Supporting Information for

Boosting Oxygen Evolution of Layered Double Hydroxide through Electronic Coupling with Ultralow Noble Metal

Zhao Li, Dongsheng Liu, Xinhua Lu, Minglin Du, Zhenyang Chen, Jingrui Teng, Ruiqi Sha, Lin Tian*

School of Materials and Chemical Engineering, Xuzhou University of Technology, Xuzhou 221018, P.R. China

Corresponding author: Lin Tian (L. Tian)

E-mail: xzittl@xzit.edu.cn

Experiments

Materials

All chemicals and solvents were used as received. $Co(NO_3)_2 \cdot 6H_2O$, $Fe(NO_3)_3 \cdot 9H_2O$, $Ni(NO_3)_2 \cdot 6H_2O$, $MnCl_2$, and 2-MIM, were purchased from the Energy Chemical. $Zn(NO_3)_2 \cdot 6H_2O$, $IrCl_3$, $RuCl_3$, and KOH were purchased from Sinopharm Chemical Reagent Co., Ltd. Methanol, ethanol, propanol, and butanol were purchased from Tianjin Fuyu Fine Chemical Co., Ltd. Nafion was bought form the DuPont.

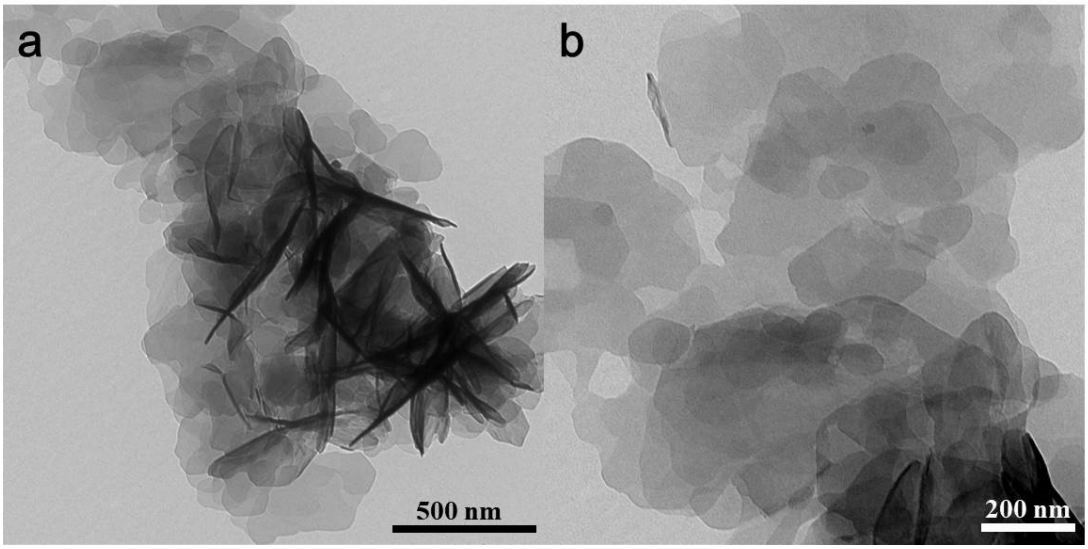

Fig.S1 Representative TEM images of the ultrathin $Co(OH)_2$ nanosheets.

