

Magnetic Field Enhances Interfacial Electron Redistribution to Promote Magneto-electrocatalytic Hydrogen Evolution

Chong Liu¹, Lianqing Yu*¹, Nannan Chen¹, Gege Tian², Haifeng Zhu*²

1. School of Materials Science and Engineering, China University of Petroleum, Qingdao 266580
China.

2. College of Science, China University of Petroleum, Qingdao 266580 China.

*Corresponding author Lianqing Yu *Email: iyy2000@163.com*

Haifeng Zhu *Email: zhufeng_97@upc.edu.cn*

Supplementary Methods

Chemicals and materials

Ammonium molybdate tetrahydrate ((NH₄)₆Mo₇O₂₄·4H₂O), ferric chloride hexahydrate (FeCl₃·6H₂O), Cetyltrimethylammonium bromide (CTAB), melamine (C₃H₆N₆), potassium hydroxide (KOH), and ethanol (C₂H₅OH) were purchased from Aladdin company, (Shanghai, China). The above chemicals were used as received.

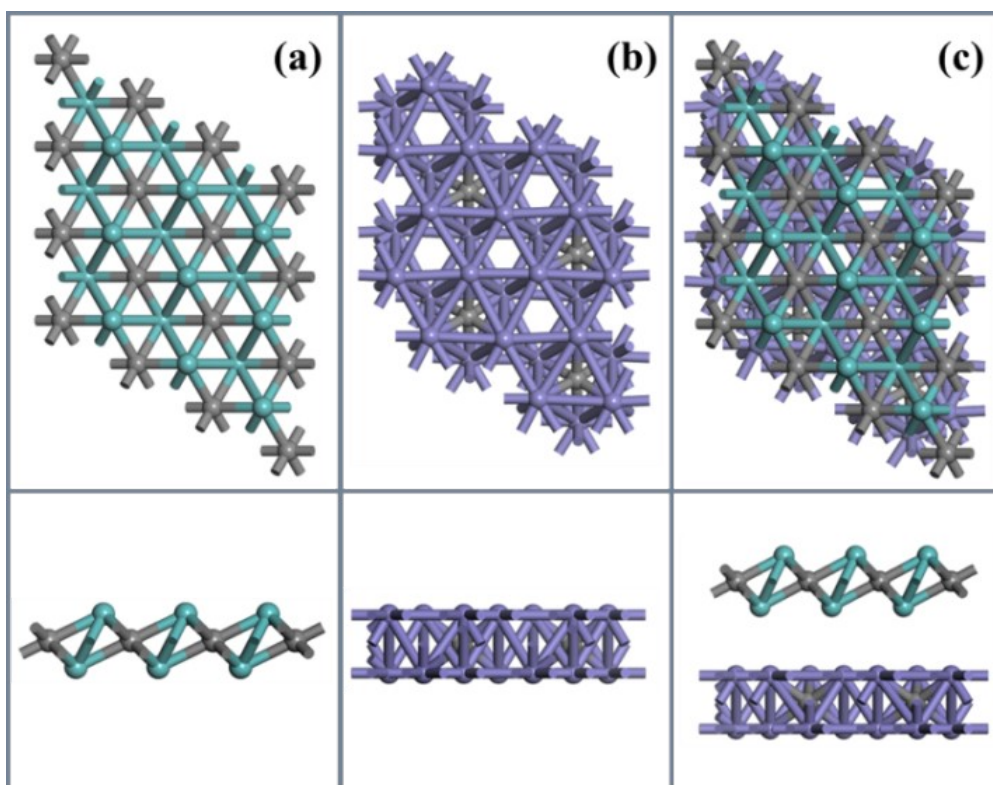


Fig. S1 Top and side views of the Mo₂C (a), Fe₃C (b), and Mo₂C/Fe₃C (c).

