Supporting Information

Ultra-fast preparation of Ni-Fe nanoclusters/graphene heterojunction catalyst for oxygen evolution reaction and urea oxidation reaction

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1. Supplementary Figures

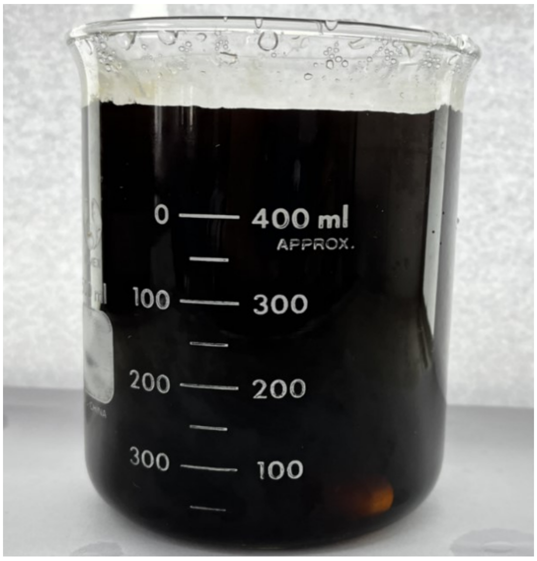

Fig. S1. The optical photograph of NiFe NCs/GO.

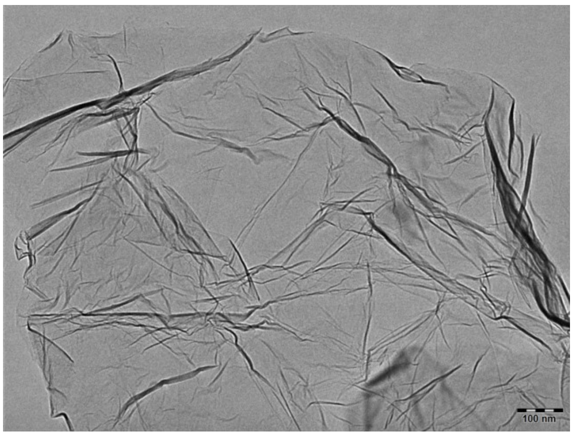

Fig. S2. The TEM image of pure GO.

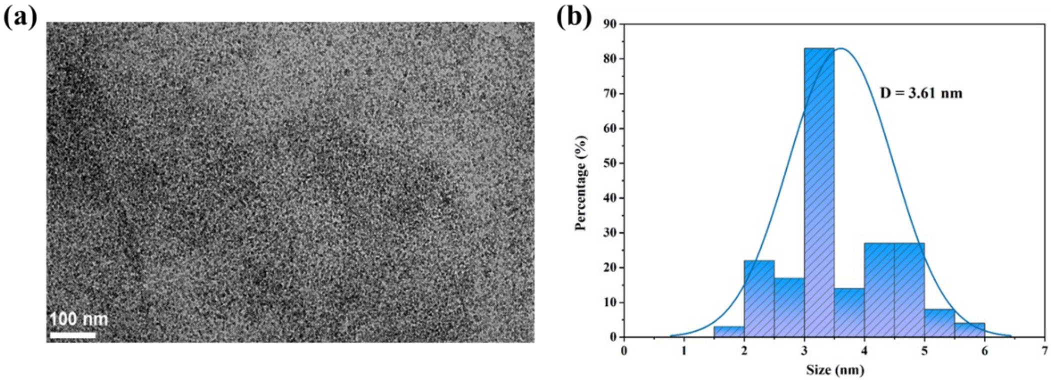

Fig. S3. (a) TEM of NiFe NCs/GO, (b) the grain diameter distribution map of NiFe NCs/GO obtained from (a).

