

# Supplementary Materials

## **MOF-mediated construction of NiCoMn-LDH nanoflakes assembled Co(OH)F nanorods for improved supercapacitive performance**

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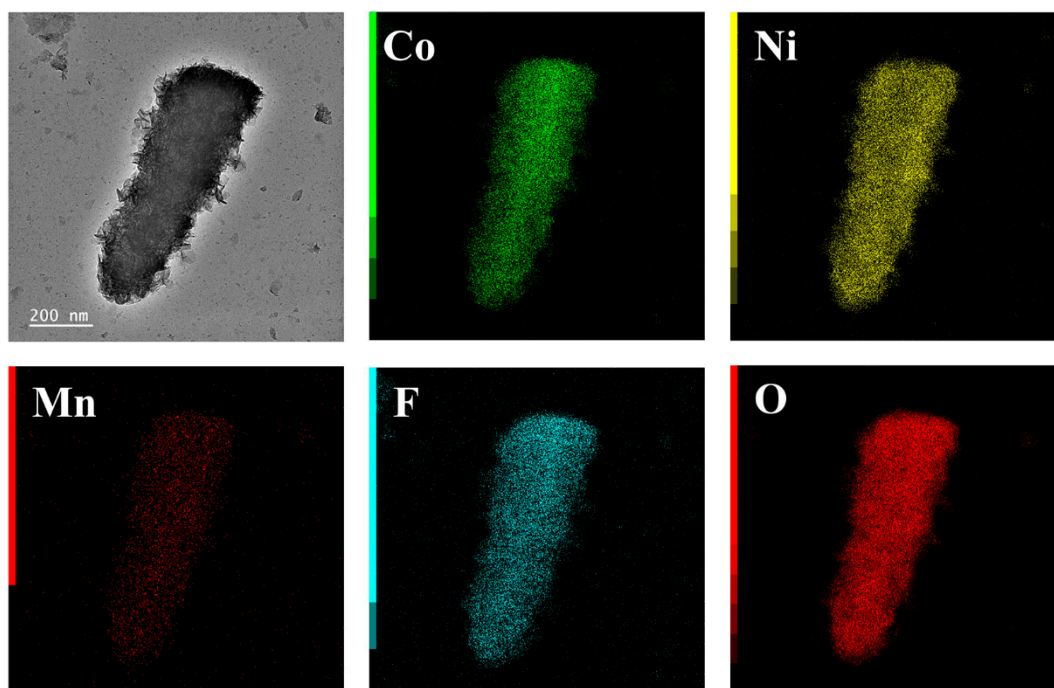


Figure S1. EDS-mapping images of Co(OH)F@NiCoMn-LDH.

