Electronic supplementary information (ESI):

Dealloying-directed synthesis of efficient mesoporous CoFe-based catalysts towards oxygen evolution reaction and overall water splitting

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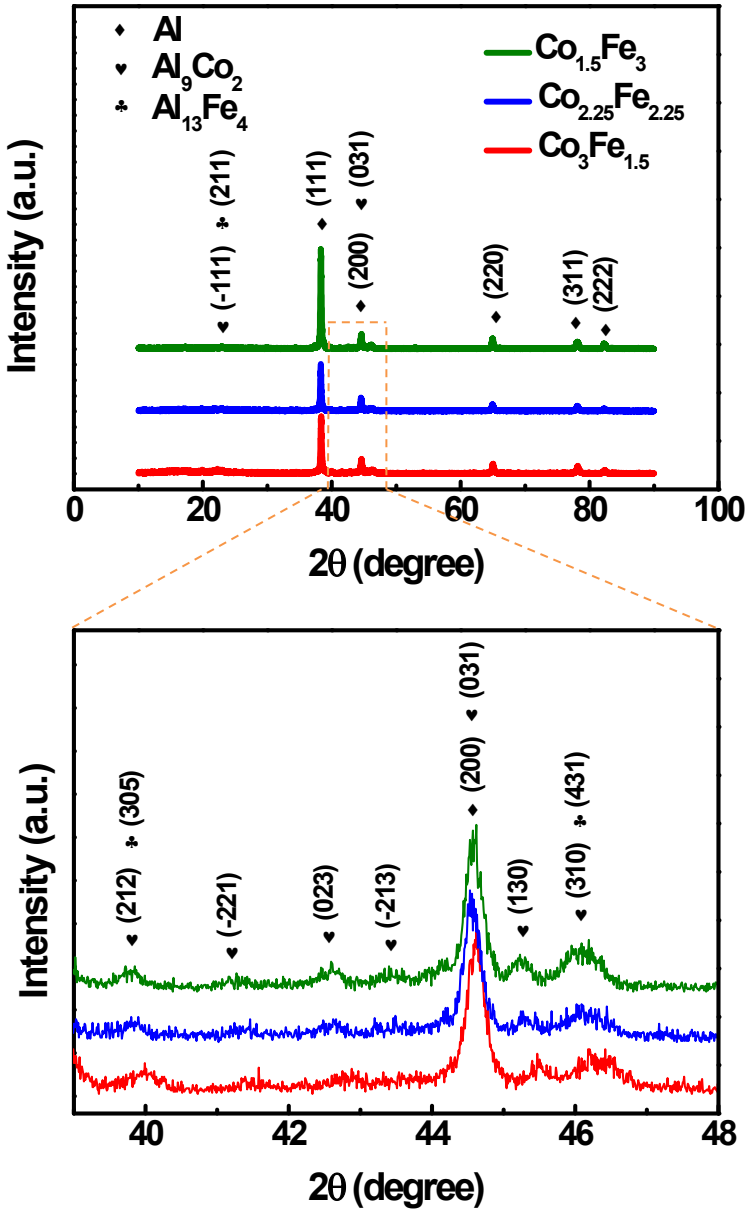

Figure S1. XRD patterns and magnified XRD patterns with the degree ranging from 39º to 48º of the $Al_{95.5}Co_xFe_{4.5-x}$ (x=1.5, 2.25, 3) alloy ribbons.