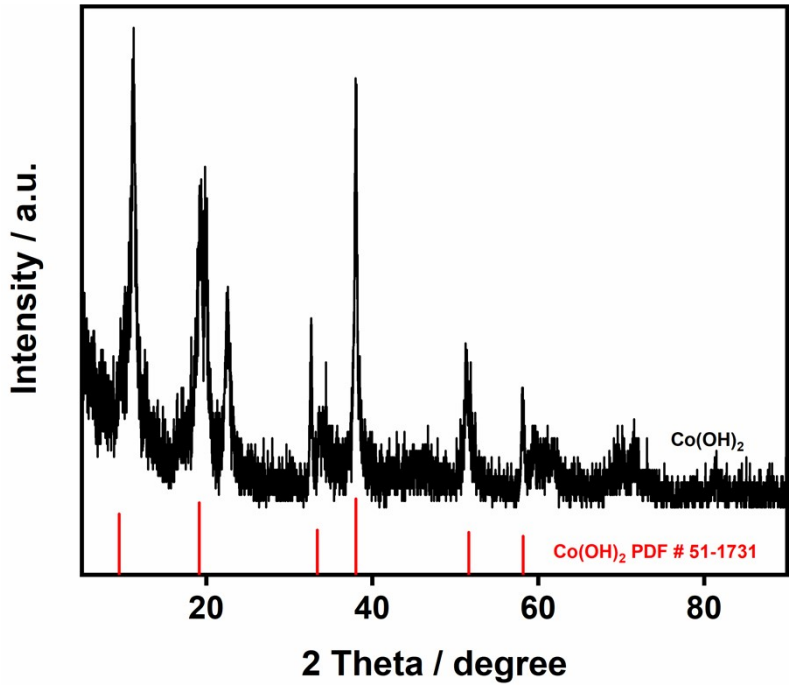

Fig.S2 XRD pattern of the $Co(OH)_2$ nanosheets.

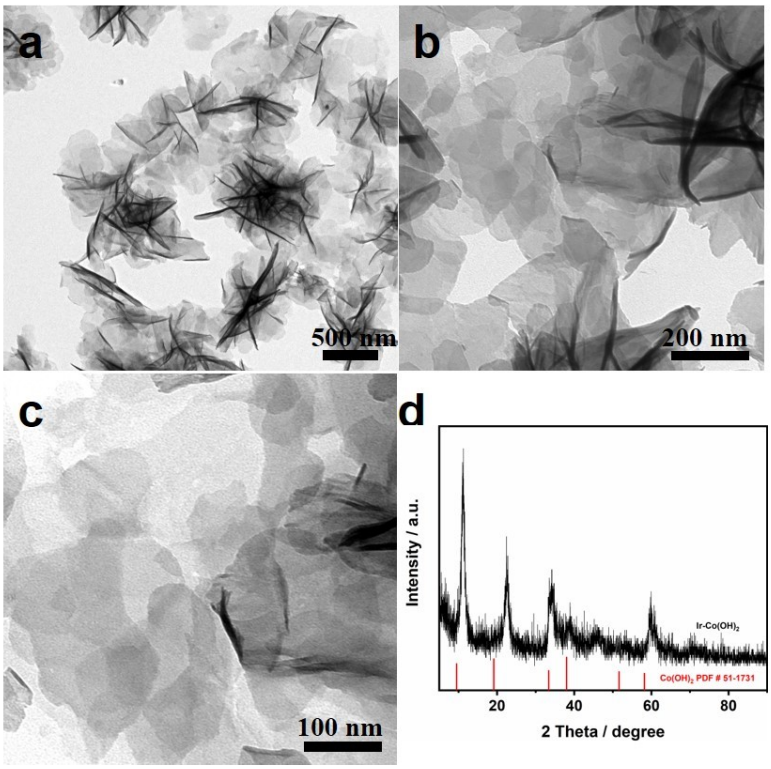

Fig.S3 (a-c) Representative TEM images of the Ir-$Co(OH)_2$ nanosheets. (d) XRD pattern of the Ir-$Co(OH)_2$ nanosheets.