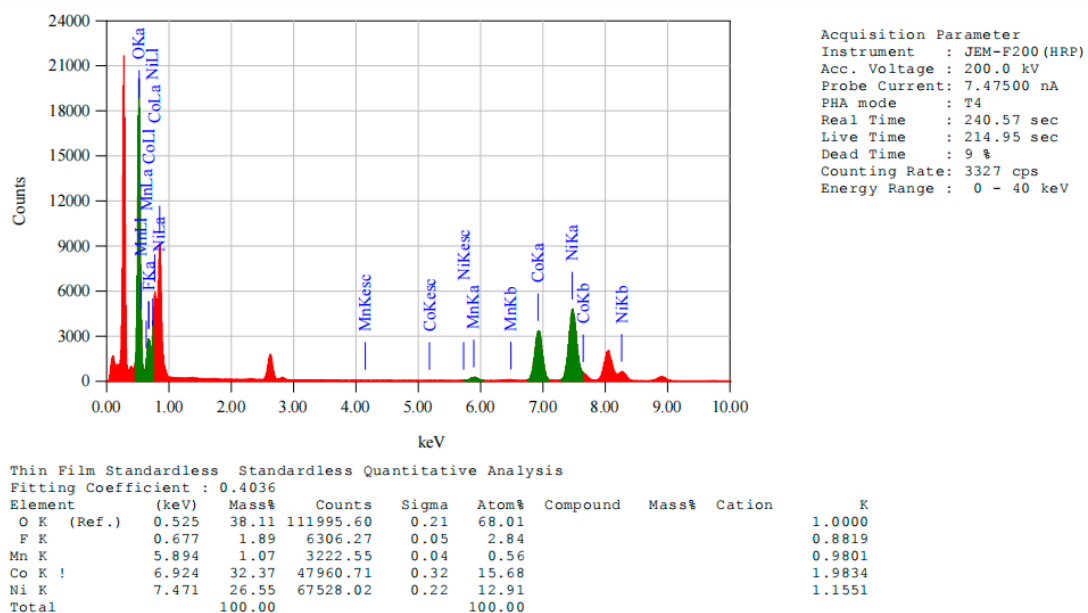


Figure S2. The elemental composition of Co(OH)F@NiCoMn-LDH.

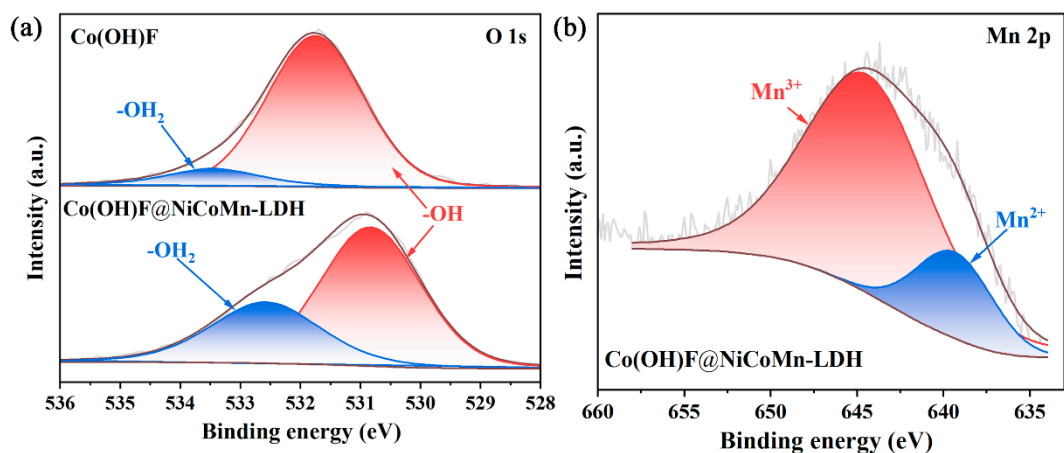


Figure S3. (a) O 1s XPS spectra of Co(OH)F and Co(OH)F@NiCoMn-LDH.

(b) Mn 2p<sub>3/2</sub> XPS spectra of Co(OH)F@NiCoMn-LDH.

