

Supporting information

Irradiation regulates the size of Pt nanoparticles on Au@MnO₂ nanosheets for electrocatalytic hydrogen evolution

Ting Li ^{a, b, c}, Yidan Liu ^{a, b}, Rongrong Jia ^b, Muhammad Yaseen ^d, Liyi Shi ^b and Lei Huang ^{b*}

^a School of Materials Science and Engineering, Shanghai University, Shanghai 200444, P. R. China.

^b Research Center of Nano Science and Technology, College of Sciences, Shanghai University, Shanghai 200444, P. R. China.

^c Jiangxi Province Key Laboratory of Polymer Preparation and Processing, Shangrao Normal University, Shangrao 334001, P. R. China.

^d Institute of Chemical Sciences, University of Peshawar, 25120, KP, Pakistan

*Corresponding authors. Fax: +86-21-66137426; Tel: +86-21-66137426.

E-mail addresses: leihuang@shu.edu.cn (L. Huang)

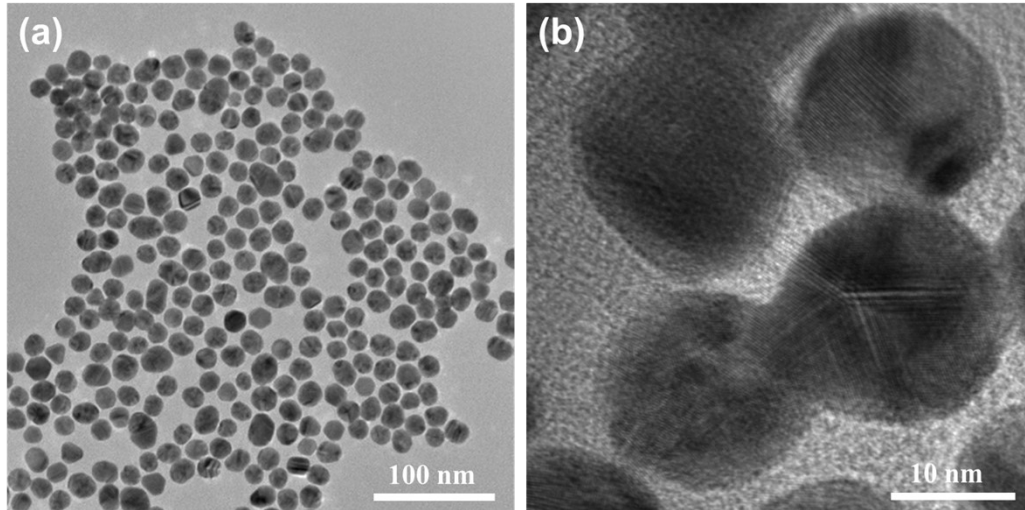


Fig. S1. TEM images of Au nanoparticles.