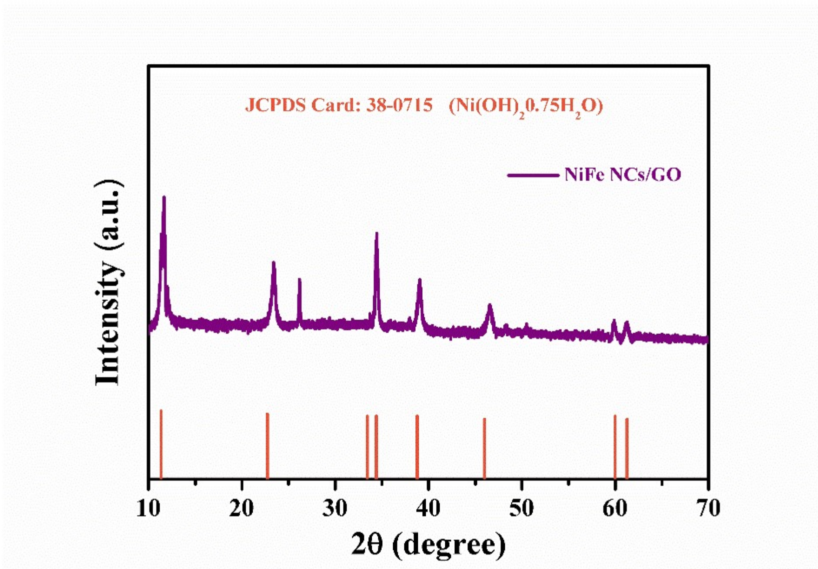

Fig. S4. XRD patterns of NiFe NCs/GO.

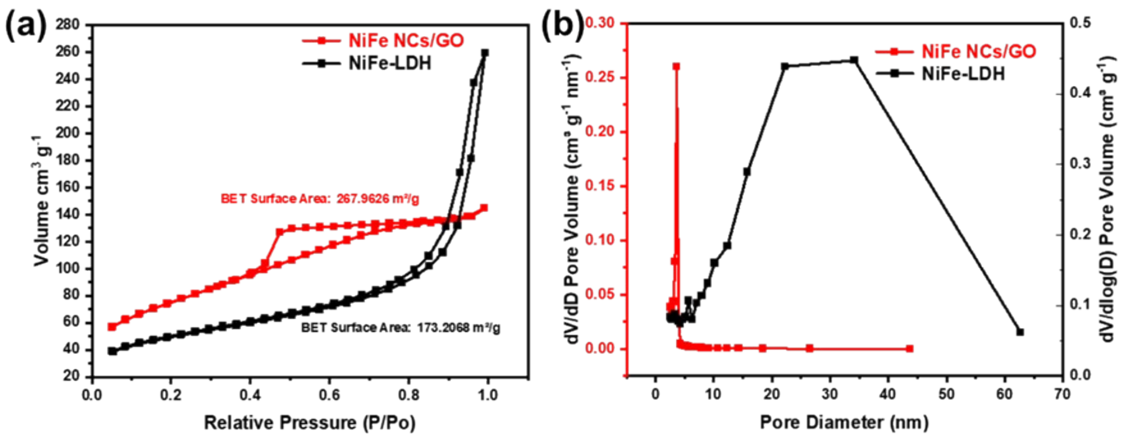

Fig. S5. (a) Nitrogen adsorption–desorption isotherms and (b) Pore sizes distribution of NiFe NCs/GO and NiFe-LDH.

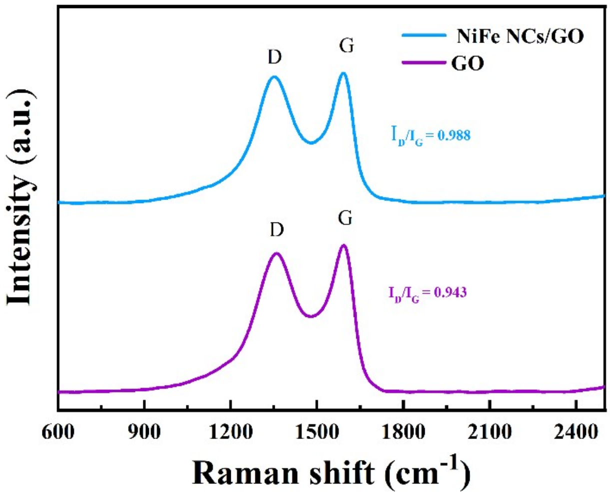

Fig. S6. Raman spectra of GO and NiFe NCs/GO.

