Supporting Information

Design of 2D nanocrystalline Fe_2Ni_2N coated onto graphene nanohybrid sheets for efficient electrocatalytic oxygen evolution

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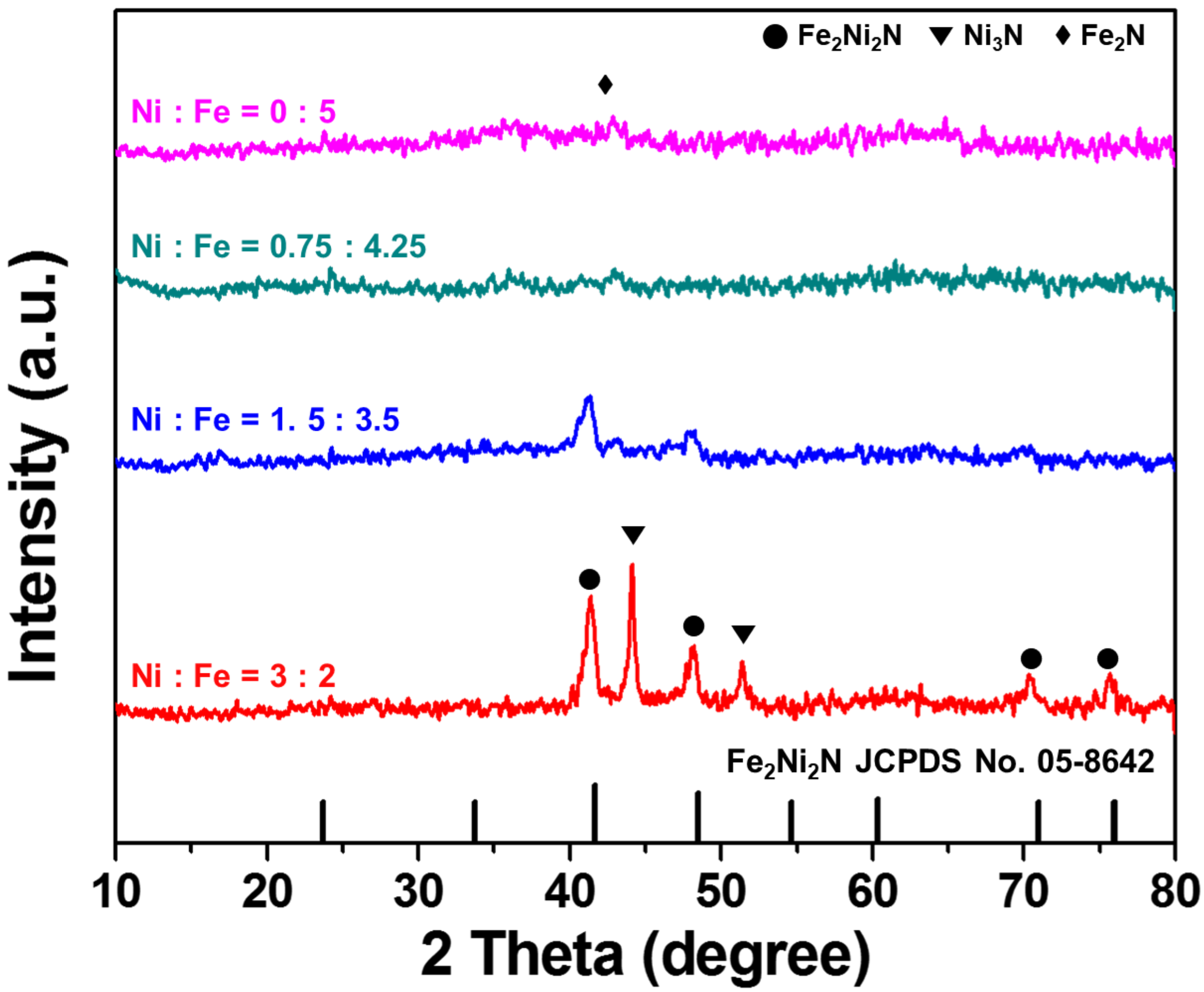

Figure S1. Wide angle PXRD pattern of the 2D-NC Fe_xNi_yN/rGO NHSs via 2D $Ni_xFe_{3-x}[Fe(CN)_6]_2$/rGO (x = 0 to 3) precursors at 450°C for 2 hours with co-atmosphere of N_2 (200 sccm) and NH_3 (50 sccm).