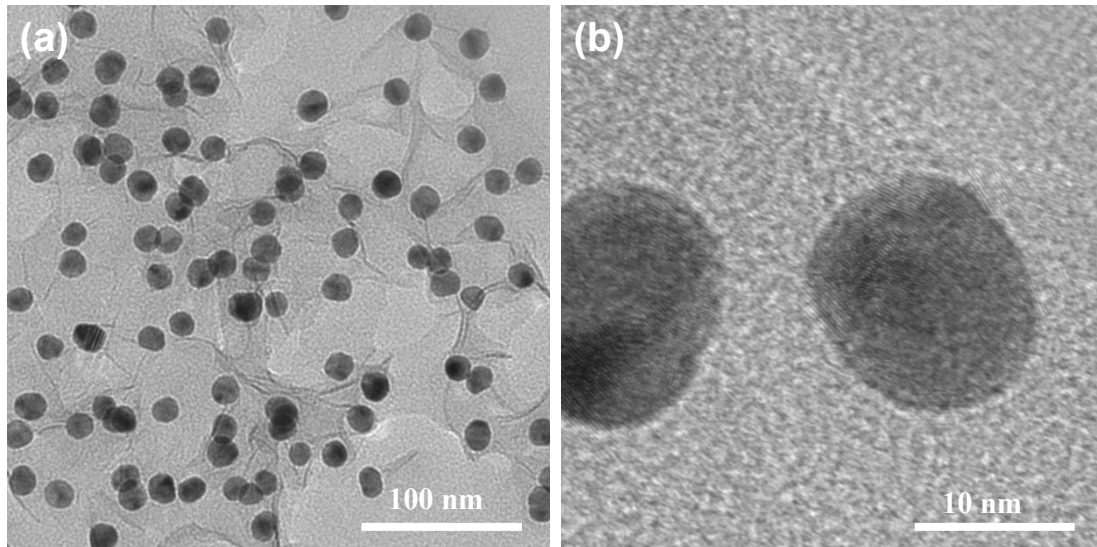


Fig. S2. TEM images of Au@MnO₂ nanosheets.

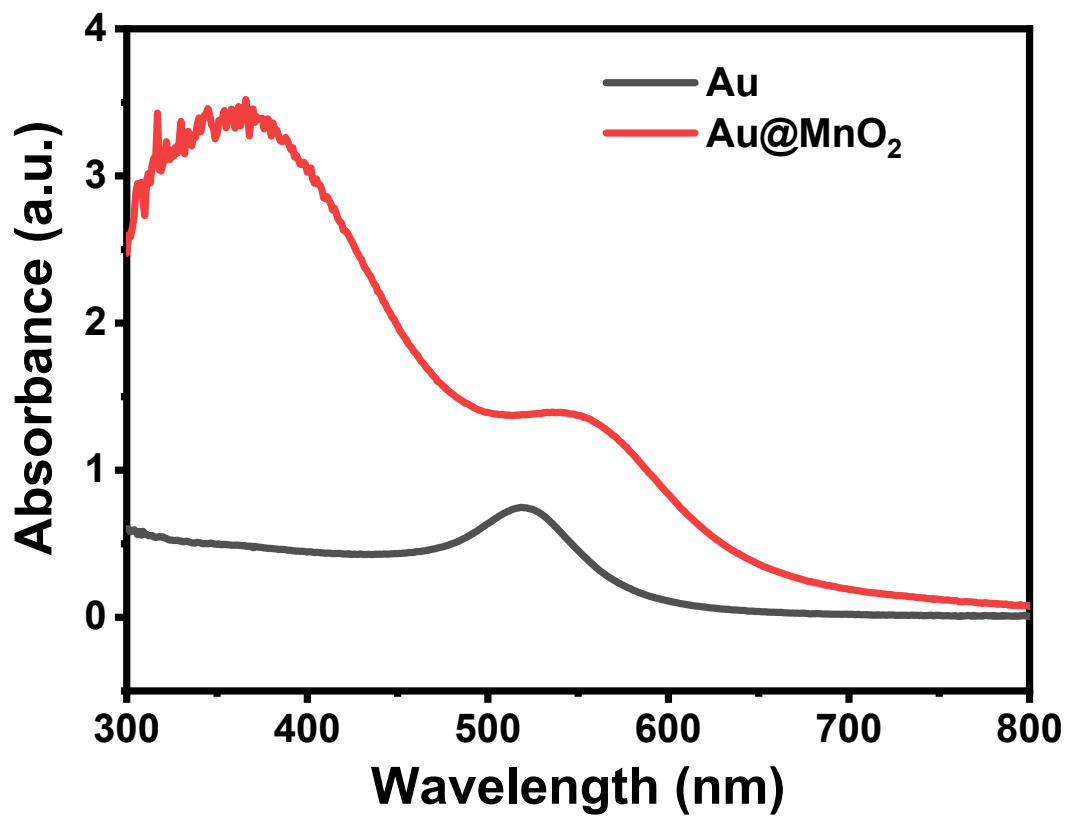


Fig. S3. UV-vis absorption spectra of Au NPs and Au@MnO₂ nanosheets.

