Electronic Supplementary Information

Ultrathin sulfate-intercalated NiFe-layered double hydroxides nanosheets for efficient electrocatalytic oxygen evolution

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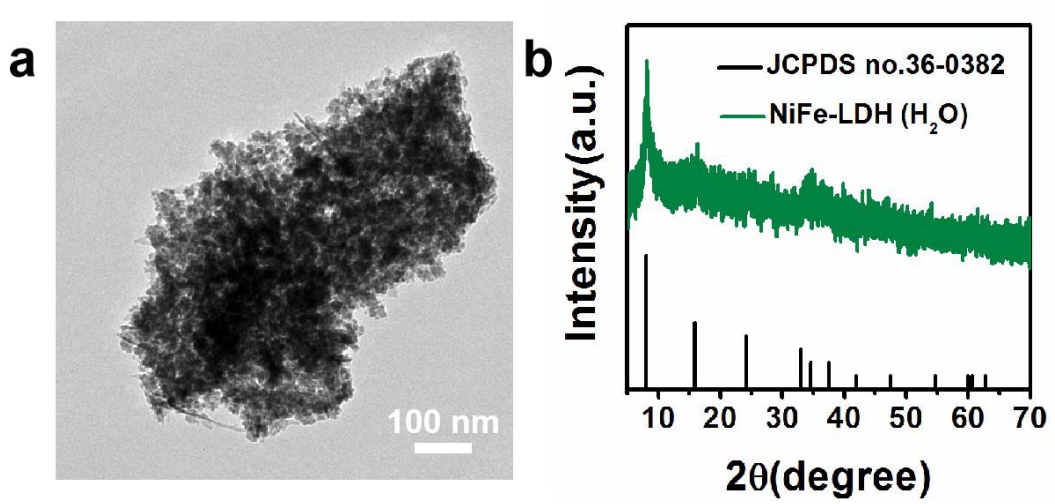


Fig. S1 (a) TEM image and (b) PXRD patterns of the products obtained under similar conditions of U-LDH(SO_4^{2-}) except that only water was used as the reaction solvent.

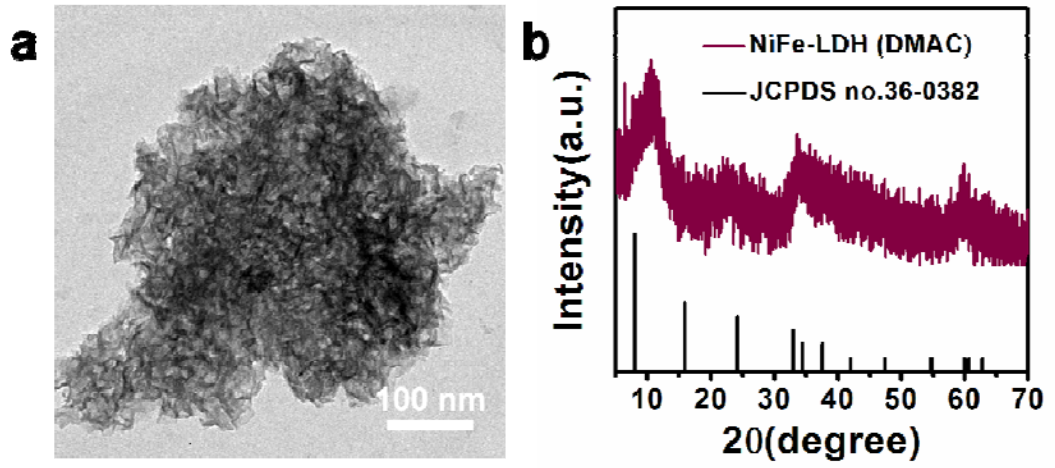


Fig. S2 (a) TEM image and (b) PXRD patterns of the products obtained under similar conditions of U-LDH(SO_4^{2-}) except that only DMAC was used as the reaction solvent.

