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Supporting Information

Colloidal synthesis of iridium-iron nanoparticles for electrocatalytic oxygen evolution

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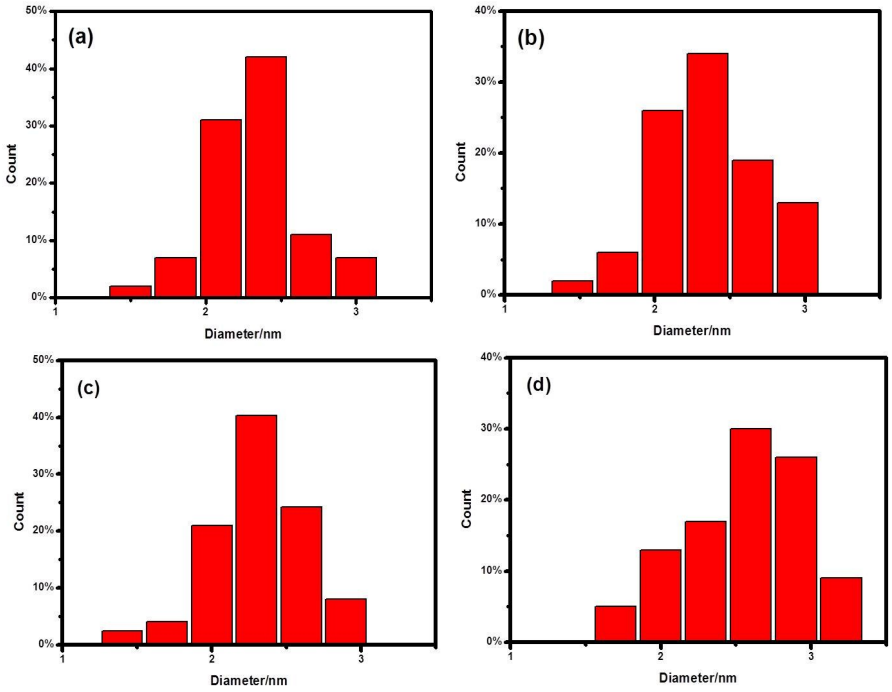

Figure S1. Size statistics of as-prepared Ir-Fe alloy nanoparticles with initial molar ratios of Ir/Fe precursors were 1:1 (a), 3:1 (b), 1:3 (c) and 1:0 (d), respectively.

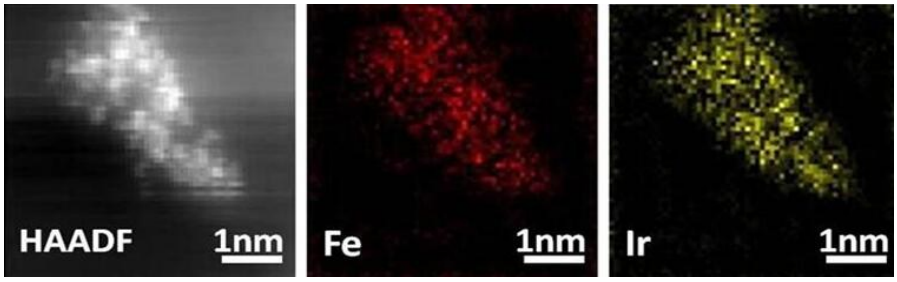

Figure S2. HAADF-STEM image of Ir-Fe alloy nanoparticles with initial molar ratio 1:1 and the corresponding element mapping of Fe (red) and Ir (yellow).

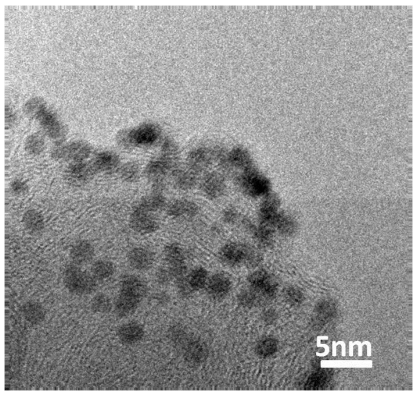

Fig. S3 (a) TEM image of $Ir_1Fe_{0.41}$/C achieved by washing IrFe (molar ratio of Ir/Fe precursors: 1/1) alloy nanoparticles loaded on the activated carbon with acetic acid.

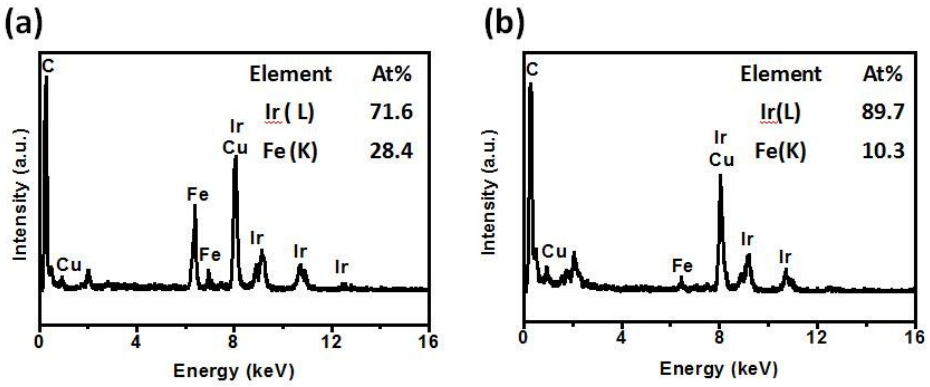

Fig. S4 EDX spectrum of $Ir_1Fe_{0.41}/C$ (a) and $Ir_1Fe_{0.11}/C$ (b).