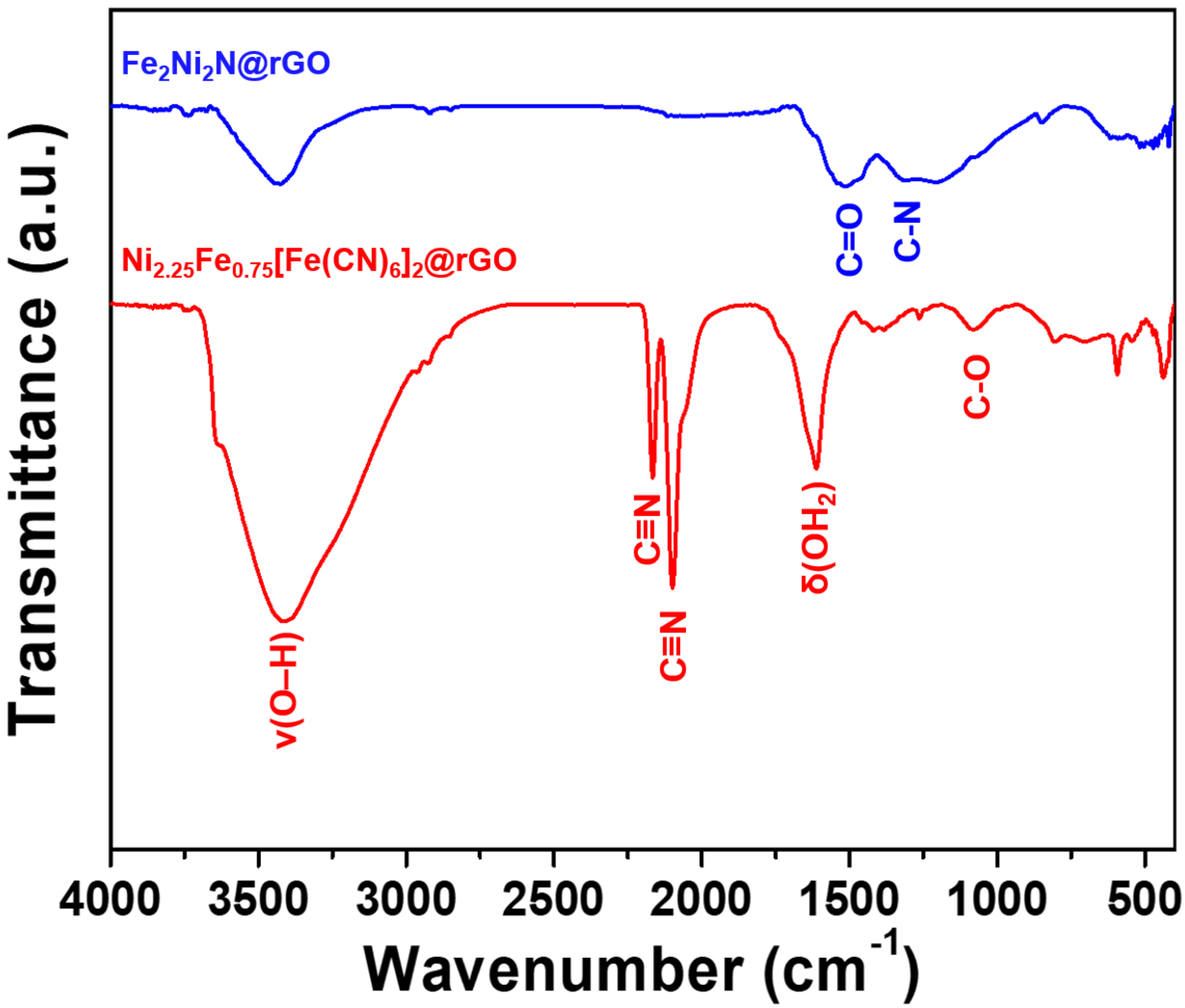

Figure S2. FTIR spectra of the as-prepared 2D-NC Fe_2Ni_2N/rGO NHSs and 2D $Ni_{2.25}Fe_{0.75}[Fe(CN)_6]_2$/rGO precursors.