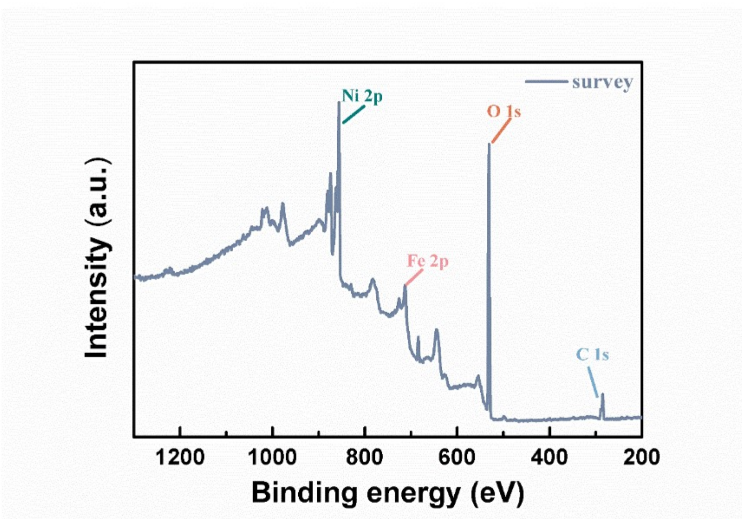

Fig. S7. The survey spectrum of NiFe NCs/GO. The only found of Ni, Fe, C and O elements.

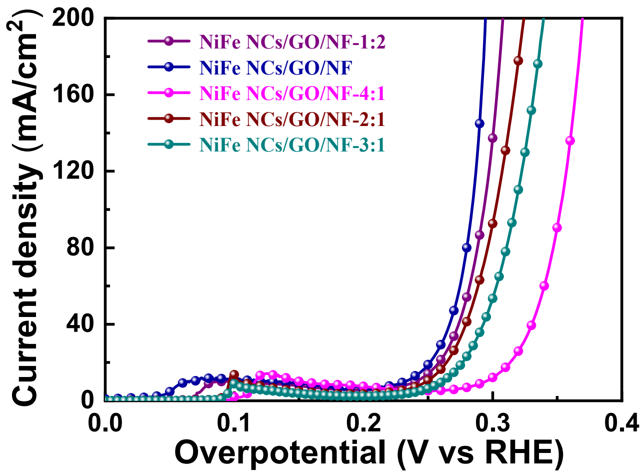

Fig. S8. LSV curves of NiFe NCs/GO-1:2, NiFe NCs/GO, NiFe NCs/GO-2:1, NiFe

NCs/GO-3:1 and NiFe NCs/GO-4:1.

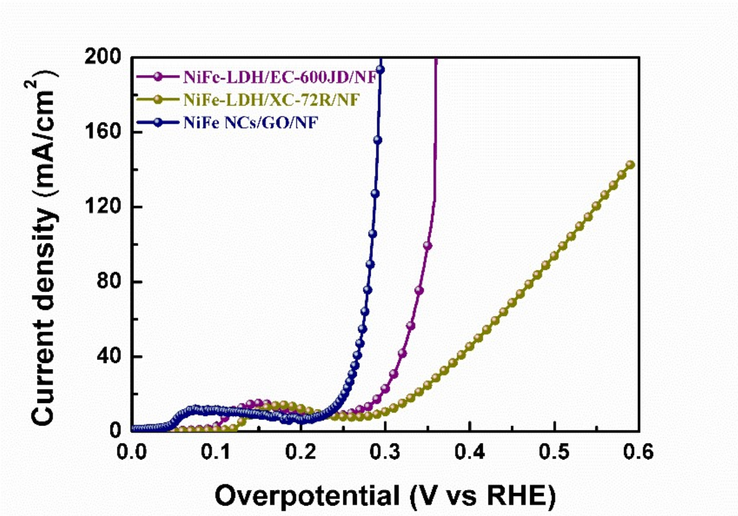

Fig. S9. LSV curves of NiFe NCs/GO/NF, NiFe-LDH/EC-600JD/NF and NiFe-LDH/XC-72/NF.

