

Supplementary Information

**Co@Ir Core-shell Nanochains Aerogels for
Hydrogen Evolution Reaction and Oxygen
Evolution Reaction in Alkaline Media**

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Supplementary Tables

Table S1. The HER activity comparison between the Ir₇Co₃ aerogel and recently reported top-level aerogel electrocatalysts in 1.0 M KOH.

Catalyst	η_{10} (mV)	Tafel slope (mV·dec ⁻¹)	Reference
Ir ₇ Co ₃ aerogel	20.4	28.87	This work
Ir ₅ Co ₅ aerogel	73.0	118.77	This work
Ir ₃ Co ₇ aerogel	206.8	237	This work
Ir aerogel	34.5	57.81	This work
CoNiFe/MnO@CNTs	122	149	1
Ru aerogel	272	41.6	2
NiSe ₂ -CoSe ₂	65	57.54	3
Ru ₀₈ Ir ₂ -350	26	8.3	4
P-CoCu	142	101.75	5
RuNi ₇ FeO _x (OH) _y @NCA	99	61.1	6

Table S2. The relevant data of EIS spectra for HER.

Catalyst	R_S (Ω)	R_S+R_{CT} (Ω)	R_{CT} (Ω)
Ir_7Co_3 aerogel	5.4	25.2	19.8
Ir_5Co_5 aerogel	6.6	83.4	76.8
Ir_3Co_7 aerogel	8.2	135.5	127.3
Ir aerogel	5.9	39.4	33.5
Co aerogel	5.8	488.2	482.4

Table S3. The OER activity comparison between the Ir₇Co₃ aerogel and recently reported top-level aerogel electrocatalysts in 1.0 M KOH.

Catalyst	η_{10} (mV)	Tafel slope (mV·dec ⁻¹)	Reference
Ir ₇ Co ₃ aerogel	269	31	This work
Ir ₅ Co ₅ aerogel	288	52.4	This work
Ir ₃ Co ₇ aerogel	341	85.8	This work
Ir aerogel	326	62.3	This work
CoNiFe/MnO@CNTs	275	63	1
Ru _{0.7} Co _{0.3} aerogel	272	41.6	2
RuNi ₇ FeO _x (OH) _y @NCA	278	102.7	6
NiFe ₂ O _x Aero-300-Ar	356	57	7
Ni-NCN/CoFe-LDH	280	42	8
NSCA/FeCo	335	60	9
Ni ₉₄ Fe ₆ aerogel	380	-	10
Ir ₃ Cu MAs	298	41	11
NiCoMn-LDHs	340(η_{50})	87	12

Table S4. The relevant data of EIS spectra for OER.

Catalyst	R_s (Ω)	R_s+R_{ct} (Ω)	R_{ct} (Ω)
Ir_7Co_3 aerogel	5.6	42.0	36.4
Ir_5Co_5 aerogel	5.6	81.4	75.8
Ir_3Co_7 aerogel	5.7	163.3	157.6
Ir aerogel	6.0	119.5	113.5
Co aerogel	5.1	241.6	236.5

