

Electronic Supplementary Material

Reconstructing cobalt disulfide nanosheets through sulfur doping hexamethylenetetramine regulated β -Co(OH)₂ for oxygen evolution reaction

Xiangtai Zhang^{1,2}, Lei Wu (✉)³

1 Laboratory Management Office of Qinghai University, Qinghai University, Xining 810016, China

2 School of Chemistry and Chemical Engineering, Qinghai University, Xining 810016, China

3 School of Energy and Electrical Engineering, Qinghai University, Xining 810016, China

E-mail: wulei@qhu.edu.cn

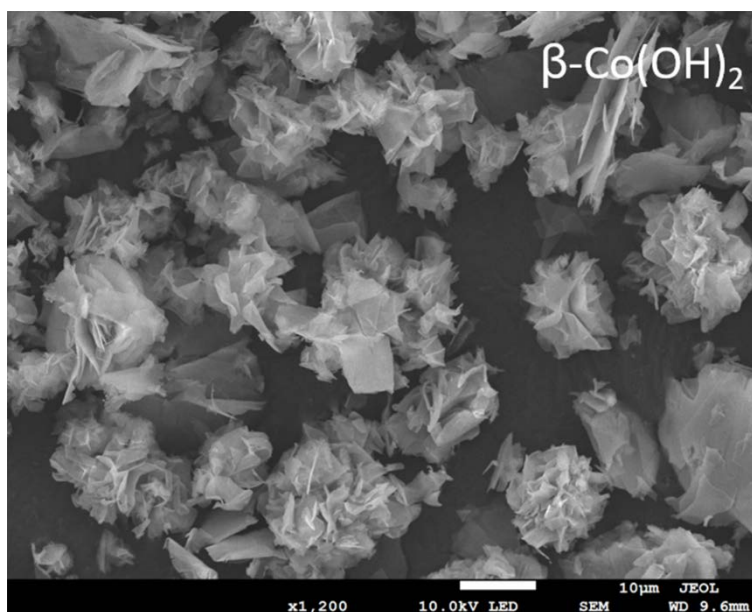


Figure S1 The FESEM image of β -Co(OH)₂ nanosheets.

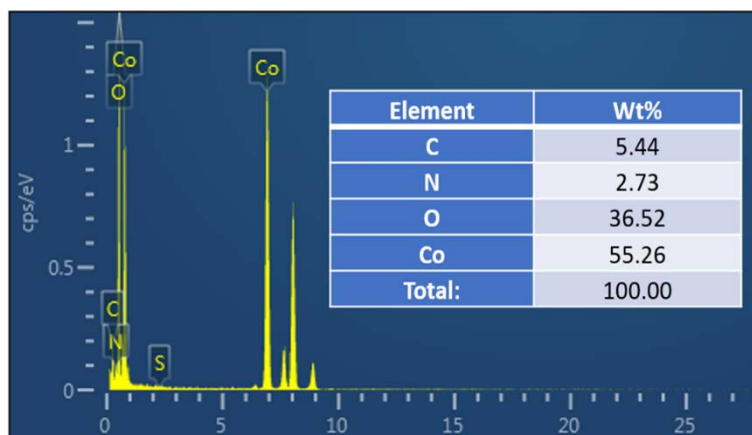


Figure S2 The point scan results of EDS spectrum for β -Co(OH)₂ nanosheets.