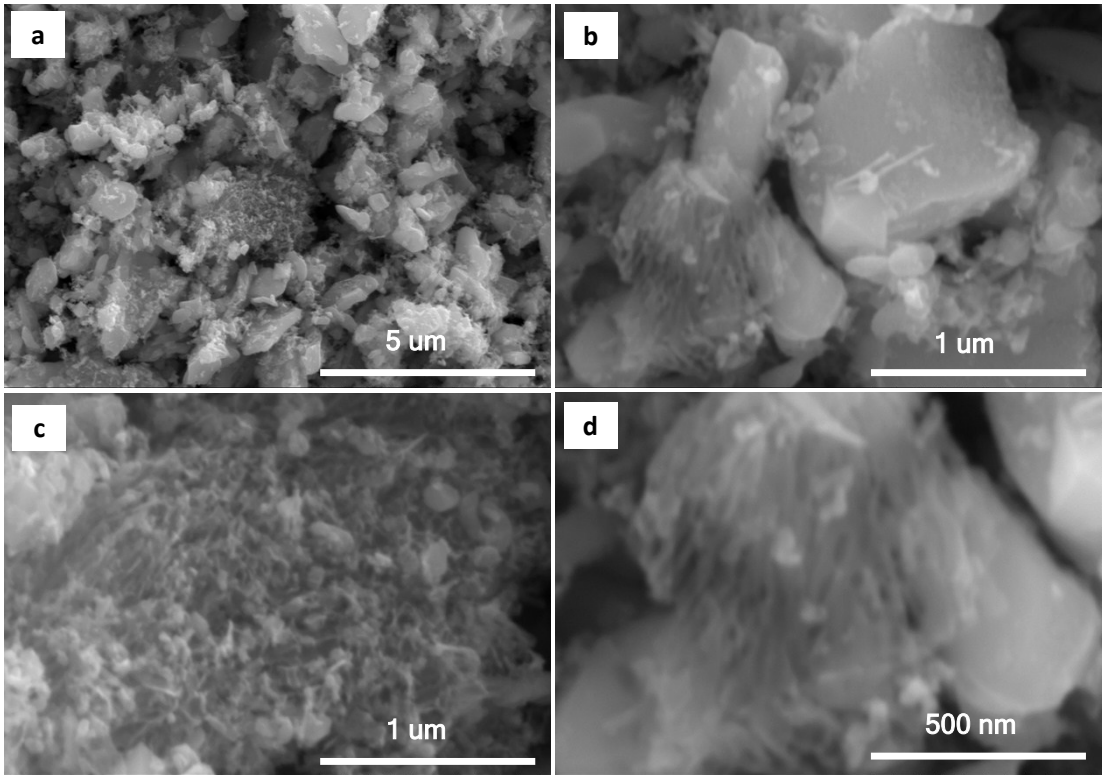

Figure S2. SEM images of the $Co_{1.5}Fe_3$-O catalyst with different magnifications.

