Electronic Supplementary Information (EIS) for New Journal of Chemistry

Rational Design of M-N-CNT Catalyst for CO_2 Reduction Based on NiZn Layered Double Hydroxides

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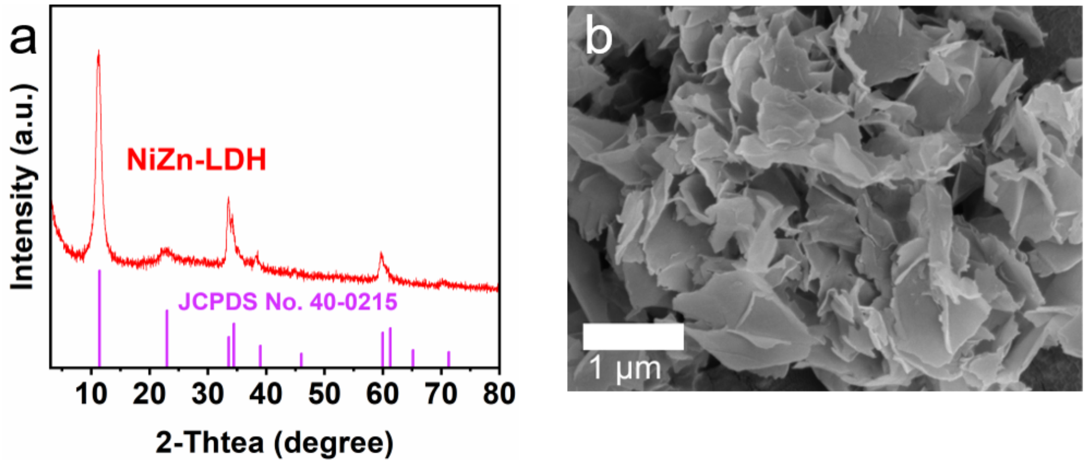

Fig. S1 (a) XRD pattern and (b) SEM image of NiZn-LDH.

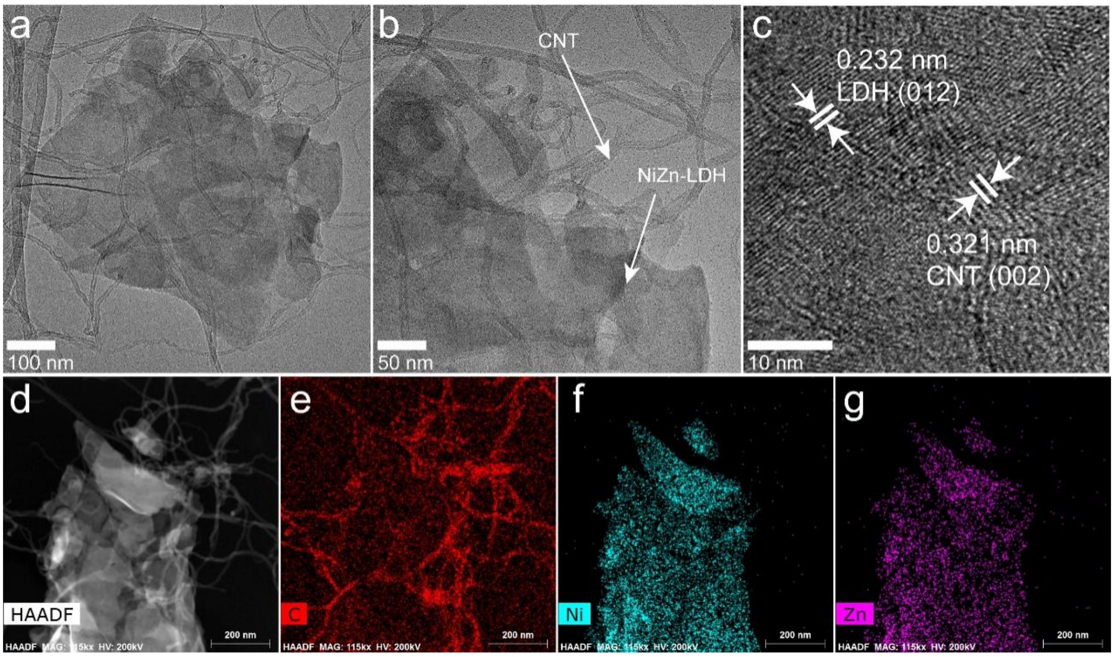

Fig. S2 (a) ~ (c) TEM images of CNT@NiZn-LDH NS-10, (d) ~ (g) the corresponding elemental mapping images of CNT-N-NiZn-10.