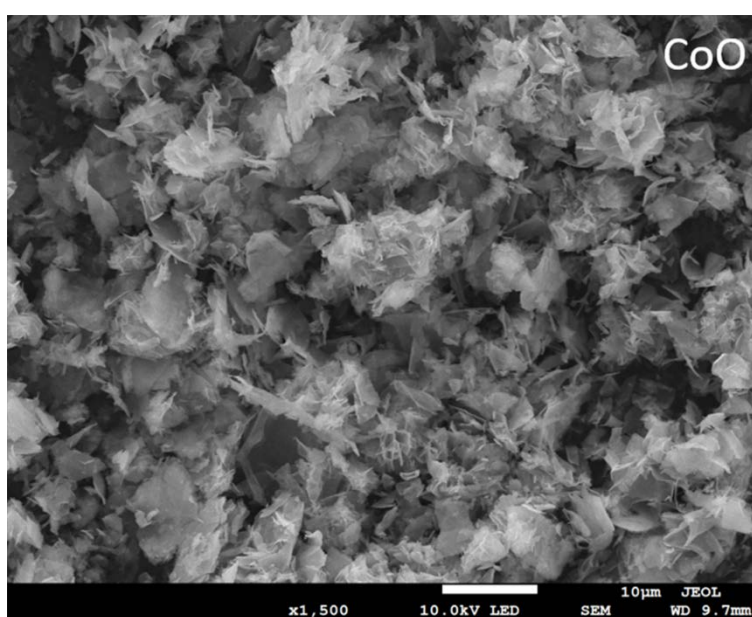


Figure S3 The FESEM image of CoO nanosheets.

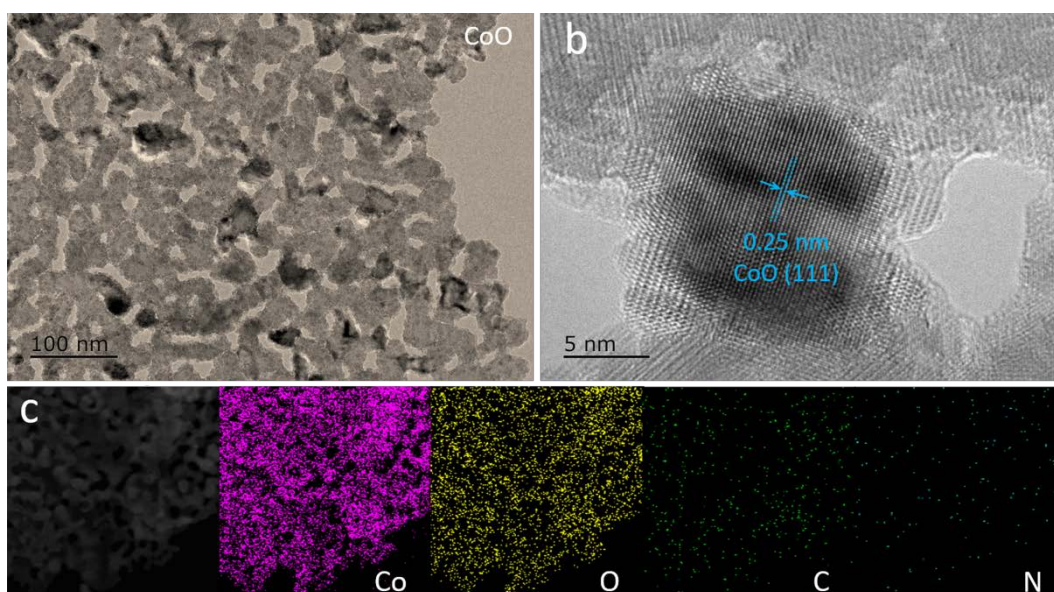


Figure S4 The (a) TEM. (b) HRTEM images of CoO nanosheets. (c) the corresponding mapping images.

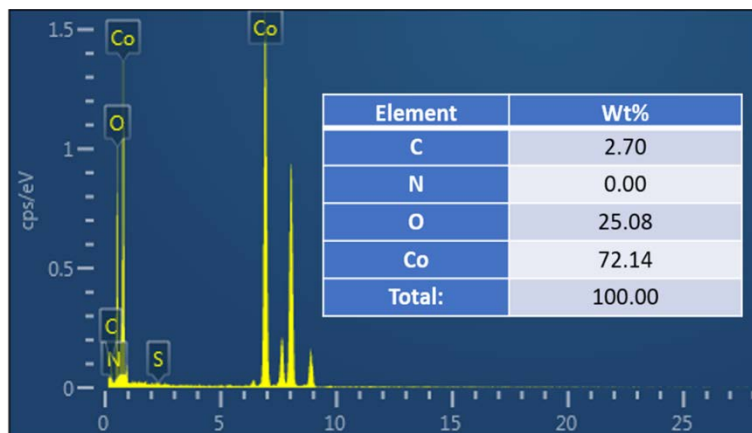


Figure S5 The point scan results of EDS spectrum for CoO.