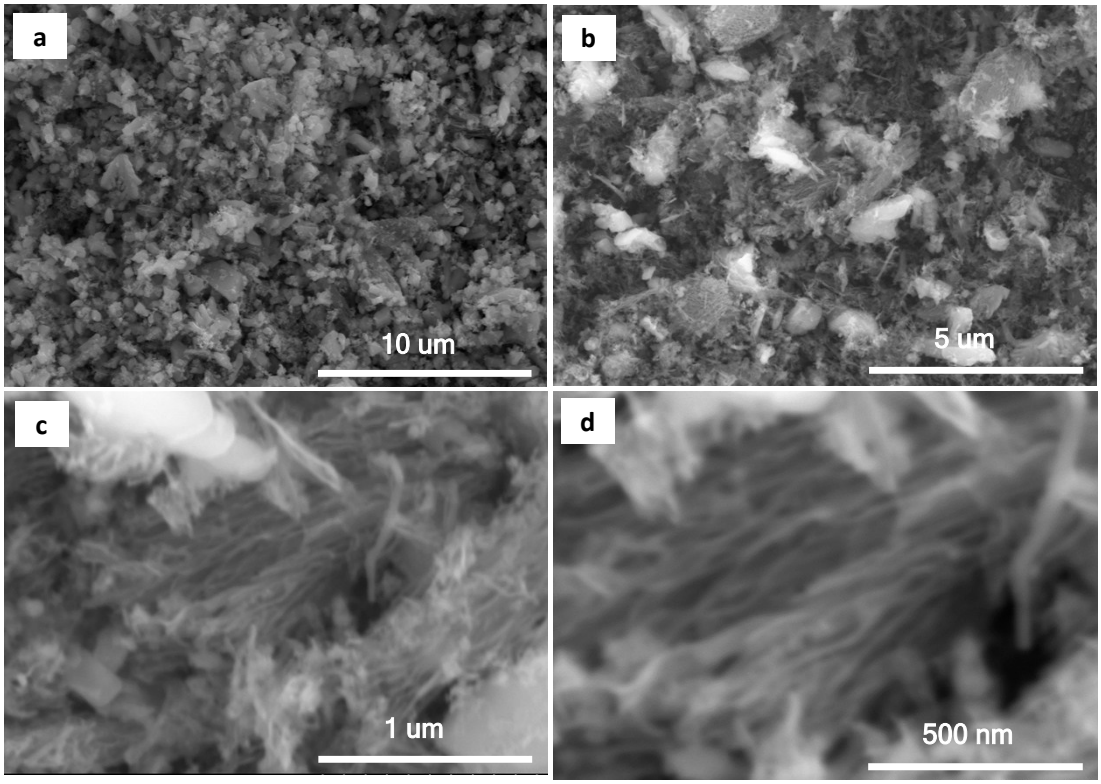

Figure S3. SEM images of the $Co_{2.25}Fe_{2.25}$-O catalyst with different magnifications.

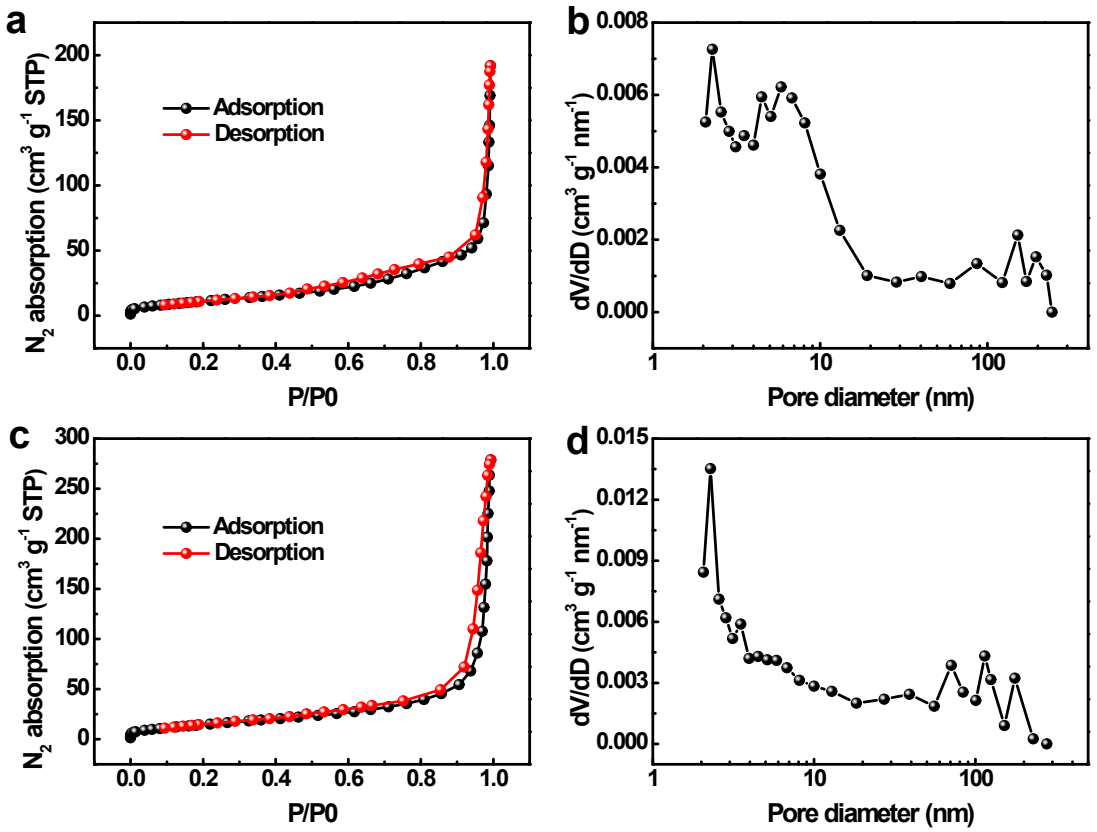

Figure S4. N_2 adsorption-desorption isotherms of the (a) $Co_{1.5}Fe_3$-O and (c) $Co_{2.25}Fe_{2.25}$-O catalysts. Pore size distribution of the (b) $Co_{1.5}Fe_3$-O and (d) $Co_{2.25}Fe_{2.25}$-O catalysts.