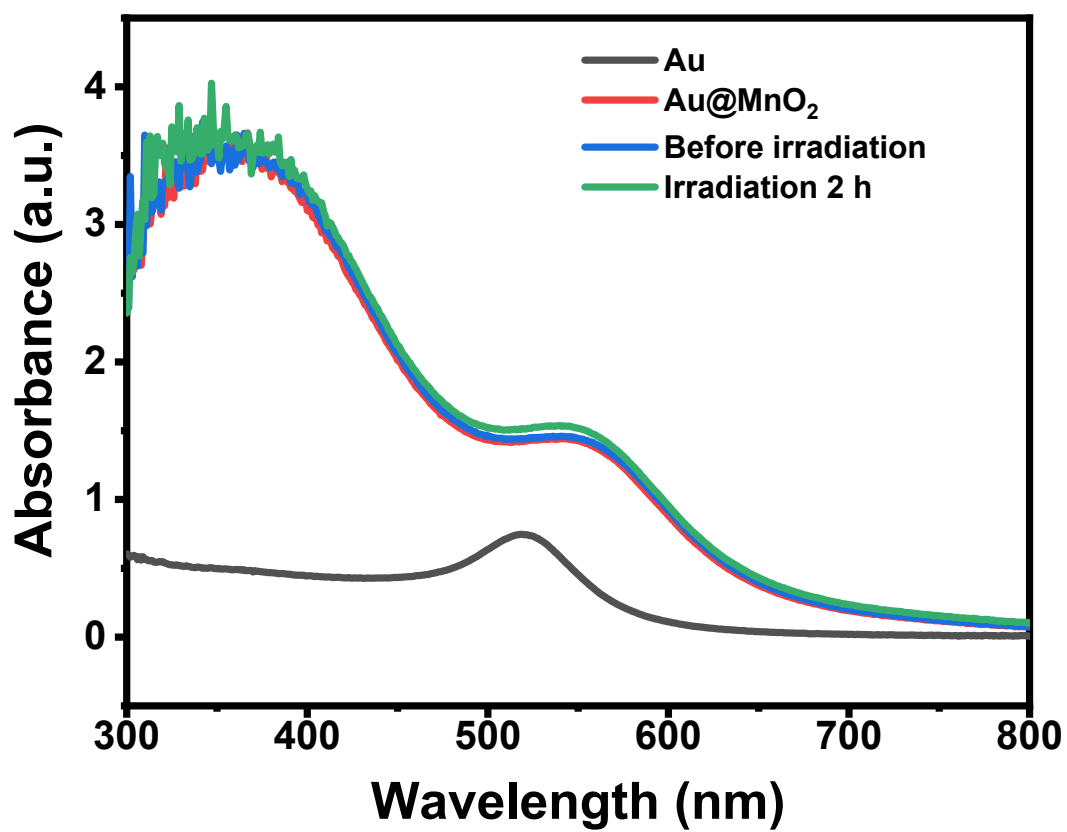


Fig. S4. UV-vis absorption spectra of Ag-520/Au@MnO₂.

