Supporting Information

Ultrathin Ir nanowires as high-performance electrocatalysts for efficient water splitting in acidic media

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Supplementary Figures: Figure S1- S11

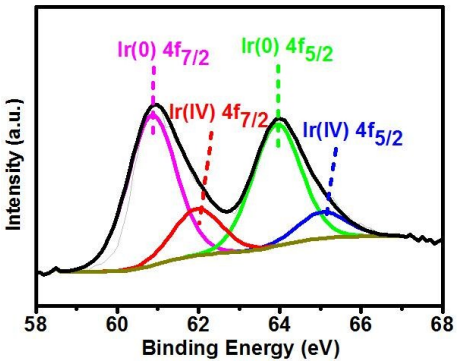

Fig. S1 XPS spectra of Ir 4f for Ir WNWs.

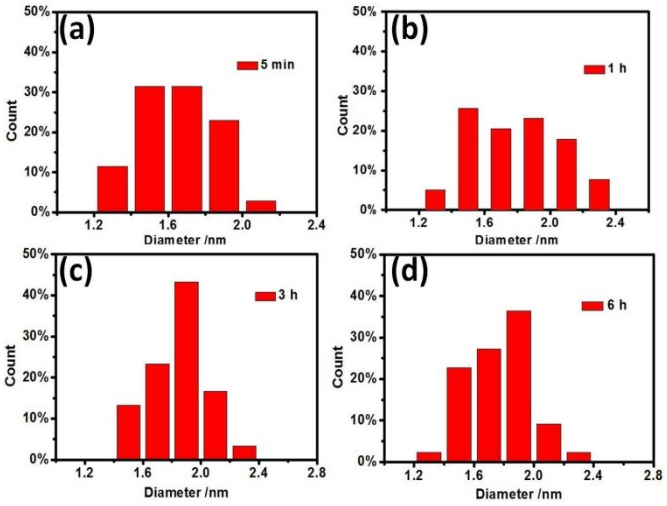

Fig. S2 Size statistics of as-prepared Ir NWs at diffrerent growth stages: 5 min (a), 1 h (b), 3 h (c) and 6 h (d).

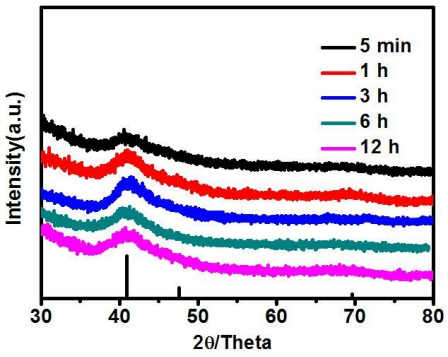

Fig. S3 XRD patterns of as-synthesized Ir WNWs at diffrerent growth stages.

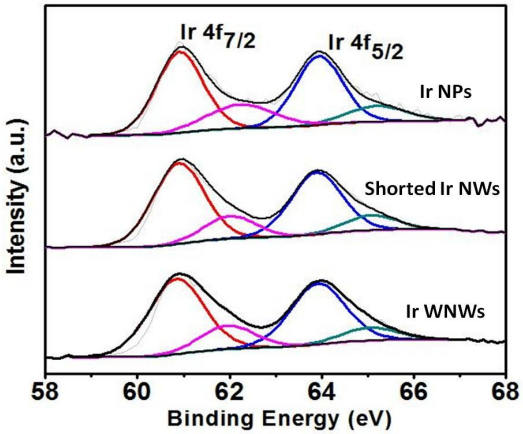

Fig. S4 XPS spectra of Ir 4f for the as-prepared Ir WNWs, shorted Ir NWs, and Ir NPs.

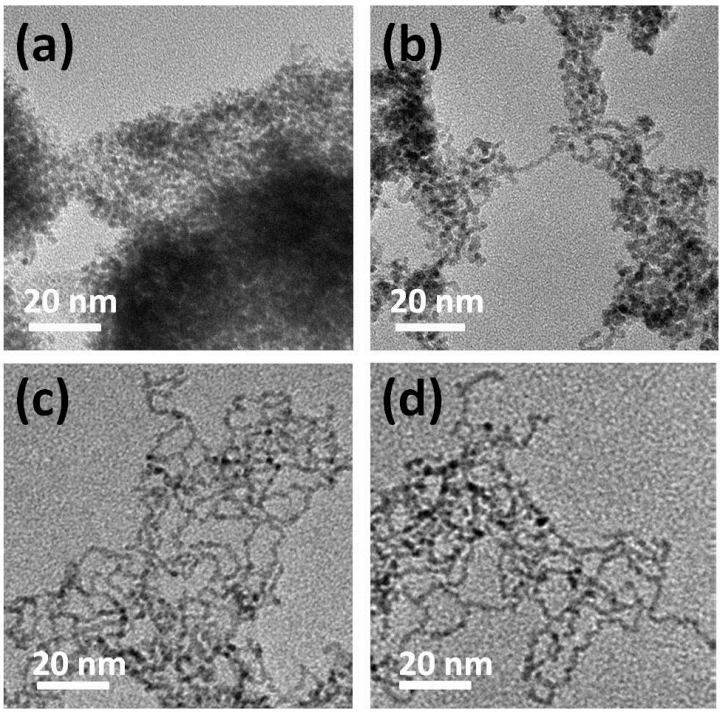

Fig. S5 TEM images of Ir WNWs obtained with different amounts of CTAB: a) 0 g, b) 0.5 g, c) 1 g and d) 3 g.