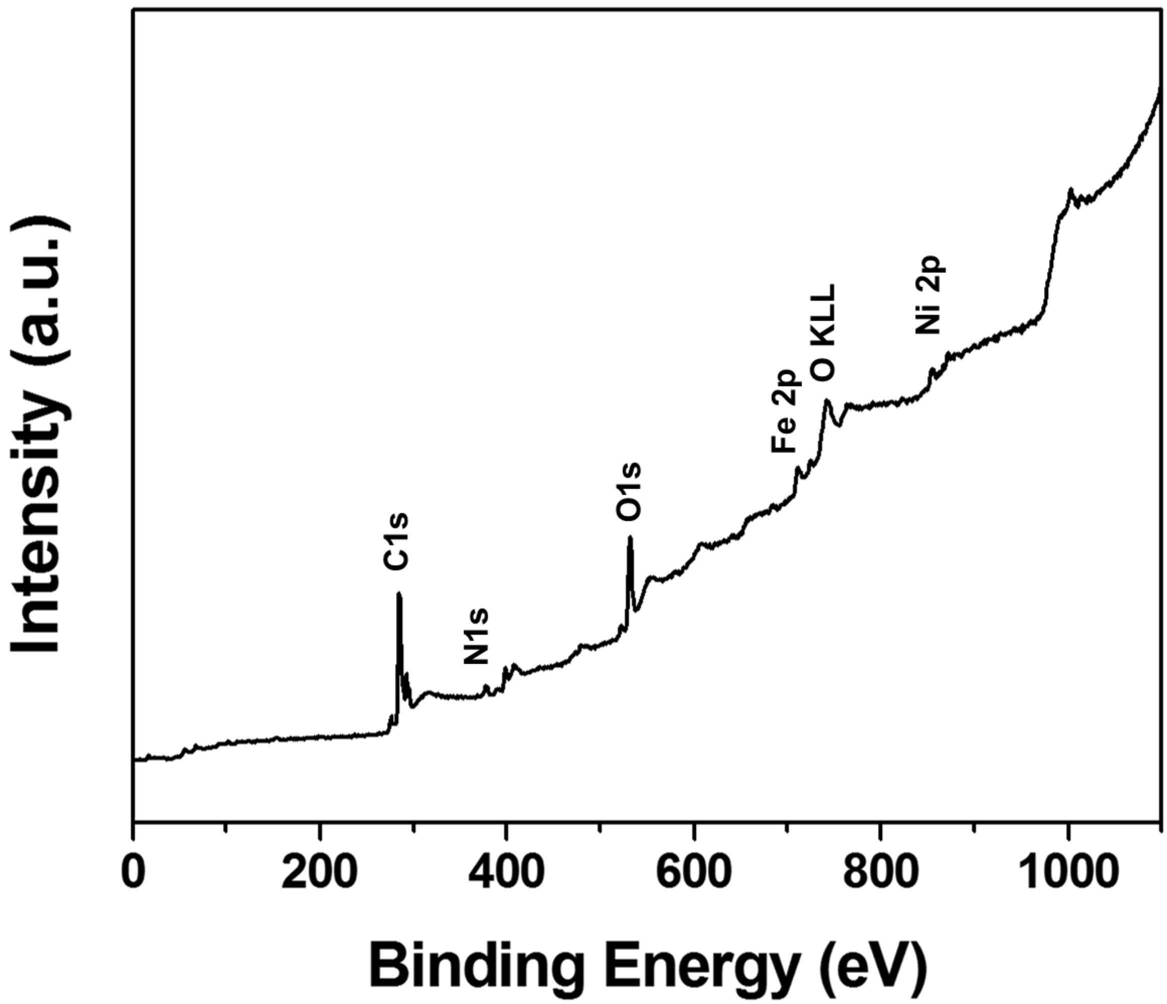

Figure S3. XPS wide scan of the as-prepared 2D-NC Fe_2Ni_2N@rGO NHSs.

