

Supplementary Materials: Bi-Phase $\text{NiCo}_2\text{S}_4\text{-NiS}_2/\text{CFP}$ Nanocomposites as a Highly Active Catalyst for Oxygen Evolution Reaction

Jintang Li *, Yongji Xia, Xianrui Luo, Tianle Mao, Zhenjia Wang, Zheyu Hong and Guanghui Yue *

College of Materials, Xiamen University, Xiamen 361005, China

* Correspondence: leejt@xmu.edu.cn (J.L.), yuegh@xmu.edu.cn (G.Y.)

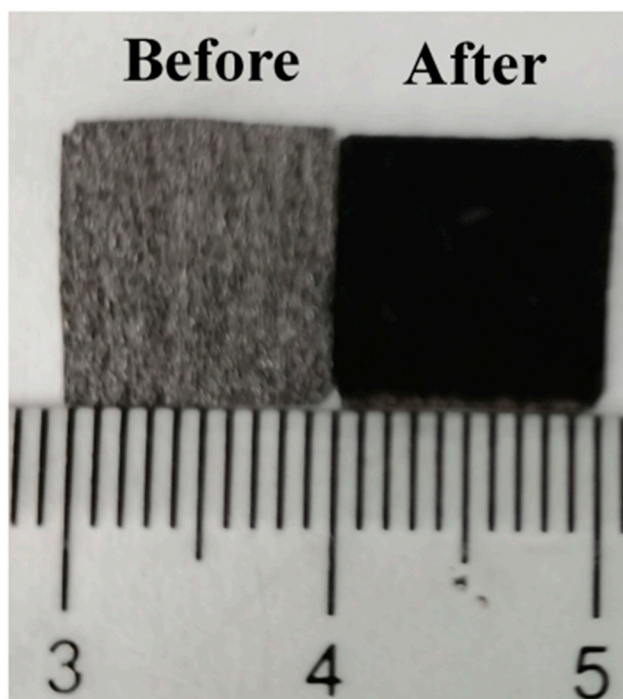


Figure S1. The surface change after as prepared $\text{NiCo}_2\text{S}_4\text{-NiS}_2$ anchored on the surface of CFP.

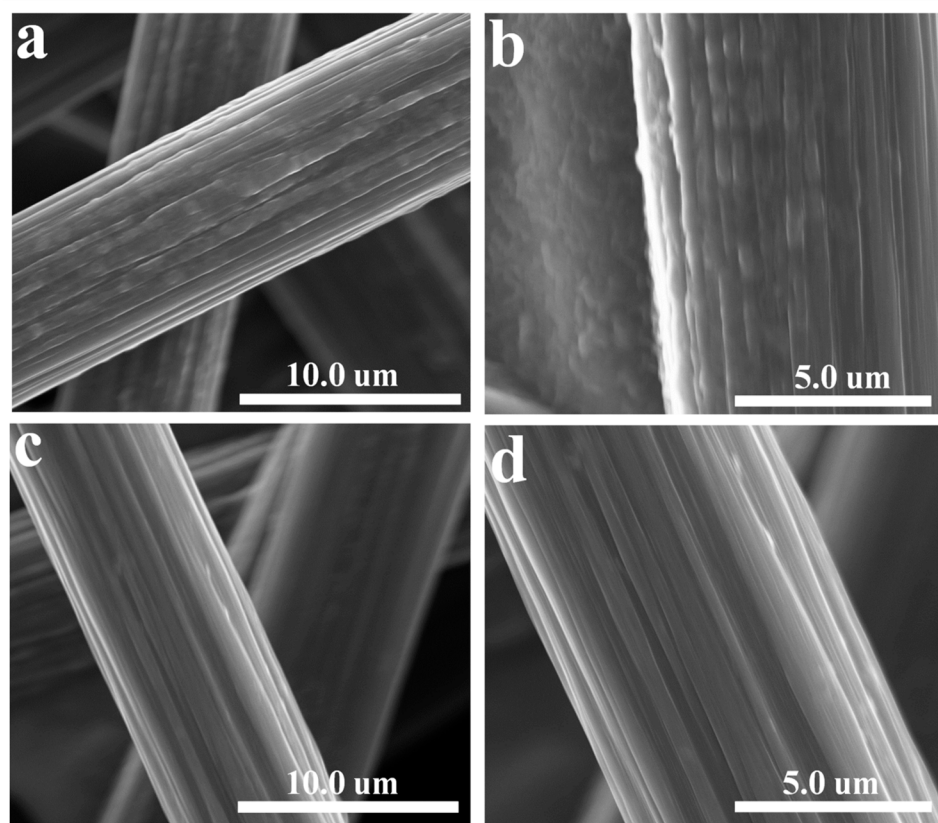


Figure S2. Low-magnification SEM images of (a) CFP and (c) OCFP. High-magnification SEM images of (b) CFP and (d) OCFP.

