Supporting Information

Engineering oxygen vacancies on dendrite-like IrO_2 for oxygen evolution reaction in acid solution

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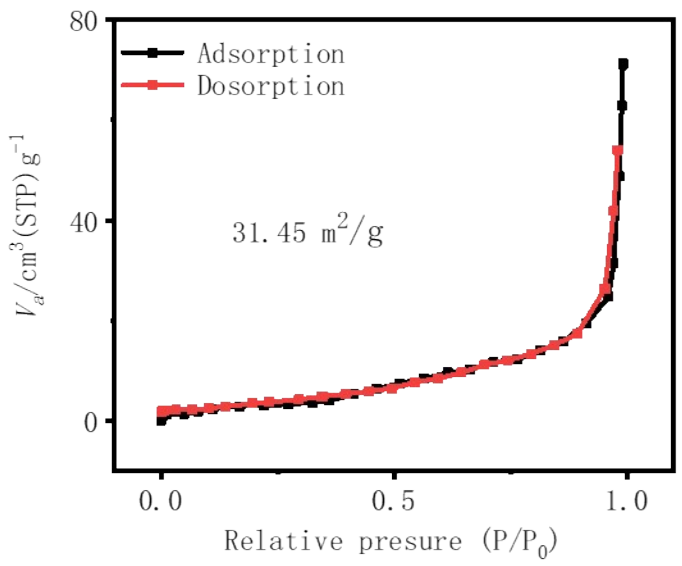

Figure S1. N_2 adsorption-desorption isotherms of IrO_2 DLNs (650 12 h).

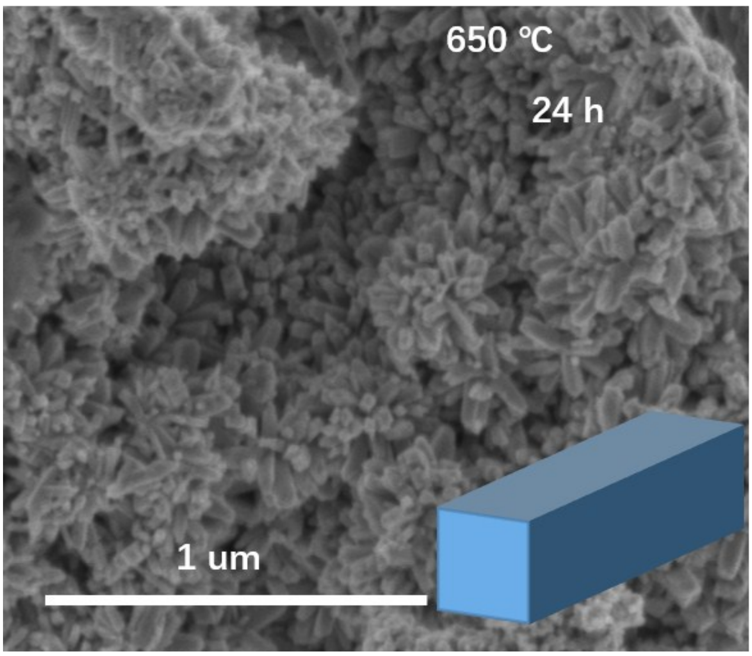

Figure S2. IrO_2 DLNs prepared at 650 ℃ with ageing time of 24 h.