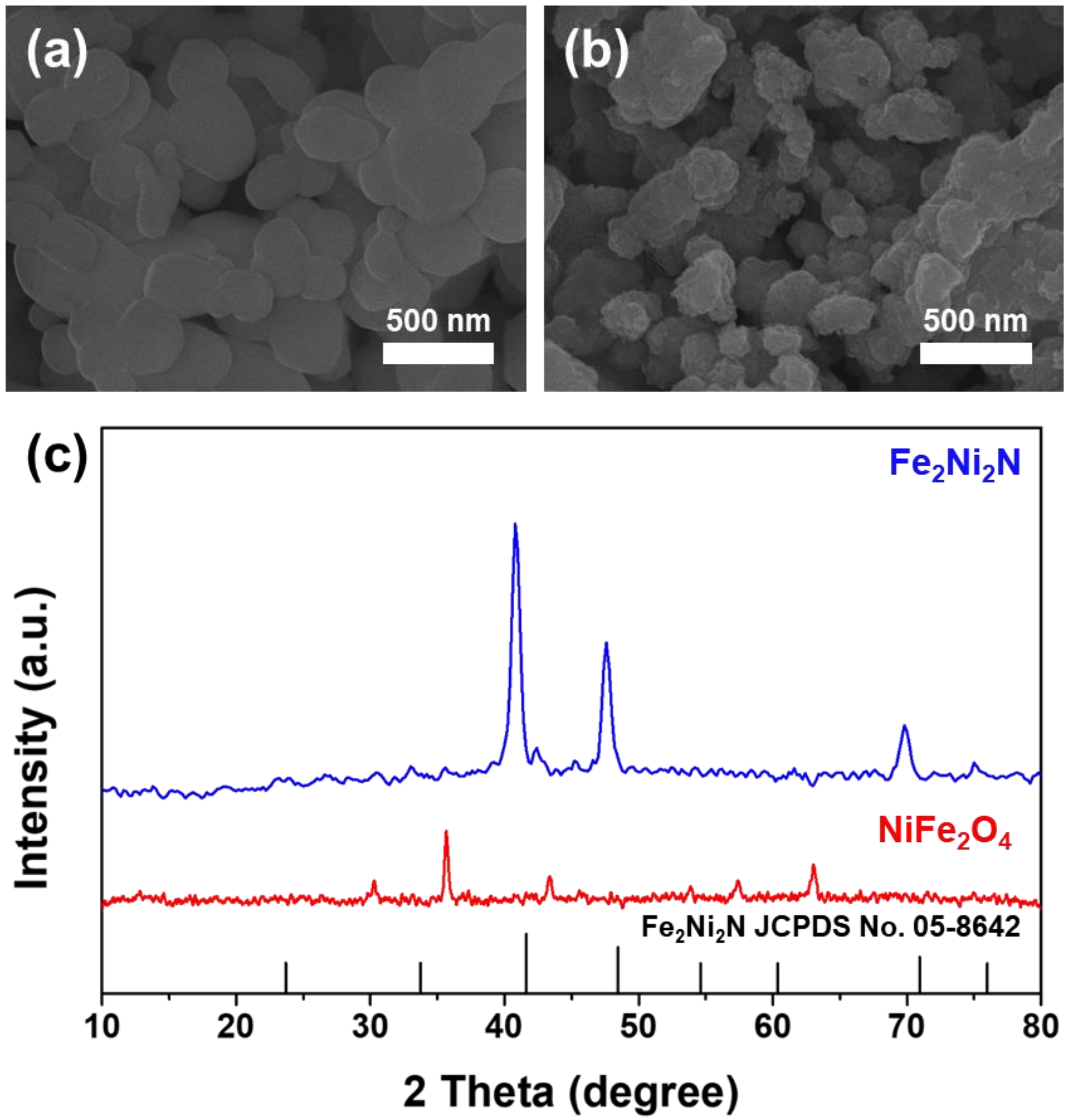

Figure S4. FESEM images of synthesized (a) $NiFe_2O_4$ and (b) Fe_2Ni_2N NPs. (c) PXRD pattern of the synthesized $NiFe_2O_4$ and Fe_2Ni_2N NPs by LPP method.

