

Supplementary Information

Interface Engineering of RuO₂/Ru-Co₃O₄ Heterostructures for High-Efficiency Oxygen Evolution Reaction in Acid

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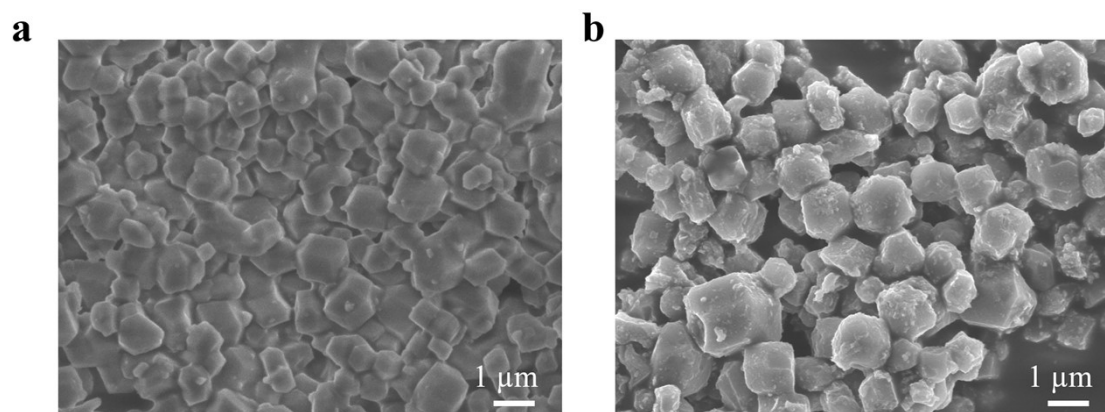


Fig. S1. SEM micrograph of (a) ZIF-67 and (b) Ru/ZIF-67.

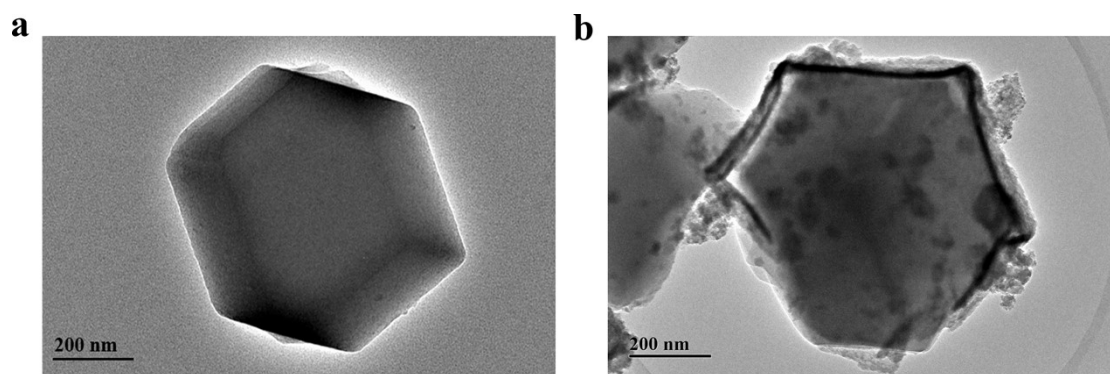


Fig. S2. TEM micrograph of (a) ZIF-67 and (b) Ru/ZIF-67.