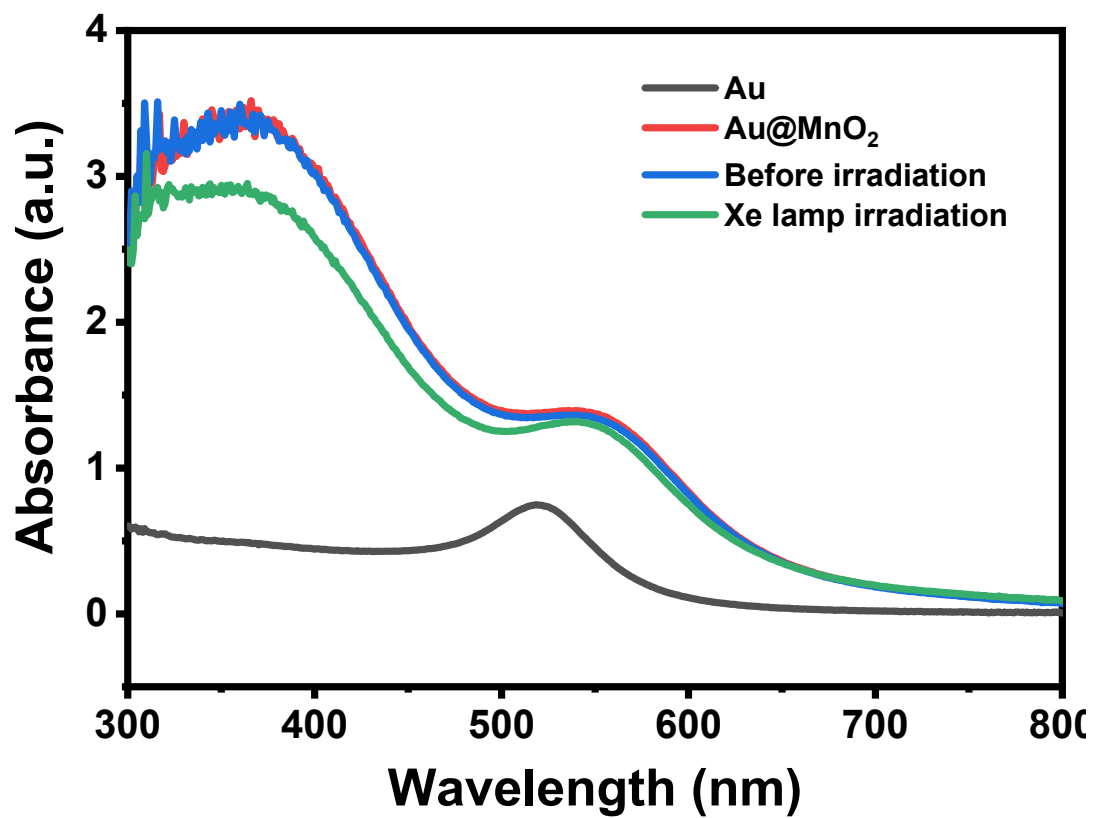


Fig. S5. UV-vis absorption spectra of Pt-Xe/Au@MnO₂.

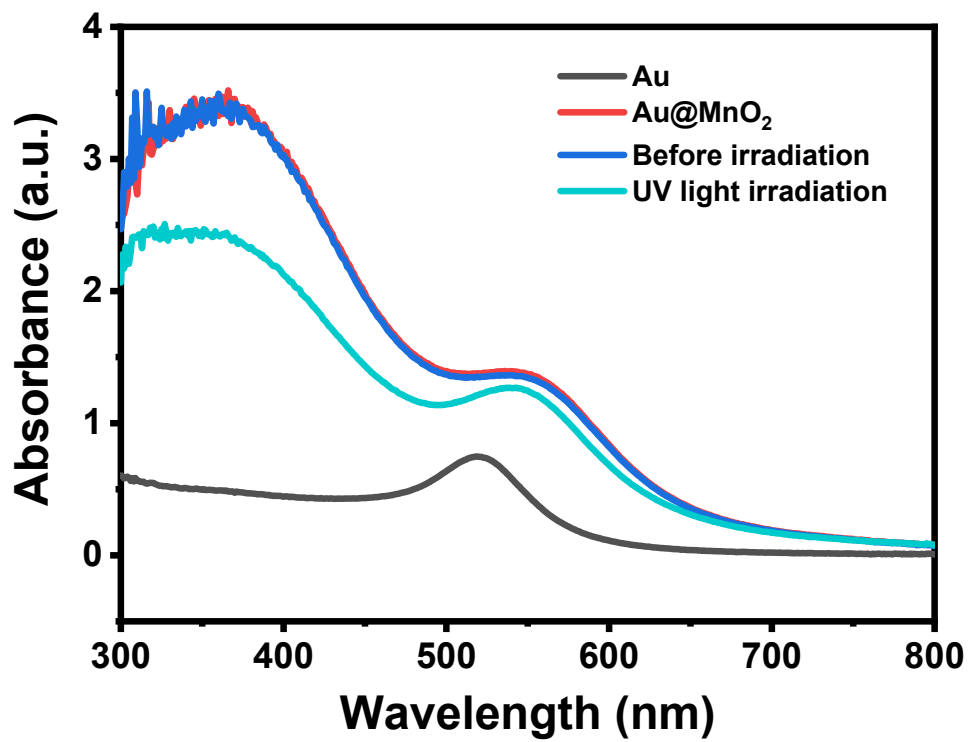


Fig. S6. UV-vis absorption spectra of Pt-400/Au@MnO₂.