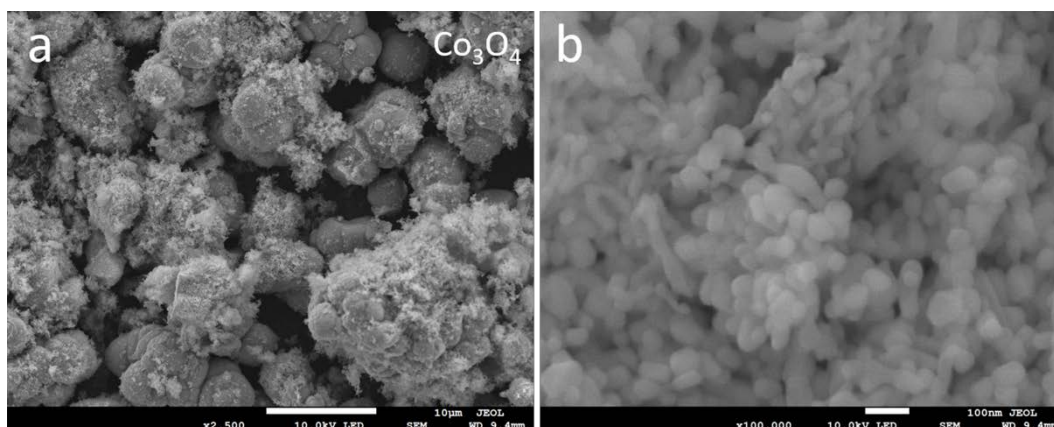


Figure S6 The FESEM images of Co₃O₄ nanoparticles.

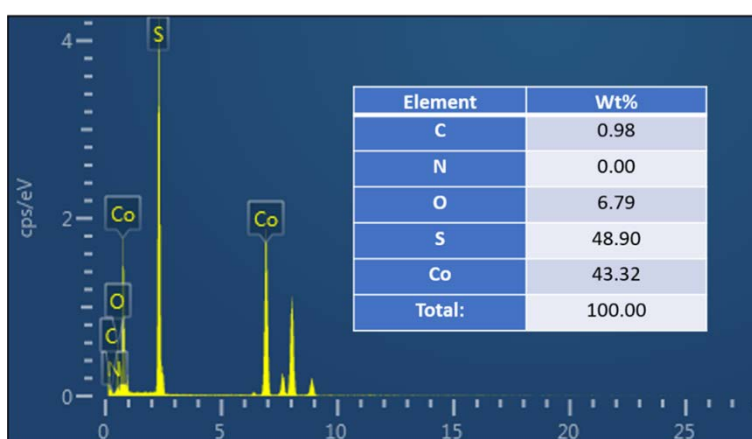


Figure S7 The point scan results of EDS spectrum for CoS₂ nanoparticles.

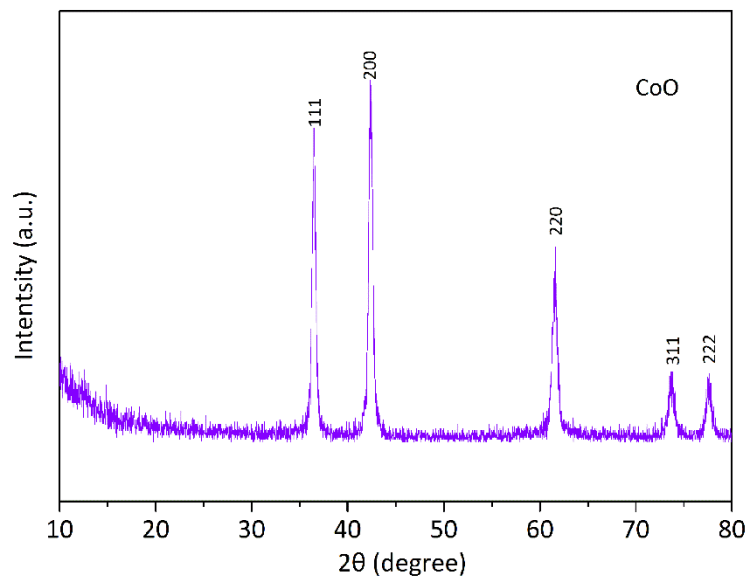


Figure S8 XRD of CoO nanosheets.

