

**Supporting Information:**

**Electroactivation-induced IrNi Nanoparticles at Different pH  
Conditions for Neutral Water Oxidation**

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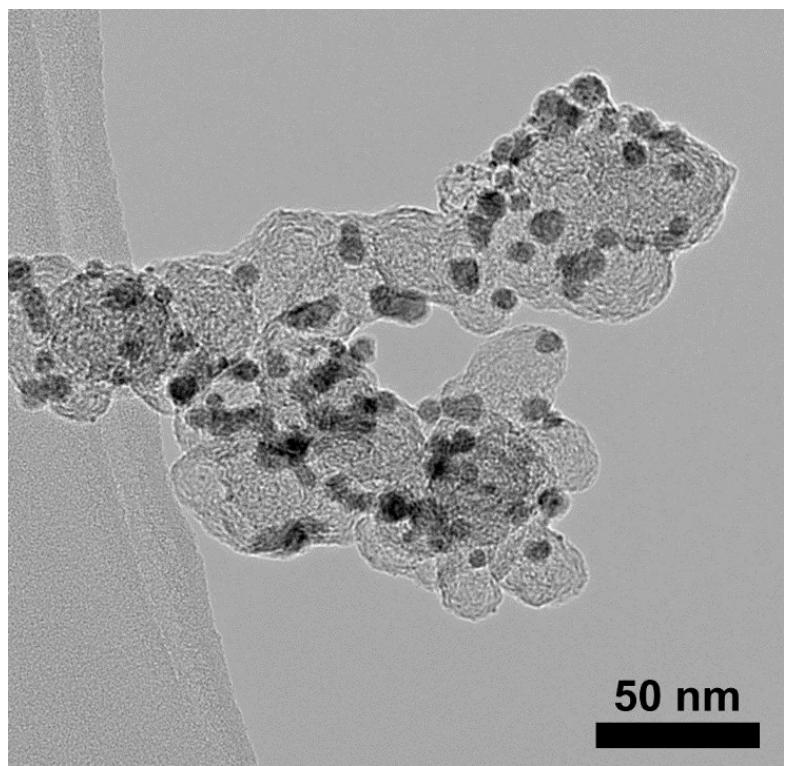
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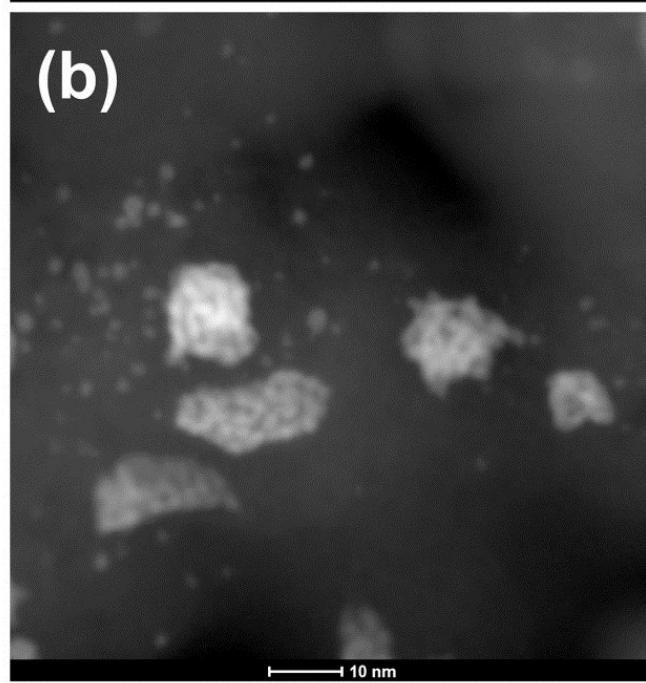