Supplementary Figures

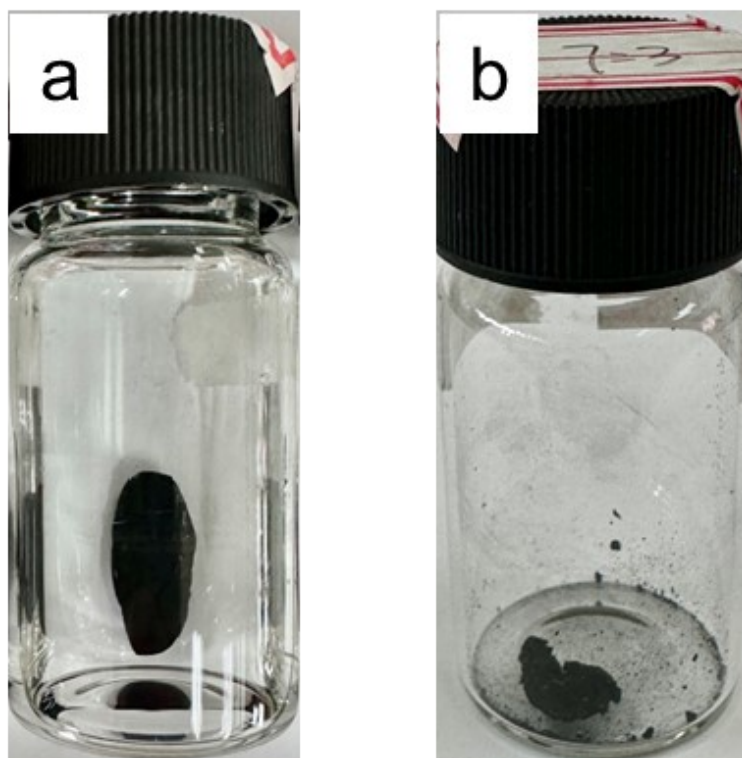


Figure S1. Optical photographs of the Ir_7Co_3 aerogel (a) after gelation and (b) after freeze-drying.