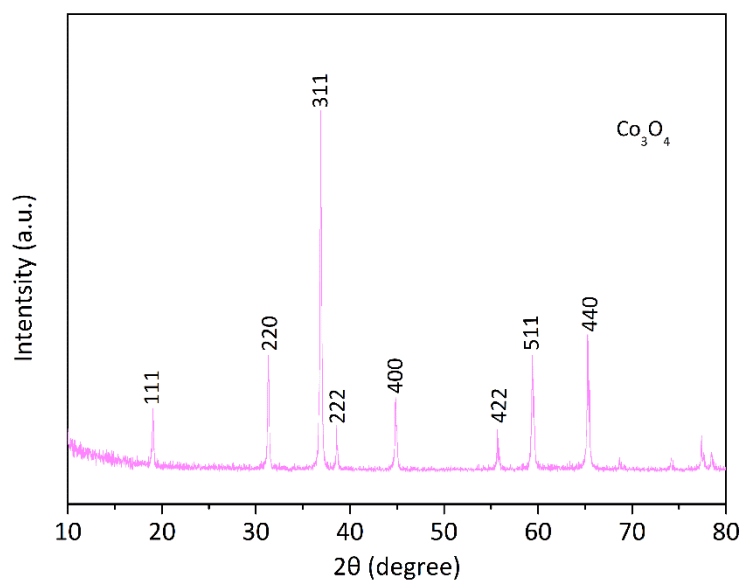


Figure S9 XRD of Co₃O₄ nanoparticles.