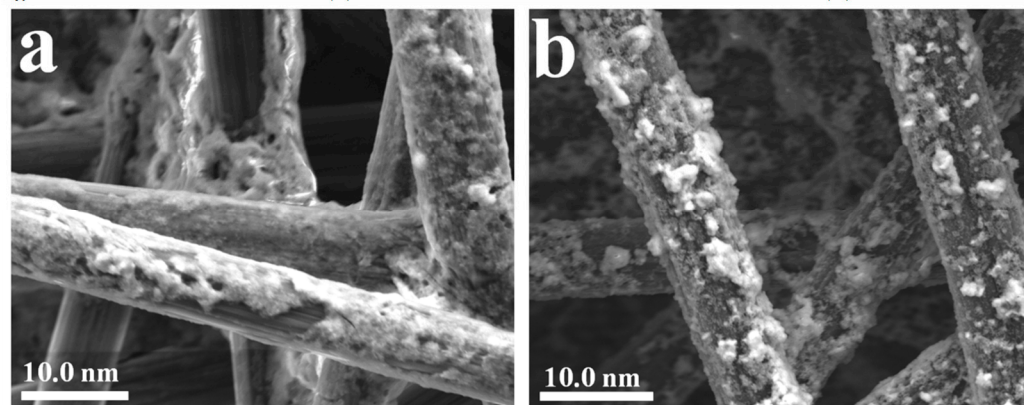


Figure S3. The morphologies of (a) Ni₃S₄-NiS₂/CFP and (b) CoS₂/CFP.

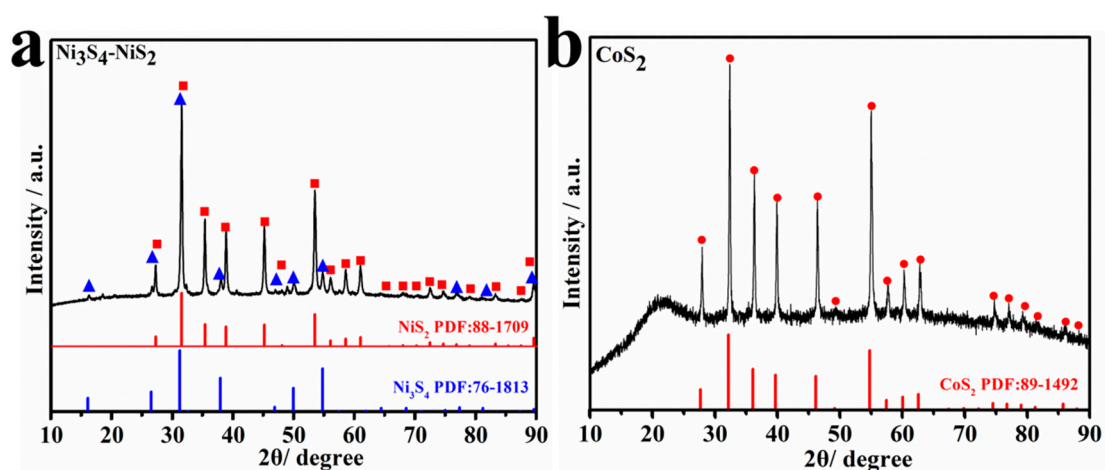


Figure S4. XRD patterns of (a) $\text{Ni}_3\text{S}_4\text{-NiS}_2$ and (b) CoS_2 .