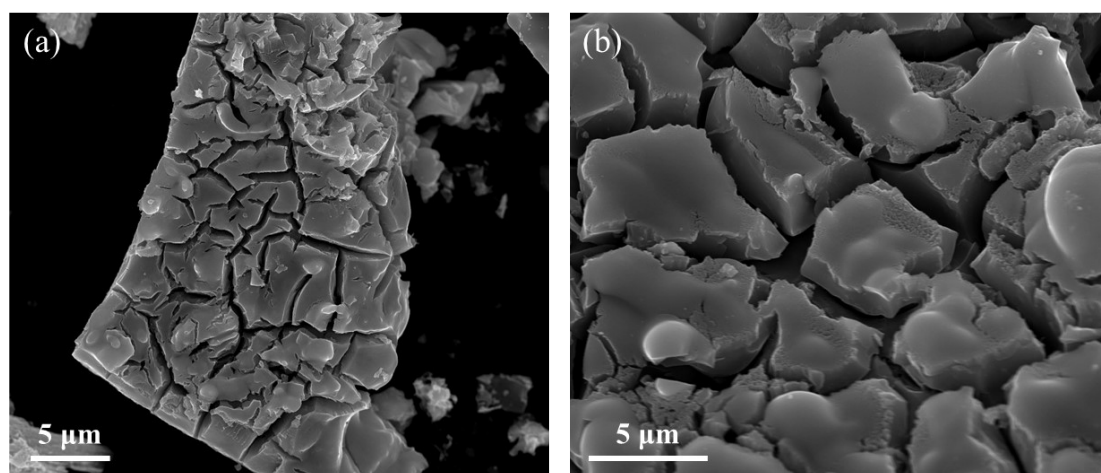


Fig. S2 SEM images of Mo₂C.

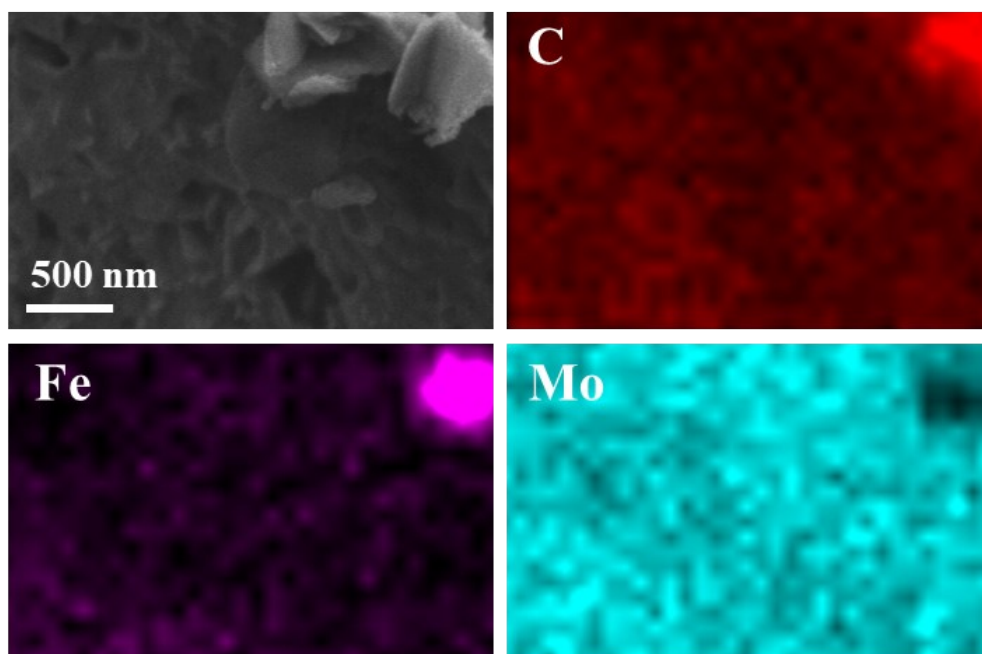


Fig. S3 SEM images of $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -1:1 and corresponding element mappings.