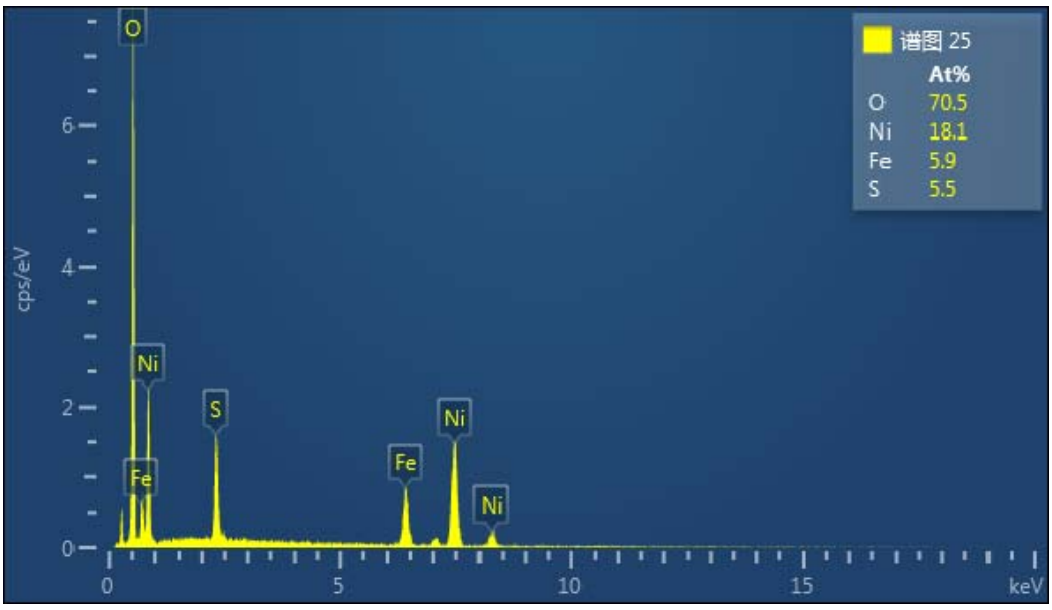


Fig. S3 EDX spectrum of U-LDH(SO_4^{2-}).

Noted: (**n(Ni) : n(Fe) : n(S)** = 18.1: 5.9: 5.5 = 3: 1: 0.93)

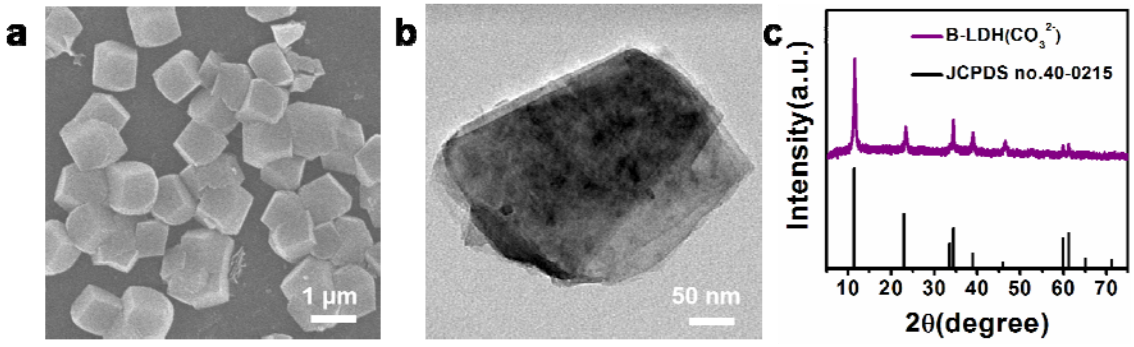


Fig. S4 (a) SEM image, (b) TEM image and (c) PXRD patterns of B-LDH(CO_3^{2-}).