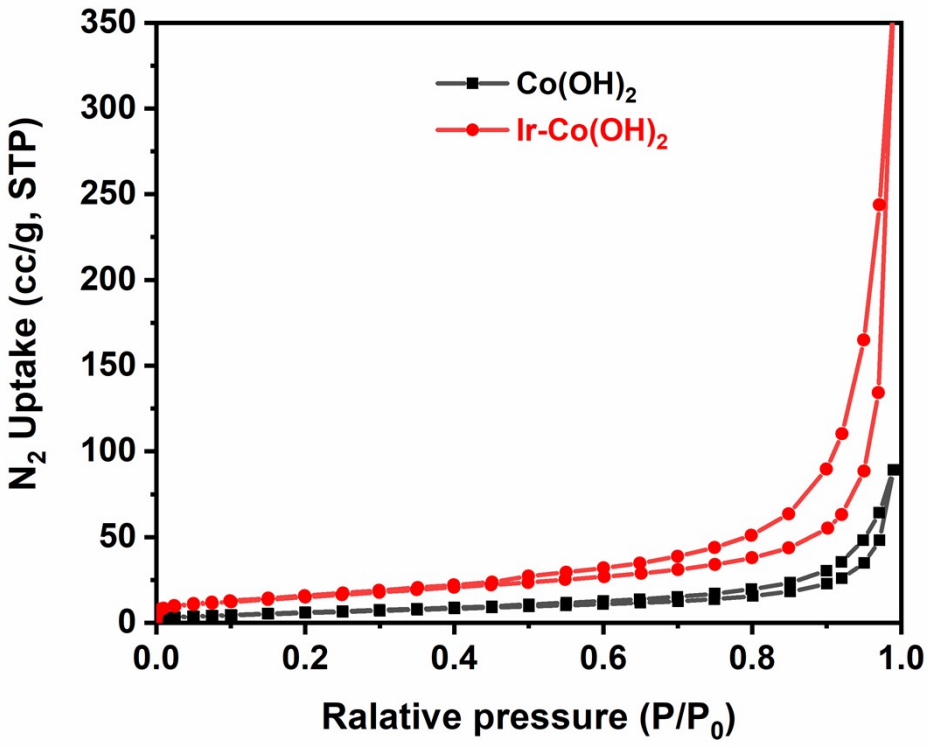

Fig.S4 The N_2 adsorption-desorption isotherms of Ir-doped $Co(OH)_2$ and $Co(OH)_2$.

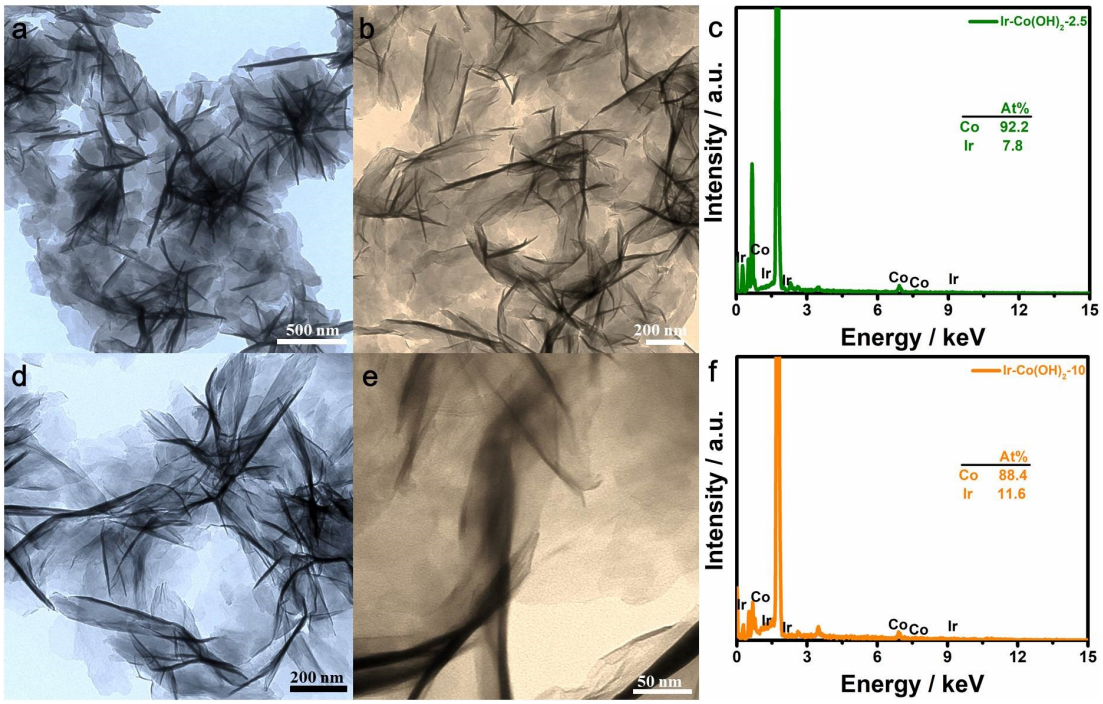

Fig.S5 Representative TEM images of the (a, b) Ir-$Co(OH)_2$-2.5 and (d, e) Ir-$Co(OH)_2$-10 nanosheets. SEM-EDX spectra of the (c) Ir-$Co(OH)_2$-2.5 and (f) Ir-$Co(OH)_2$-10 nanosheets.

