

# Supplementary Information

Figure S1. XRD patterns of NiAl LDH at different concentrations of KOH.

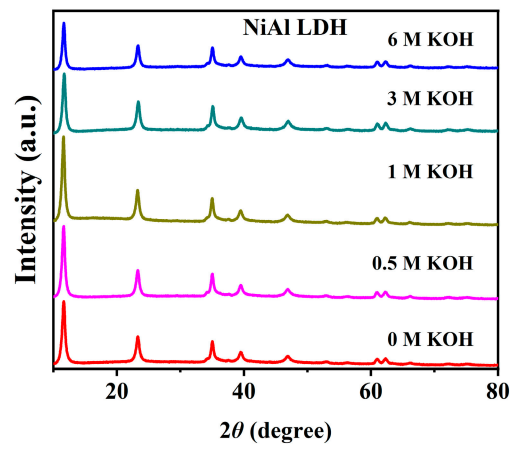


Figure S2. (a) XRD patterns of CoAl LDH at different concentrations of KOH, (b) partial enlarged drawing of (a).

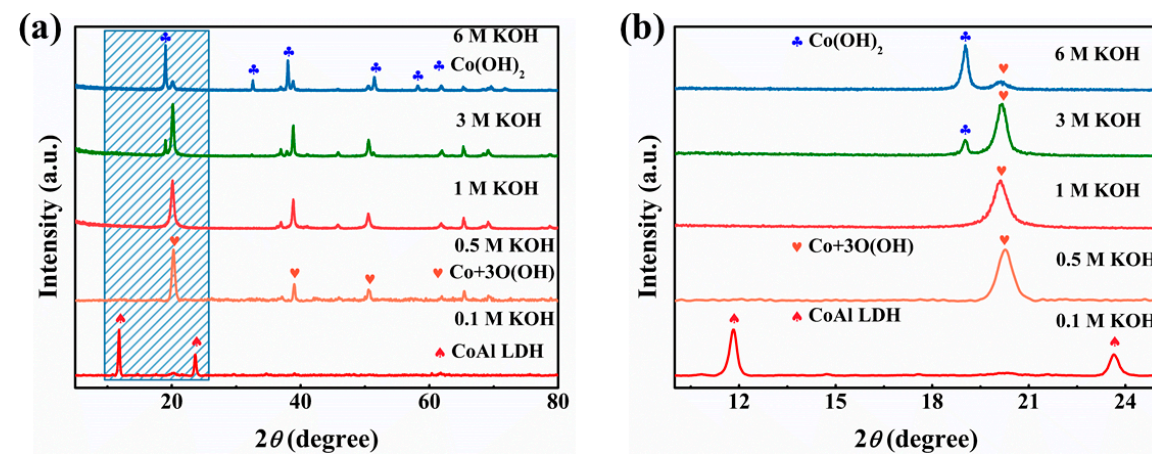


Figure S3. (a) CV, GCD curves and rate capacities of NiAl LDH, CoAl LDH and CoAl LDH-E.

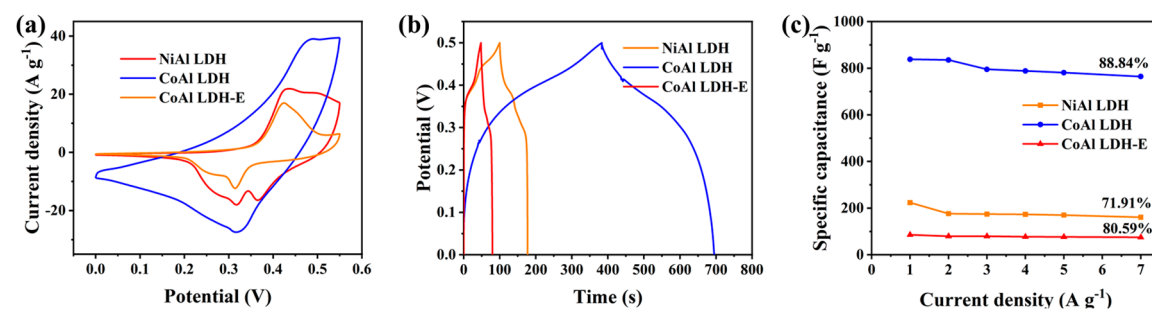


Figure S4. (a) The morphology, (b) selected area electron diffraction, (c) elements content and (d) EDS mapping of  $\text{Ni}_2\text{Co}_1\text{Al}$  LDH