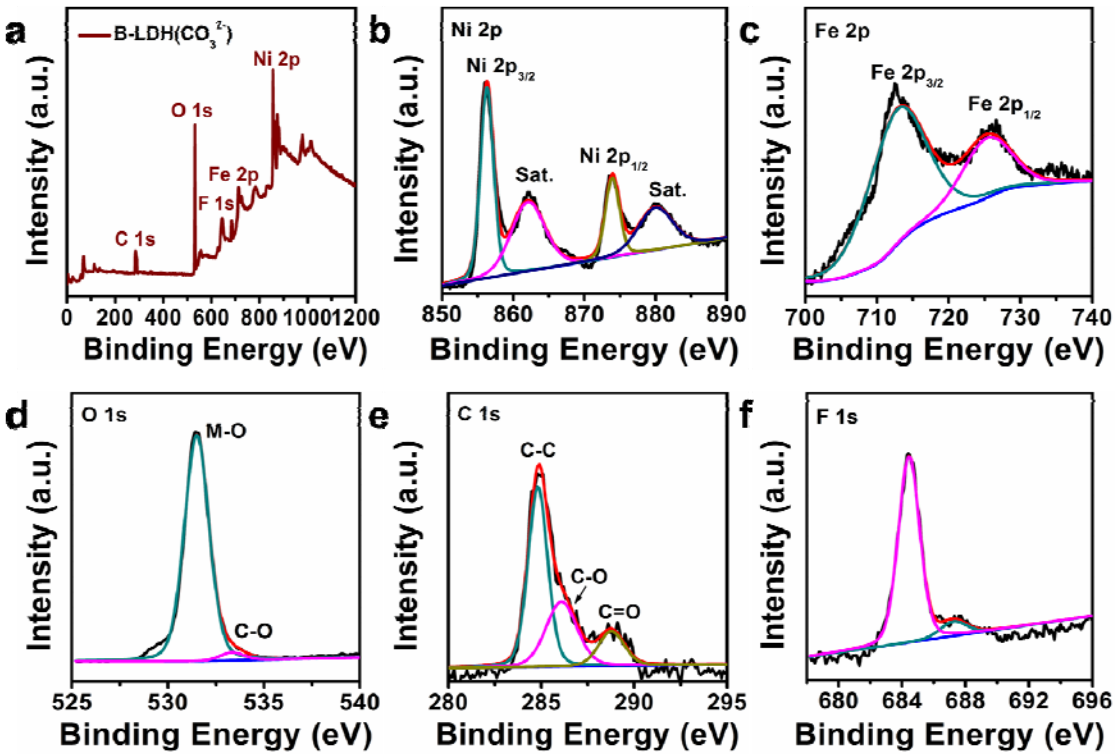


Fig. S5 XPS spectra of B-LDH(CO_3^{2-}): (a) survey scan, (b) Ni 2p, (c) Fe 2p, (d) O 1s, (e) C 1s, (f) F 1s.

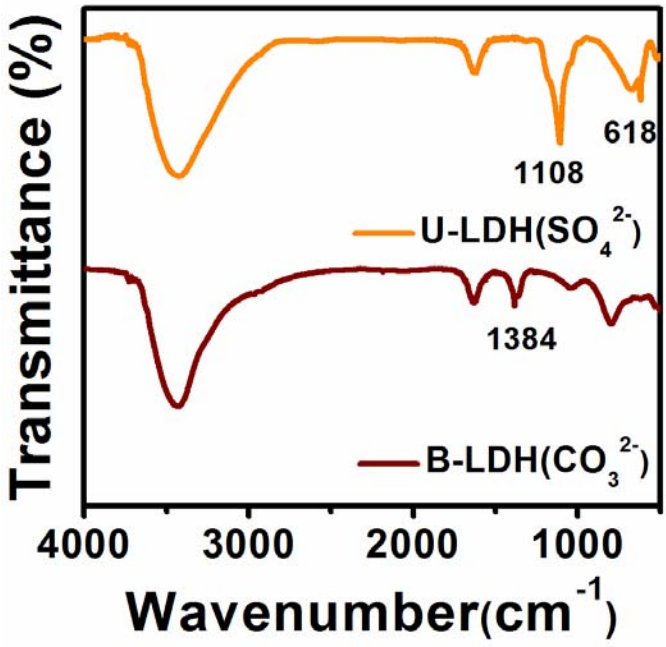


Fig. S6 FT-IR spectra of U-LDH(SO_4^{2-}) and B-LDH(CO_3^{2-}).