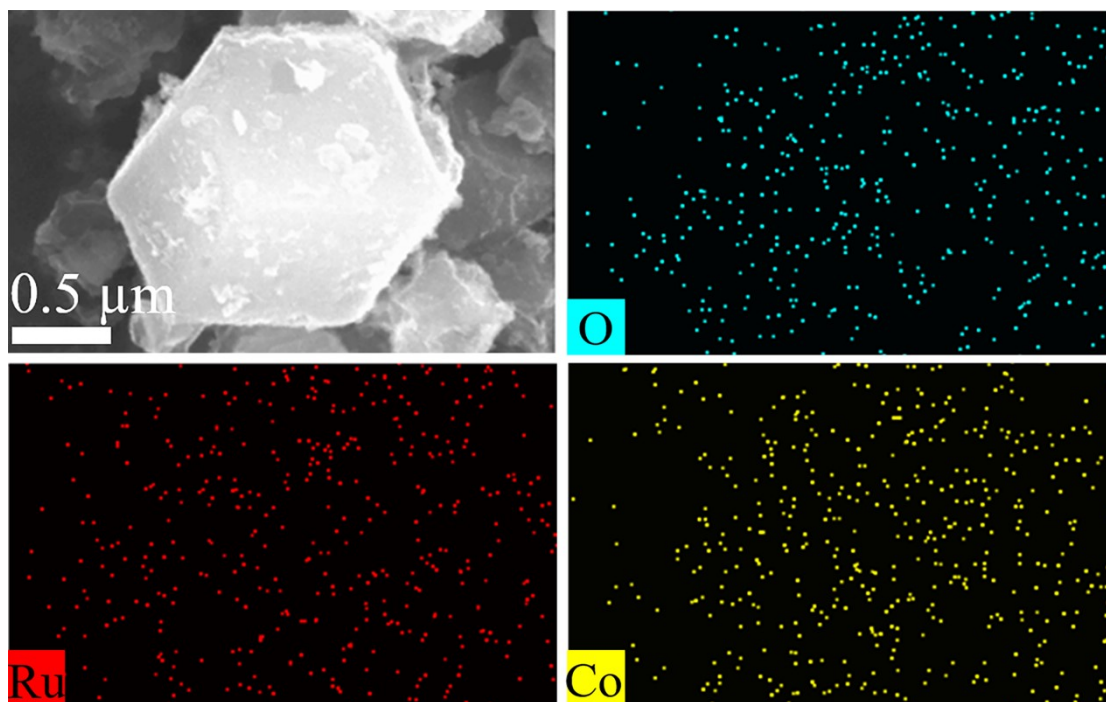


Fig. S3. EDS elemental mappings of Ru/ZIF-67.

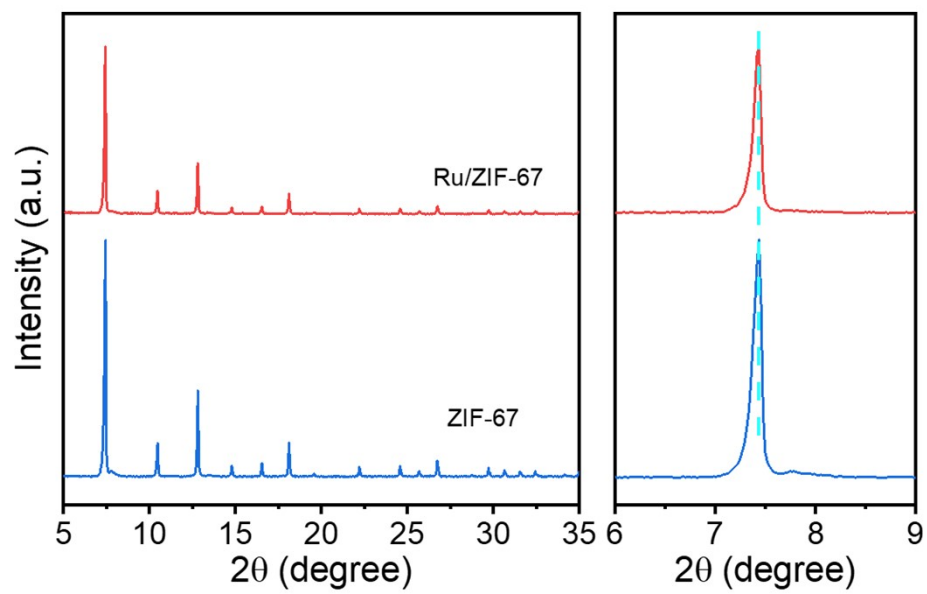


Fig. S4. XRD patterns of ZIF-67 and Ru/ZIF-67.