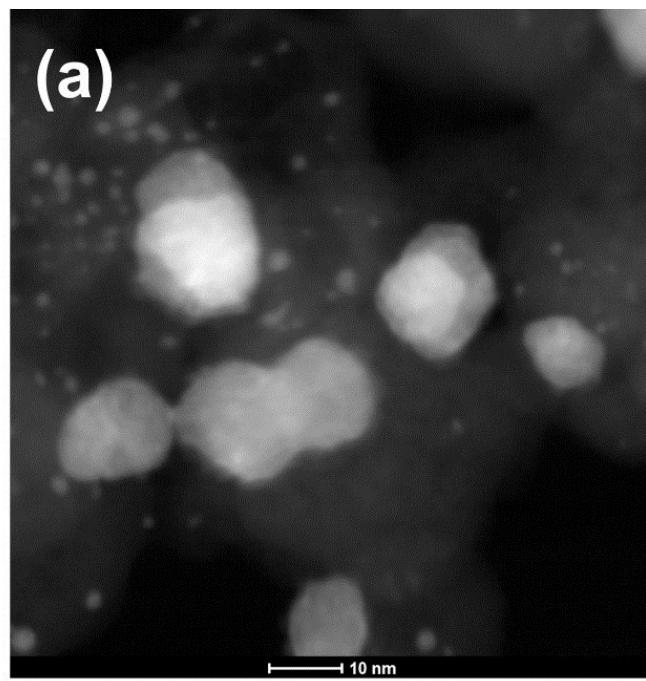
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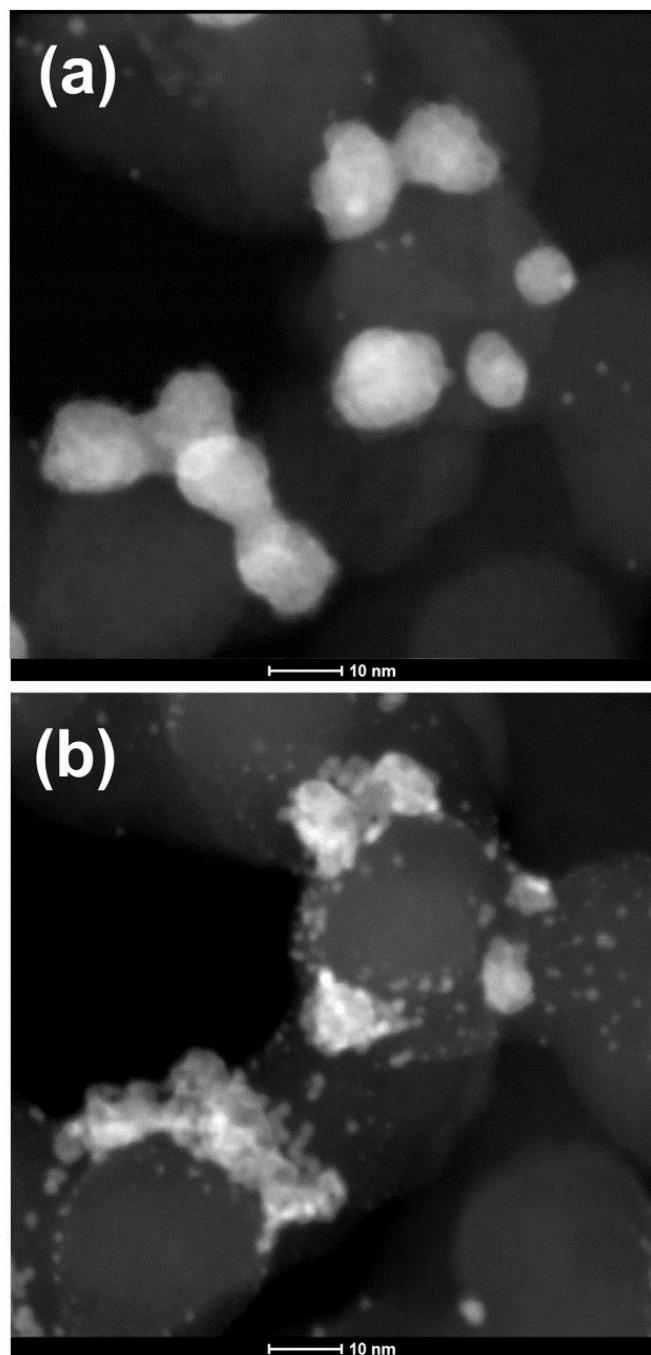
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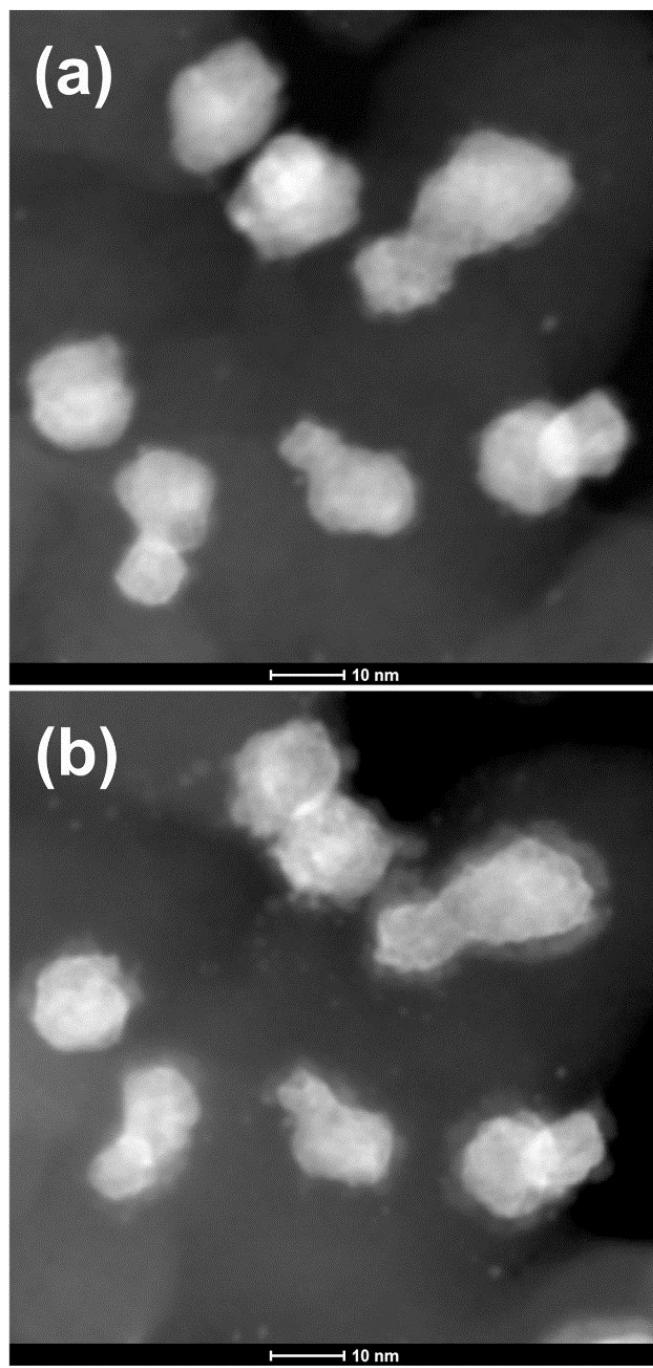
**Figure S1.** HR-TEM images of the pristine IrNi nanoparticles supported on carbon black (IrNi/C)