Noted: The peak at 1384 cm^{-1} is attributed to $\nu_3(CO_3^{2-})$, while those at 1108 cm^{-1} and 618 cm^{-1} are attributed to the $\nu_3(SO_4^{2-})$ and $\nu_4(SO_4^{2-})$.

Table S1 Comparisons of OER performance for Fe/Ni-based and LDH-based electrocatalysts in 1 M KOH.

Catalysts	**Electrode**	**Overpotential (mV) at 10 mA·cm^{-2}**	**Tafel slope (mV·dec^{-1})**	**Reference**
U-LDH(SO_4^{2-})	GCE	212	65.2	**This work**
SO_4^{2-} (EG) NiFe LDH	Carbon paper	375	56	*Chem. Mater*., 2018, **30**, 4321-4330.
NiFe-SO_4	Ni foam	356	93	*Chem. Mater.*, 2019, **31**, 6798-6807.
Ni-Fe LDH nanoprisms	GCE	280	49.4	*Angew. Chem. Int. Ed.,* 2018, **57**, 172-176.
Ni/NiO@CoFe LDH	Ni/NiO foam	230	34.3	*ChemSusChem,* 2019, **12**, 2773-2779.
NiFe/Cu_2O NWs/CF	Cu foam	284	42	*ChemSusChem,* 2017, **10,** 1475-1481.
$Fe(OH)_3$@Co-MOF-74	carbon paper	292	44	*ChemSusChem,* 2019, **12**, 4623-4628.
NiFe-LDH-UF (UF: Ultrafine)	Graphite paper	254	32	*Adv. Energy Mater.,* 2018, **8**, 1703585.
NiFe hydroxide	GCE	270	36.2	*Angew. Chem. Int. Ed*., 2019, **58**, 736-740.
δ-FeOOH NSs/NF	Ni foam	265	36	*Adv. Mater.,* 2018, **30**, 1803144.
CoMn-LDH	GCE	325	43	*J. Am. Chem. Soc.,* 2014, **136** , 16481-16484.
NiFeRu LDH/Ni foam	Ni foam	225	32.4	*Adv. Mater*., 2018, **30**,

				1706279.
$Ni_{0.75}Fe_{0.125}V_{0.125}$-LDHs/ NF	Ni foam	231	39.4	*Small,* 2018, **14**, 1703257.
Cu@CoFe LDH	Cu foam	240	44.4	*Nano Energy,* 2017, **41**, 327-336.
CoFe LDHs-Ar	GCE	266	37.85	*Angew. Chem. Int. Ed.,* 2017, **56**, 5867-5871.