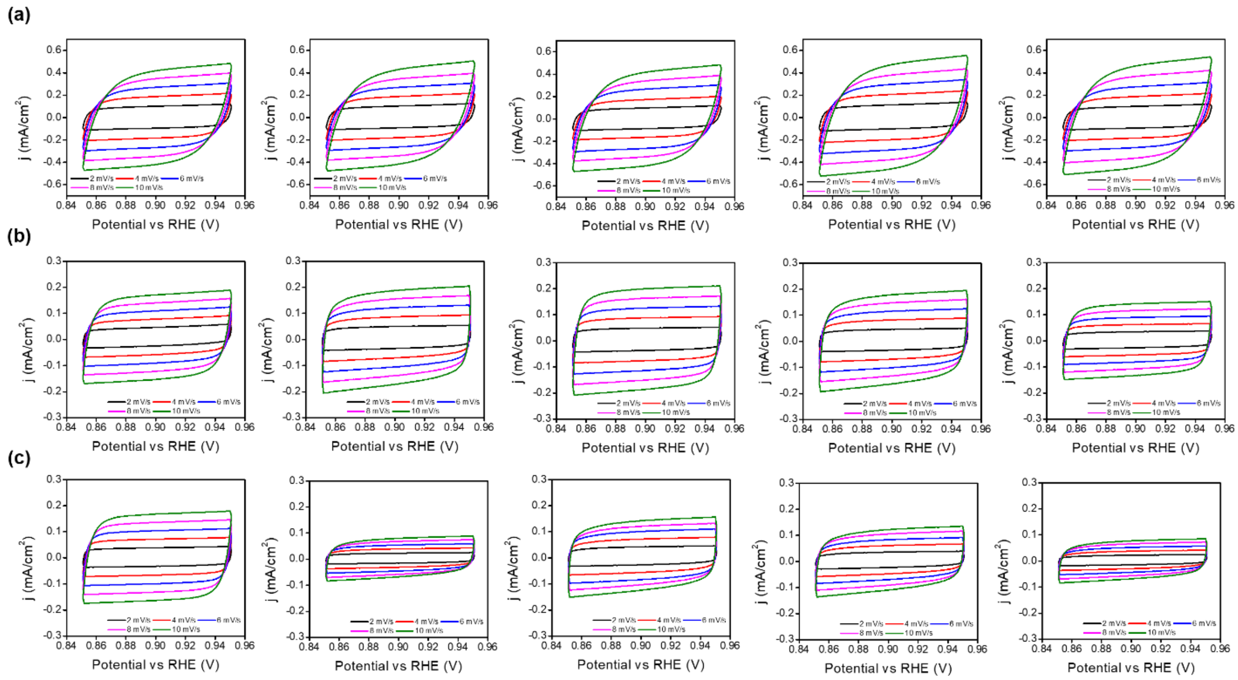

Figure S5. CVs scanned at different rates from 2 to 10 mV s^{-1} in the potential range of 1.0–1.12 V vs. RHE for the (a) 2D-NC Fe_2Ni_2N/rGO NHSs, (b) Fe_2Ni_2N, and (c) $NiFe_2O_4$ NPs electrodes.