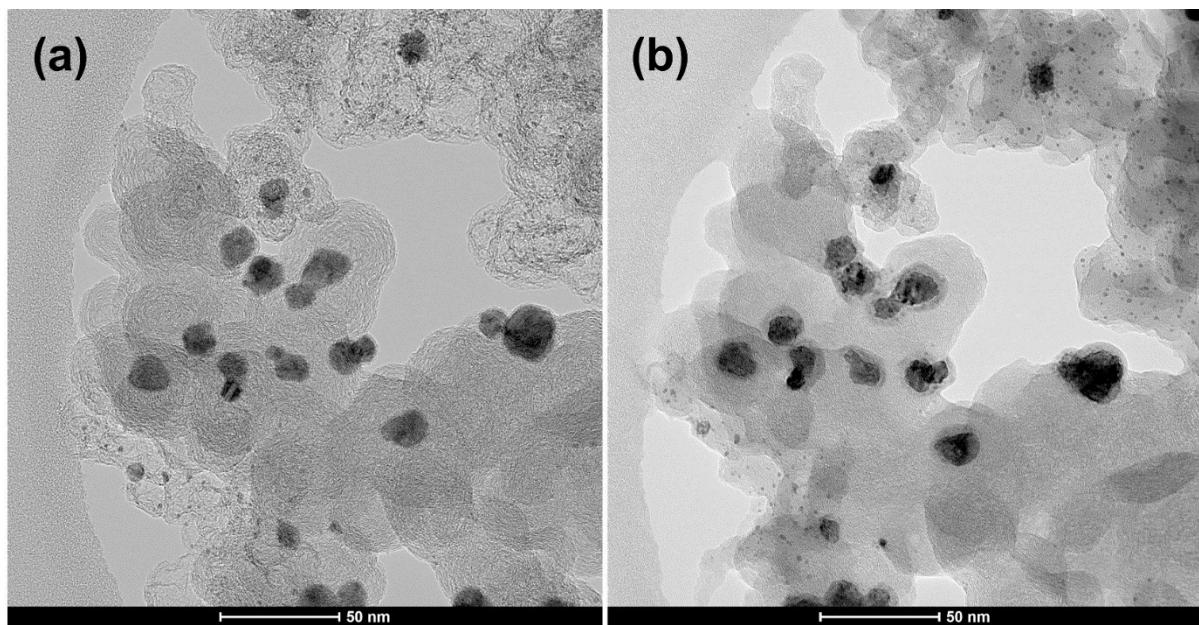
**Figure S2.** Identical location high angle annular dark-field STEM (IL-HADDF-STEM) images of IrNi/C (a) before and (b) after electrochemical activation in the acidic electrolyte conditions.



