Electronic Supplementary Information

Fast microwave-assisted preparation of nickel-copper-chromium layered double hydroxide as an excellent electrocatalyst for water oxidation

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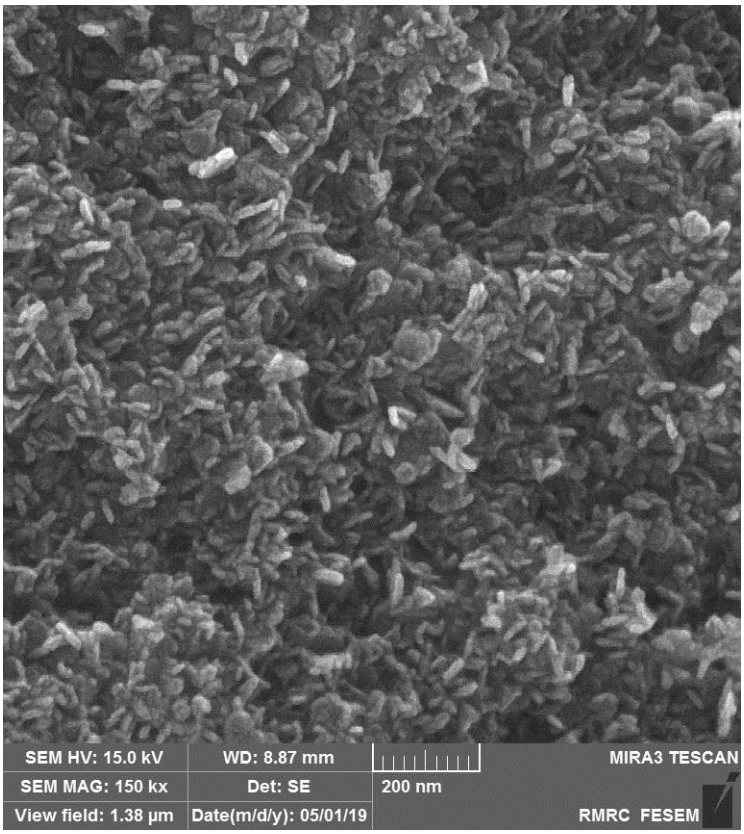

Fig. S1 FE-SEM image of $Ni_{2.25}Cu_{0.75}Cr$-LDH

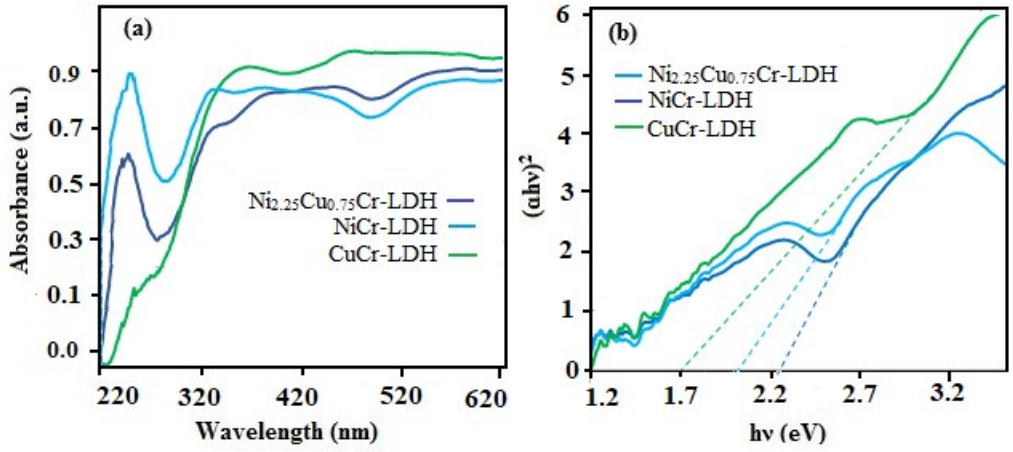

Fig. S2 (a) Diffuse reflectance spectra of the $Ni_{2.25}Cu_{0.75}Cr$-LDH, NiCr-LDH, and CuCr-LDH (labelled on curves) and (b) Touc's plot transformed reflectance spectra of the $Ni_{2.25}Cu_{0.75}Cr$-LDH, NiCr-LDH, and CuCr-LDH

