrometer (EDS) mapping images of γ-$Mo_{0.5}W_{0.5}C$ sample.

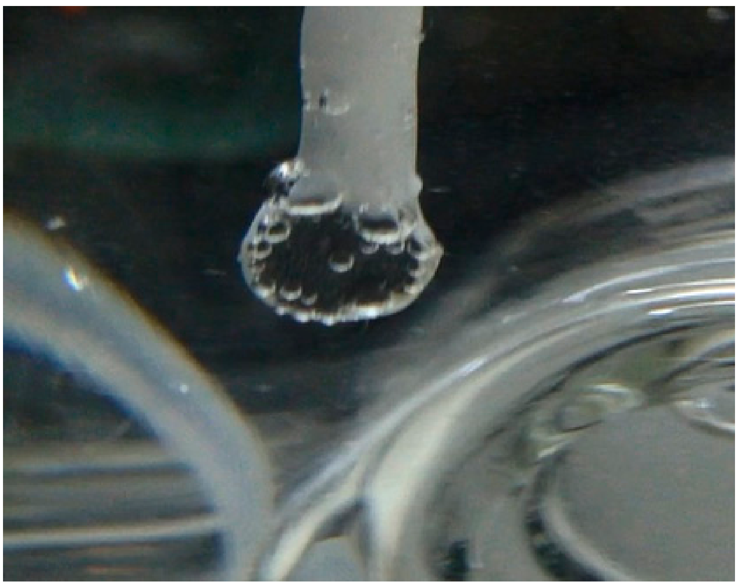

Figure S2. Photograph of γ-$Mo_{0.5}W_{0.5}C$ electrode collected with a hydrogen evolution reaction.

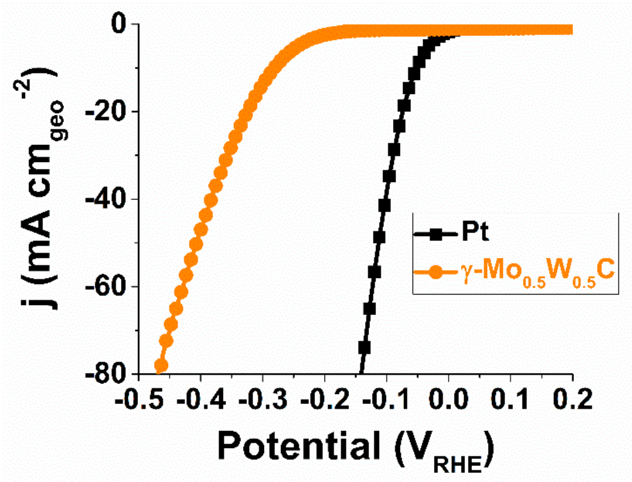

Figure S3. Polarization curve of the γ-$Mo_{0.5}W_{0.5}C$ electrode in 1 M NaOH.

In addition to the incompressible γ-$Mo_{0.5}W_{0.5}C$, the physical properties and HER performances of η-MoC were investigated. The XRD pattern of η-MoC was exhibited in Figure S3. It is clear that η-MoC (Figure S3) shows four basic diffraction peaks at around 35.5°, 37.2°, 39.8°, and 43.1°, which can be indexed as (101), (006), (103), and (104) diffraction planes (JCPDS 08-0384). Figure S4 exhibits the surface morphologies of η-MoC. It is obvious that the surface of both η-MoC is massive and dense. The polarization curves and Tafel plots of the electrodes are shown in Figures S5 and S6. The Tafel slope of η-MoC is 93 mV·dec^{-1}.