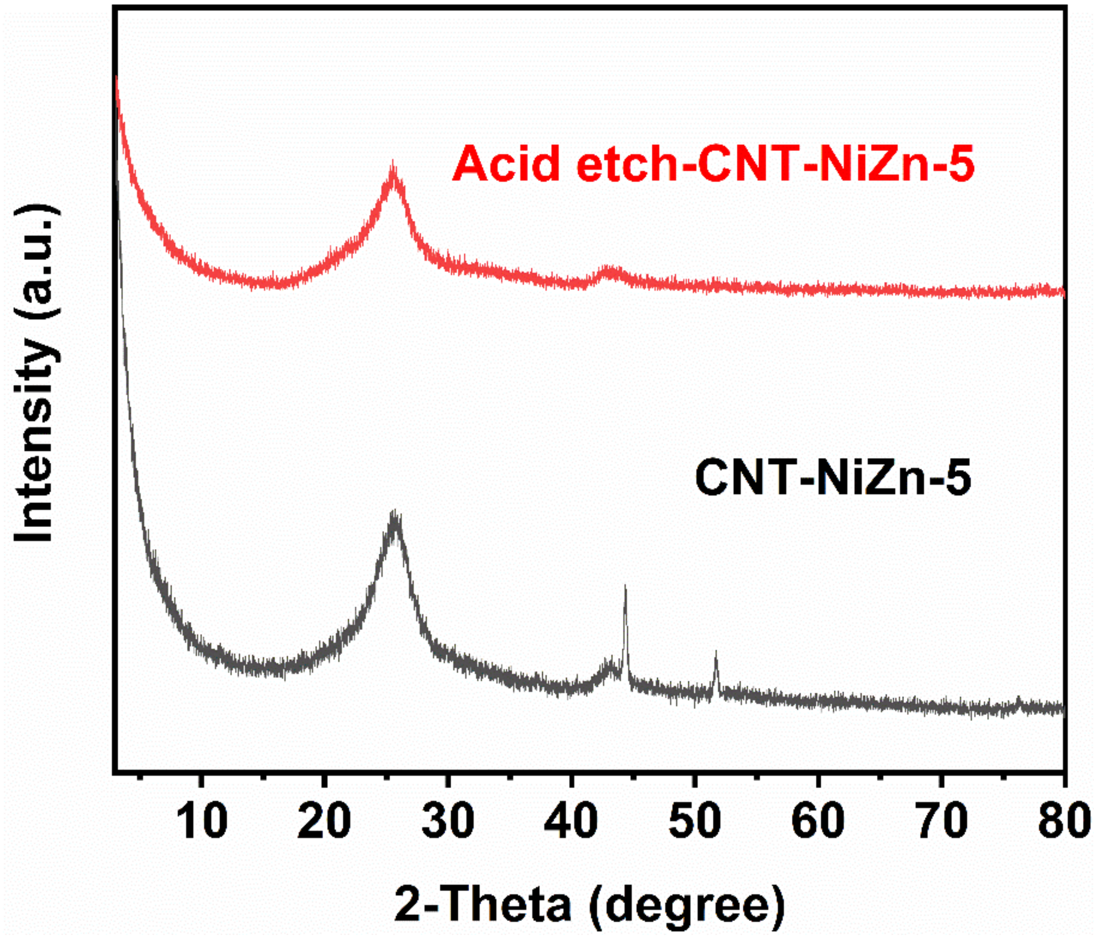

Fig. S3 XRD pattern of CNT-NiZn-5. The characteristic peak belonging to metal nanoparticles in acid etch-CNT-NiZn-5 disappeared, indicating that the metal nanoparticles belonging to CNT-NiZn-5 were removed.