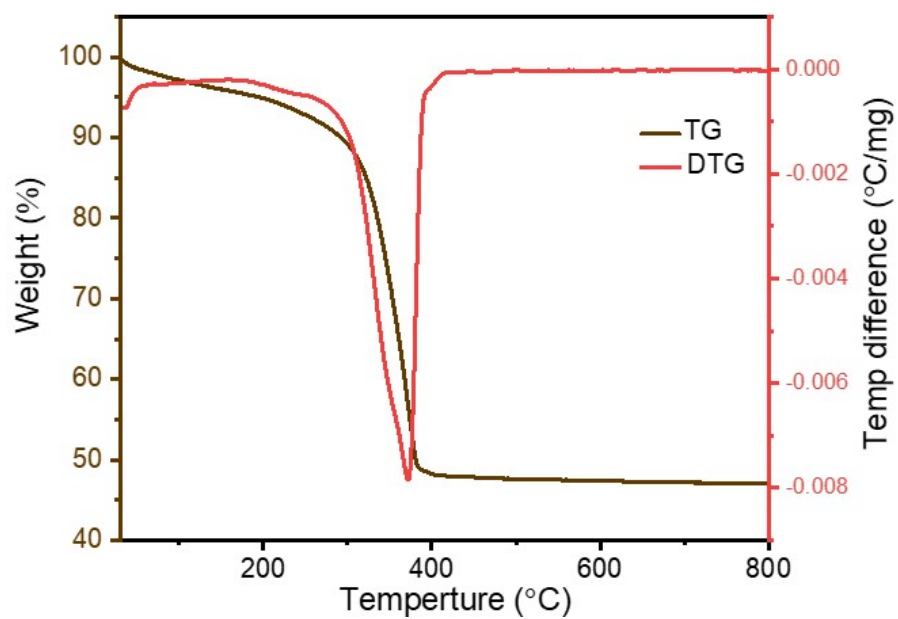


Fig. S5. TD-DTG curves of ZIF-67 with the heating rate of 5 °C/min in air atmosphere.

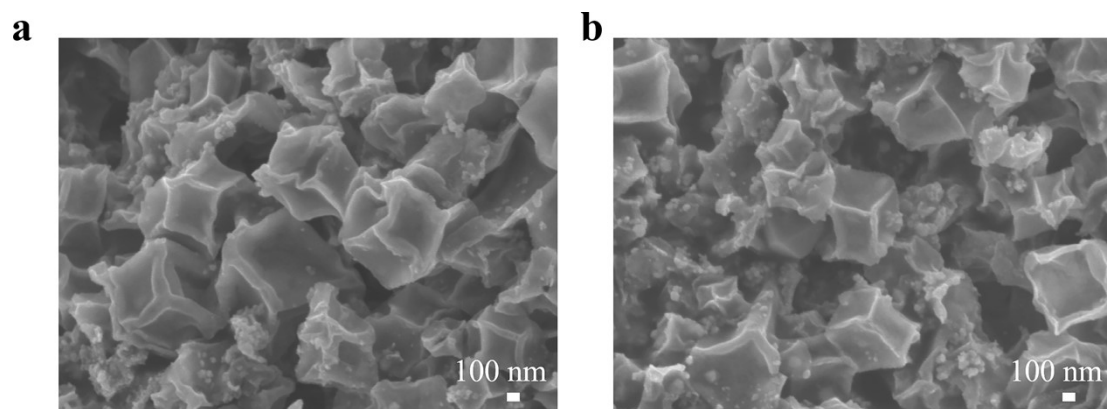


Fig. S6. SEM micrographs of (a) RCO_400 and (b) RCO_450.

