

Supplementary materials

Fabrication of Co:ZnS/CoS₂ Heterostructure Nanowires with Superior Hydrogen Evolution Reaction Performance

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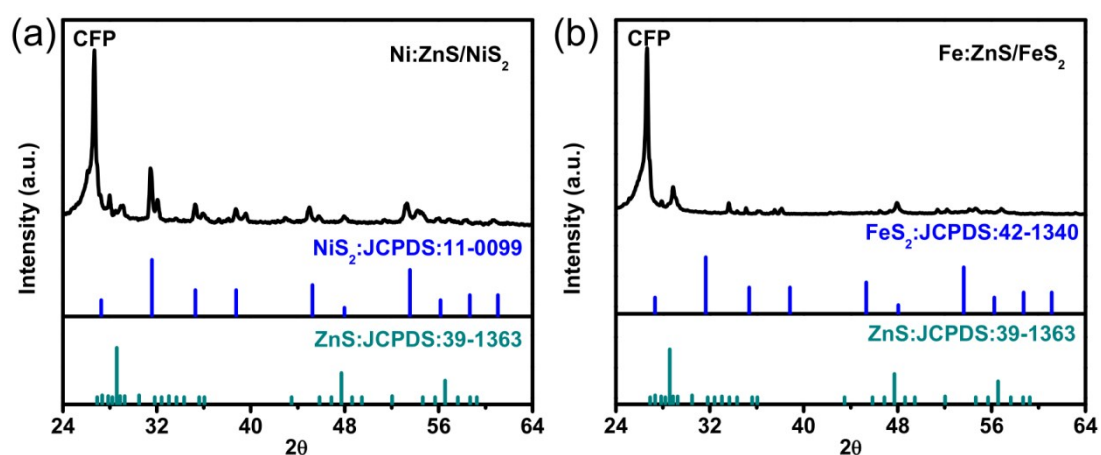


Figure S1. (a) XRD patterns of Ni:ZnS/NiS₂ (Ni:Zn=20%); (b) XRD patterns of Fe:ZnS/FeS₂ (Fe:Zn=20%).

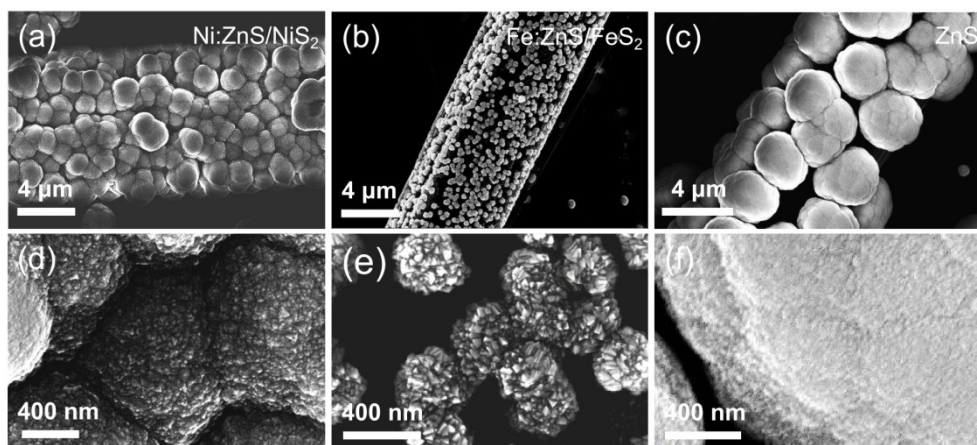


Figure S2. SEM images of (a) Ni:ZnS/NiS₂ (Ni:Zn=20%), (b) Fe:ZnS/FeS₂ (Fe:Zn=20%), and (c) ZnS; (d), (e), and (f) are corresponding high-resolution SEM images.

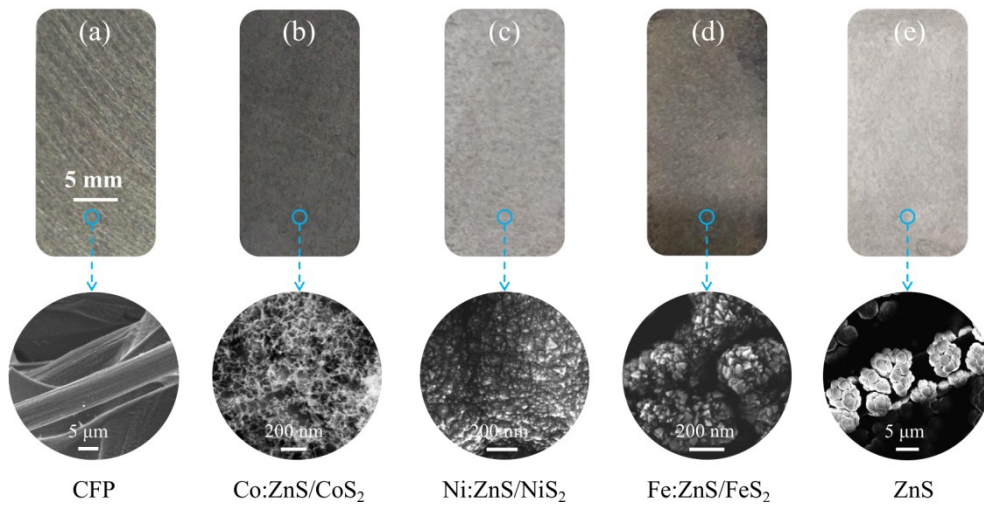


Figure S3. Photograph of (a)-(e) CFP, Co:ZnS/CoS₂ (Co:Zn=20%), Ni:ZnS/NiS₂ (Ni:Zn=20%), Fe:ZnS/FeS₂ (Fe:Zn=20%), and ZnS and their corresponding SEM images.