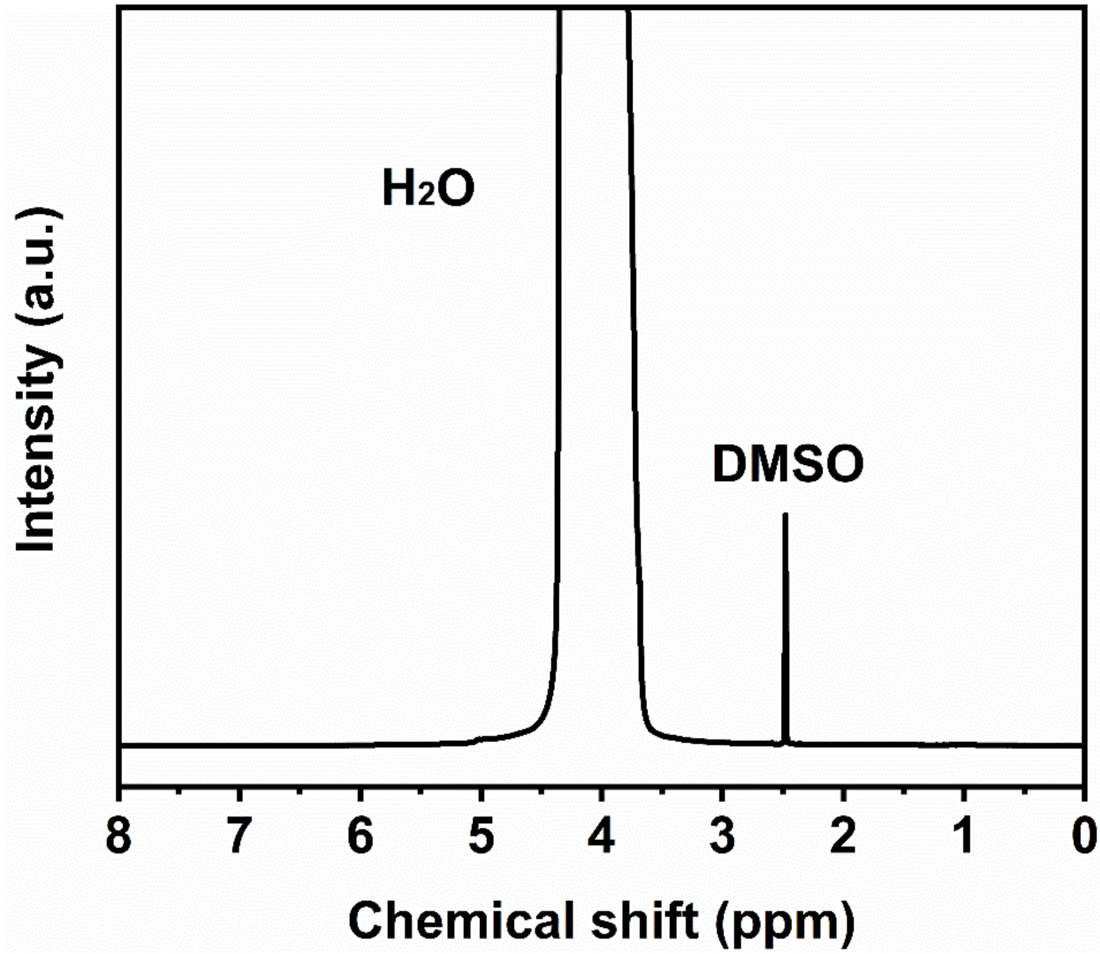

Fig. S4 1H-NMR spectrum of the electrolyte after the test of CNT-NiZn-10 at -0.8 V (vs. RHE). DMSO was added as inner standard.

