

Electronic Supplementary Information

3D Ordered Porous Mo_xC (x= 1 or 2) for Advanced Hydrogen Evolution and Li Storage

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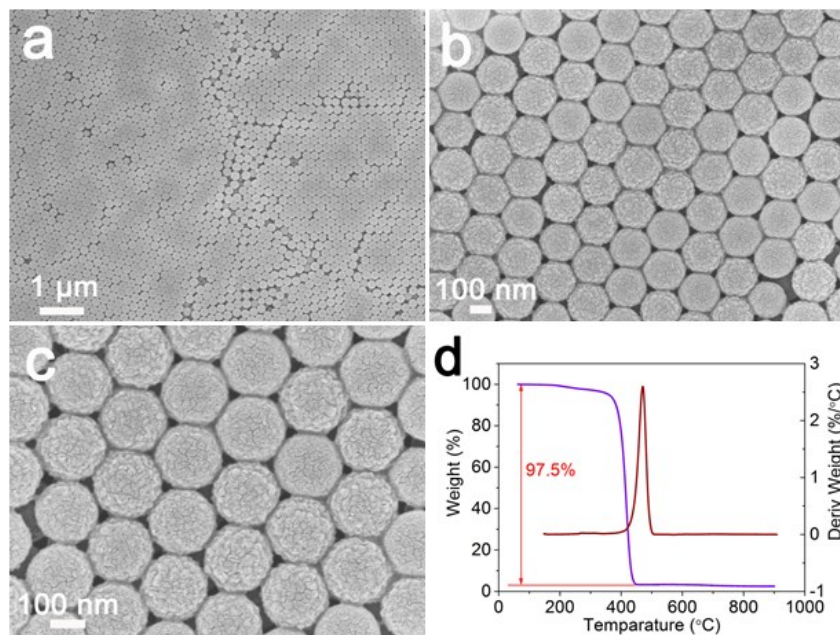


Fig. S1. (a-c) FESEM images and (d) TGA of carboxylic polystyrene (COOH-PS) spheres.

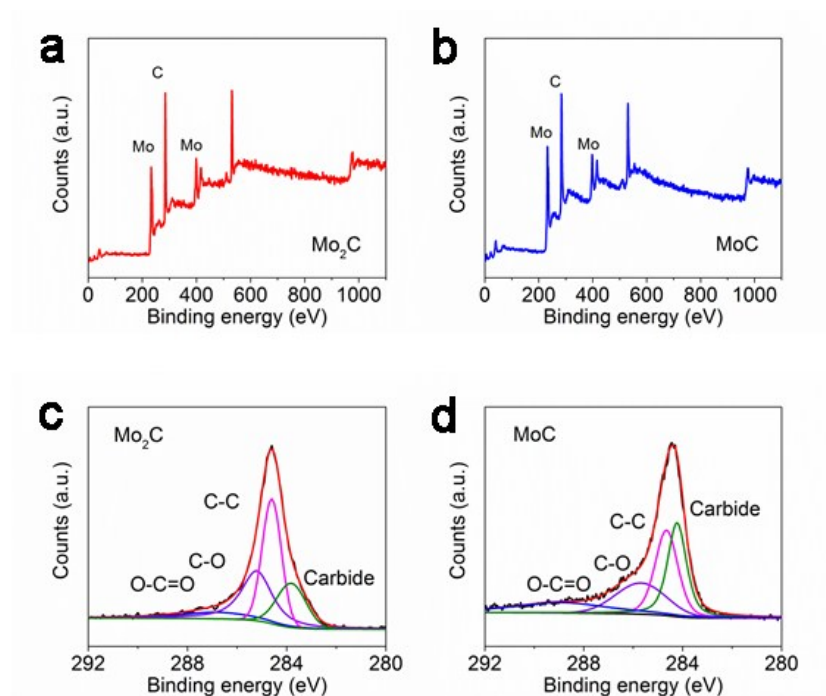


Fig. S2. XPS survey spectrum of (a) Mo_2C and (b) MoC . XPS high resolution scans of C 1s electrons of 3D ordered porous (c) Mo_2C and (d) MoC .

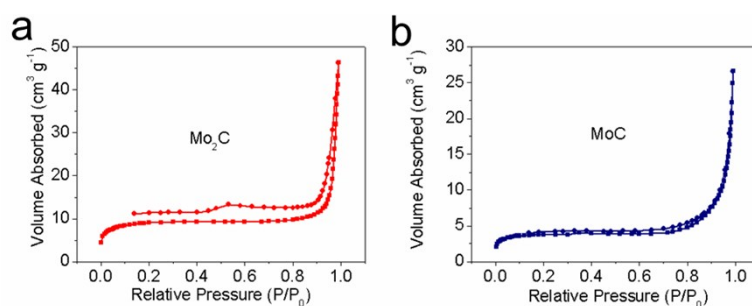


Fig. S3. Nitrogen adsorption/desorption isotherms of (a) Mo_2C and (b) MoC .