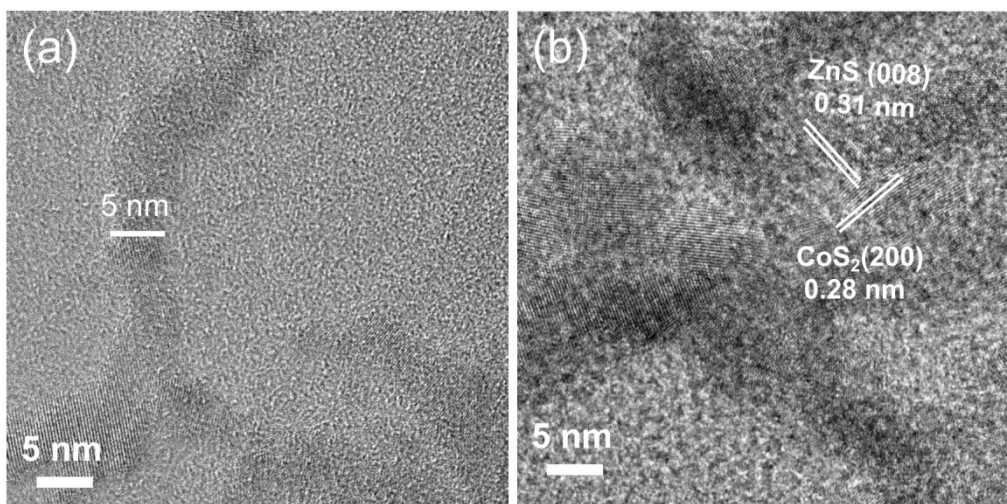


Figure S4. (a) and (b) HRTEM image of Co:ZnS/CoS₂ (Co:Zn=20%) heterostructures nanowires.

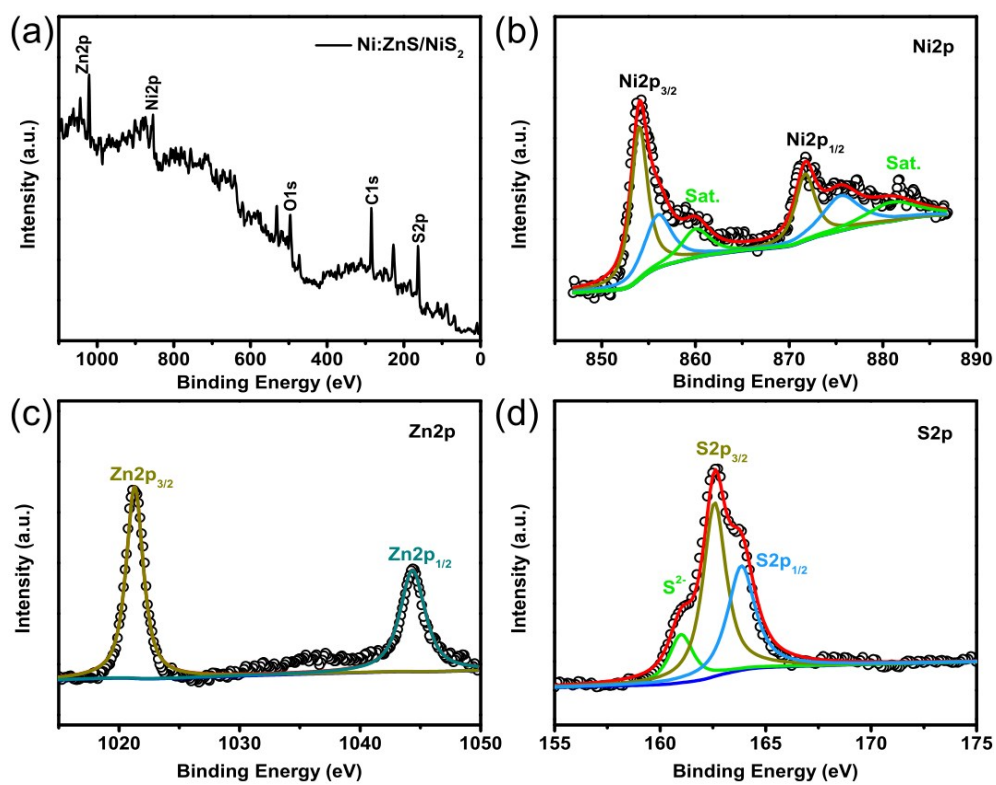


Figure S5. (a) XPS survey spectrum of Ni:ZnS/NiS₂ (Ni:Zn=20%); XPS spectra of the Ni:ZnS/NiS₂ (Ni:Zn=20%) from (b) Ni 2p, (c) Zn 2p, (d) S 2p.