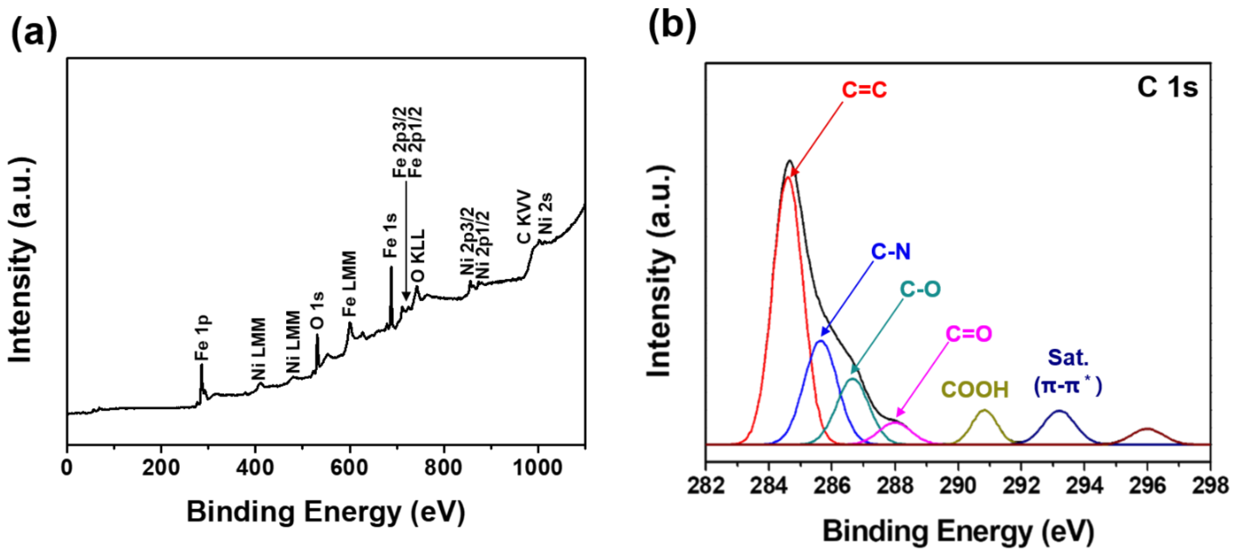

Figure S6. (a) XPS wide scan and spectra of high-resolution (b) C 1s of the 2D-NC Fe_2Ni_2N/rGO NHSs after OER.

Materials	Overpotential (at 10 mA cm^{-2})	Tafel slope	Electrolyte	Ref.
2D Fe_2Ni_2N/Graphene hybrid sheets	**290 mV**	**49.1 mV dec^{-1}**	**0.1 M KOH**	**Our research**
Fe_2Ni_2N/CNTs	282 mV	38 mV dec^{-1}	1 M KOH	1
Fe_2Ni_2N Nanoarrays	420 mV	34 mV dec^{-1}	1 M KOH	2
Nanoparticles-stacked porous Ni_3FeN nanosheets	223 mV	40 mV dec^{-1}	1 M KOH	3
Ni_3FeN microspheres	355 mV	70 mV dec^{-1}	1 M KOH	4
[Ni,Fe]O nanoparticles	300 mV	50 mV dec^{-1}	0.1 M KOH	5
Fe-doped NiO_x nanotubes	310 mV	49 mV dec^{-1}	1 M KOH	6
Mesoporous $NiO/NiFe_2O_4$ biphasic Nanorods	302 mV	42 mV dec^{-1}	1 M KOH	7
nNiFe LDH/NGF	337 mV	73 mV dec^{-1}	0.1 M KOH	8
Ni–P porous Nanoplates	300 mV	64 mV dec^{-1}	1 M KOH	9
NiS_x films	353 mV	41 mV dec^{-1}	1 M KOH	10

Table S1. Comparison of OER performance of different non-noble transition metal based electrocatalysts.

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