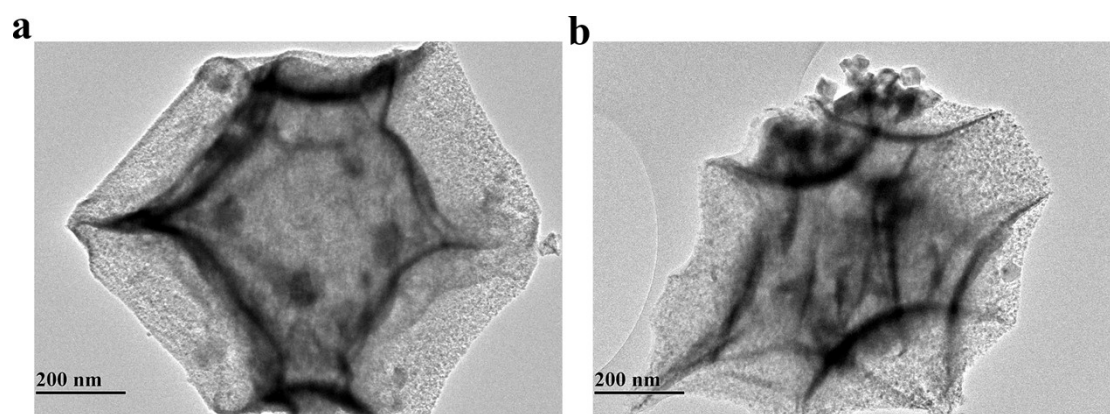


Fig. S7. TEM micrographs of (a) RCO_400 and (b) RCO_450.