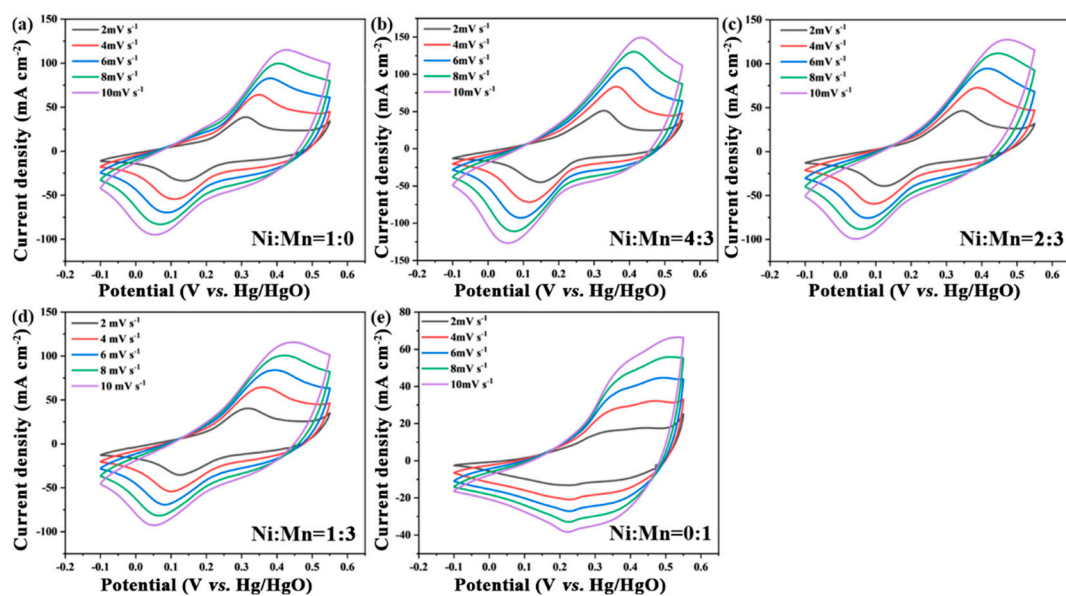


Figure S4. CV curves of Co(OH)F@Ni<sub>x</sub>CoMn<sub>y</sub>-LDH with different Ni/Mn ratios.

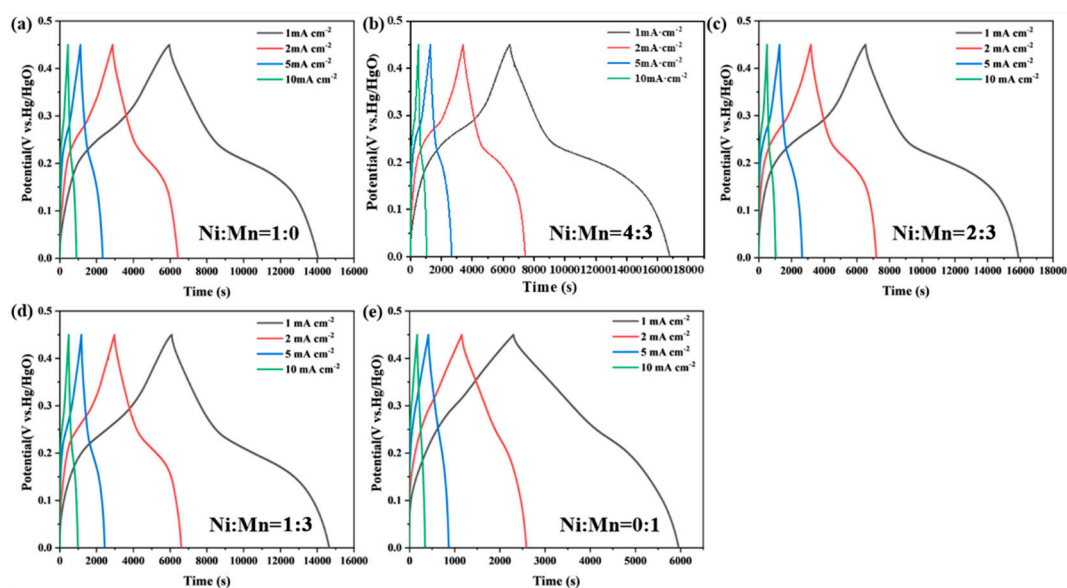


Figure S5. GCD curves of Co(OH)F@Ni<sub>x</sub>CoMn<sub>y</sub>-LDH with different Ni/Mn ratios.