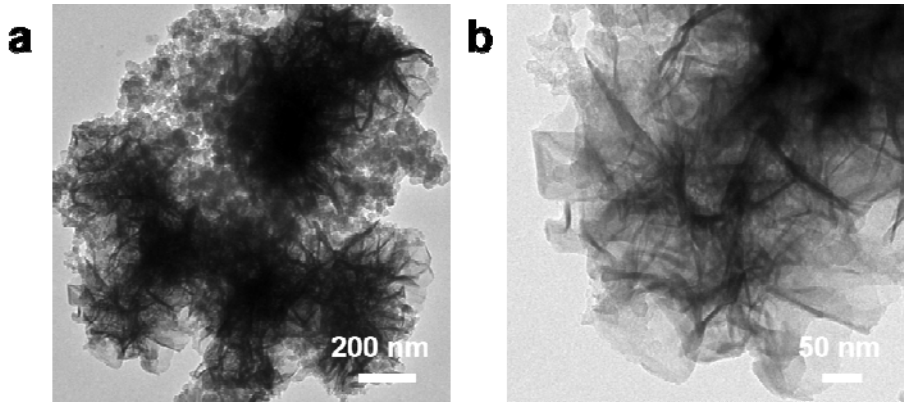
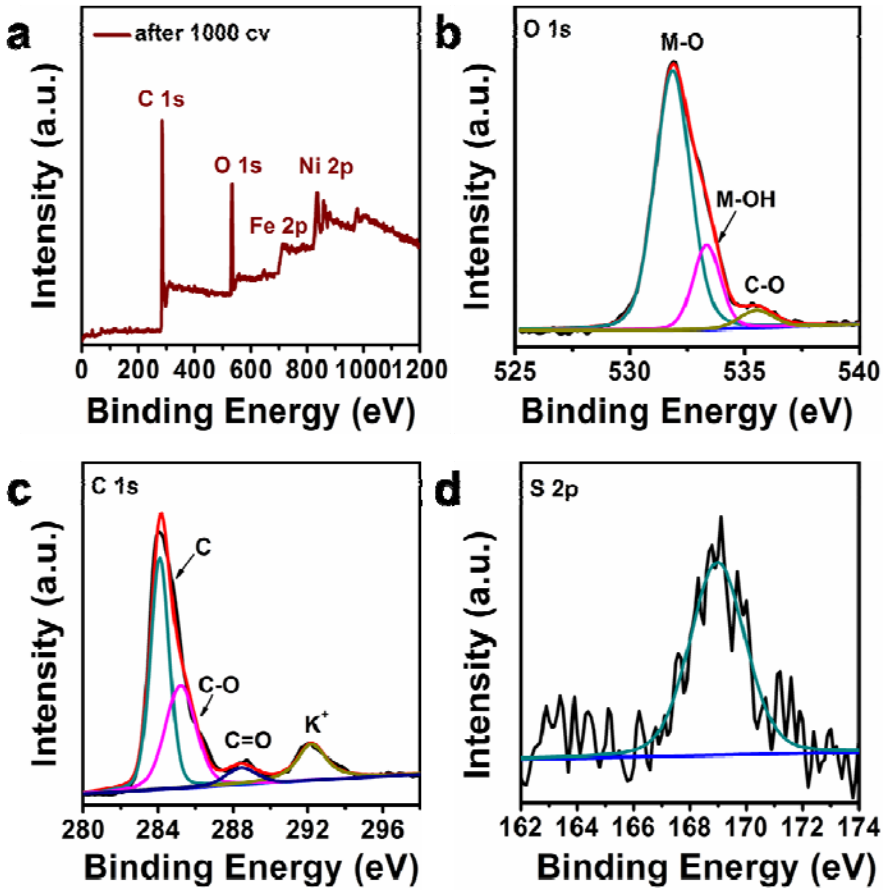


Fig. S7 TEM images of U-LDH(SO_4^{2-}) after 1000 CV cycles.



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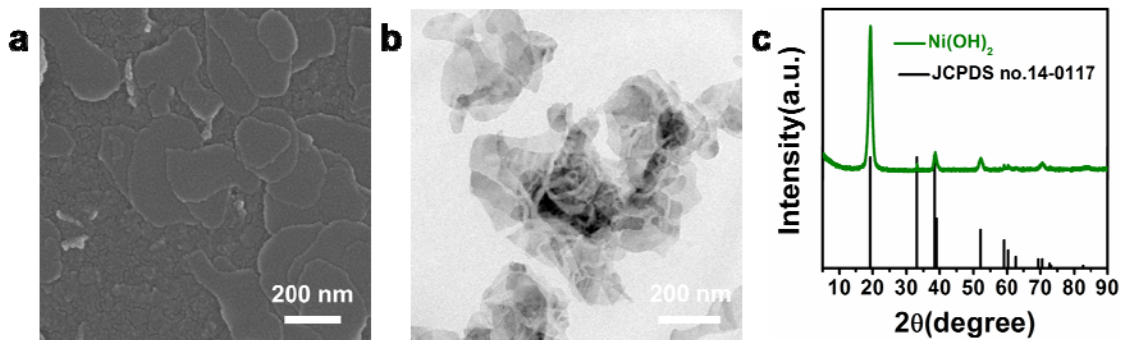