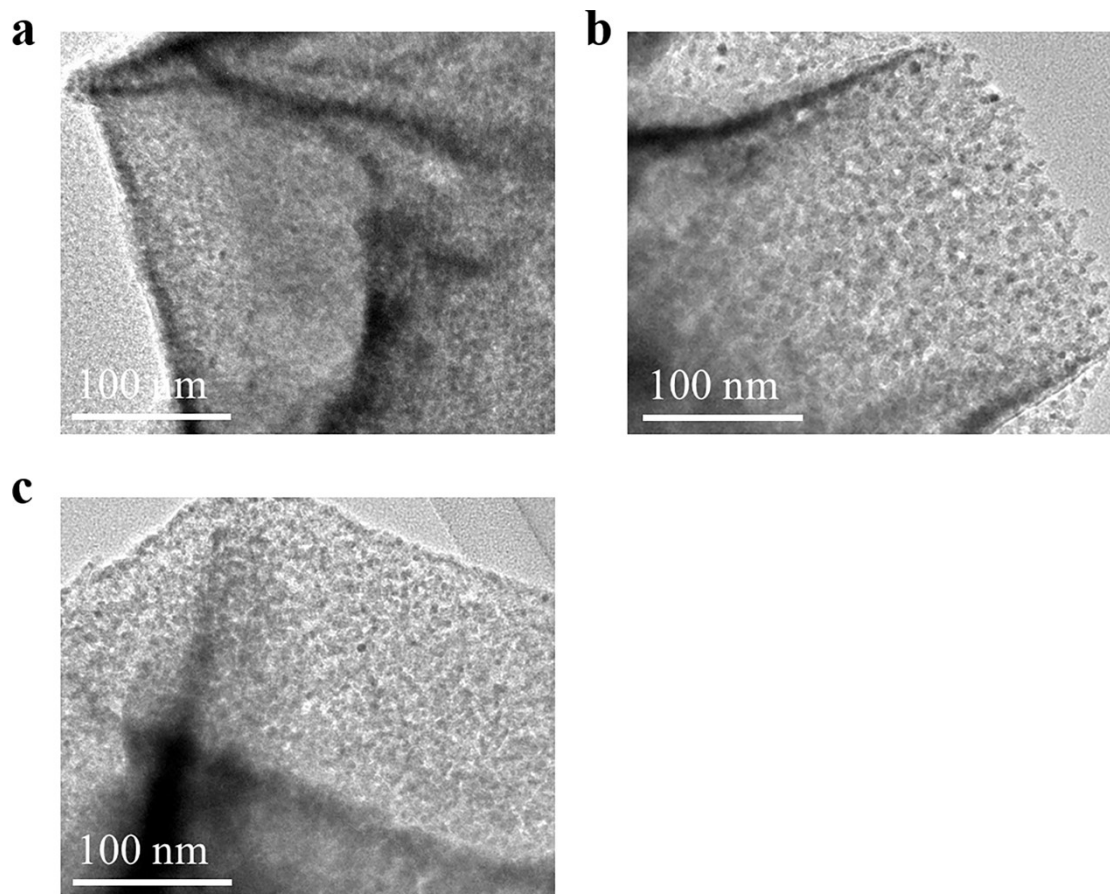


Fig. S8. TEM micrographs of (a) RCO_350, (b) RCO_400, (c) RCO_450.

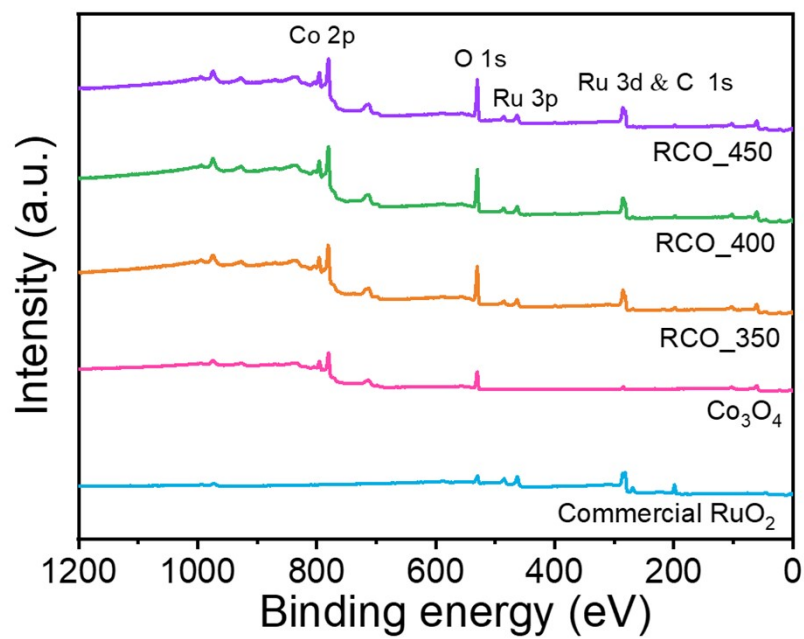


Fig. S9. XPS survey spectra of the commercial RuO₂, Co₃O₄ and RCO_T catalysts.

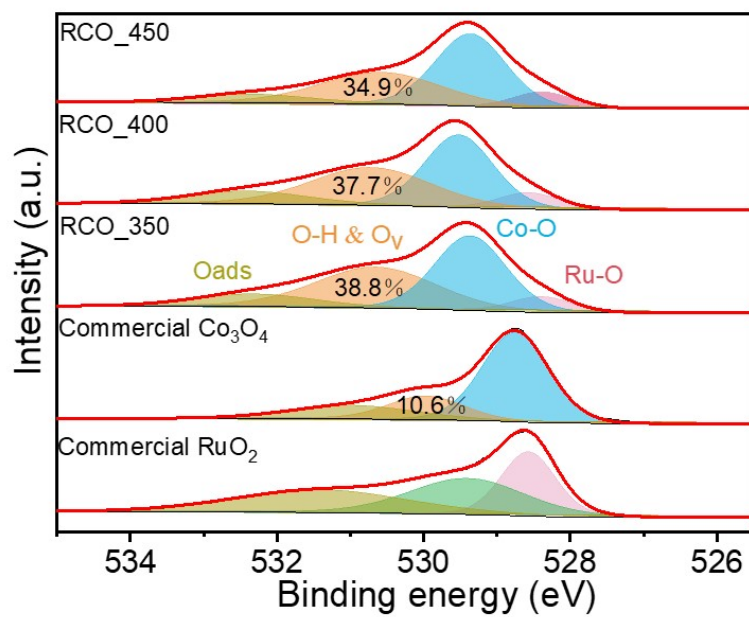


Fig. S10. Deconvoluted high-resolution O 1s XPS spectra of the commercial RuO₂, Co₃O₄ and RCO_T catalysts.