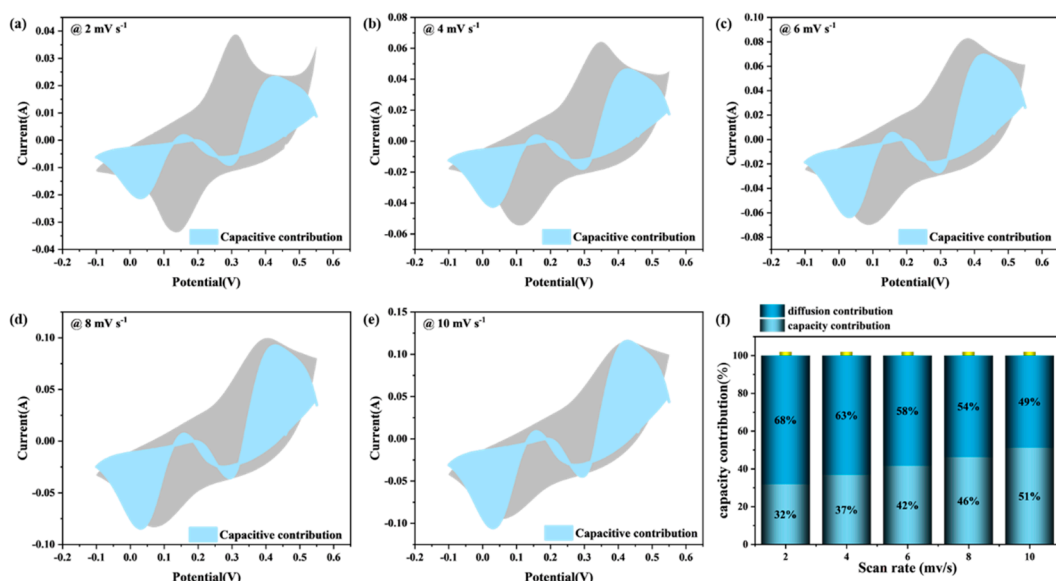


Figure S6. (a-e) CV curves and fitted capacitive-controlled curves of Co(OH)F@Ni<sub>1</sub>CoMn<sub>0</sub>-LDH at different scan rates. (f) Capacitive-controlled contribution to the total pseudocapacitive charge storage of Co(OH)F@Ni<sub>1</sub>CoMn<sub>0</sub>-LDH.

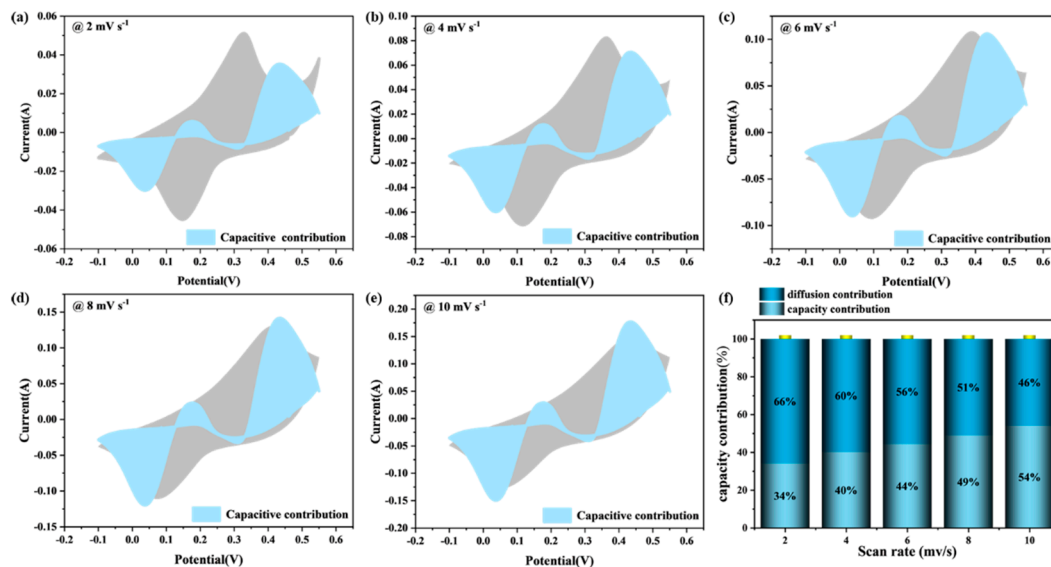


Figure S7. (a-e) CV curves and fitted capacitive-controlled curves of Co(OH)F@Ni<sub>2</sub>CoMn<sub>1</sub>-LDH at different scan rates. (f) Capacitive-controlled contribution to the total pseudocapacitive charge storage of Co(OH)F@Ni<sub>2</sub>CoMn<sub>3</sub>-LDH.