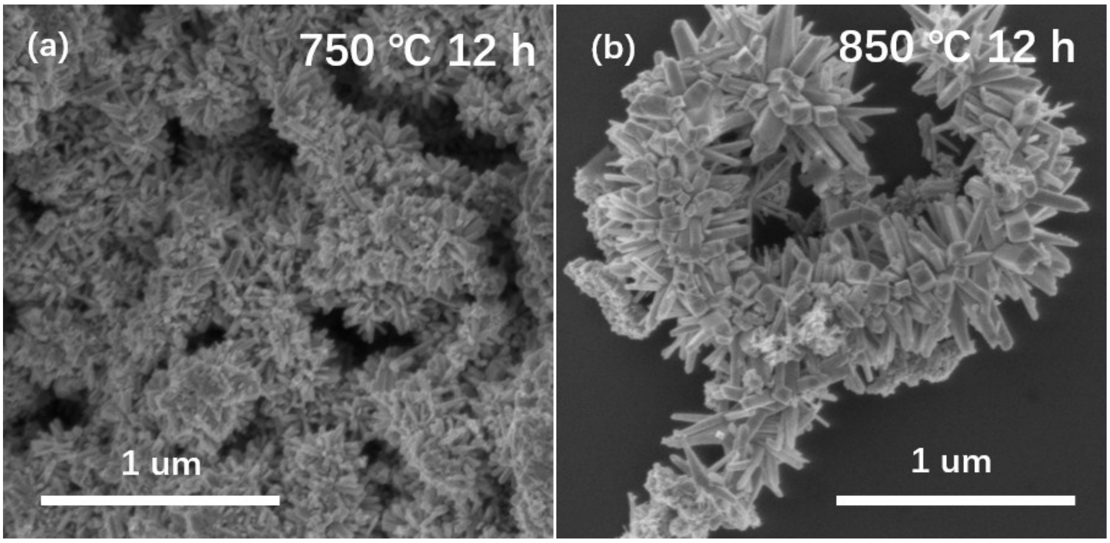

Figure S3. IrO_2 DLNs prepared at different temperature with ageing time of 12 h.

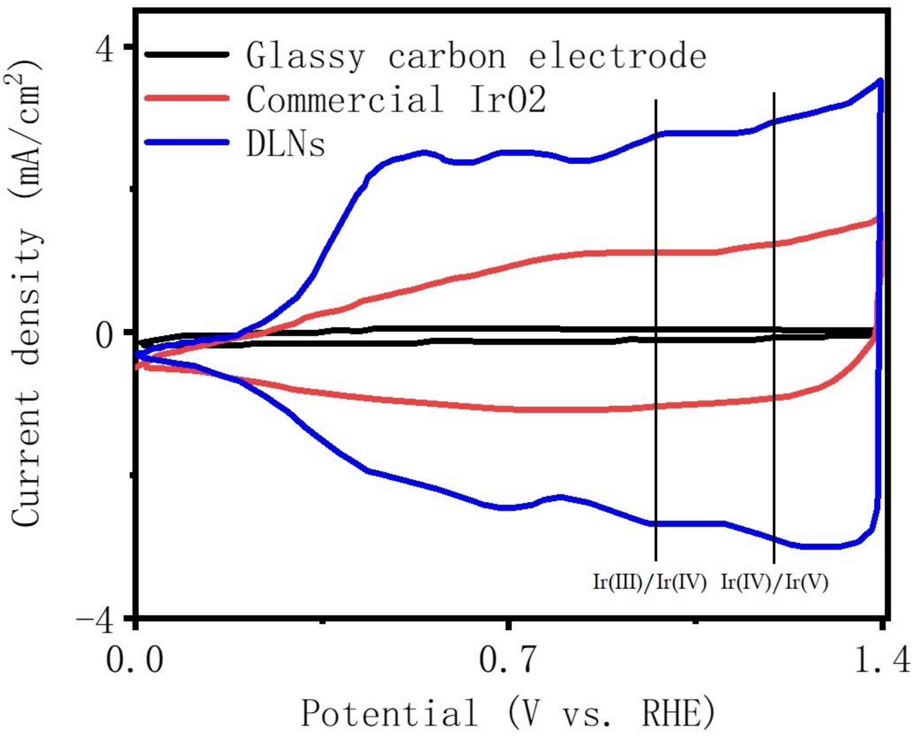

Figure S4. CV curve of support, Commercial IrO_2 and IrO_2 DLNs (650 12 h). IrO_2 DLNs show two redox peaks, i.e., Ir(III)/Ir(IV) and Ir(IV)/Ir(V), located at +0.95 V and +1.23 V vs. RHE, respectively.

Table S1. Ir-based materials for OER in acid solution.