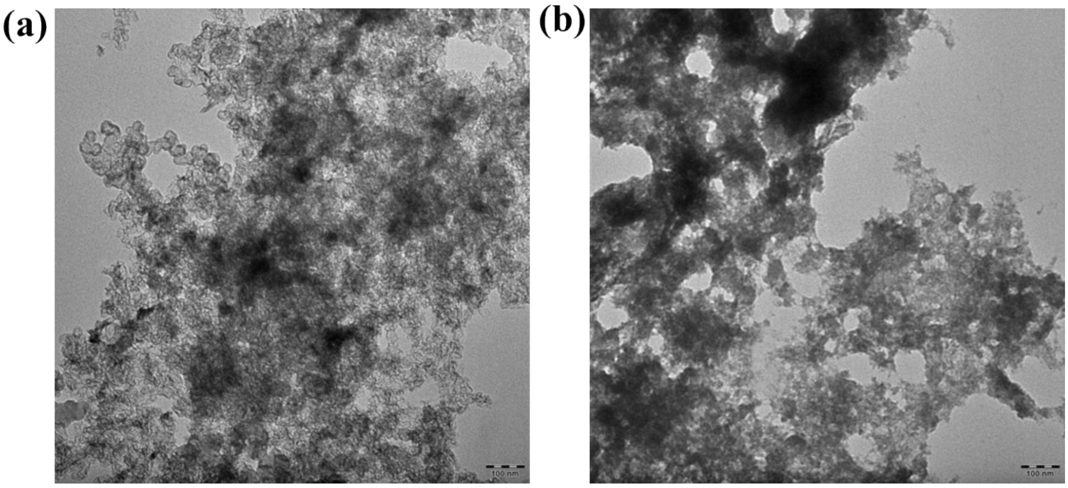

Fig. S10. TEM images of NiFe-LDH/EC-600JD and NiFe-LDH/XC-72.