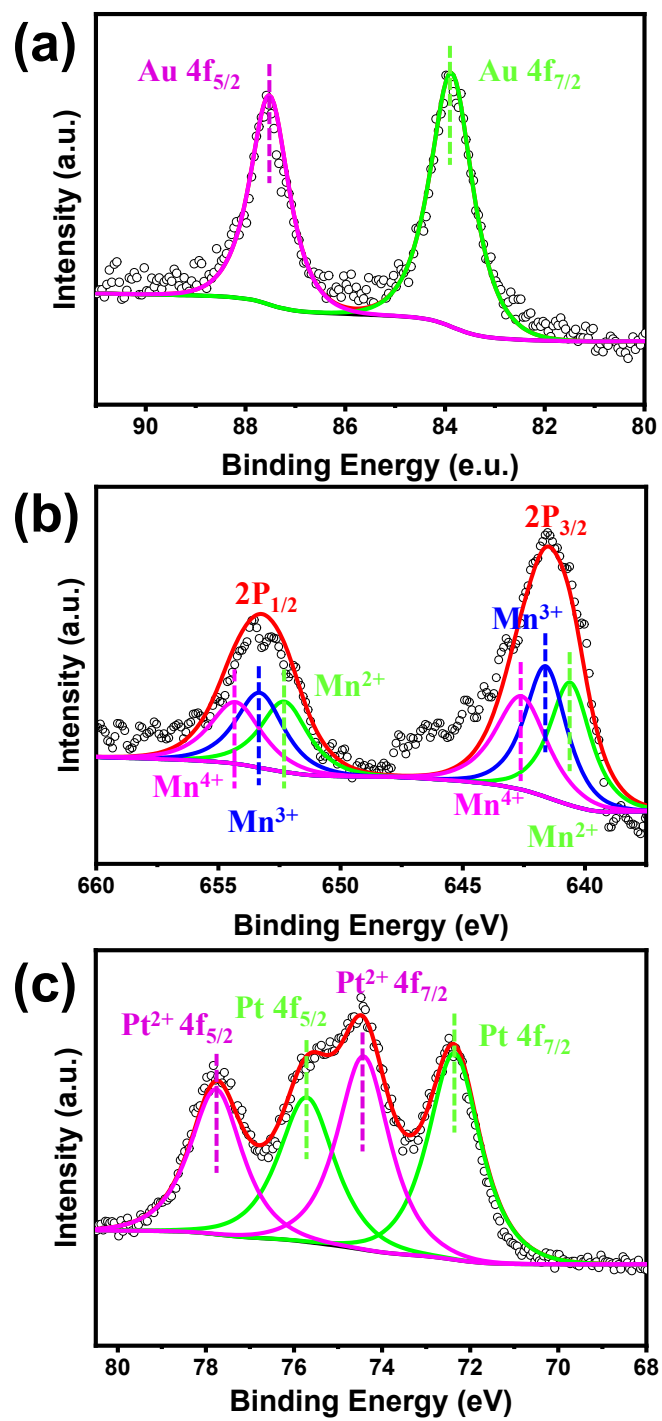


Fig. S7. Au 4f (a), Mn 2p (b) and Pt 4f (c) XPS spectra of Pt-400/Au@MnO₂.