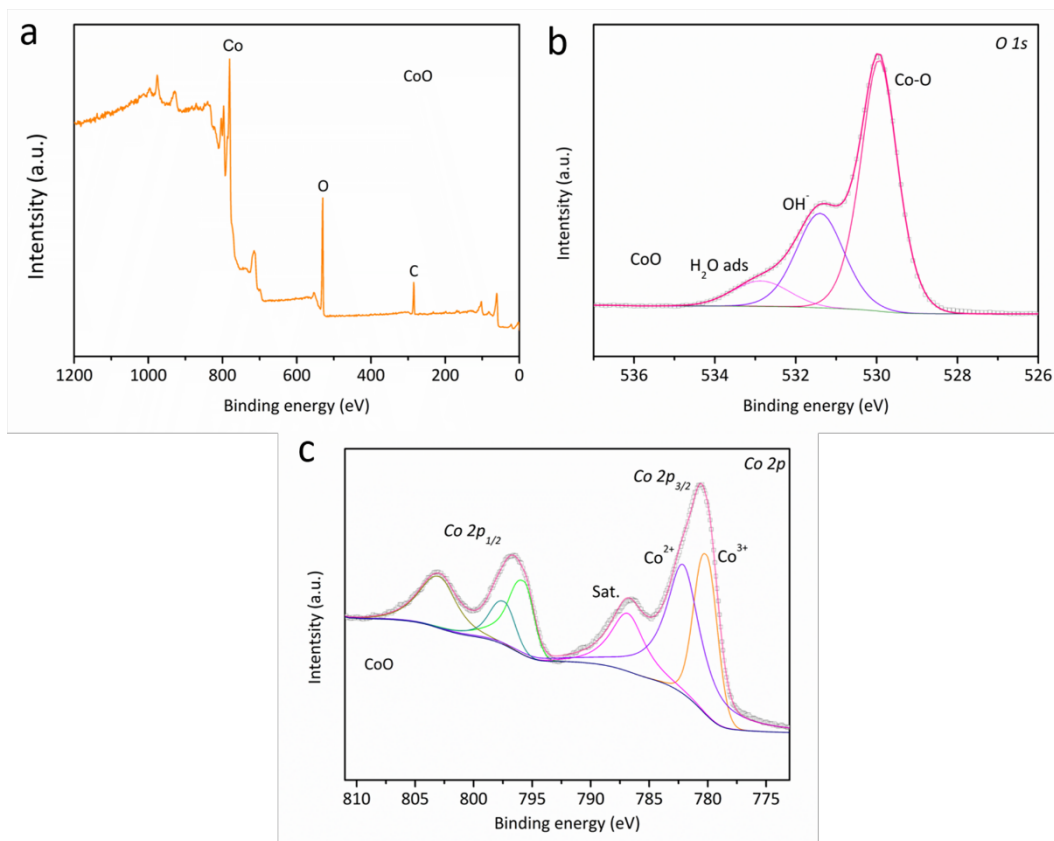


Figure S10 (a) Survey spectrum of CoO nanosheets. (b) O 1s and (c) Co 2p spectra of CoO nanosheets.

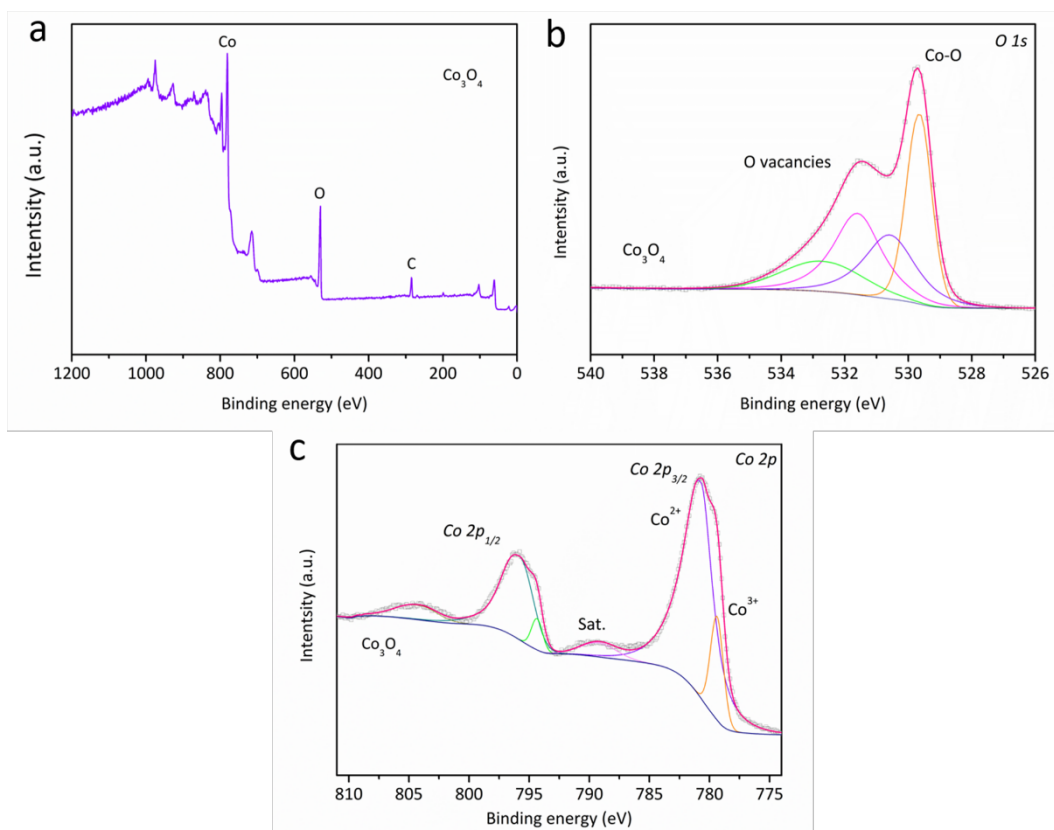


Figure S11 (a) Survey spectrum of Co_3O_4 nanoparticles. (b) O 1s and (c) Co 2p spectra of Co_3O_4 nanoparticles.