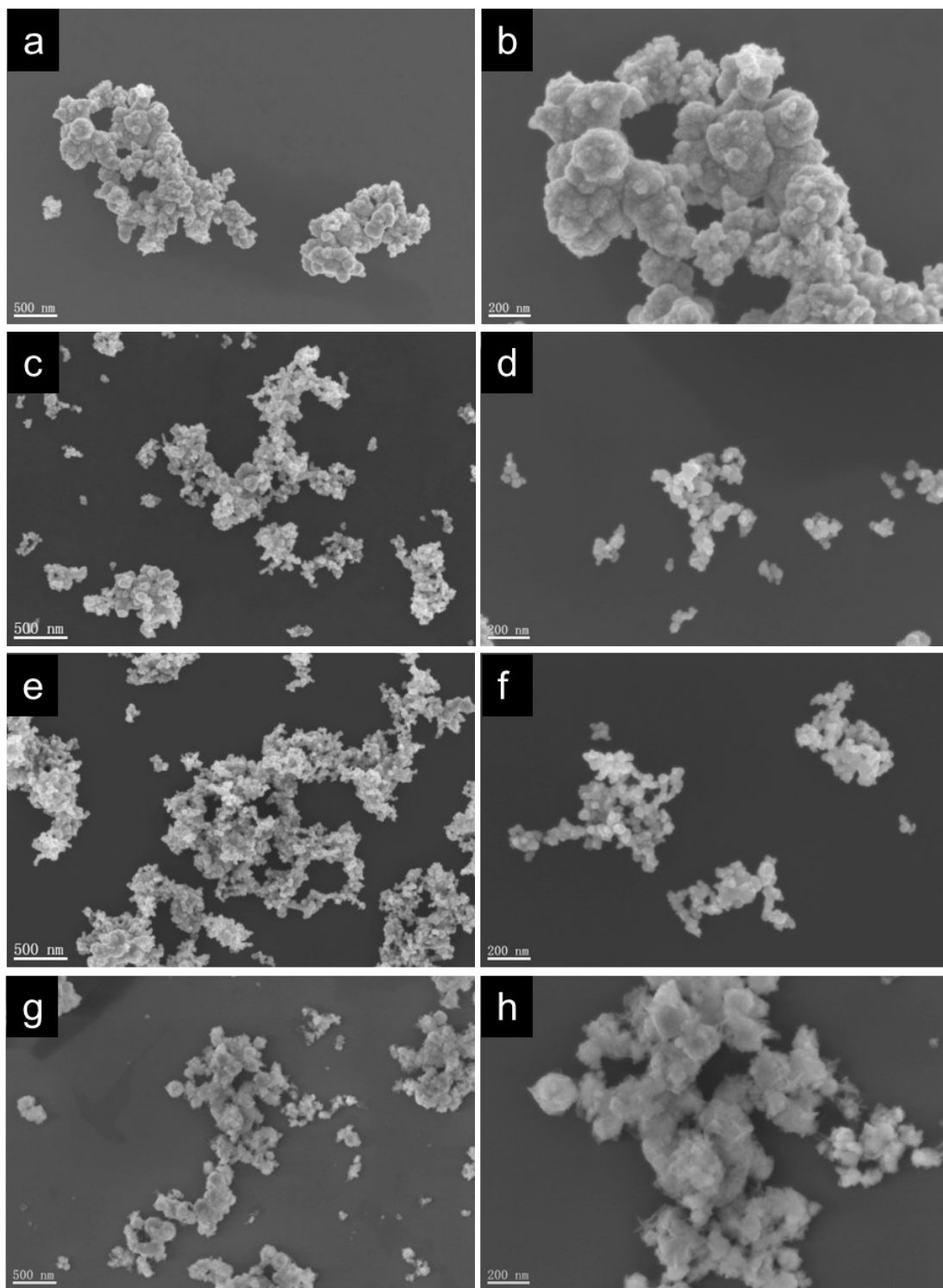


Figure S2. Typical SEM images of the (a-b) Ir aerogel, (c-d) Ir₅Co₅ aerogel, (e-f) Ir₃Co₇ aerogel, (g-h) Co aerogel.