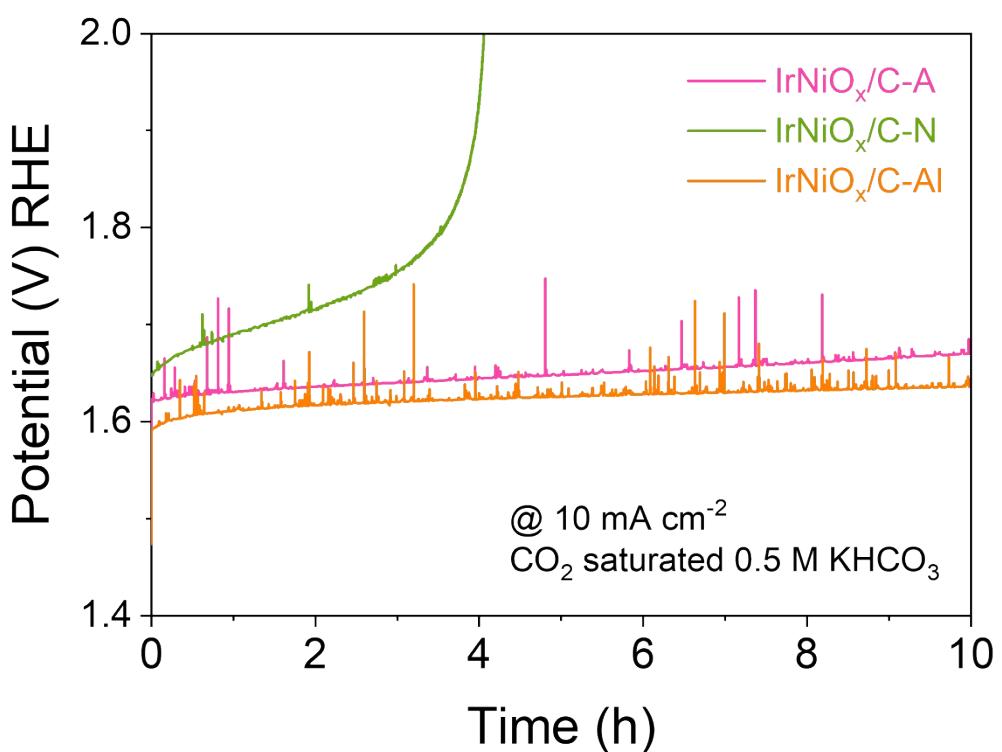
**Figure S3.** Identical location high angle annular dark-field STEM (IL-HADDF-STEM) images of IrNi/C (a) before and (b) after electrochemical activation in the neutral electrolyte conditions.