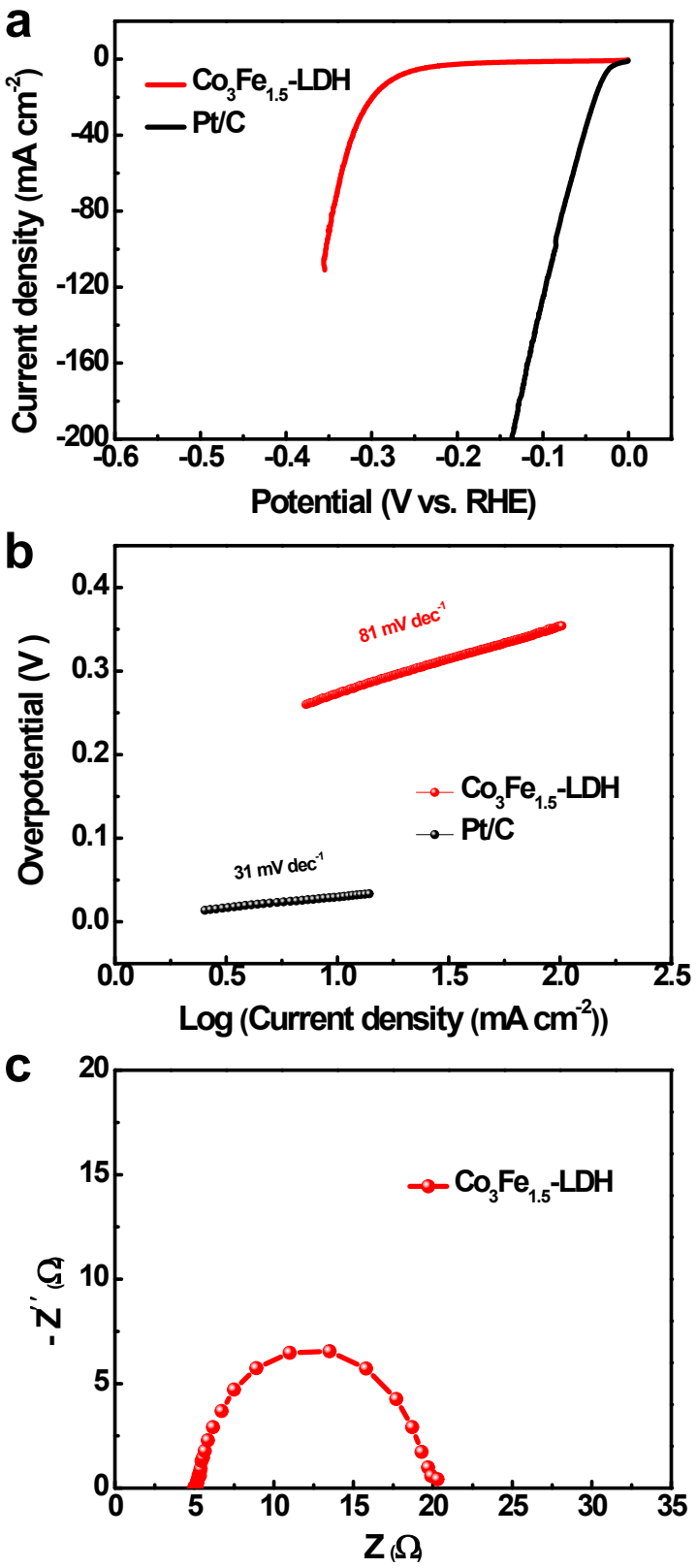

Figure S5. (a) HER polarization curves and (b) the corresponding Tafel curves of the $Co_3Fe_{1.5}$-LDH and Pt/C catalysts. (c) EIS of the $Co_3Fe_{1.5}$-LDH catalyst loaded on GC at -0.3 V vs. RHE.