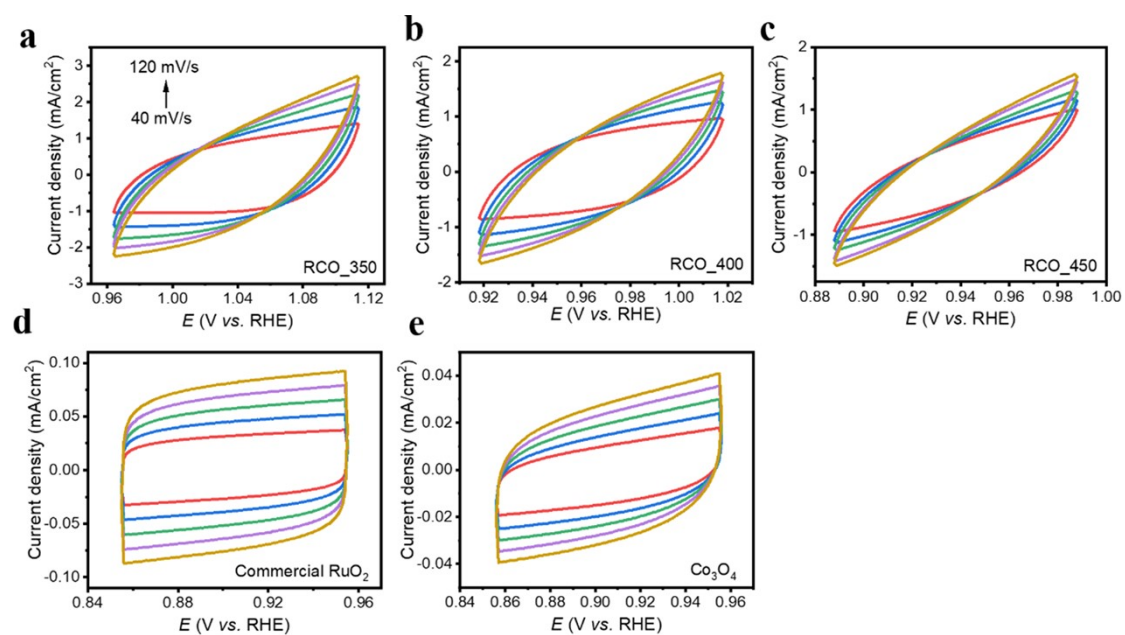


Fig. S11. CVs of (a) RCO_350, (b) RCO_400, (c) RCO_450, (d) commercial RuO₂ and (e) Co₃O₄.

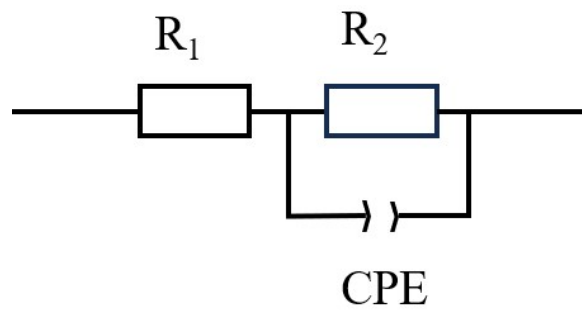


Fig. S12. EIS fitted equivalent circuit diagram.