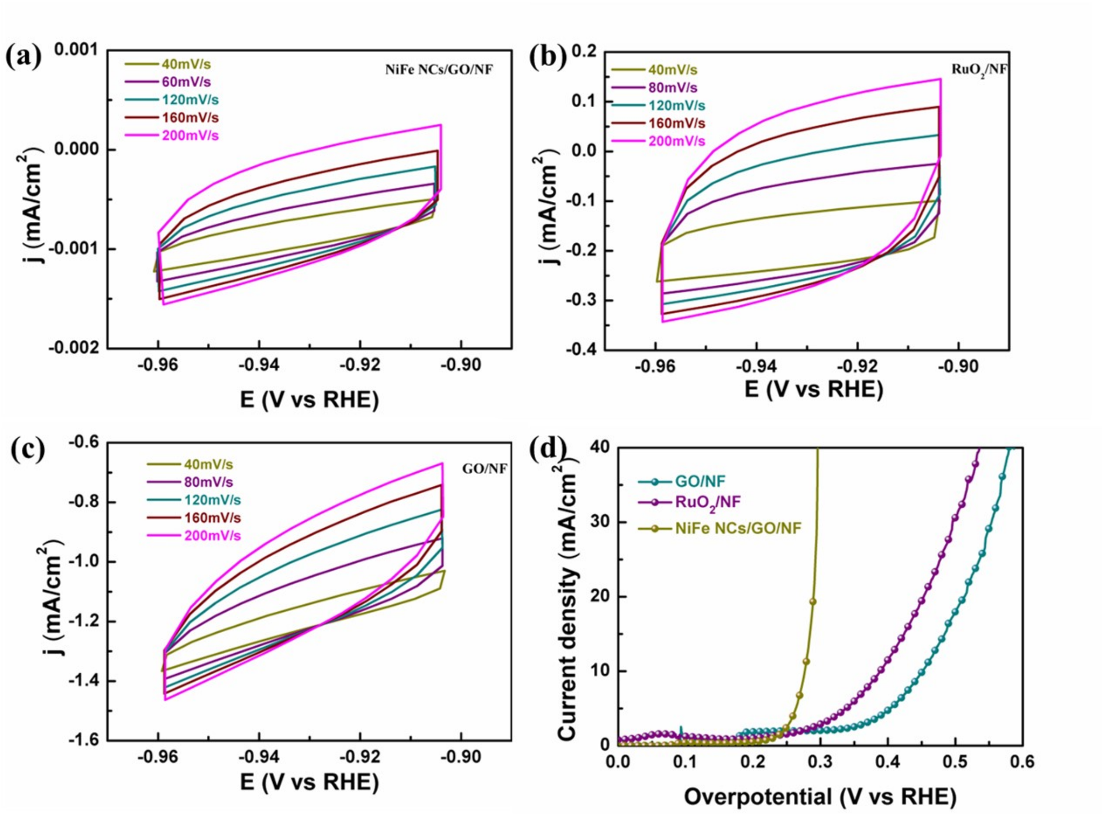

Fig. S11. Cyclic voltammograms of (a) NiFe NCs/GO/NF, (b) RuO_2/NF, (c)GO/NF at different scan rates in 1 M KOH. (d) The LSV polarization curve normalized by the Electrochemical surface area.

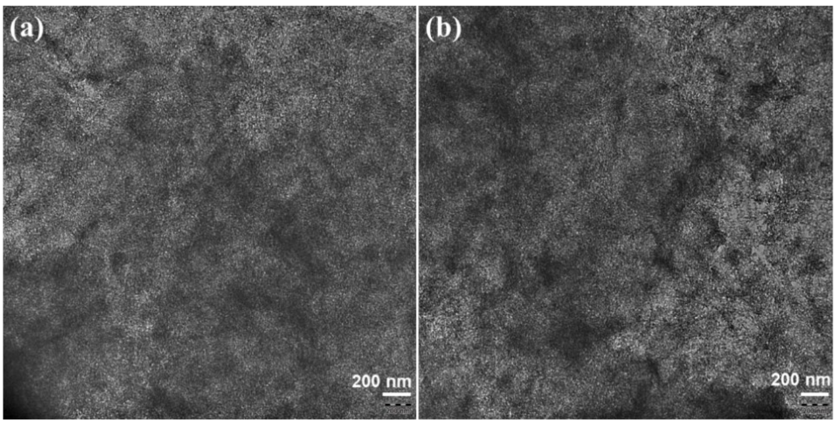

Fig. S12. The TEM image of NiFe NCs/GO (a) before and (b) after the 12h i-t test.

Table S1. Comparison of the OER performance of NiFe NCs/GO/NF with the most recently reported OER catalysts at 10 mA·cm^{-2} in 1 M KOH.

Catalysts	Electrolyte	η_{10}, OER	Tafel ($mV \cdot dec^{-1}$)	Source
NiFeCo-LDH/CF	**1 M KOH**	**249**	**42**	**[1]**
Au@Ni(Fe)OOH	**1 M KOH**	**258**	**56.78**	**[2]**
NF-Na-Fe-P	**1 M KOH**	**261**	**39.68**	**[3]**
H-CoSx @NiFe LDH/NF	**1 M KOH**	**250**	**49**	**[4]**
Co@NiFe-LDH	**1 M KOH**	**253**	**44**	**[5]**
CoO-Co4N@NiFe-LDH/NF	**1 M KOH**	**231**	**39**	**[6]**
NiFe-MOF/G	**1 M KOH**	**258**	**49**	**[7]**
NiFe-LDH/NF-3.5	**1 M KOH**	**249**	**49.8**	**[8]**
NiFe-25	**1 M KOH**	**299**	**48.7**	**[9]**
Fe^{2+}-NiFe-LDHs	**1 M KOH**	**249**	**40**	**[10]**
NF-LDH-21	**1 M KOH**	**242**	**25.9**	**[11]**
$Ni_{0.5}Fe_{0.5}/C$	**1 M KOH**	**270**	**40.4**	**[12]**
$(Ni_7Fe_3)OOH$-S	**1 M KOH**	**238**	**42.7**	**[13]**
NiFe NCs/GO	**1 M KOH**	**231**	**41**	**This work**

References

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