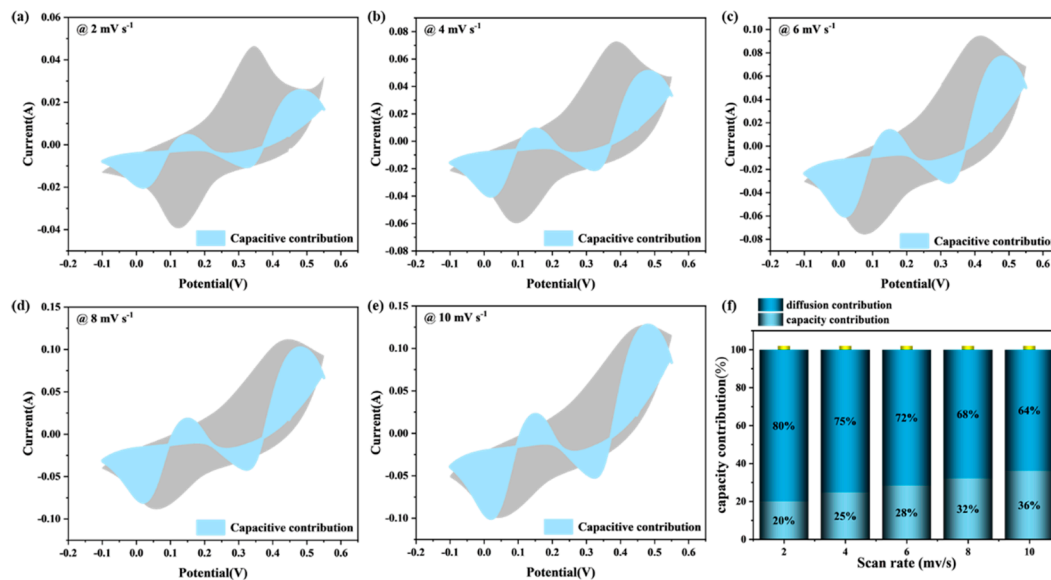


Figure S8. (a-e) CV curves and fitted capacitive-controlled curves of Co(OH)F@Ni<sub>1</sub>CoMn<sub>1</sub>-LDH at different scan rates. (f) Capacitive-controlled contribution to the total pseudocapacitive charge storage of Co(OH)F@Ni<sub>2</sub>CoMn<sub>3</sub>-LDH.