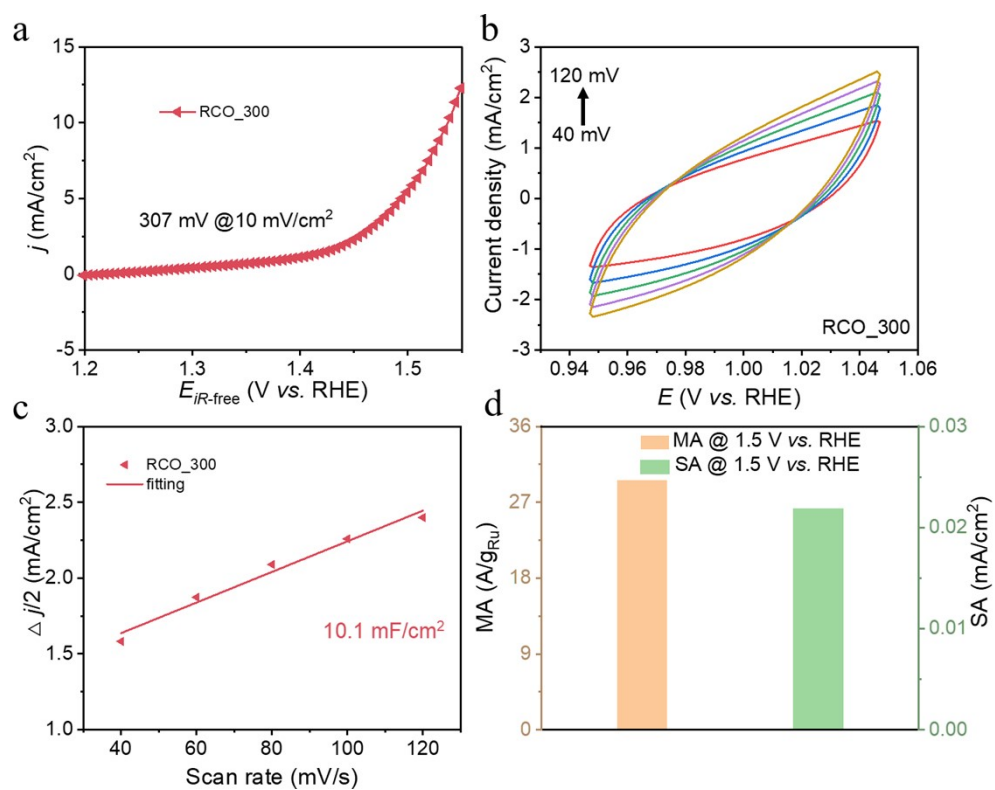


Fig. S13. OER performance of RCO_300 in 0.1 M HClO₄: (a) LSV, (b) CV, (c) C_{dl} , (d) MA and SA.

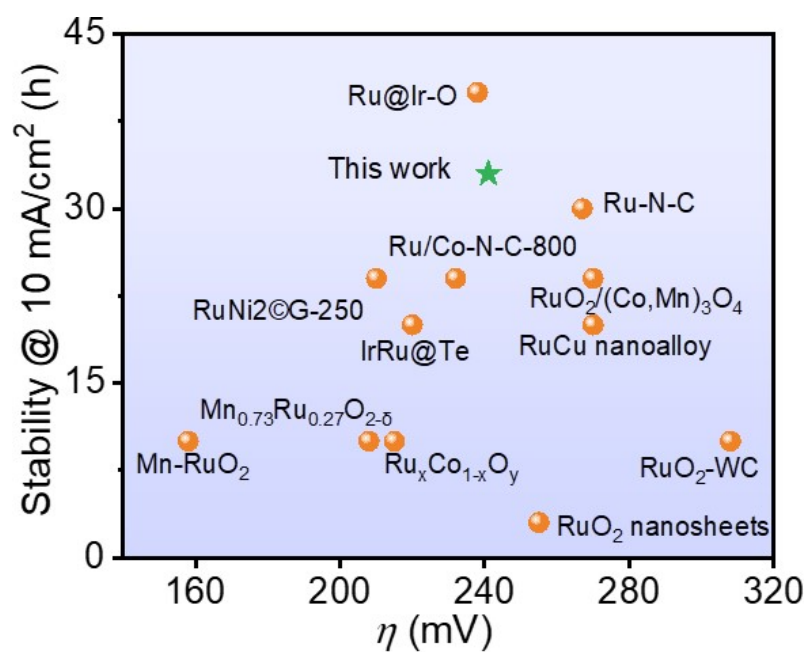


Fig. S14. The comparison of OER overpotential and stability for RCO_350 with reported catalysts in acids.¹⁻¹²