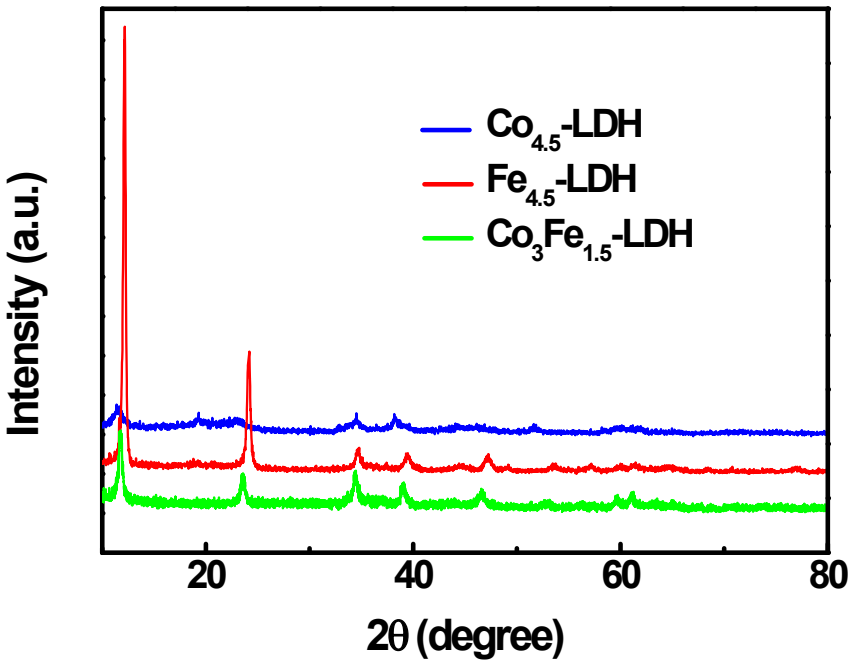

Figure S6. XRD patterns of the $Co_{4.5}$-LDH, $Fe_{4.5}$-LDH and $Co_3Fe_{1.5}$-LDH catalysts prepared from the $Al_{95.5}Co_{4.5}$, $Al_{95.5}Fe_{4.5}$ and $Al_{95.5}Co_3Fe_{1.5}$ precursor ribbons, respectively.