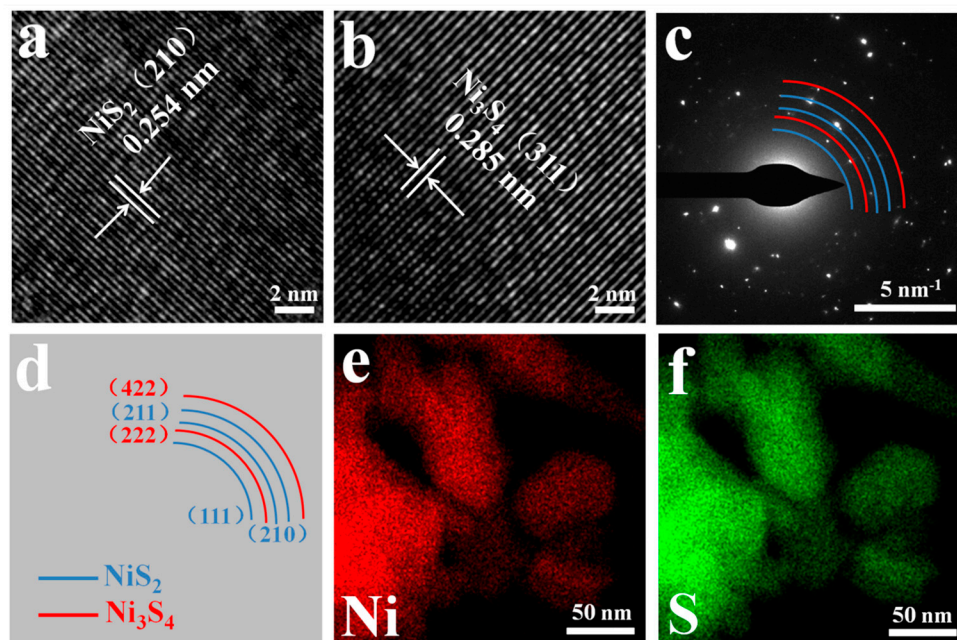


Figure S5. (a),(b) HRTEM image of $\text{Ni}_3\text{S}_4\text{-NiS}_2$. (c),(d) Selected area electron diffraction (SAED) diffraction ring of $\text{Ni}_3\text{S}_4\text{-NiS}_2$. (e),(f) The area chosen to do EDX elemental mapping and the corresponding EDX elemental mapping images for Ni and S respectively.

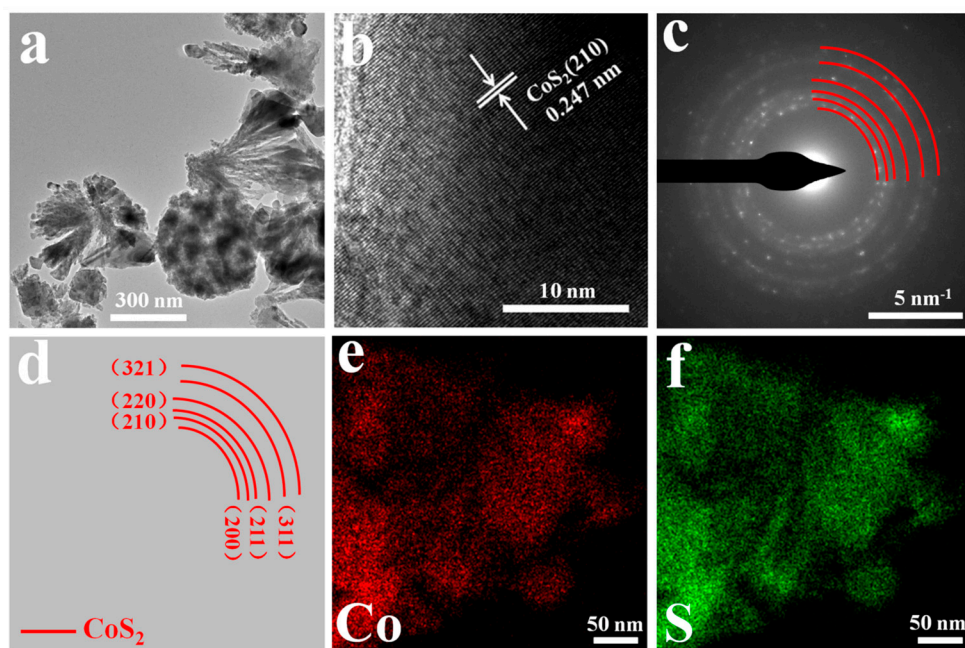


Figure S6. (a) The TEM image of CoS₂. (b) HRTEM image of CoS₂. (c),(d) Selected area electron diffraction (SAED) diffraction ring of CoS₂. (e),(f) The area chosen to do EDX elemental mapping and the corresponding EDX elemental mapping images for Co and S respectively.