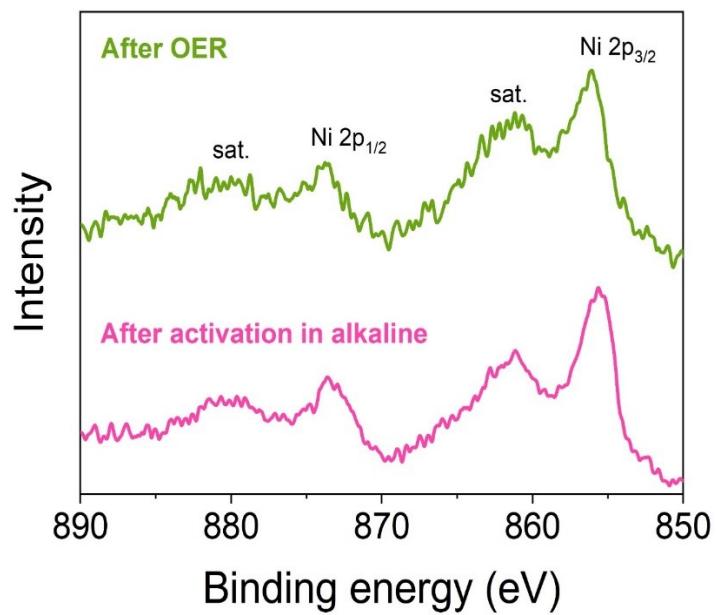
**Figure S4.** Identical location high angle annular dark-field STEM (IL-HADDF-STEM) images of IrNi/C (a) before and (b) after electrochemical activation in the alkaline electrolyte conditions.



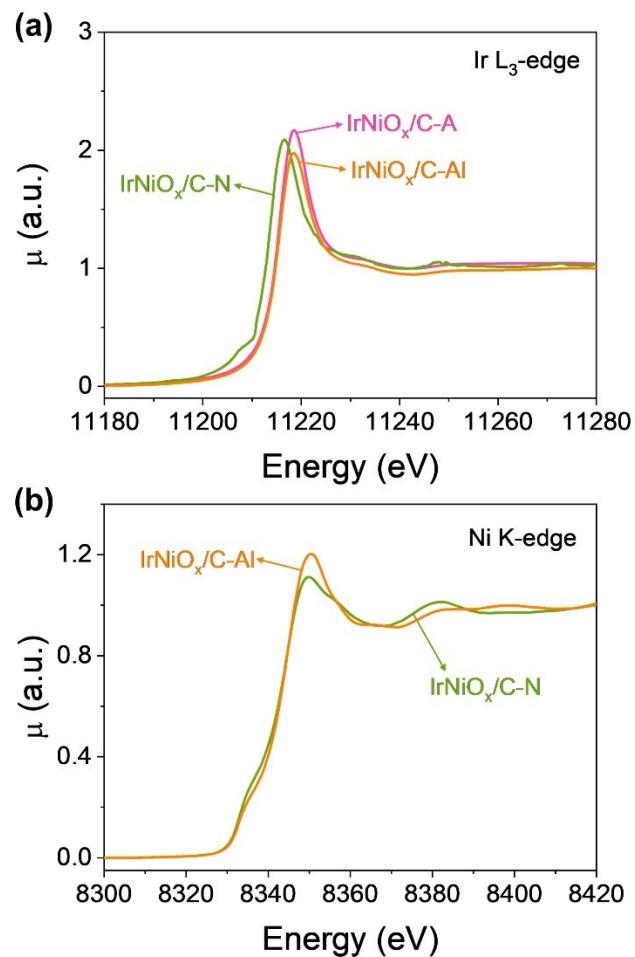
**Figure S5.** IL-TEM images of the IrNi/C (a) before and (b) after activation in the alkaline electrolyte conditions.