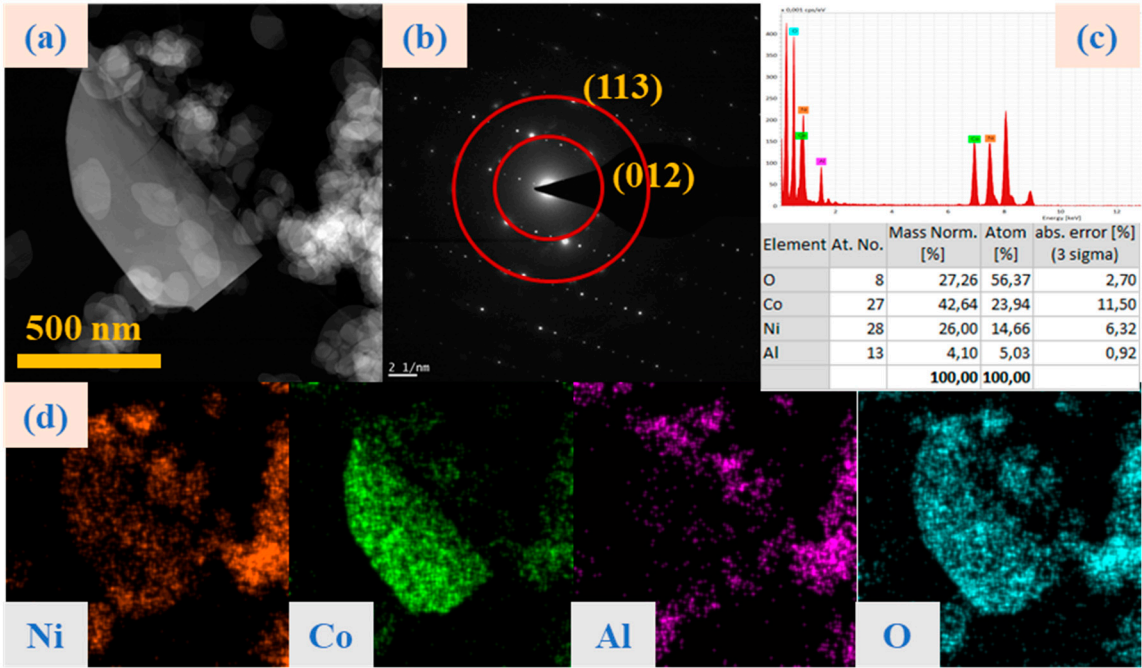


Figure S5. (a) The morphology, (b) selected area electron diffraction, (c) elements content and (d) EDS mapping of  $\text{Ni}_2\text{Co}_1\text{Al}$  LDH-E.

