Supporting Information

Island-type hybrid catalysts applied for anion exchange membrane water electrolysis

Hsueh-Yu Chen,[1] Guan-Cheng Chen,[1] Kuo-Wei Liao, [1] Wen-Hui Wei, [1] Hsin-Chih Huang,[#2] Chen-Hao Wang[*1] [1] Department of Materials Science and Engineering, National Taiwan University of Science and Technology, Taipei 106335, Taiwan [2] Global Development Engineering Program, National Taiwan University of Science and Technology, Taipei, 106335, Taiwan

**Corresponding author's email: chwang@mail.ntust.edu.tw (Prof. C.-H. Wang)*

[#]Co-corresponding author's email: hchuang@mail.ntust.edu.tw (Prof. H.-C. Huang)

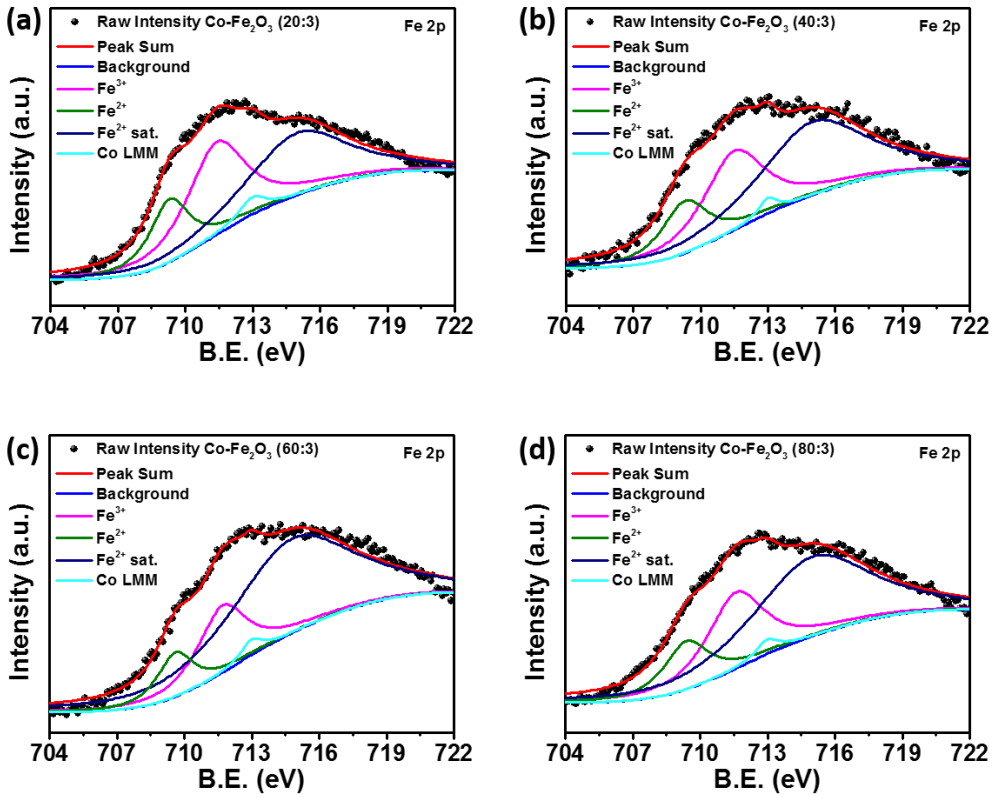

Figure S1. The XPS of Fe 2p spectra for (a) Co-Fe_2O_3 (20:3), (b) Co-Fe_2O_3 (40:3), (c) Co-Fe_2O_3 (60:3), (d) Co-Fe_2O_3 (80:3).

Table S1. The XPS of integrated value for Fe^{3+}, Fe^{2+}, and Co LMM.

	Fe^{3+}	Fe^{2+}	Co LMM
Co-Fe_2O_3 (20:3)	64.6	30.09	5.31
Co-Fe_2O_3 (40:3)	64.05	32.17	3.78
Co-Fe_2O_3 (60:3)	62.94	30.8	6.26
Co-Fe_2O_3 (80:3)	63.32	31.86	4.82

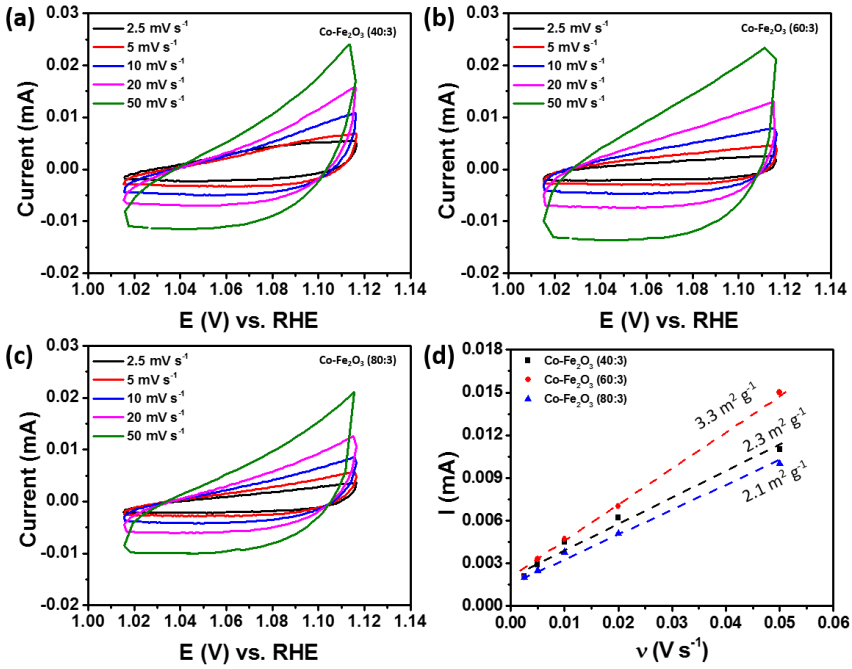

Figure S2. The CV method near the non-faradic potential window: (a) Co-Fe_2O_3 (40:3), (b) Co-Fe_2O_3 (60:3), (c) Co-Fe_2O_3 (80:3), and (d) the scan rates vs. the nonfaradic currents for all samples.

Cycle voltammetry (CV) was performed to calculate the electrochemical surface area (ECSA) with various scan rates from 2.5 to 50 mV s^{-1} using the capacitive method. For calculation of double-layer charge capacitance (C_{DL}), CV with various scan rates is conducted, and the difference between anodic (j_a) and cathodic (j_c) currents was determined to obtain C_{DL}, which is the slope of cathodic and anodic current. The value of ECSA is calculated by:

$$ECSA = \frac{C_{DL}}{mC_S} \qquad (S1)$$

where m means the loading of the active catalysts and C_s means the specific capacitance, which is 4 10^{-5} F cm^{-2} [1].

Reference

1. Cao, X.; Johnson, E.; Nath, M. Identifying high-efficiency oxygen evolution electrocatalysts from Co–Ni–Cu based selenides through combinatorial

electrodeposition. *J. Mater. Chem. A* **2019**, *7*, 9877–9889, doi:10.1039/C9TA00863B.