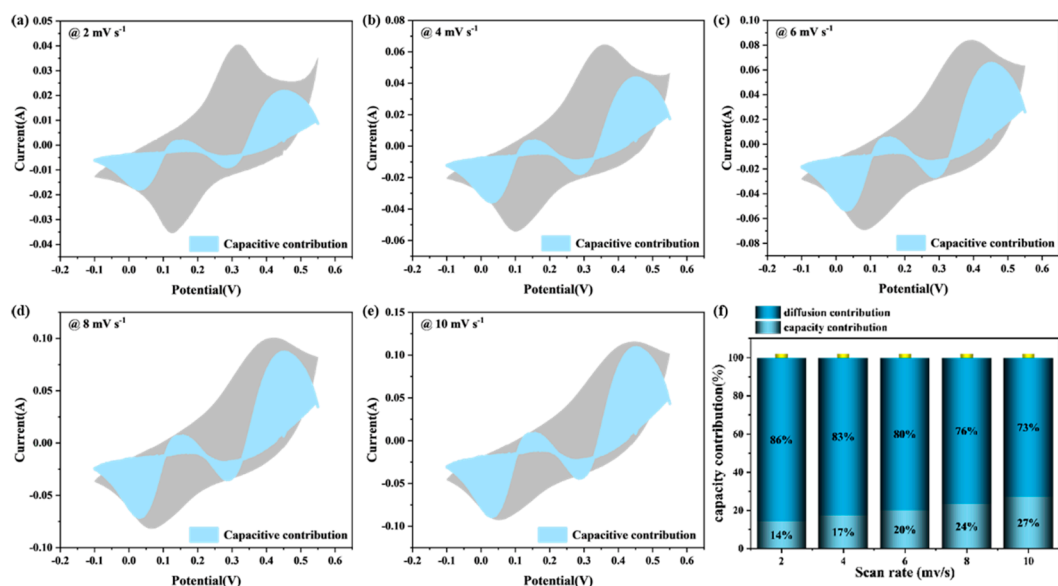


Figure S9. (a-e) CV curves and fitted capacitive-controlled curves of Co(OH)F@Ni<sub>1</sub>CoMn<sub>2</sub>-LDH at different scan rates. (f) Capacitive-controlled contribution to the total pseudocapacitive charge storage of Co(OH)F@Ni<sub>1</sub>CoMn<sub>3</sub>-LDH.

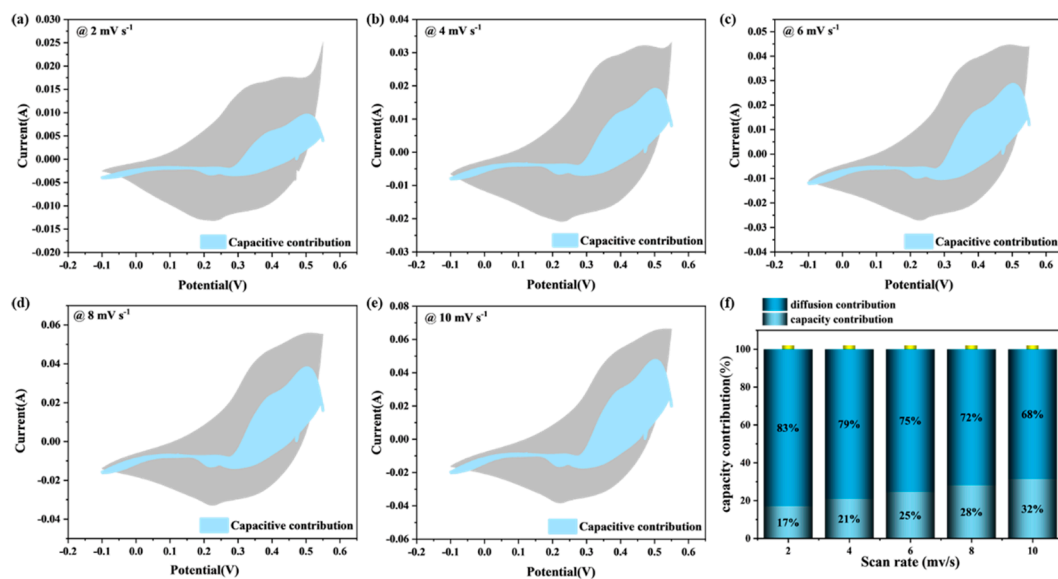


Figure S10. (a-e) CV curves and fitted capacitive-controlled curves of Co(OH)F@Ni<sub>0</sub>CoMn<sub>1</sub>-LDH at different scan rates. (f) Capacitive-controlled contribution to the total pseudocapacitive charge storage of Co(OH)F@Ni<sub>0</sub>CoMn<sub>1</sub>-LDH.