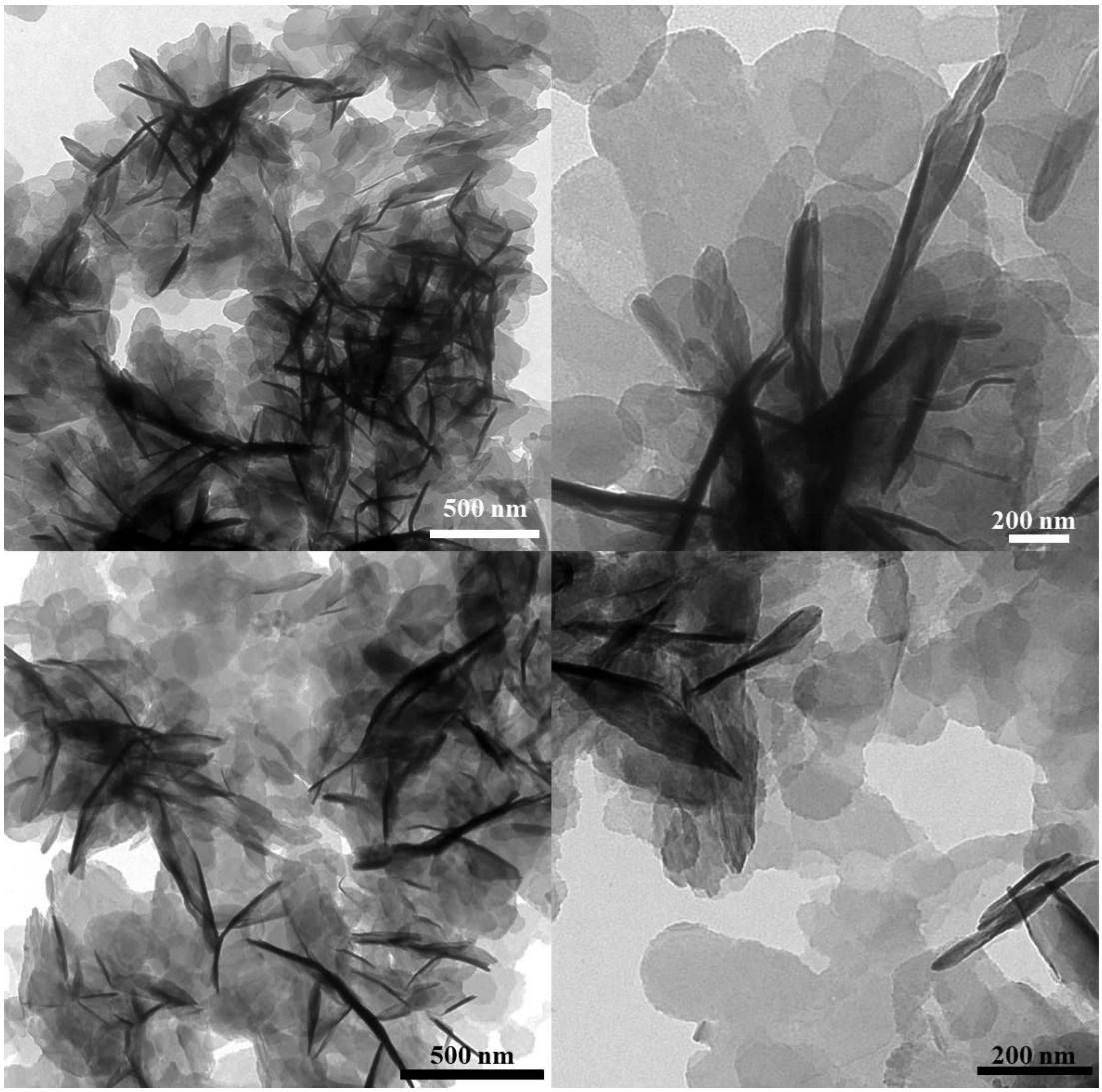

Fig.S6 Representative TEM images of the Ru-doped $Co(OH)_2$ ultrathin nanosheets with different magnifications.