Materials	Electrolyte	Overpotential at 10 mA/cm^2 (mV)	Tafel slopes (mV/dec)	Mass activity (A/g)	Ref.
$IrRuO_3$	0.5 M H_2SO_4	308	-	27.45 A/g at 1.48 V vs. RHE	[1]
$Ir/Fe_4/N$	0.5 M H_2SO_4	316	-	77.6 A/g at 1.54 V vs. RHE	[2]
Ir nanowires	0.5 M $HClO_4$	270	43.6	--	[3]
IrCoNi/C	0.5 M H_2SO_4	305	53.8	--	[4]
IrCu frame	0.1 M $HClO_4$	293	-	--	[5]
$Y_2Ru_2O_{7-x}$	0.1 M $HClO_4$	2.23 mA/cm^2 at 1.5 V *vs.* RHE	55	--	[6]
IrO_2 needles	0.5 M H_2SO_4	313	57	--	[7]
IrO_2 DLNs	0.5 M H_2SO_4	270	43	820 A/g	This

				at 1.55 V vs. RHE	work

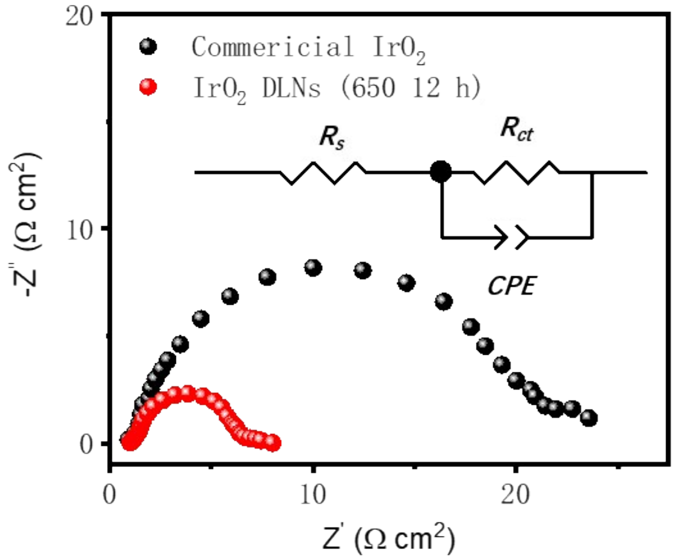

Figure S5. Nyquist plots of Commercial IrO_2 and IrO_2 DLNs (650 12 h). The EIS is measured at 1.5 V *vs.* RHE.

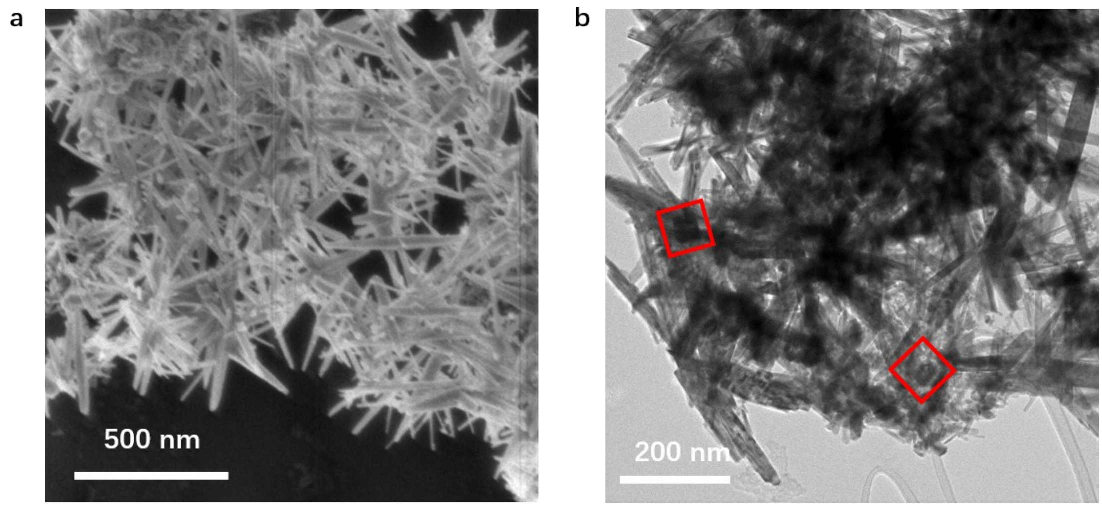

Figure S6. SEM (a) and TEM (b) image of IrO_2 DLNs (650 12 h) after use.

References

1. Park, S.-A., K.-S. Kim, and Y.-T. Kim, *Electrochemically Activated Iridium Oxide Black as Promising Electrocatalyst Having High Activity and Stability for Oxygen Evolution Reaction.* ACS Energy Letters, 2018. **3**(5): p. 1110-1115.

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