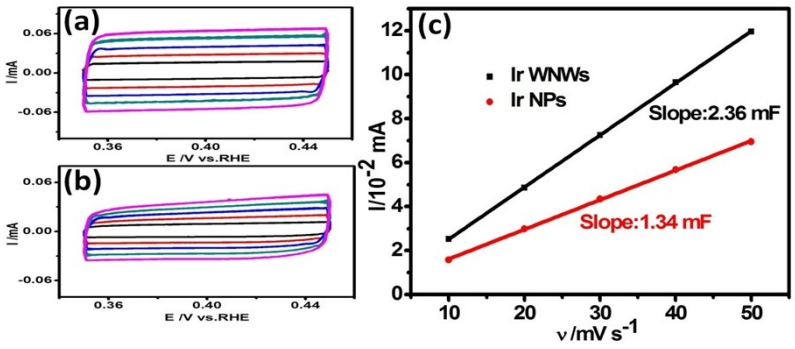

Fig. S6 Charging currents measured in the non-faradaic potential of 0.35 V-0.45 V (vs. RHE) at different scan rates (0.01, 0.02, 0.03, 0.04 and 0.05 V/s) for Ir WNWs (a) and Ir NPs (b). (c) Charging currents measured at 0.40 V vs. RHE plotted as a function of scan rate. The double layer capacitance of the system is taken from the slopes of the linear fit to the data.

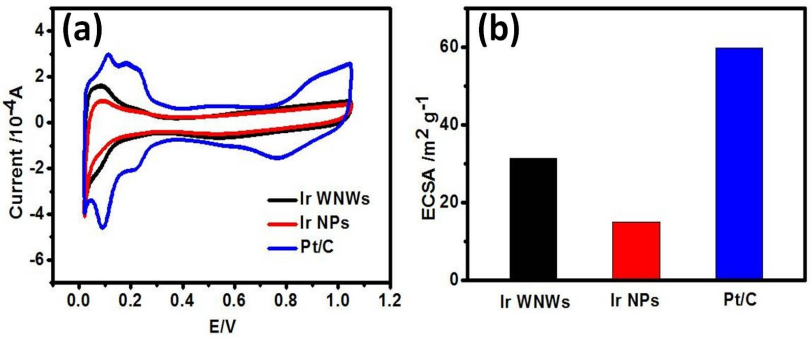

Fig. S7 (a) Cyclic voltammograms of Ir WNWs, Ir NPs, and the commercial Pt/C in N_2-saturated 0.1 M $HClO_4$ solution at 50 mV s^{-1}. (b) The corresponding ECSAs of Ir WNWs, Ir NPs, and the commercial Pt/C.

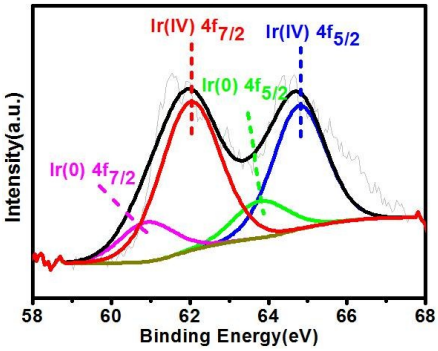

Fig. S8 XPS spectra of Ir 4f for Ir WNWs after OER in acidic condition.

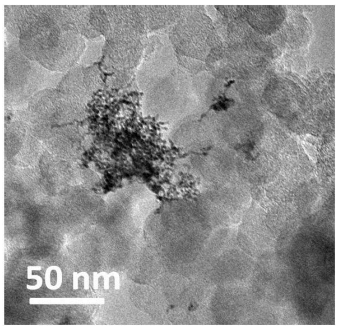

Fig. S9 TEM image of Ir WNWs after the stability test.