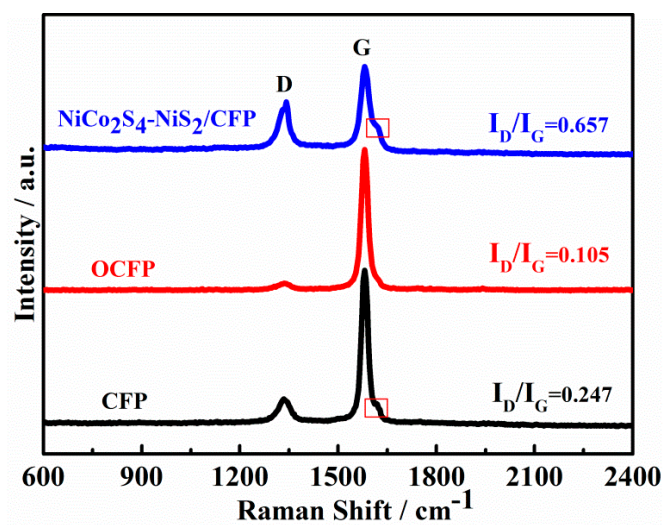


Figure S7. Raman spectra of CFP, OCFP and NiCo₂S₄-NiS₂/CFP.

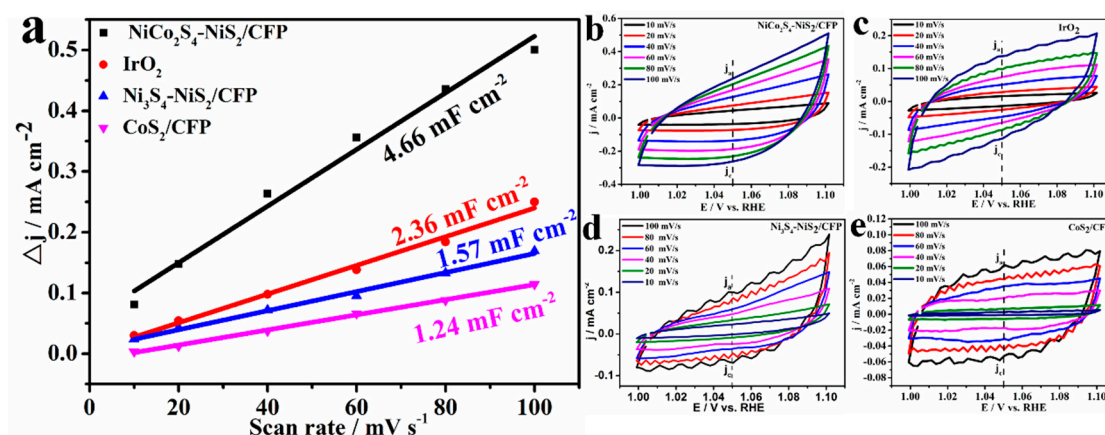


Figure S8. Double-layer capacitances (a) and CV scans at different scan rates (b–e).

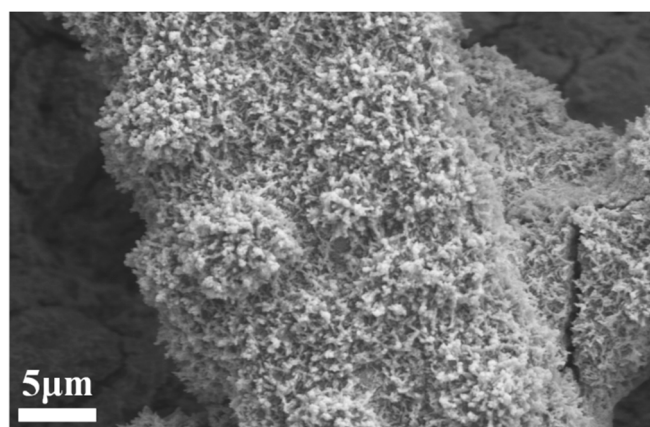


Figure S9. The morphology of $\text{NiCo}_2\text{S}_4\text{-NiS}_2/\text{CFP}$ after 12 h durability test.