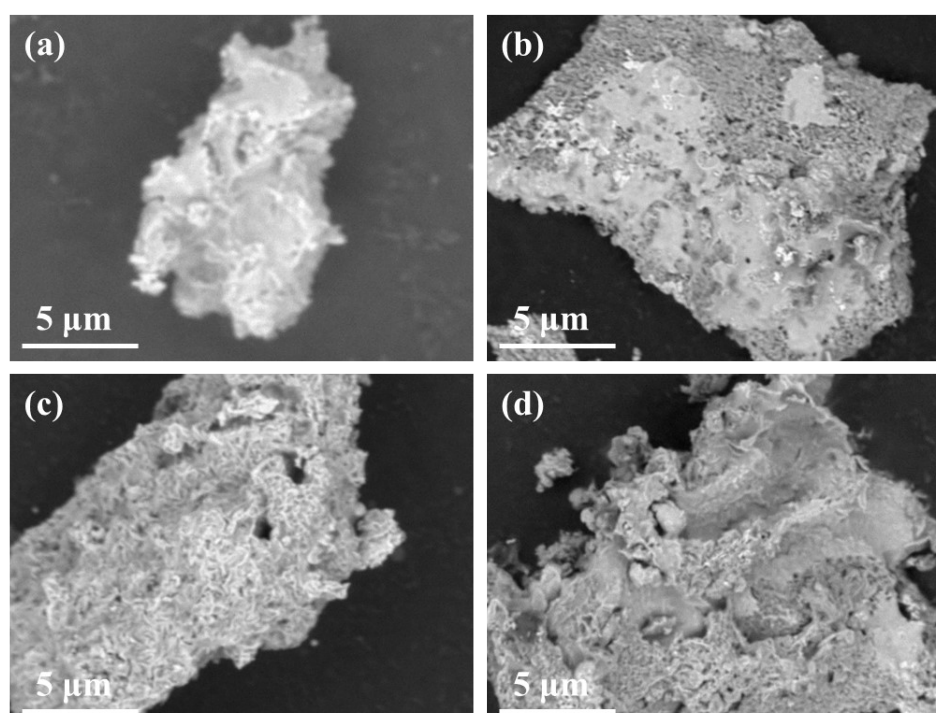


Fig. S4 SEM images of $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -2:1 (a-b) and $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -1:2 (c-d).