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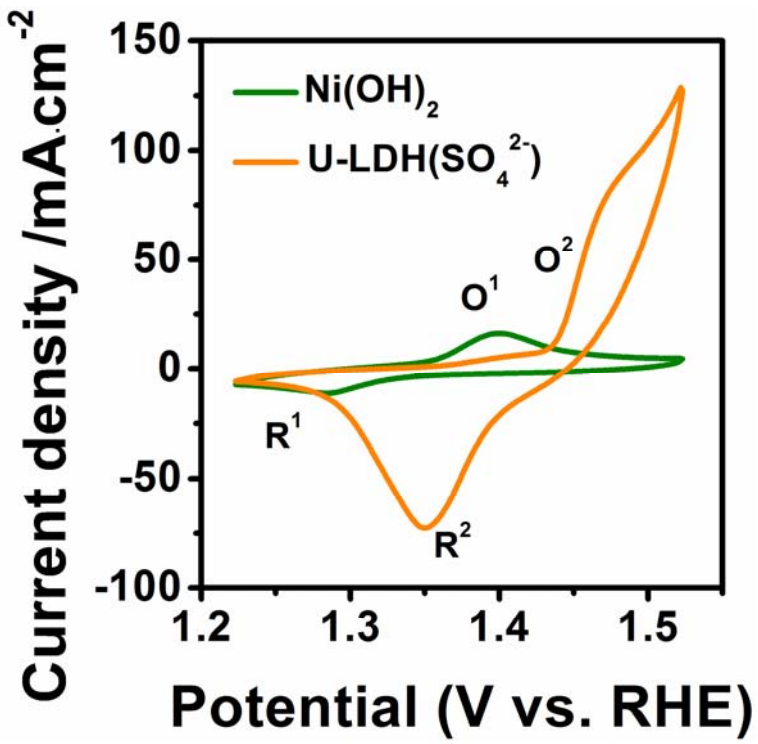
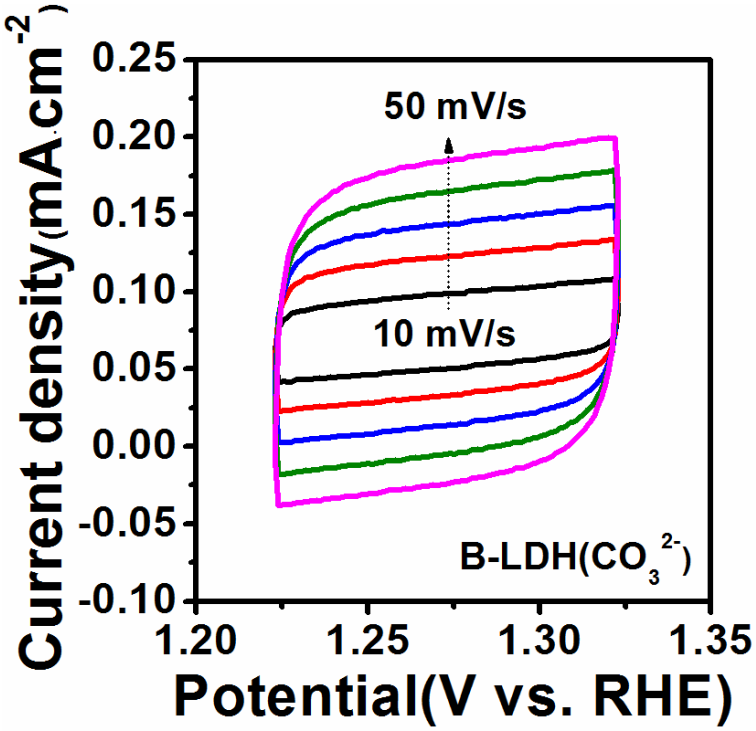


Fig. S10 CV curves of $Ni(OH)_2$ and U-LDH(SO_4^{2-}) at a scan rate of 5 $mV \cdot s^{-1}$.