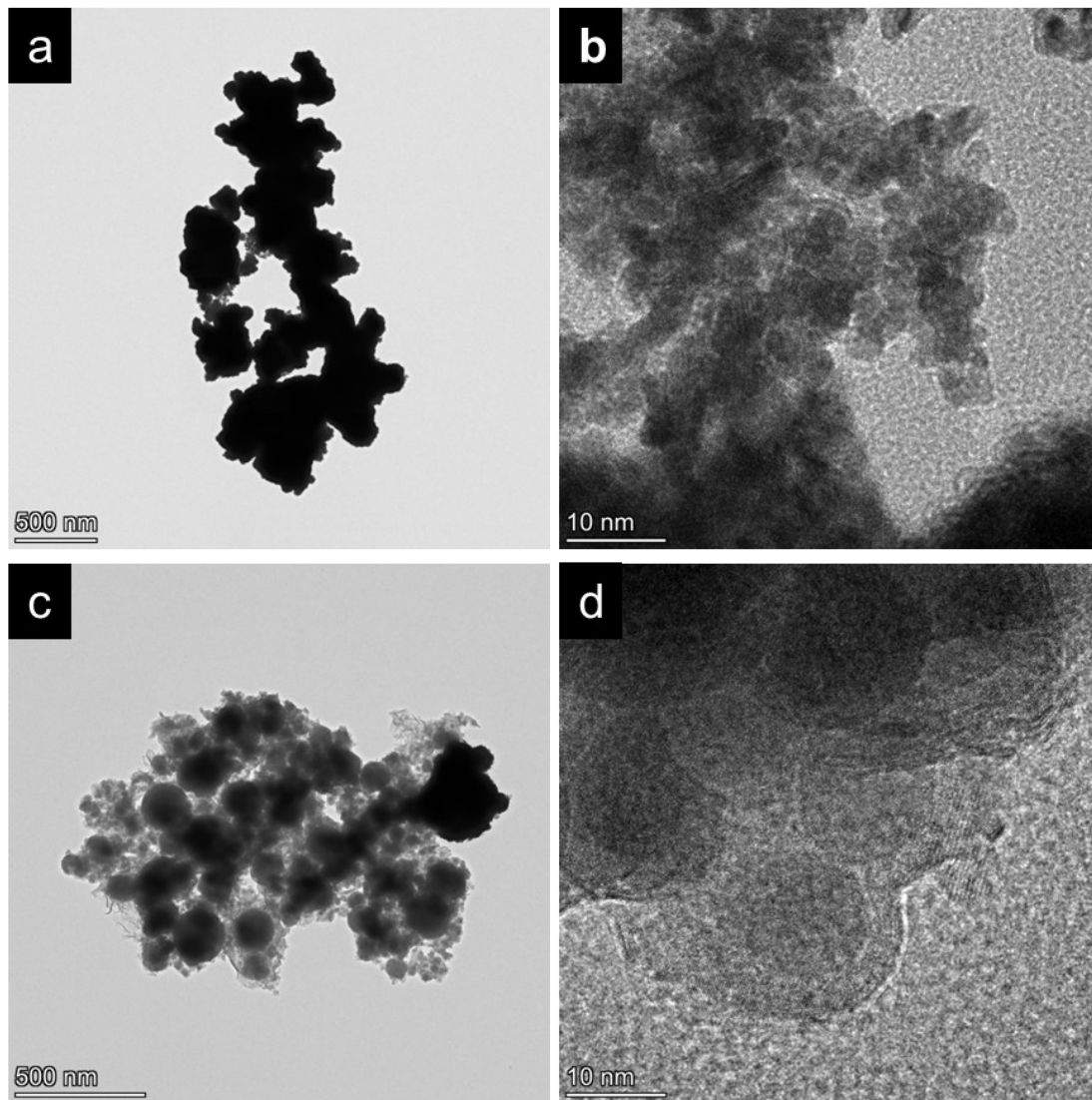


Figure S3. Typical TEM and HRTEM images of the (a-b) Ir and (c-d) Co aerogel.

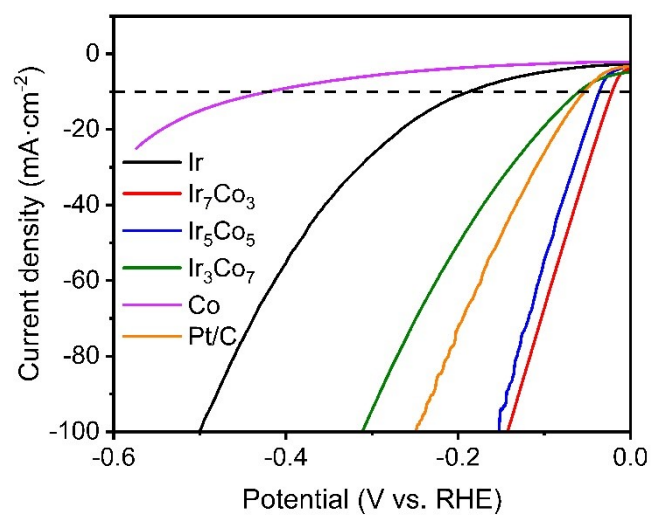


Figure S4. LSV polarization curves of the Ir, Ir_7Co_3 , Ir_5Co_5 , Ir_3Co_7 , Co aerogels and Pt/C catalyst towards HER without iR compensation.

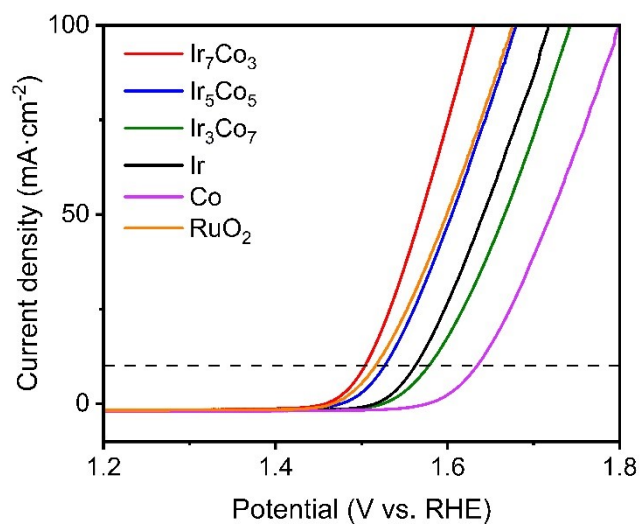


Figure S5. LSV polarization curves of the Ir, Ir_7Co_3 , Ir_5Co_5 , Ir_3Co_7 , Co aerogels and RuO_2 catalyst towards OER without iR compensation.