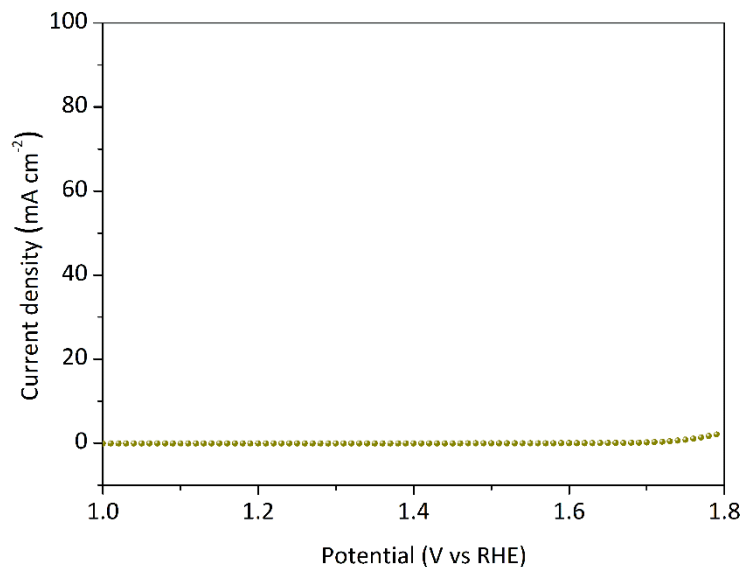


Figure S12 GC electrode LSV measurement was performed at a scan rate of 10 mV s^{-1} along a potential window of 1.0-1.8 V (RHE) in 1 M KOH was degassed by bubbling O_2 for 30 min.

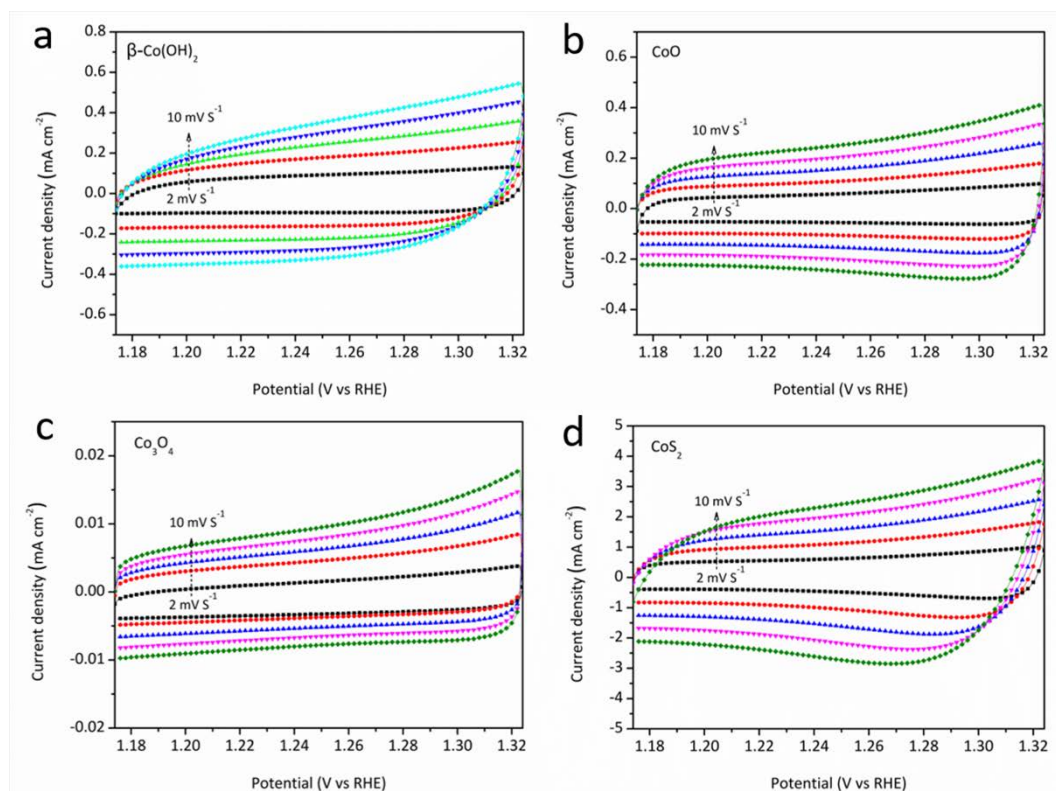


Figure S13 The CV curves of (a) $\beta\text{-Co(OH)}_2$, (b) CoO , (c) Co_3O_4 , (d) CoS_2 with the scan rates of 2, 4, 6, 8 and 10 mV s^{-1} .