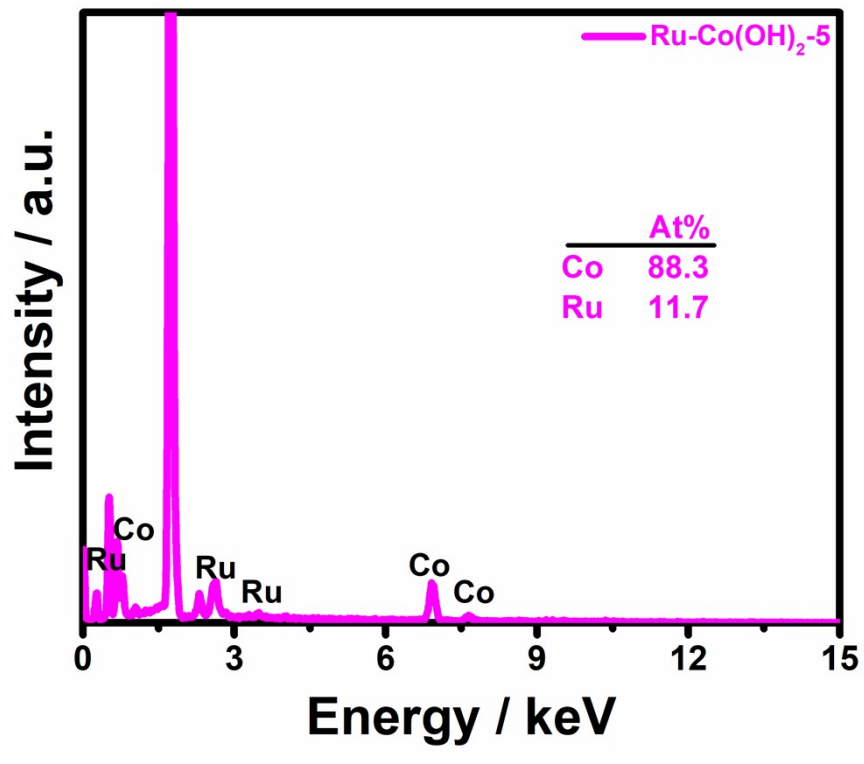

Fig.S7 SEM-EDX spectrum of the Ru-$Co(OH)_2$-5.