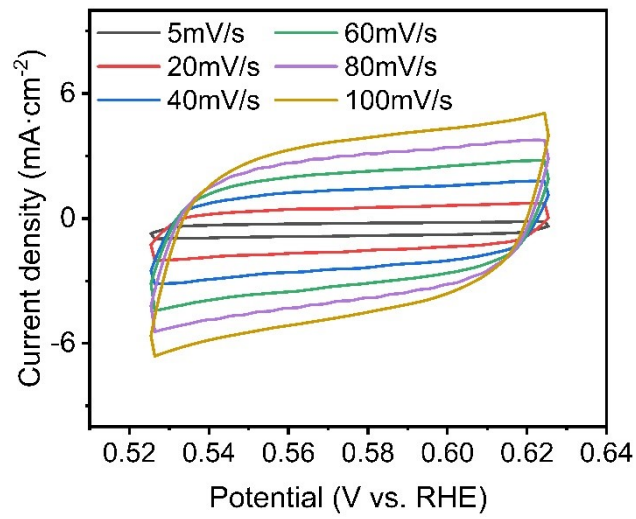


Figure S6. Cyclic voltammograms of the Ir₇Co₃ aerogel in the range from 0.525 to 0.625 V (vs. Hg/HgO) at different scan rates.

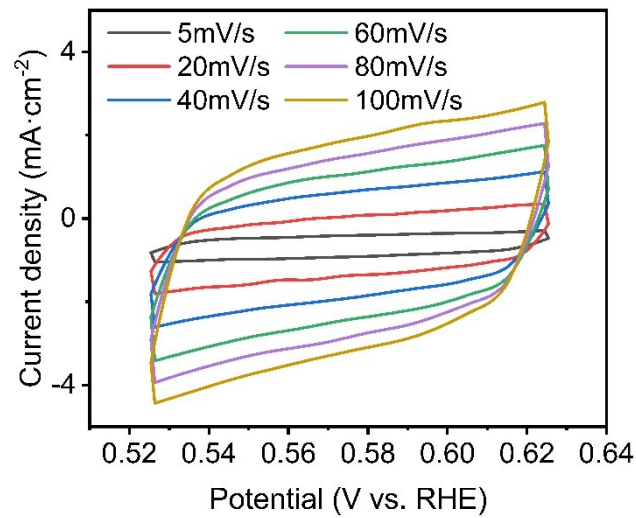


Figure S7. Cyclic voltammograms of the Ir₅Co₅ aerogel in the range from 0.525 to 0.625 V (vs. Hg/HgO) at different scan rates.

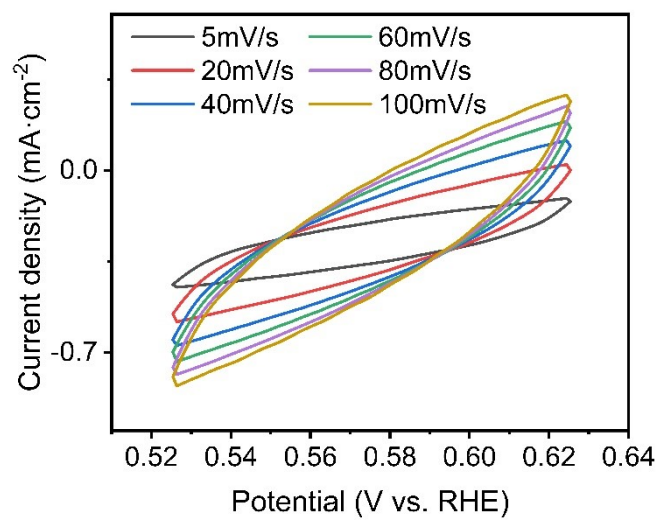


Figure S8. Cyclic voltammograms of the Ir₃Co₇ aerogel in the range from 0.525 to 0.625 V (vs. Hg/HgO) at different scan rates.