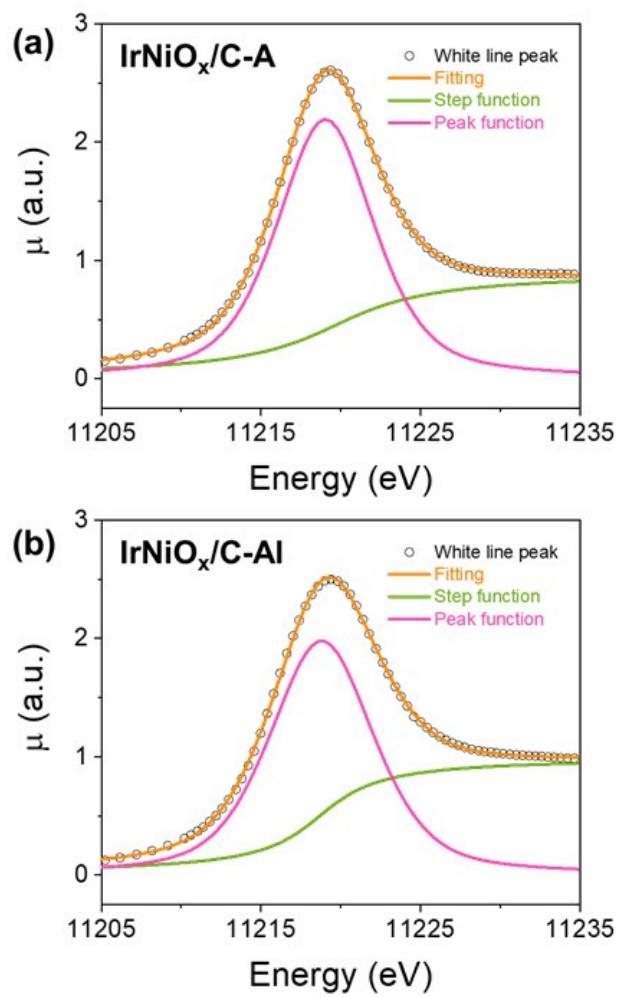
**Figure S6.** Constant current stability test of  $\text{IrNiO}_x$  based electrocatalysts for OER with different pH electrolyte activation conditions. Measurement condition: 25 °C, 10 mA cm<sup>-2</sup>, CO<sub>2</sub>-saturated 0.5 M KHCO<sub>3</sub>, 1600 rpm. Test time: 10 h. Ir loading: 20.5  $\mu\text{g cm}^{-2}$ .



**Figure S7.** XPS spectra for Ni 2p of IrNiO<sub>x</sub>/C-Al (a) after electrochemical activation in alkaline condition and (b) after OER test in CO<sub>2</sub> saturated 0.5 M KHCO<sub>3</sub>.



**Figure S8.** *Ex-situ* X-ray absorption spectroscopy (XAS) results of  $\text{IrNiO}_x/\text{C-A}$ ,  $\text{IrNiO}_x/\text{C-N}$ , and  $\text{IrNiO}_x/\text{C-Al}$ . NEXAFS region of (a) Ir L<sub>3</sub>-edge and (b) Ni K-edge.



**Figure S9.** XANES Peak area fitting results of (a)  $\text{IrNiO}_x/\text{C-A}$  and (b)  $\text{IrNiO}_x/\text{C-Al}$ .

**Table S1.** Comparisons of OER electrocatalytic activity in neutral media

Catalyst	Catalyst loading (mg/cm <sup>2</sup> )	Tafel slope (mV/dec)	Potential (mV) @ 10mA/cm <sup>2</sup>	Reference
IrNiO <sub>x</sub> /C-Al	0.02	150	384	This work
Ni <sub>0.1</sub> Co <sub>0.9</sub> P	0.58	133	~530	Yu et al <sup>1</sup>
Co@Co-Bi/Ti	0.2	-	470	Wang et al <sup>2</sup>
Iridium incorporated Co(OH) <sub>2</sub>	0.566	117.5	373	Song et al <sup>3</sup>
Dendritic IrTe NTs	0.0245	77.9	570	Lin et al <sup>4</sup>
Ir <sub>70</sub> Ni <sub>15</sub> Co <sub>15</sub>	1.08	63.5	290	Tan et al <sup>5</sup>
IrRu@Te	0.15	-	309	Liu et al <sup>6</sup>
Li-IrSe <sub>2</sub>	0.25	-	315	Zeng et al <sup>7</sup>

## Reference

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