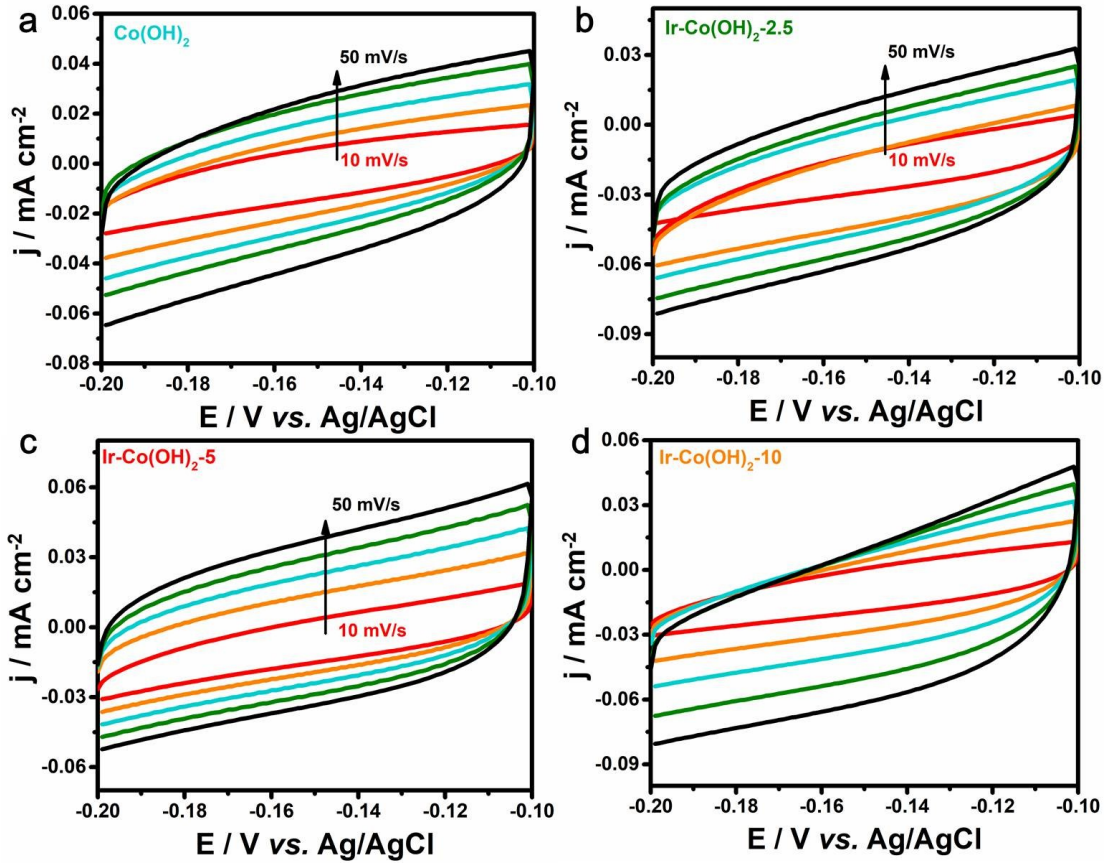

Fig.S8 The CV curves of (a) $Co(OH)_2$, (b) Ir-$Co(OH)_2$-2.5, (c) Ir-$Co(OH)_2$-5, and (d) Ir-$Co(OH)_2$-10 with different scan rates.

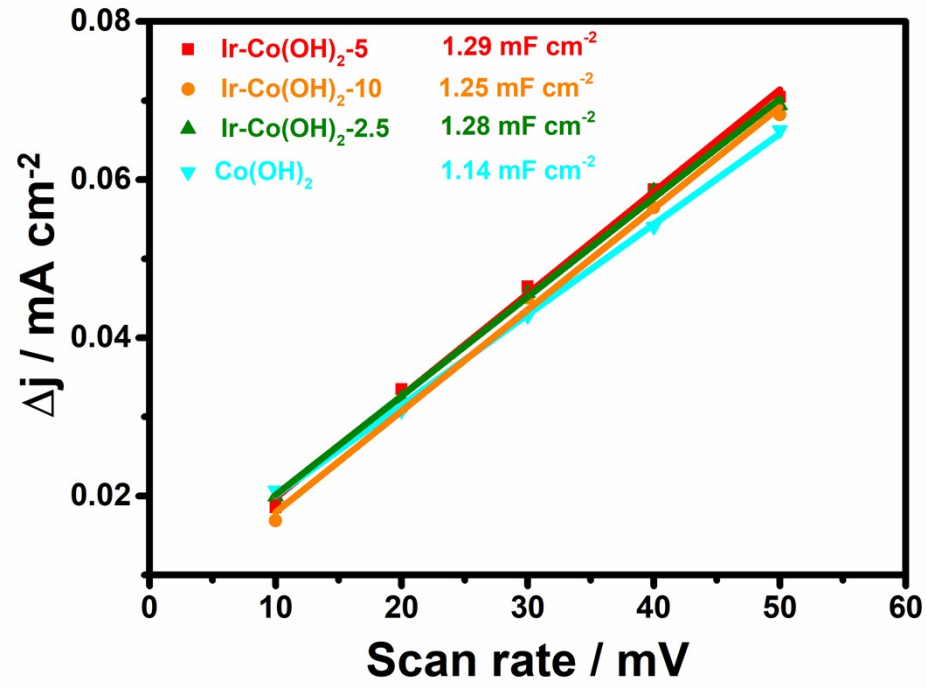

Fig.S9 Plots of the current densities at -0.15 V (vs Ag/AgCl) vs scan rate for the $Co(OH)_2$, Ir-$Co(OH)_2$-2.5, Ir-$Co(OH)_2$-5, and Ir-$Co(OH)_2$-10.