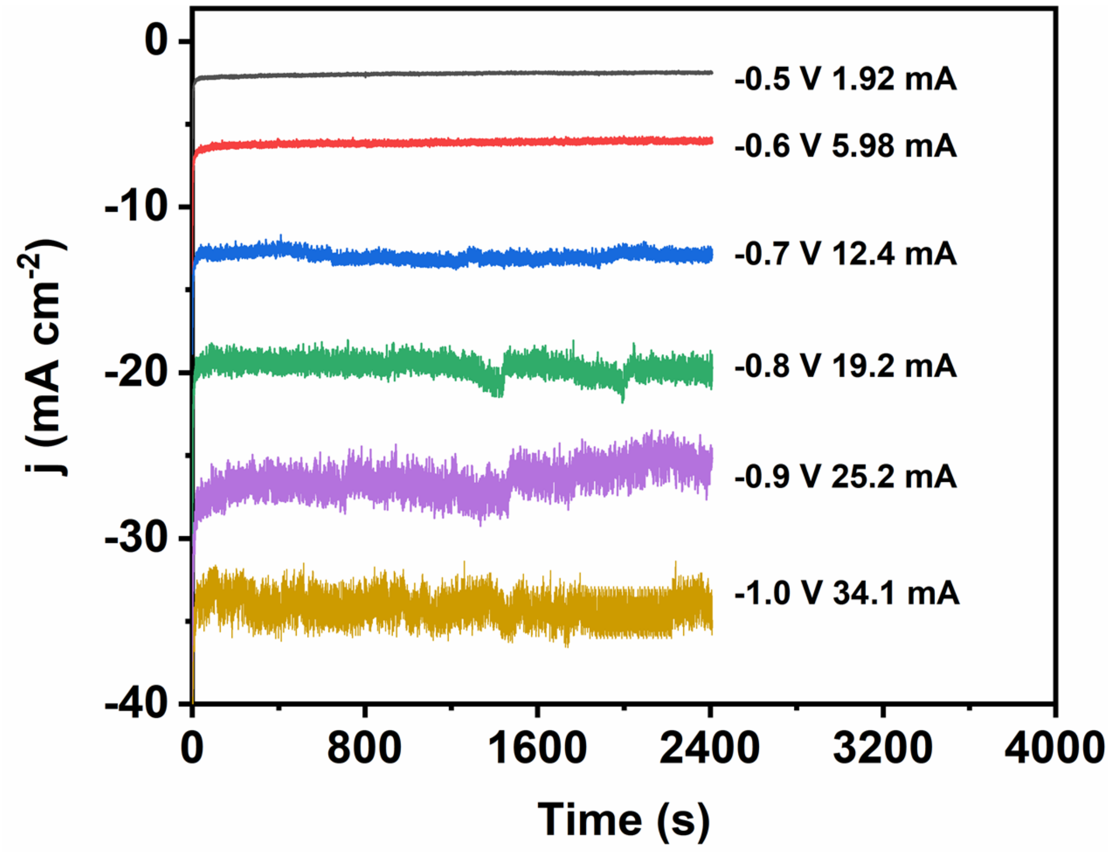

Fig. S5 it-curve of CNT-NiZn-10. Potentiostatic experiments were conducted at 6 different potentials in the range of −0.5 to −1.0 V vs.

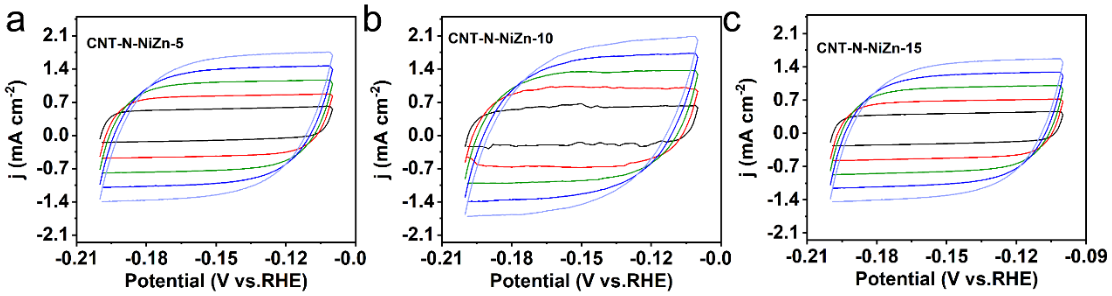

Fig. S6 The cyclic voltammetry curves of (a) CNT-NNiZn-5, (b) CNT-N-NiZn-10, (c) CNT-N-NiZn-15, with various scan rates.