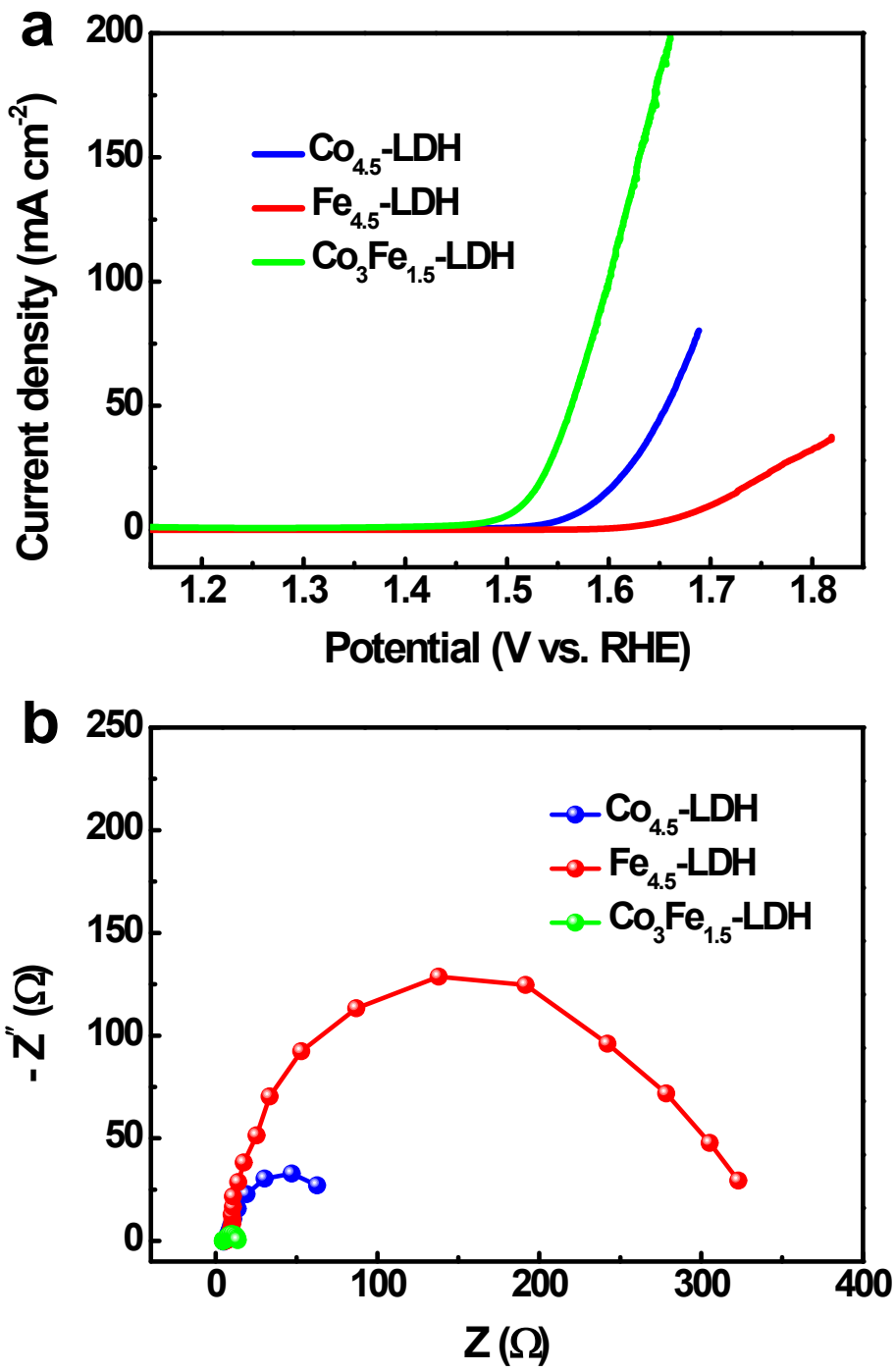

Figure S7. (a) OER polarization curves and (b) EIS of the $Co_{4.5}$-LDH, $Fe_{4.5}$-LDH and $Co_3Fe_{1.5}$-LDH catalysts loaded on GC at 1.54 V vs. RHE.

Table S1 OER activity comparison of our catalysts with other reported CoFe-based active catalysts.

Catalysts/Substrates	Onset potential (V vs. RHE)	η at 10 mA/cm^2 (V)	Tafel slope mV/dec	Reference
$Co_3Fe_{1.5}$/GC	**1.356**	**0.284**	**60**	**This work**
$Co_3Fe_{1.5}$-LDH/GC	**1.464**	**0.286**	**45**	**This work**
$CoFe_2O_4$/CP	not available	0.477	51	1
$LiCo_{0.8}Fe_{0.2}O_2$/GC	1.49	0.34	50	2
$(Co_{0.54}Fe_{0.46})_2P$/GC	1.43	0.37	not available	3
$CoFe_2O_4$/GC	1.5	0.314	not available	4
$CoFeO_x$/Au	1.51	0.32	36	5
CoFePO/NF	not available	0.275	51.7	6
CoFe-LDH/GC	1.49	0.34	43	7
$W_{0.5}Co_{0.4}Fe_{0.1}$/NF	not available	0.26	32	8
LDH FeCo/GC	not available	0.33	85	9
CoFe LDHs-Ar/GC	1.457	0.266	37.9	10

GC : glassy carbon. CP : carbon paper. NF : Ni foam.

Table S2 The simulated values of solution resistance (R_s) and charge-transfer resistance (R_{ct}) of the CoFe-based catalysts obtained from the electrical equivalent circuit model in the inset of Figure 5c.

Samples	R_s (Ω)	R_{ct} (Ω)
$Co_{1.5}Fe_3$-O	4.62	17.16
$Co_{2.25}Fe_{2.25}$-O	4.55	15.36
$Co_3Fe_{1.5}$-O	4.58	9.61
$Co_3Fe_{1.5}$-LDH	4.72	8.05

Notes and Reference

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