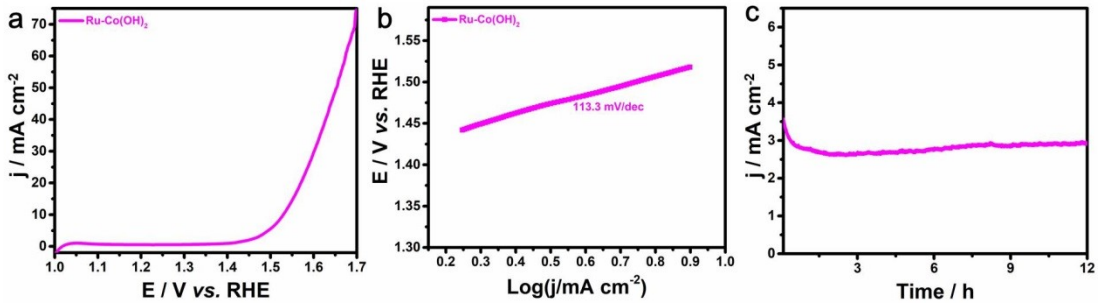

Fig.S10 OER polarization curves of Ru-$Co(OH)_2$-5 in 1 M KOH solution at the scan rate of 5 mV/s. Tafel plot of the Ru-$Co(OH)_2$-5. CA curve of the Ru-$Co(OH)_2$-5 at the potential of 1.5 V.

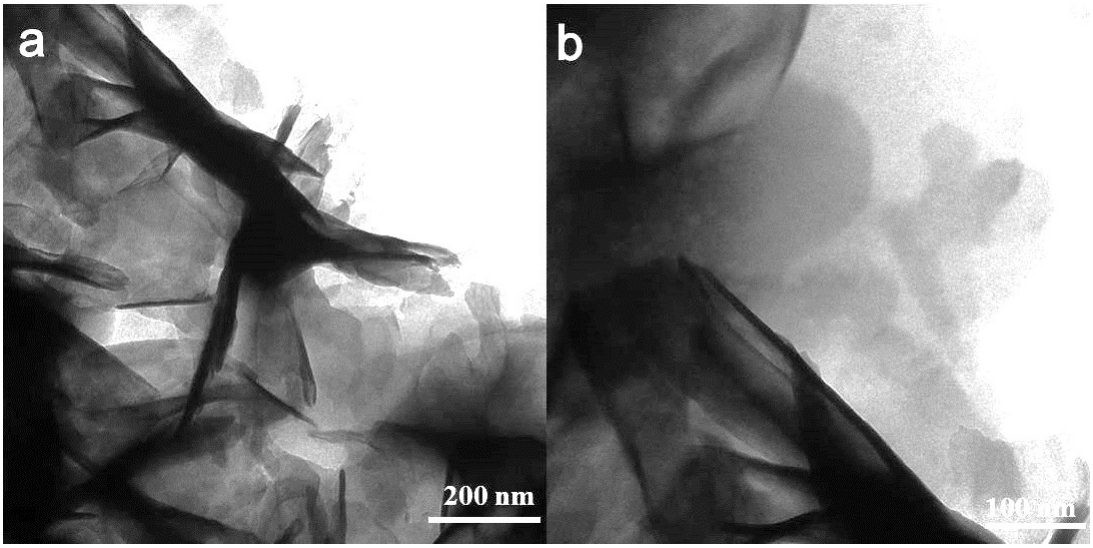

Fig.S11 The representative TEM images of the Ir-$Co(OH)_2$-5 after electrochemical measurements.