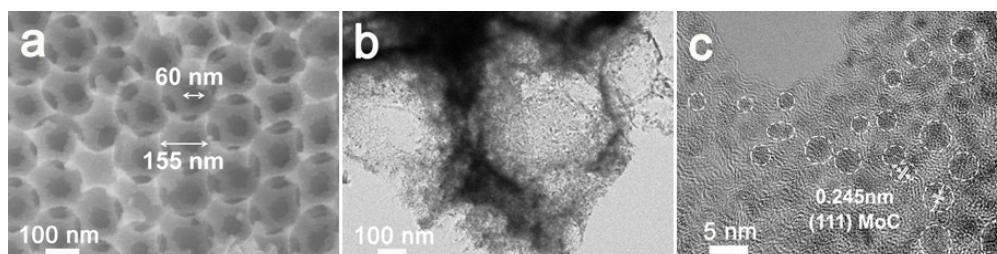


Fig. S4. (a) FESEM, (b) TEM and HRTEM images of MoC .

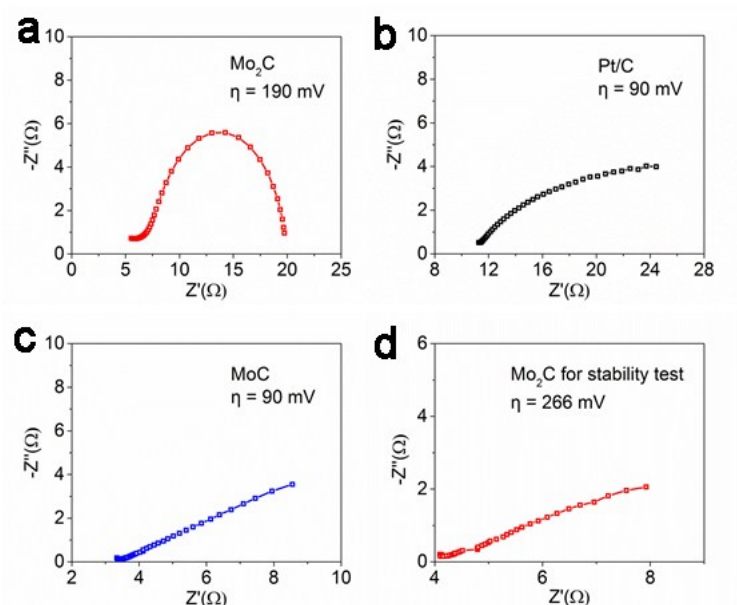


Fig. S5. Electrochemical impedance spectra to measure the resistance of the system for I-R correction of (a) Mo_2C , (b) Pt/C , (c) MoC and (d) Mo_2C during stability test at different overpotentials in 1.0 M PBS buffer solution.

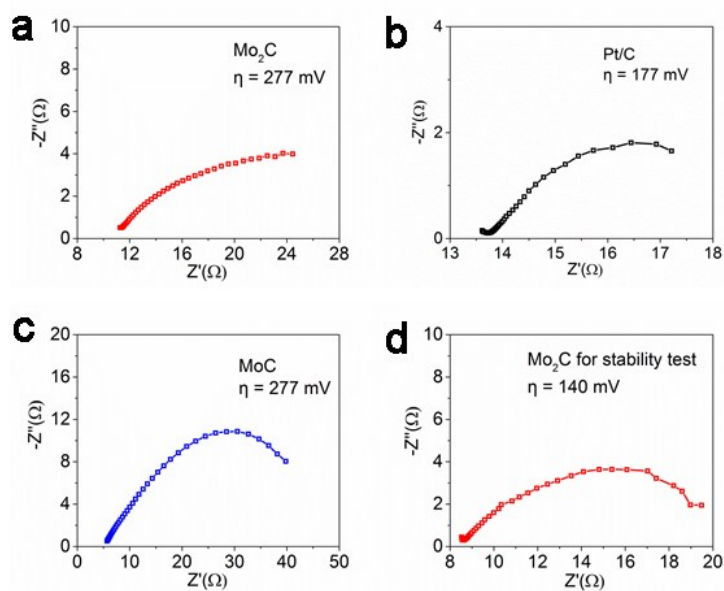


Fig. S6. Electrochemical impedance spectra to measure the resistance of the system for I-R correction of (a) Mo_2C , (b) Pt/C , (c) MoC and (d) Mo_2C during stability test at different overpotentials in 1.0 M KOH solution.