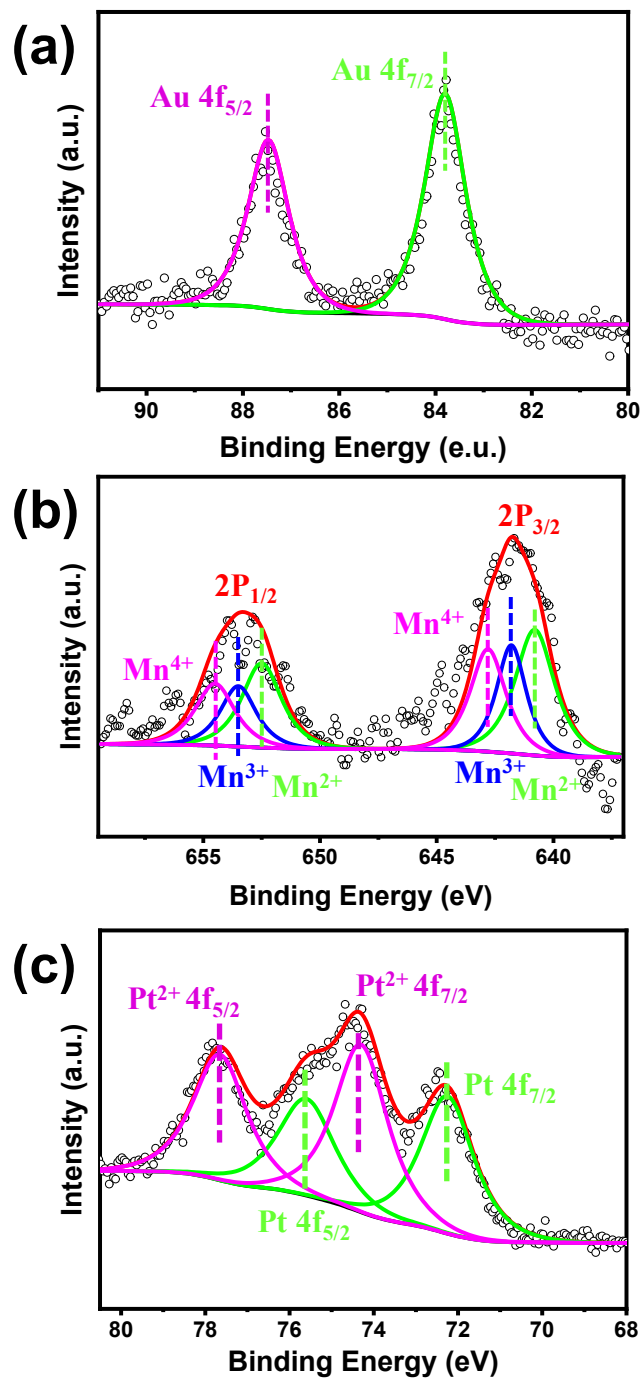


Fig. S8. Au 4f (a), Mn 2p (b) and Pt 4f (c) XPS spectra of Pt-Xe/Au@MnO₂.