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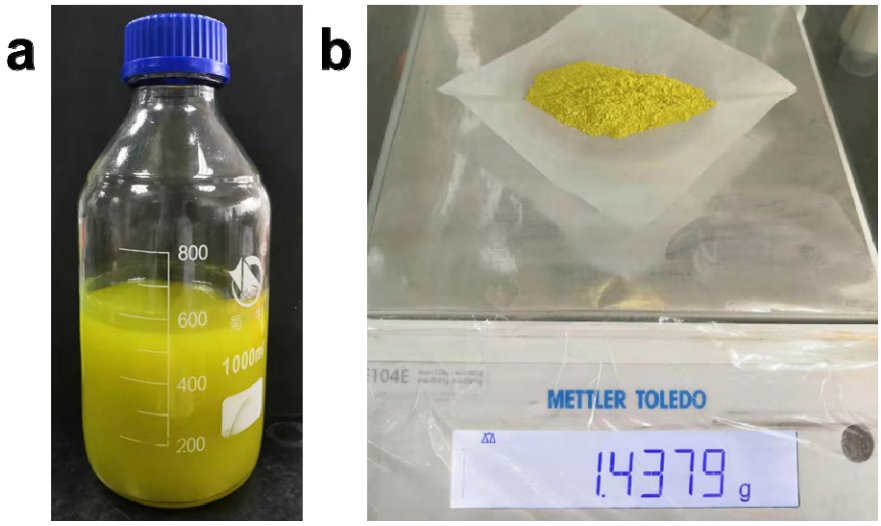

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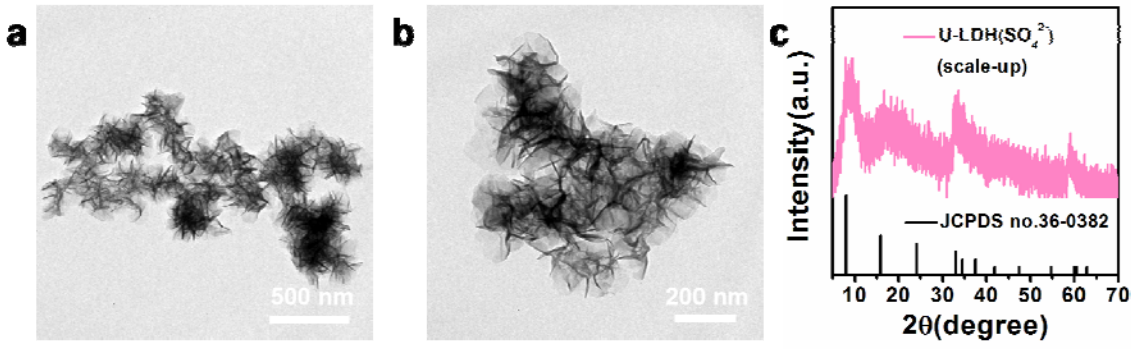

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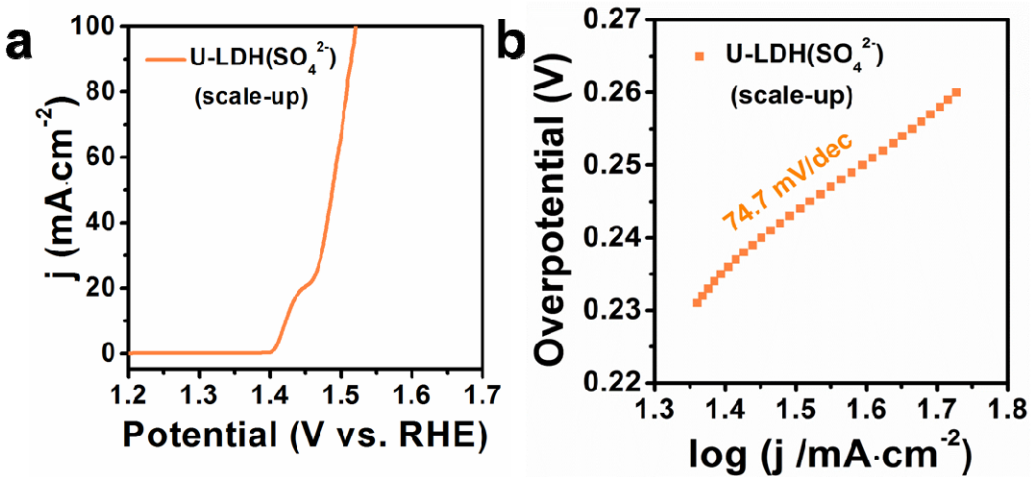

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