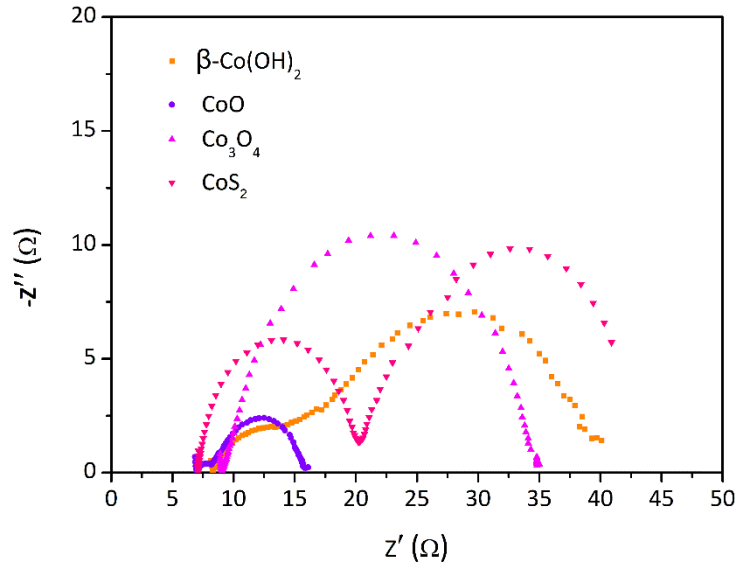


Figure S14 Nyquist plot of catalysts (the testing is performed alternating current amplitude at 1.65 V (RHE) from 10 K Hz to 0.1 Hz in 1 M KOH solution).

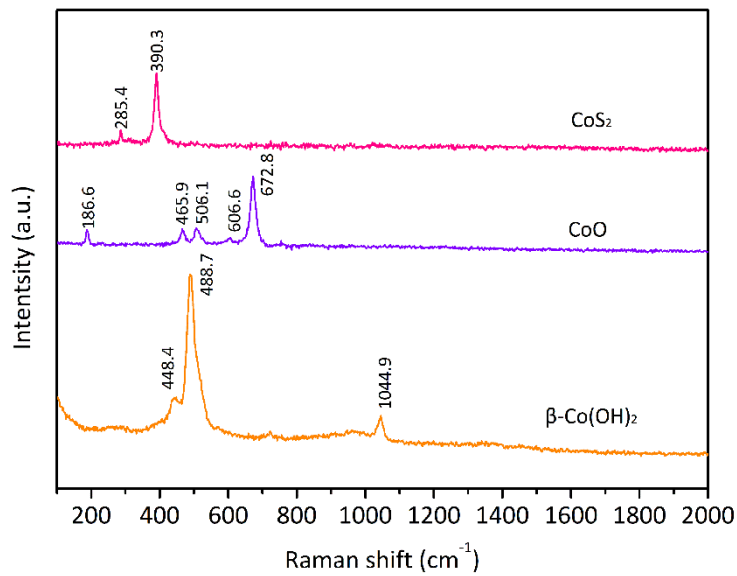


Figure S15 Raman spectra of β -Co(OH)₂, CoO and CoS₂.

Table S1 Comparison of OER performance for different cobalt sulfide catalysts in alkaline medium (1 M KOH). All the potential values from this study and the references were converted to *vs.* RHE for comparison.

Catalyst	η_{10} (mV)	Tafel slope (mV dec ⁻¹)	Ref.
Co:S (1:2)	320	135 ± 0.7	[1]
CoS ₂ NTA/CC	276	81	[2]

Pure CoS ₂	327	81.4	[3]
Co ₃ S ₄ nanoparticles	340	187	[4]
CoS ₂	300	81	[5]
Bulk CoS ₂ nanosheets	319	103	[6]
Co ₉ S ₈ /S-CNTs	331	88	[7]
Co-S-130 nanosheets	338	69	[8]
NiS ₂ /CoS ₂ NWs	320	54	[9]
CoS₂ nanosheets	297	71.7	This work

References

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