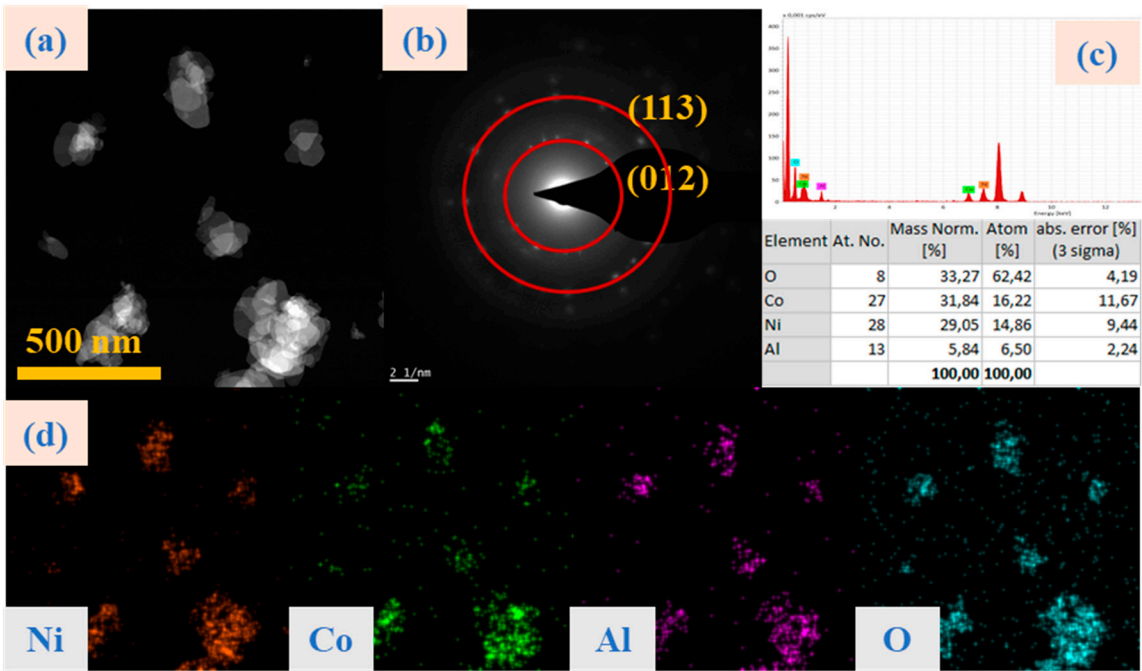


Figure S6. The CV, GCD curves and Nyquist plots of Ni<sub>2</sub>Co<sub>1</sub>Al LDH-E, Ni<sub>1</sub>Co<sub>2</sub>Al LDH-E, Ni<sub>2</sub>Co<sub>1</sub>S<sub>4</sub>-E and Ni<sub>1</sub>Co<sub>2</sub>S<sub>4</sub>-E.

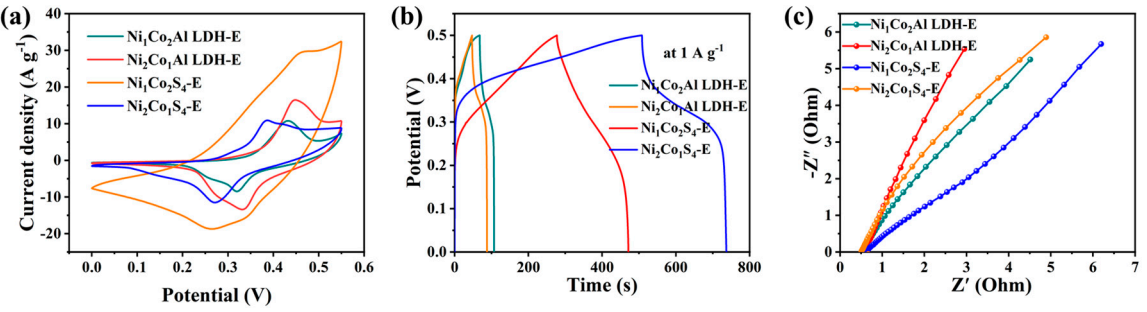


Figure S7. The GCD curves of AC at the current densities of 1, 2 and 3 A g<sup>-1</sup>.

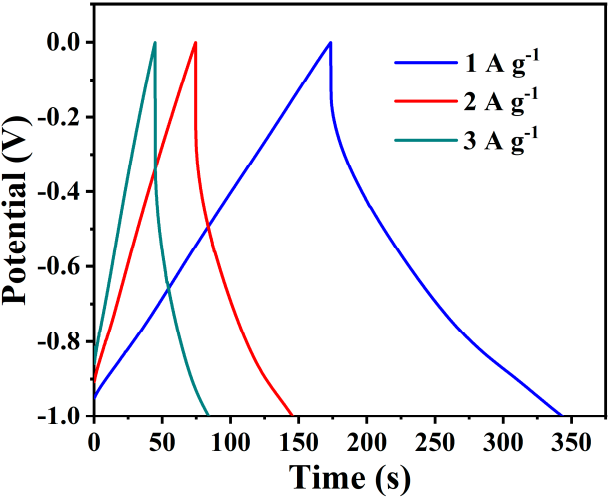


Table S1. The specific surface area, pore volume and average pore diameter of Ni<sub>2</sub>Co<sub>1</sub>S<sub>4</sub>, Ni<sub>2</sub>Co<sub>1</sub>S<sub>4</sub>-E, Ni<sub>2</sub>Co<sub>1</sub>Al LDH and Ni<sub>2</sub>Co<sub>1</sub>Al LDH-E.

	Ni <sub>2</sub> Co <sub>1</sub> S <sub>4</sub>	Ni <sub>2</sub> Co <sub>1</sub> S <sub>4</sub> -E	Ni <sub>2</sub> Co <sub>1</sub> Al LDH	Ni <sub>2</sub> Co <sub>1</sub> Al LDH-E
Specific surface				
area	7.1648	31.0860	58.8592	63.2865
(m <sup>2</sup> g <sup>-1</sup> )				
Pore volume	0.040893	0.151196	0.376361	0.372464
(cm <sup>3</sup> g <sup>-1</sup> )				
Average pore				
diameter	18.4100	14.9734	13.6747	13.0023
(nm)				