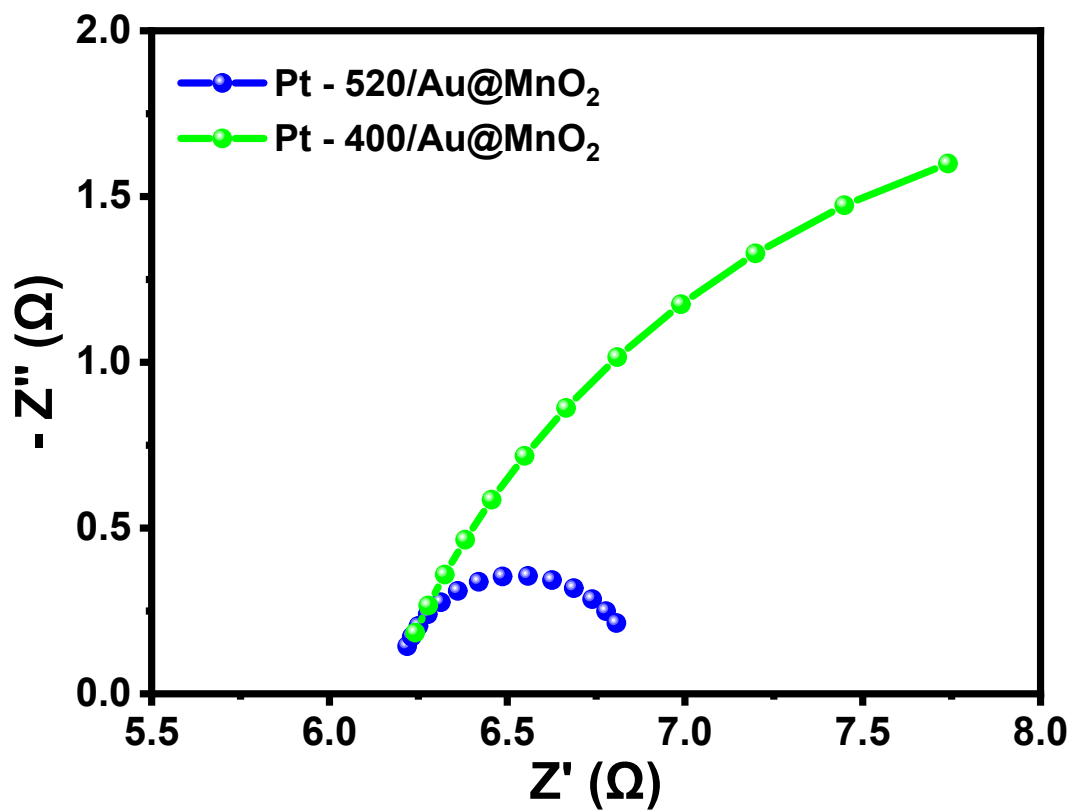


Fig. S9. Electrochemical impedance spectroscopy (EIS) curves of Pt-400/Au@MnO₂, Pt-520/Au@MnO₂.

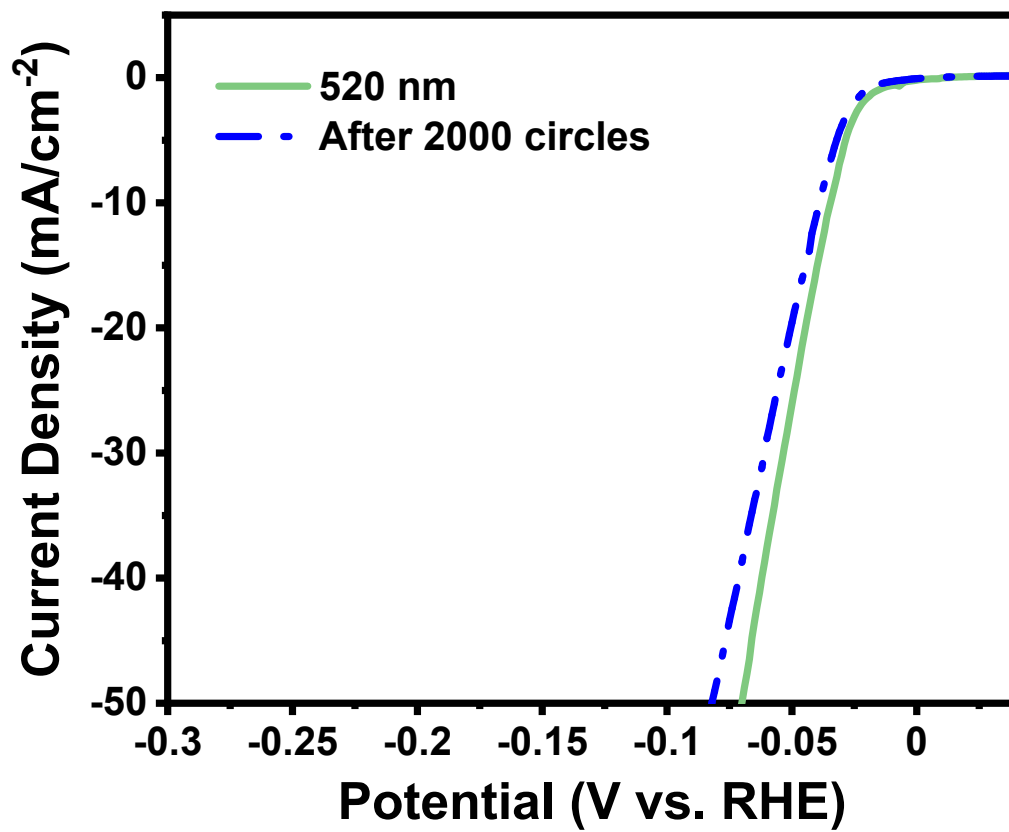


Fig. S10. Durability test of the Pt-520/Au@MnO₂.