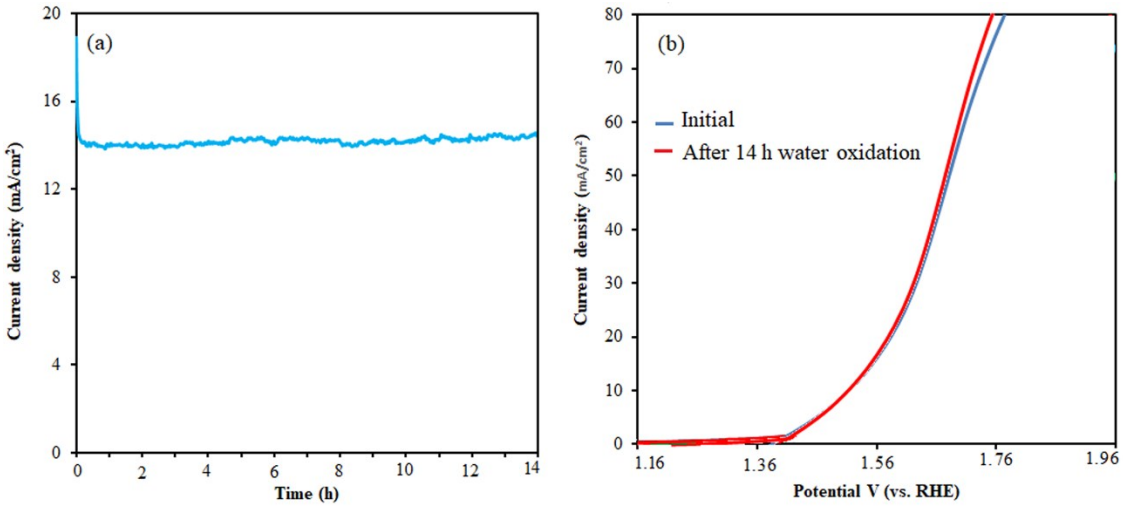

Fig. S3 (a) Chronoamperogram curves for water oxidation using the $Ni_{2.25}Cu_{0.75}Cr$-LDH modified CPE and bare CPE (b) LSV curves of the same modified electrode in phosphate buffer solution (pH = 7.0) before and after 14 h electrolysis.

Table S1. The obtained data for Ni, Cu, and Cr using the Inductively Coupled Plasma

Sample	Starting metal ratios	Ni[a] (%)	Cu[a] (%)	Cr[a] (%)	Metal ratios in product
CuCr-LDH	3.00: 1.00	-----	19	5.0	0.03: 0.096
NiCr-LDH	3.00: 1.00	17.6	------	5.1	0.03: 0.098
$Ni_{2.5}Cu_{0.5}Cr$-LDH	2.50: 0.50: 1.00	14.6	3.0	5.2	2.47: 0.48: 1.00
$Ni_{2.25}Cu_{0.75}Cr$-LDH	2.25: 0.75: 1.00	13.0	4.8	5.2	2.25: 0.75: 1.00
NiCuCr-LDH	2.00: 1.00: 1.00	11.7	6.3	5.2	2.00: 0.98: 1.00

[a] Data from the Inductively Coupled Plasma

Table S2. Comparison on water oxidation activity of the $Ni_{2.25}Cu_{0.75}Cr$-LDH in the present work and reported in the literature.

Electrocatalyst	Electrolyst	pH	Onset potential (V) RHE	Over potential at 10 mA/cm^2	Ref.
NiAlFe-LDH	0.1 M phosphate buffer	7	1.57	725	1
NiZnFe-LDH	0.1 M phosphate buffer	7	1.65	---	2
CoCr-LDH	0.1 M KOH	13	1.47	340	3
NiFeCr-LDH	1M KOH	14	1.42	280	4
NiCu-LDH/SAV	1M KOH	14	1.52	290	5
NiCr-LDH	1M KOH	14	1.40	320	6
Cu@NiFe-LDH	1M KOH	14	1.45	199	7
CC/Ni_2Cu-LDH	1M KOH	14	1.50	370	8
Ni_2Cu-LDH	1M KOH	14	1.60	770	8
$Ni_{2.25}Cu_{0.75}Cr$-LDH	0.1 M phosphate buffer	7	1.40	280	This study

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