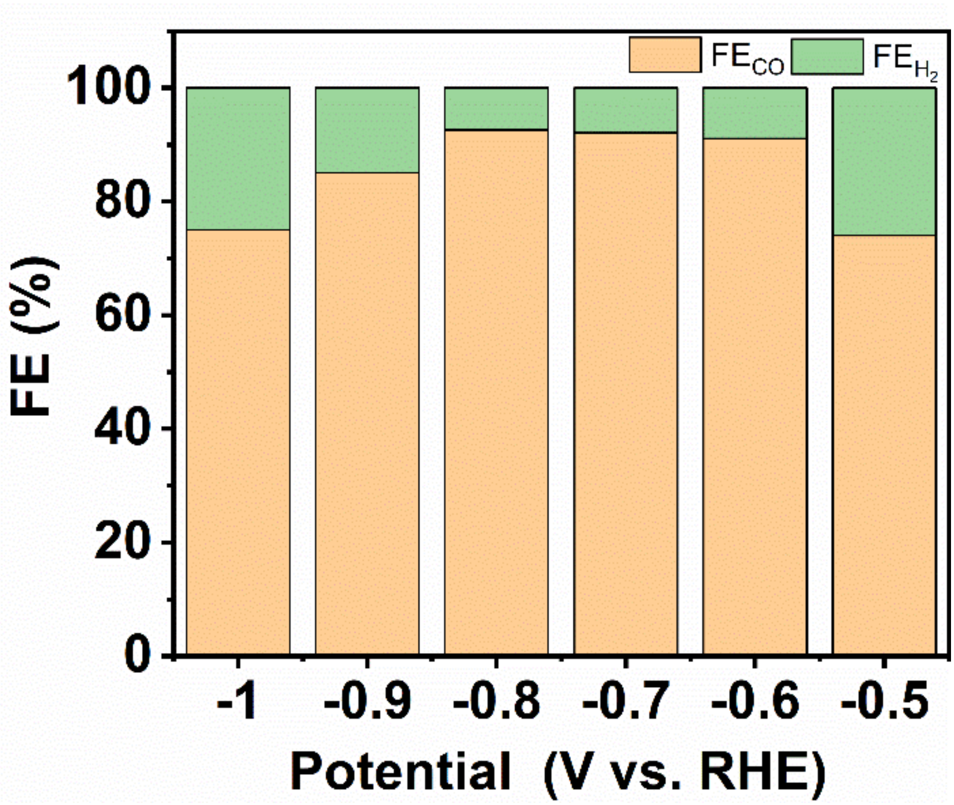

Fig. S7 The product distribution of CNT-N-NiZn-10 electrocatalytic reduction of carbon dioxide.

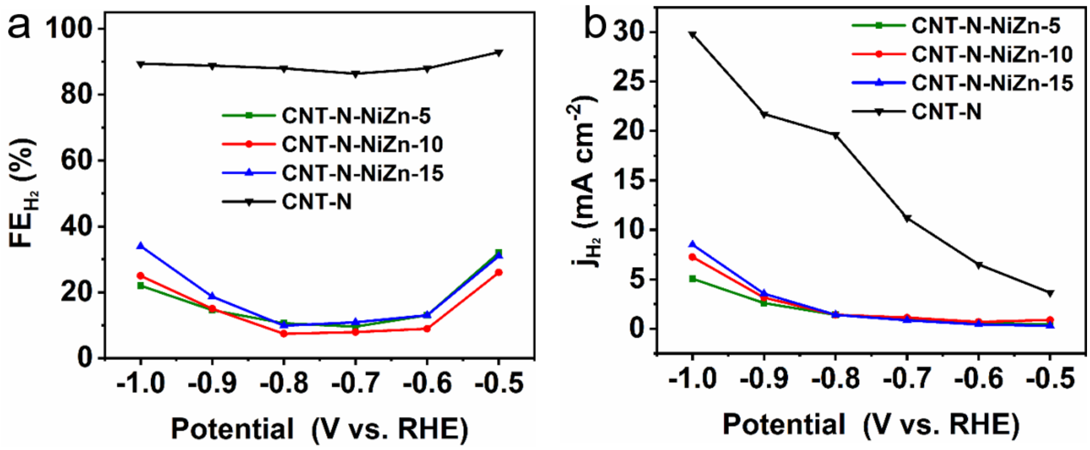

Fig. S8 (a) FE_{H2} at different potentials, (b) current densities of H_2.

Fig. S9 The rate of CO_2 injection in the electrochemical test.

Table S1 Comparison of CO_2 reduction performance on various catalysts.

Catalysts	electrolyte	Potential V (vs. RHE)	FE_{CO} (%)	Reference
CNT-N-NiZn-10	0.5 M $KHCO_3$	- 0.8	92.6	This work
NiSAs/N-C	0.5 M $KHCO_3$	- 0.89	71.9	1
Ni@N-C	0.5 M $KHCO_3$	- 0.77	90	2
CoNi-NC	0.1M $KHCO_3$	- 0.5	55	3
Zn-Co@N-C	0.5 M $KHCO_3$	- 0.53	60	4
CNT-N-NiFe	0.5 M $KHCO_3$	- 0.7	82	5
Cu-Pd NP/C	0.1 M $KHCO_3$	-0.9	87	6
Co@CoNC	0.1 M $KHCO_3$	- 0.7	62	7
CuZnO/CNT	0.1 M $KHCO_3$	- 0.8	50	8
Ni, Fe-N-C	0.5 M $KHCO_3$	- 1.0	92.37	9
AgNNs@Zn	0.5 M $KHCO_3$	- 0.86	91	10

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