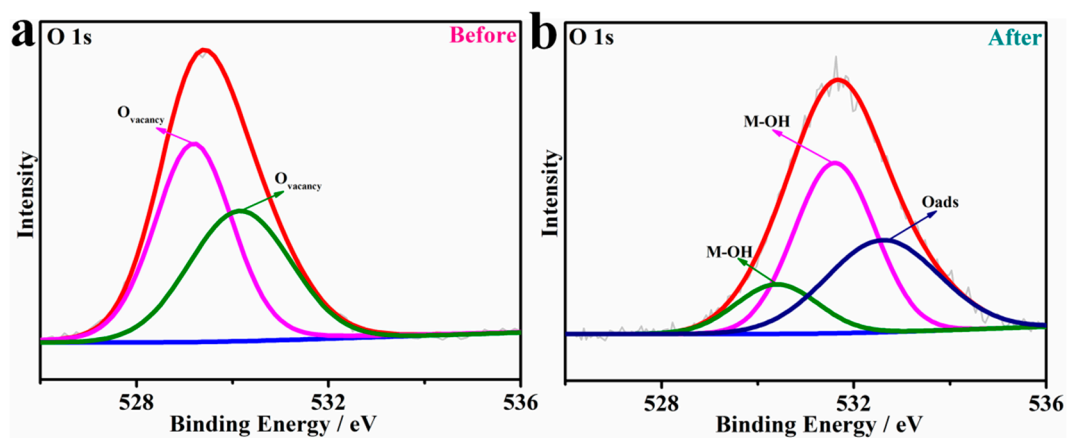


Figure S10. The O XPS spectra of as-prepared catalyst before (a) and after (b) 12 h durability test.

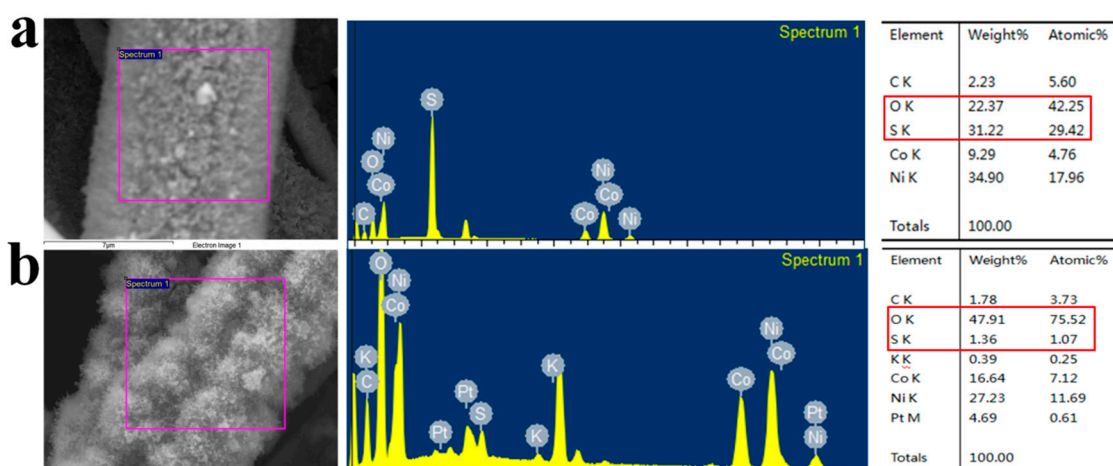


Figure S11. The EDS results of NiCo₂S₄-NiS₂/CFP (a) before 12 h durability test. (b) After 12 h durability test.