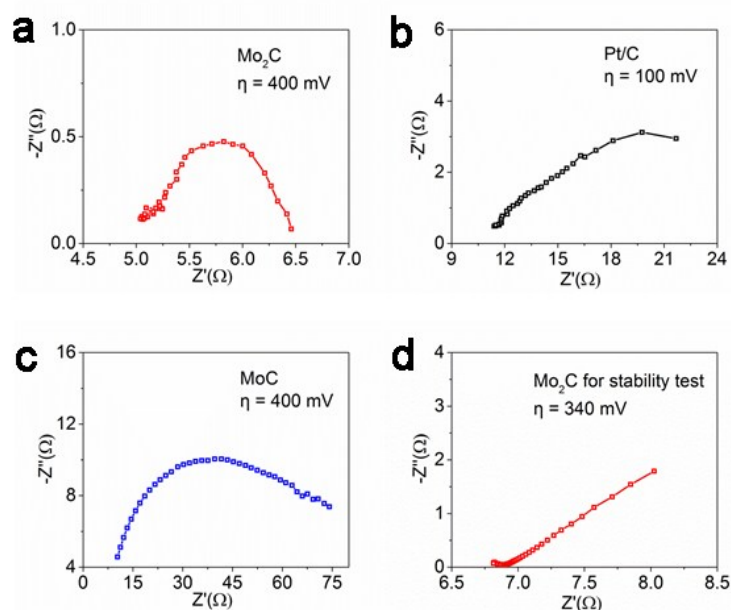


Fig. S7. Electrochemical impedance spectra to measure the resistance of the system for I-R correction of (a) Mo_2C , (b) Pt/C , (c) MoC and (d) Mo_2C during stability test at different overpotentials in 0.5 M H_2SO_4 solution.

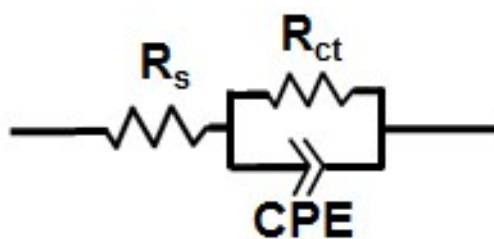


Fig. S8. Equivalent electrical circuit used to fit the Nyquist plots. R_s represents the resistance of the system and R_{ct} is attributed to the charge transfer resistance due to the HER process.

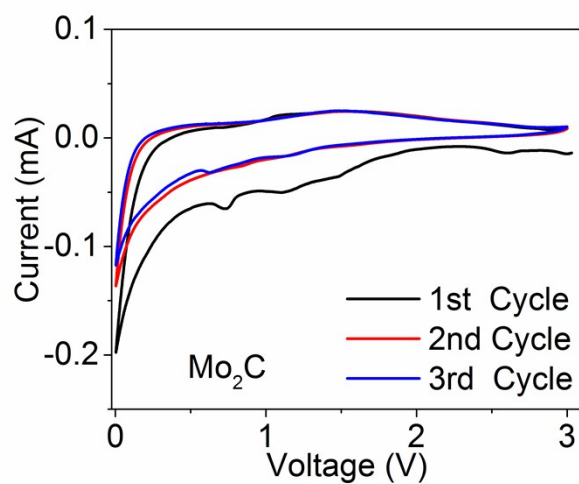


Fig. S9. Cyclic voltammetry (CV) of the first three cycles at a scan rate of 0.2 mV s^{-1} of Mo_2C .

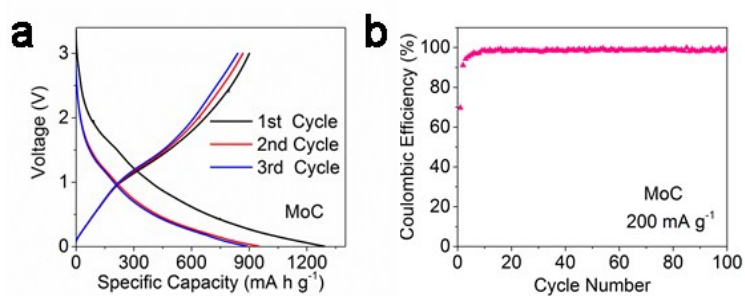


Fig. S10. (a) The first three galvanostatic discharge/charge voltage profiles, and (b) coulombic efficiency for the first 100 cycles of MoC at a current density of 200 mA g^{-1} .

Table S1. Summary and comparison of activities of Non-Pt electrocatalysts for HER.

Catalyst	Electrolyte	Onset Potential (mV vs RHE)	η at 10 mA cm ⁻² (mV vs RHE)	j_0 (mA cm ⁻²)	Tafel slope (mV dec ⁻¹)	Ref
Mo ₂ C	1.0 M PBS (PH 7)	33	204	0.118	42.5	This work
Mo ₂ C	1.0 M KOH	40	128	0.081	34	This work
Mo ₂ C	0.5 M H ₂ SO ₄	70	204	0.153	43.9	This work
MoC _x	1.0 M KOH	80	151	0.029	59	S1
MoS ₂	0.5 M H ₂ SO ₄	120	~190	0.0089	50	S2
MoN/C	0.1 M HClO ₄	157		0.036	54.5	S3
NiMoN/C	0.1 M HClO ₄	78		0.24	36	S3
CoSe ₂	0.5 M H ₂ SO ₄	~100	137	0.005	40	S4
MoS _{2.7} @NPG	0.2 M PBS (PH 7)	120			60	S5
Co-S film/FTO	1.0 M PBS (PH 7)	43	~180	0.256	93	S6
WS ₂	0.5 M H ₂ SO ₄	100			48	S7
NiP/Ti	0.5 M H ₂ SO ₄	~50	140	0.033	46	S8

Reference

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