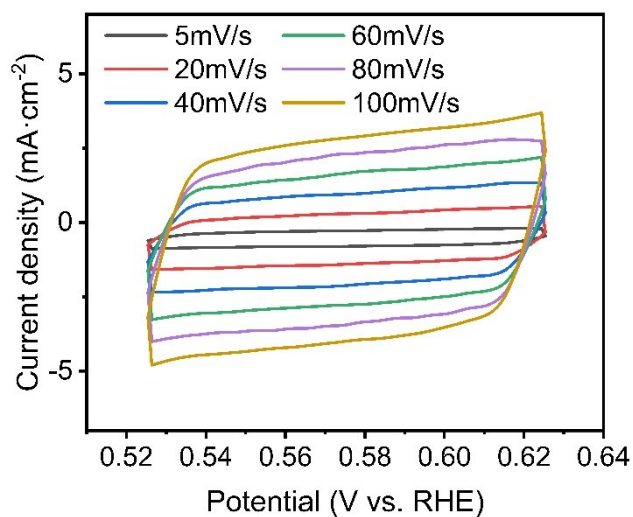


Figure S9. Cyclic voltammograms of the Ir aerogel in the potential range from 0.525 to 0.625 V (vs. Hg/HgO) at different scan rates.

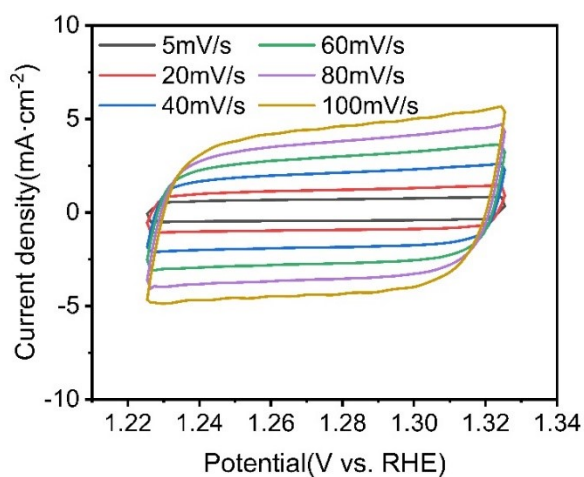


Figure S10. Cyclic voltammograms of the Ir₇Co₃ aerogel in the potential range from 1.225 to 1.325 V (vs. Hg/ HgO) at different scan rates.

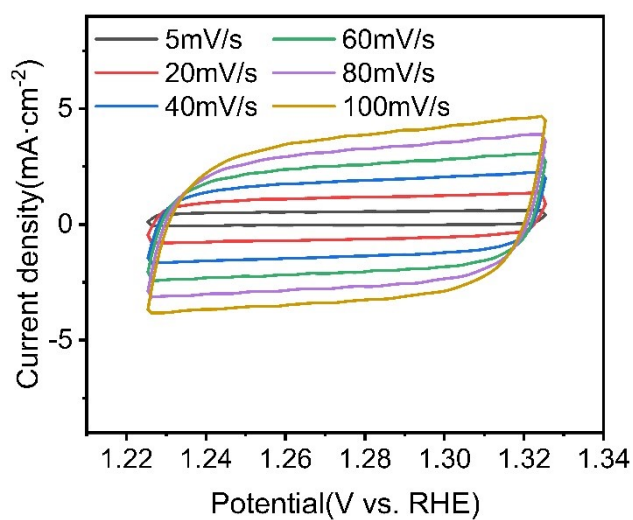


Figure S11. Cyclic voltammograms of the Ir₅Co₅ aerogel in the potential range from 1.225 to 1.325 V (vs. Hg/ HgO) at different scan rates.