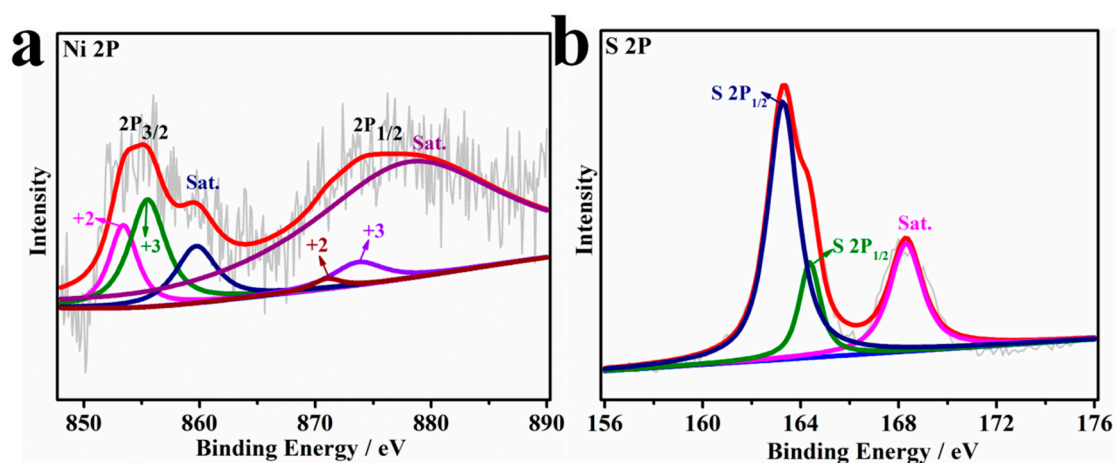


Figure S12. The XPS spectra of (a) Ni 2p, (b) S 2p in Ni₃S₄-NiS₂/CFP.

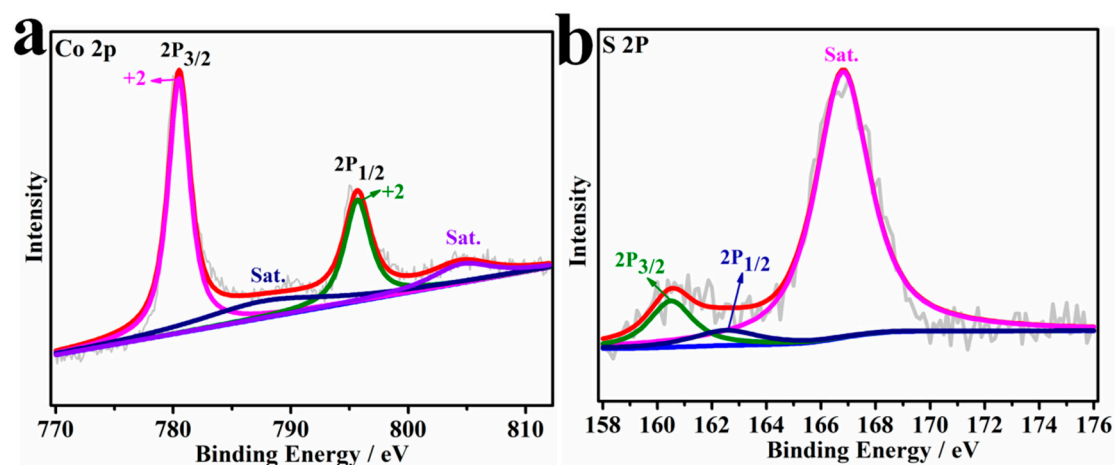


Figure S13. The XPS spectra of (a) Co 2p, (b) S 2p in CoS₂/CFP.

Table S1. Comparison of OER activity of NiCo₂S₄-NiS₂/CFP with that of most reported nickel-cobalt sulfide catalysts tested in alkaline solution.

Catalysts	E ₁₀ (V vs. RHE)	Tafel slope b (mV/dec)	Reference
NiCo ₂ S ₄ -NiS ₂ /CFP	1.395	81.54	This work

Ni ₃ S ₄ -NiS ₂ /CFP	1.485	179.2	This work
Ni-Fe-Co-S NSs/NNCs	1.437	63	[1]
Co _x Ni _{1-x} S ₂	1.52	46	[2]
NCT-NiCo ₂ S ₄	1.56 (100 mA/cm ²)	86.8	[3]
NiCoDH/NiCoS	1.533 (20 mA/cm ²)	77.6	[4]
NiCoS/Ti ₃ C ₂ T _x	1.595	58.2	[5]
Ni _{4.3} Co _{4.7} S ₈	1.378	90	[6]
H-3DRG@NiCo-LDH	1.519	80.3	[7]
H-3DRG@NiCo ₂ S ₄	1.494	93.5	[7]
Co _{1.22} Ni _{0.78} P ₂ O ₇ -C/RGO	1.513	51	[8]
NiCoS-3	1.55	58.8	[9]
NiCo ₂ S ₄	1.567	64	[10]

E₁₀ is the potential to reach 10mA cm⁻² for OER.

References

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