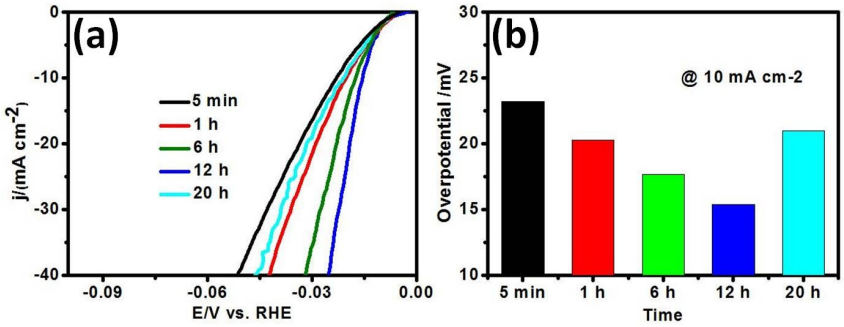

Fig. S10 (a) The HER polarization curves of Ir WNWs at diffrerent growth stages in 0.5 M $HClO_4$ solution; (b) The corresponding overpotentials at 10 mA cm^{-2} for Ir WNWs at diffrerent growth stages.

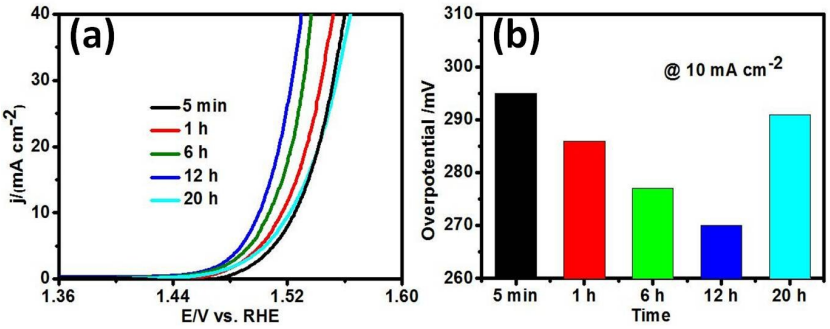

Fig. S11 (a) The OER polarization curves of Ir WNWs at diffrerent growth stages in 0.5 M $HClO_4$ solution; (b) The corresponding overpotentials at 10 mA cm^{-2} for Ir WNWs at diffrerent growth stages.

Table S1 Comparison of HER activity for different electrocatalysts in acidic electrolytes.

Catalysts	Electrolyte	Current density	η /mV	Reference
Ir WNWs	**0.5 M $HClO_4$**	**10 mA cm^{-2}**	**15**	**This work**
		20 mA cm^{-2}	**19**	
	0.1 M $HClO_4$	**10 mA cm^{-2}**	**11**	
		20 mA cm^{-2}	**14**	
IrNi NCs	0.1 M $HClO_4$	20 mA cm^{-2}	21	1
Ru@C_2N	0.5 M H_2SO_4	10 mA cm^{-2}	22	2
		20 mA cm^{-2}	35	
Ru/C_3N_4/C	0.5 M H_2SO_4	10 mA cm^{-2}	70	3
Rh_2P/C	0.5 M H_2SO_4	5 mA cm^{-2}	5.4	4
Rh/Si	0.5 M H_2SO_4	50 mA cm^{-2}	110	5
Rh-MoS_2	0.5 M H_2SO_4	10 mA cm^{-2}	47	6
Pt_3Ni_3 NWs	0.5 M H_2SO_4	10 mA cm^{-2}	30	7
	0.05 M H_2SO_4	5 mA cm^{-2}	60	

Table S2 Comparison of OER activity for different electrocatalysts in acidic electrolytes.

Catalysts	Electrolyte	Current density	η /mV	Reference
Ir WNWs	**0.5 M $HClO_4$**	**10 mA cm^{-2}**	**270**	**This work**
	0.1 M $HClO_4$	**10 mA cm^{-2}**	**280**	
3D Ir	0.5 M $HClO_4$	10 mA cm^{-2}	303	8
Ir-Ni NPs	0.05 M H_2SO_4	5 mA cm^{-2}	348	9
IrNi NCs	0.1 M $HClO_4$	10 mA cm^{-2}	280	1
		1500 A g_{Ir}^{-1}	290	
Ir-Ni oxide	0.1 M $HClO_4$	10 mA cm^{-2}	310	10
Co-IrCu ONC/C	0.1 M $HClO_4$	10 mA cm^{-2}	293	11
IrNiCu DNF/C	0.1 M $HClO_4$	10 mA cm^{-2}	300	12
		460 A g_{Ir}^{-1}	300	
IrNiOx/ATO	0.05 M H_2SO_4	10 mA cm^{-2}	331	13
		300 A g_{Ir}^{-1}	300	
IrOx-Ir	0.5 M H_2SO_4	10 mA cm^{-2}	295	14
		80 A g_{Ir}^{-1}	300	
IrOx/ATO	0.05 M H_2SO_4	10 mA cm^{-2}	360	15
$IrO_x/SrIrO_3$	0.5 M H_2SO_4	10 mA cm^{-2}	275	16
Ir	1 M H_2SO_4	10 mA cm^{-2}	360	17
Ru	1 M H_2SO_4	10 mA cm^{-2}	340	17

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