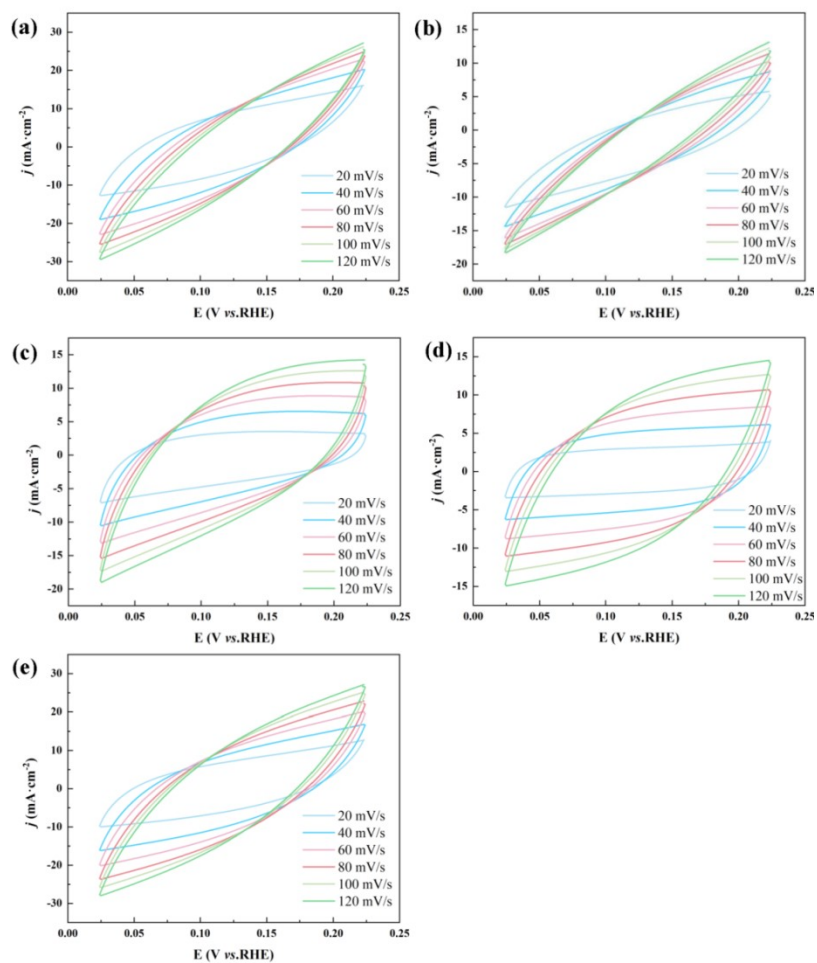


Fig. S5 Cyclic voltammetry curves of Mo_2C (a), Fe_3C (b), $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -2:1 (c), $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -1:1 (d), and $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -1:2 (e) at different scanning rates.

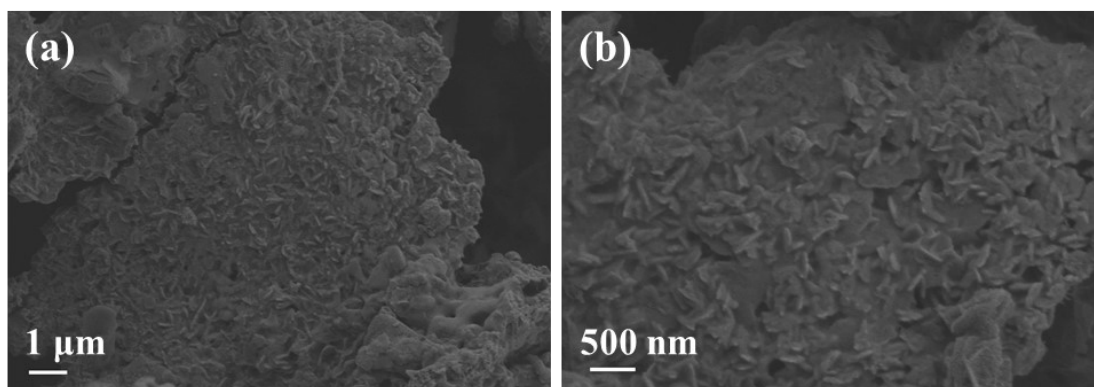


Fig. S6 (a-b) SEM images of $\text{Mo}_2\text{C}/\text{Fe}_3\text{C}$ -1:1 after the stability test.

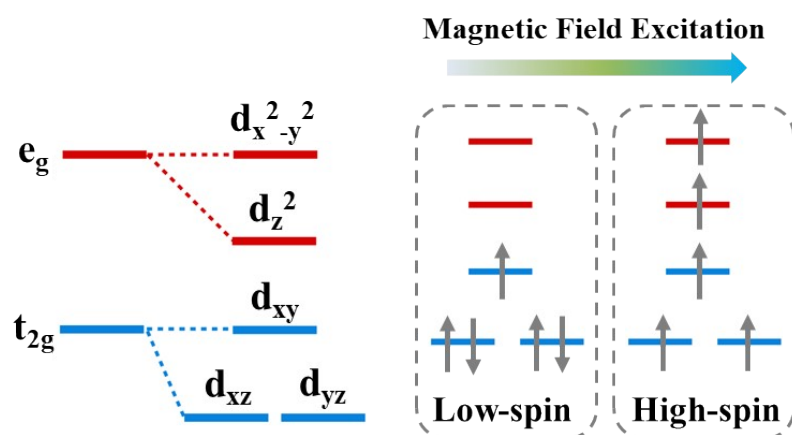


Fig. S7 Electron transition of Fe from the low to high spin.

Table S1 Values of resistance (R_s), and charge transfer resistance (R_{ct}) obtained after fitting the Nyquist plots determined on different samples.

Electrocatalysts	R_s (Ω)	R_{ct} (Ω)
Mo ₂ C	1.16	11.92
Fe ₃ C	1.27	76.12
Mo ₂ C/Fe ₃ C-1:2	1.08	4.69
Mo ₂ C/Fe ₃ C-1:1	1.56	1.25
Mo ₂ C/Fe ₃ C-2:1	1.14	3.28