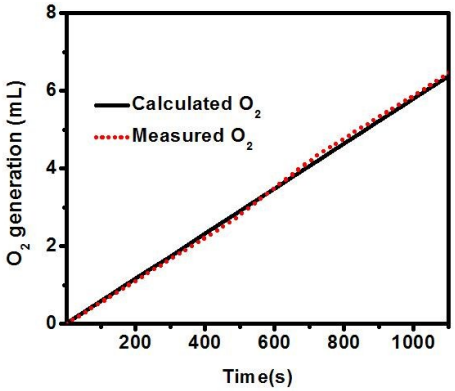

Fig. S5 Faradaic efficiency of O_2 production: the catalysts were loaded onto nickel foam (loading: 0.092 mg cm^{-2}).

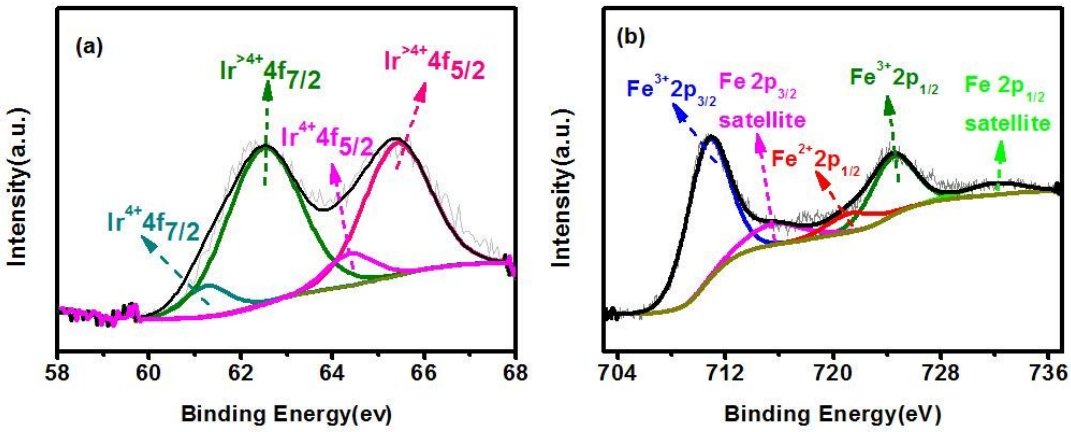

Fig. S6 The XPS spectra of Ir 4f (a) and Fe 2p (b) for the Ir-Fe alloy nanoparticles after anodic scan treatments in 1.0 M KOH solution.

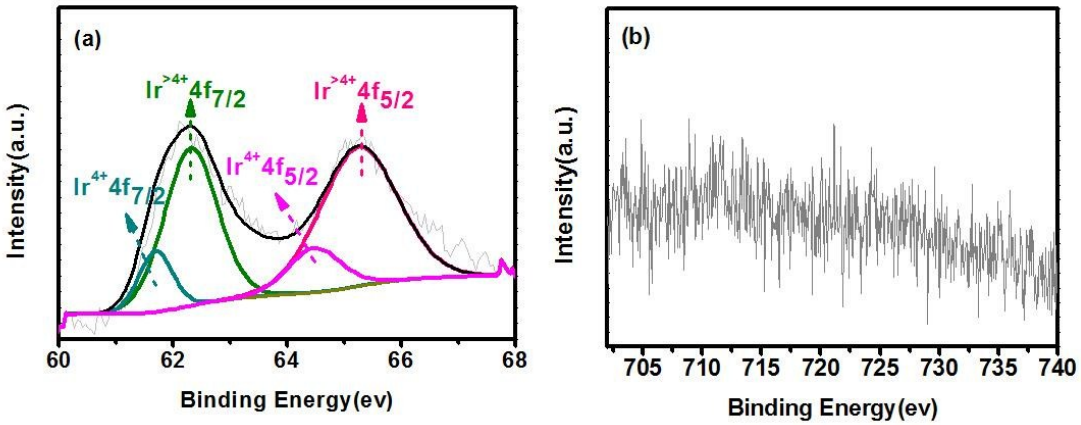

Fig. S7 The XPS spectra of Ir 4f (a) and Fe 2p (b) for the Ir-Fe alloy nanoparticles after anodic scan treatments in 0.5 M $HClO_4$ solution.

Table S1 Composition of catalysts from ICP-AES after washing with acetic acid.

Precursor ratio of Ir/Fe	1:1	3:1	1:3
Composition of catalysts	$Ir_1Fe_{0.41}$	$Ir_1Fe_{0.11}$	$Ir_1Fe_{1.47}$

Table S2 Comparison of several typical electrocatalysts in acidic electrolyte at a current density of 10 mA cm^{-2}.

Catalyst	**Electrolyte**	**η(mV)**	**Tafel slope(mV/dec)**	**Reference**
Ir-Fe NPs	0.5 M $HClO_4$	278	56	This work
Ir-Ni NPs	0.05M $H2SO_4$	>380	-	1
Ir-Co oxide	0.5M $H2SO_4$	~330	40	2
Surface-clean 3D Ir	0.1 M $HClO_4$	276	40.8	3
	0.5 M $HClO_4$	303	46.6	
IrO_2	0.1 M $HClO_4$	>420	-	4
RuO_2	0.1 M $HClO_4$	>420	-	4

Table S3 Comparison of several typical electrocatalysts in alkaline electrolyte at a current density of 10 mA cm^{-2}.

Catalyst	**Electrolyte**	**η(mV)**	**Tafel slope(mV/dec)**	**Reference**
Ir-Fe NPs	1.0 M KOH	286	65	This work
Ir-Cu nanoframes	1.0 M KOH	~360	38	5
Surface-clean 3D Ir	1.0 M KOH	242	32.7	3
IrO_x	1.0 M NaOH	320	-	6
RuO_2	0.5 M KOH	358	55	4

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