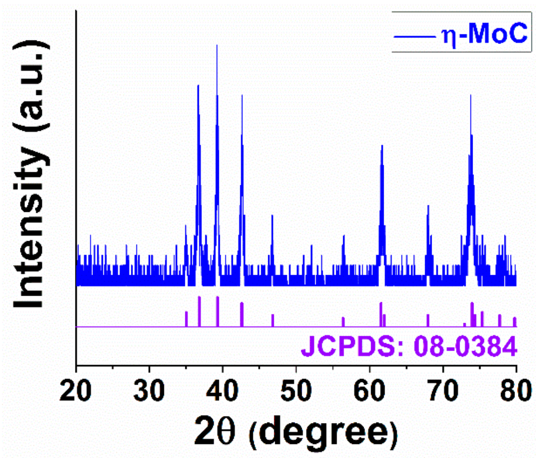

Figure S4. X-ray diffraction (XRD) pattern and standard PDF data of η-MoC.

Figure S5. Surface morphology of η-MoC.

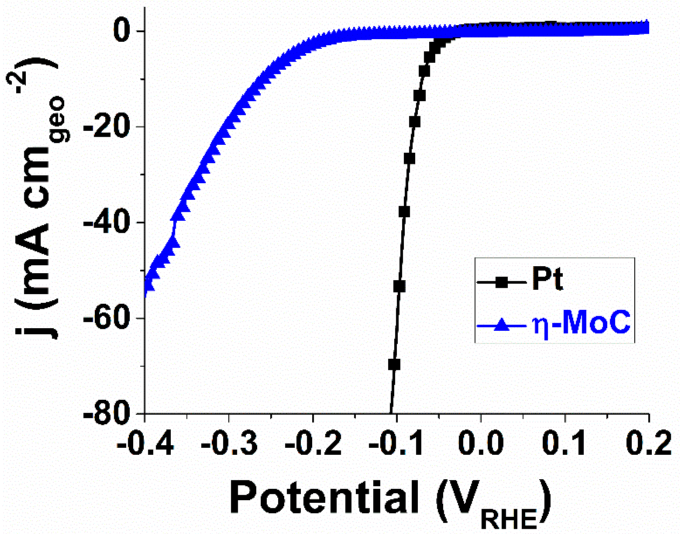

Figure S6. Polarization curve of the η-MoC electrode in 0.5 M H_2SO_4. The data were iR corrected.

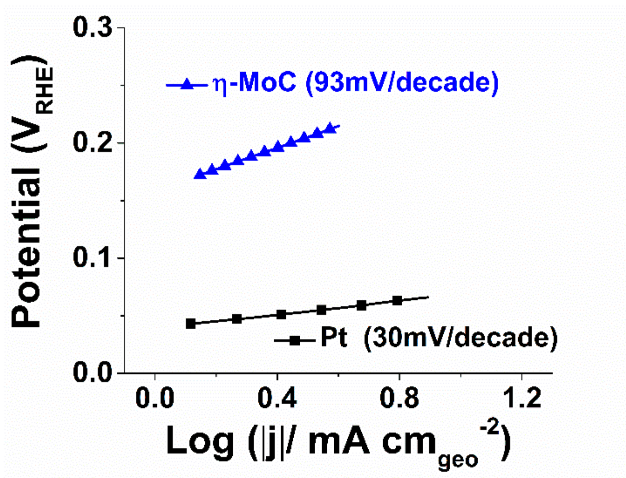

Figure S7. Tafel plot of the η-MoC electrode.

Table S1. Comparison of hydrogen evolution reaction (HER) performance in acid media for γ-$Mo_{0.5}W_{0.5}C$ with other transition metal carbides (TMCs) electrocatalysts.

TMCs	Onset η (mV)	Tafel Slope (mV·dec⁻¹)	Current Density (j, mA·cm⁻²)	η at the Corresponding *j* (mV)	Reference
Mo_2C/CNT	63	-	10	152	[1]
np-Mo_2C NW	70	53	60	200	[2]
Mo_2C/GCSs	120	62.6	10	200	[3]
Mo_2C NWs	160	55.8	10.2	200	[4]
Mo_2C NSs	160	64.5	5.3	200	
Mo_2C nanocomposite	150	110–235	4	250	[5]
γ-MoC	270	121.6	2	320	[6]
β-Mo_2C	180	120	2	240	
Incompressible γ-$Mo_{0.5}W_{0.5}C$	240	74	10	265	This work
			50	320	

References

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