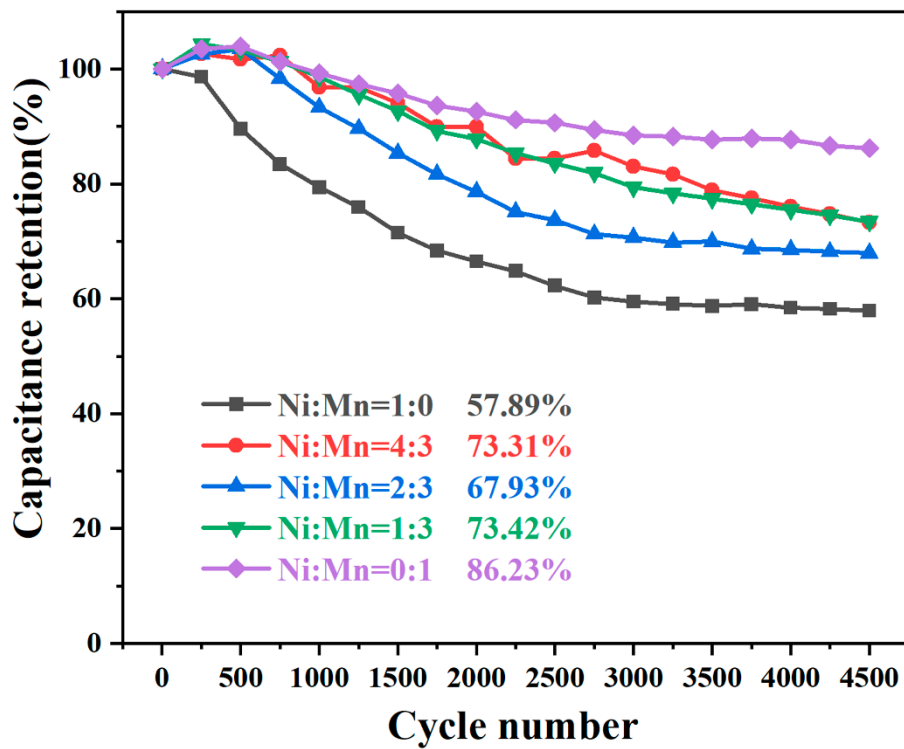


Figure S11. Cycling stability of Co(OH)F@Ni<sub>x</sub>CoMn<sub>y</sub>-LDH with different Ni/Mn ratios.

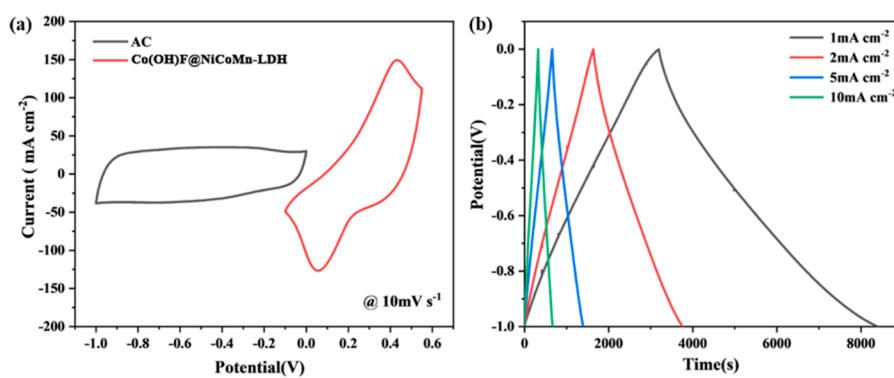


Figure S12. (a) CV curves of AC and Co(OH)F@NiCoMn-LDH electrode.  
(b) GCD curves of AC electrode at different current densities.

**Table S1.** Asymmetric supercapacitors devices and their energy density and power density reported in recent literature

Active material of positive electrode	Power density (mW cm <sup>-2</sup> )	Energy density (mWh cm <sup>-2</sup> )	Ref.
Cu-Co-Se-P	8	0.58	[46]
NCS/NCS/CC	1.6303	0.7051	[47]
CoNi <sub>300</sub> /Cu <sub>120</sub> composite	4.41	0.03086	[48]
NiCo-LDH	4.5	0.46	[49]
NiCo <sub>2</sub> S <sub>4</sub> /CC-CN	0.35	0.11	[50]
Co(OH)F@NiCoMn-LDH	75	0.363	This
Co(OH)F@NiCoMn-LDH	3.75	0.845	work