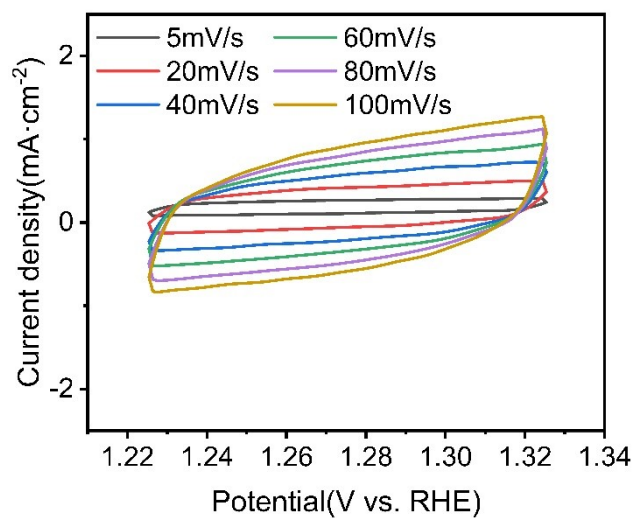


Figure S12. Cyclic voltammograms of the Ir₃Co₇ aerogel in the potential range from 1.225 to 1.325 V (vs. Hg/HgO) at different scan rates.

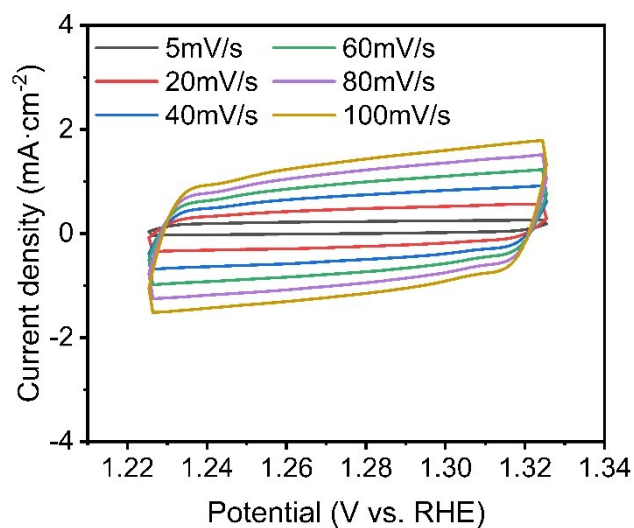


Figure S13. Cyclic voltammograms of the Ir aerogel in the potential range from 1.225 to 1.325 V (vs. Hg/HgO) at different scan rates.

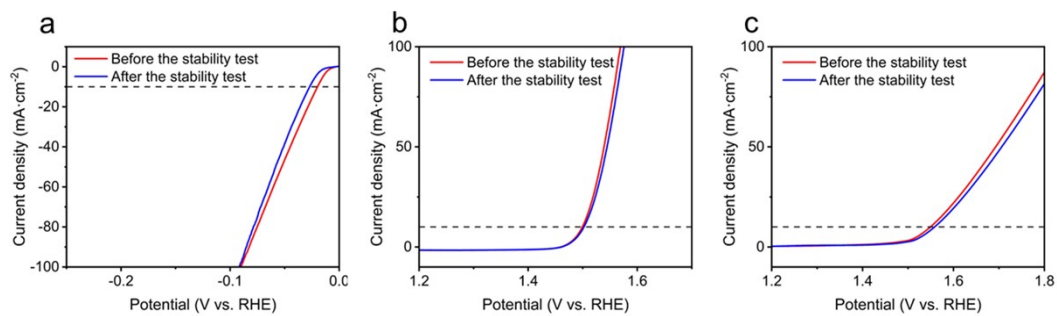


Figure S14. The LSV polarization curves before and after the stability test.

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