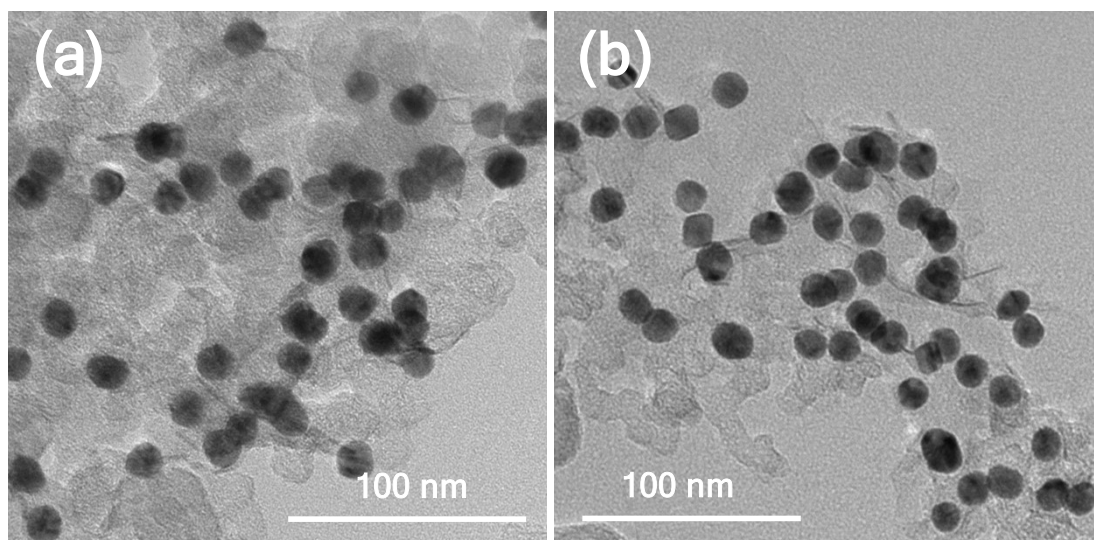


Fig. S11. TEM images of carbon powder supported Pt-520/Au@MnO₂ catalyst before and after chronoamperometry measurement for 12 h.

Table S1. Comparison of HER performance of the Pt-based catalysts.

Catalyst	Electrolyte	η (mV) @ 10 mA \cdot cm ⁻²	Mass activity (A \cdot mg _{Pt} ⁻¹)	Tafel (mV dec ⁻¹)	Reference
Pt-520/Au@MnO ₂	0.5 M H ₂ SO ₄	36	17.5 (η = 50 mV)	19	This work
20 Wt.% Pt/C	0.5 M H ₂ SO ₄	41	1.33 (η = 50 mV)	34	This work
PtAC-MnO ₂	1 M PBS	41	0.8 (η = 50 mV)	67	1
Pt ₁ /NCNS	0.5 M H ₂ SO ₄	40	7.1 (η = 50 mV)	-	2
Pt/rGO/GCE	0.5 M H ₂ SO ₄	30	-	33	3
Pt-NiS ₂ @CC	0.5 M H ₂ SO ₄	60	-	28.9	4
Pt/NPSSF	0.5 M H ₂ SO ₄	73	-	49.85	5
Pt-MoS ₂	0.5 M H ₂ SO ₄	55	-	41	6
Pt@MoS ₂	0.5 M H ₂ SO ₄	88.34	-	55.69	7
Pt-MoS ₂	0.5 M H ₂ SO ₄	103	-	56	8
1Pt/VS ₂ /CP	0.5 M H ₂ SO ₄	77	9.81 (η = 50 mV)	40.13	9
Pt ₅ /HMCS-5.08%	0.5 M H ₂ SO ₄	20.7	12.8 (η = 30 mV)	28.3	10
K ₂ PtCl ₄ @NC-M	0.5 M H ₂ SO ₄	11	5.6 (η = 20 mV)	21	11
MoS _x /CNTs/Pt	0.5 M H ₂ SO ₄	25	-	27	12
Pt/Ru/VC	0.5 M H ₂ SO ₄	23	2.3 (η = 40 mV)	30.6	13
Pt1/OLC	0.5 M H ₂ SO ₄	38	7.4 (η = 38 mV)	36	14
Pt@NOMC-A	0.5 M H ₂ SO ₄	8	1.637 (η = 50 mV)	43	15
Pt/G ₅ -(MoS ₂) ₅	0.5 M H ₂ SO ₄	33	-	23	16
Pt _{1.8} MoS ₂	0.5 M H ₂ SO ₄	80	-	48	17
Pt/MoS ₂ -80	0.5 M H ₂ SO ₄	31	-	52	18

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