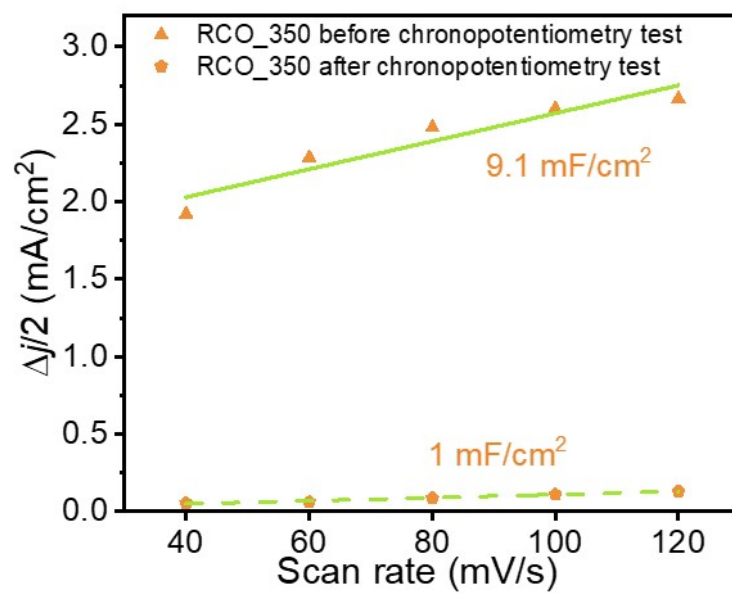


Fig. S15. The C_{dl} of RCO_350 before and after the chronopotentiometry test.

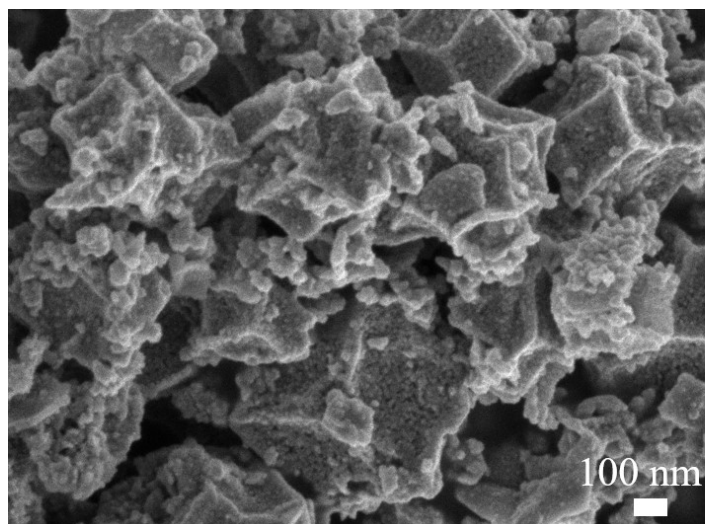


Fig. S16. The SEM of RCO_350 after chronopotentiometry test.

Table S1. ICP-MS results of Ru/ZIF-67

Elements	Ru	Co
ppm	10.18	3.568

Table S2. Summary data of O 1s XPS spectra of commercial RuO₂, Co₃O₄ and RCO_T catalysts.

Catalysts	Lattice O ²⁻ (O _{Co})	Lattice O ²⁻ (O _{Ru})	O _V (& O-H)	O _{ads}
	BE		BE	BE
	eV		eV	eV
commercial RuO₂	-	528.55	-	531.55
Co₃O₄	528.75	-	530	531.05
RCO_350	529.35	528.35	530.7	532.5
RCO_400	529.55	528.5	530.67	532.45
RCO_450	529.35	528.25	530.65	532.4

Table S3. EDS of RCO_350 before chronopotentiometry test.

Elements	Ru	Co
at. %	12.9	37.5

Table S4. EDS of RCO_350 after chronopotentiometry test.

Elements	Ru	Co
at. %	3.3	31.8

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