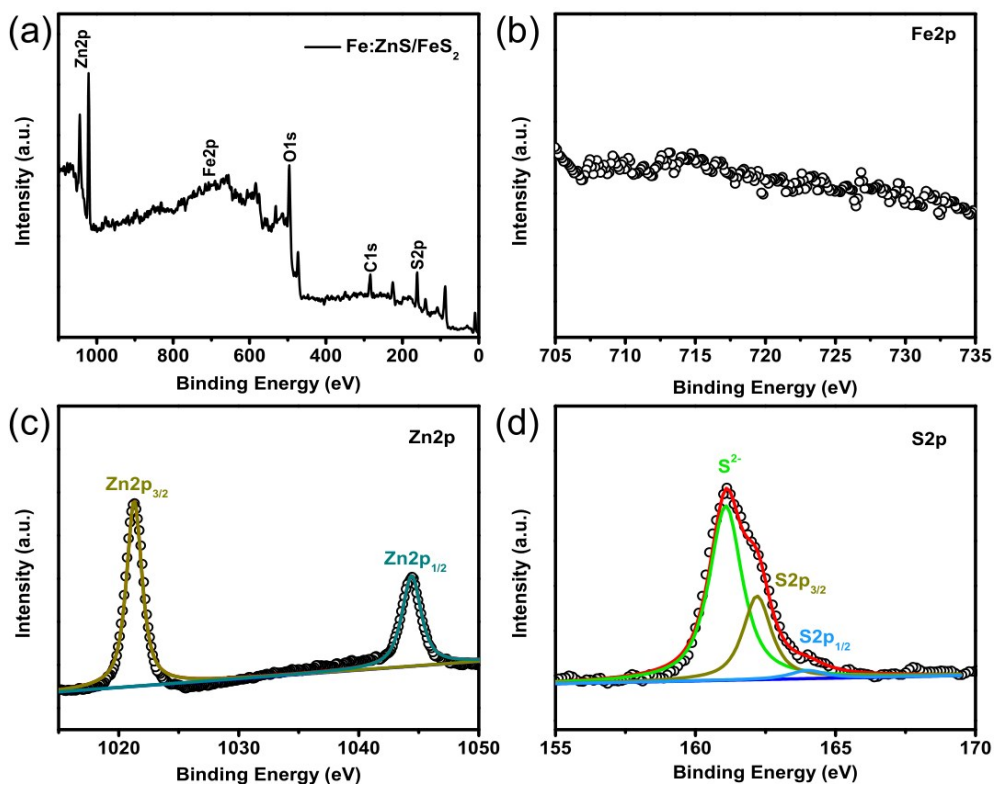


Figure S6. (a) XPS survey spectrum of Fe:ZnS/FeS₂ (Fe:Zn=20%); XPS spectra of the Fe:ZnS/FeS₂ (Fe:Zn=20%) from (b) Fe 2p, (c) Zn 2p, (d) S 2p.

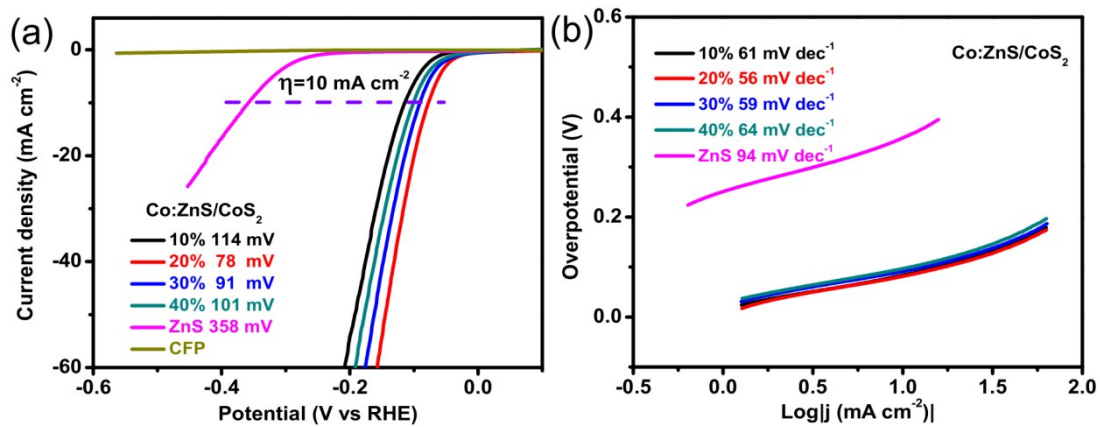


Figure S7. (a) LSV curves of ZnS and Co:ZnS/CoS₂ heterostructure nanowires with different cobalt ratios (Co:Zn=10%, 20%, 30%, 40%) for HER; (b) their corresponding Tafel plots.

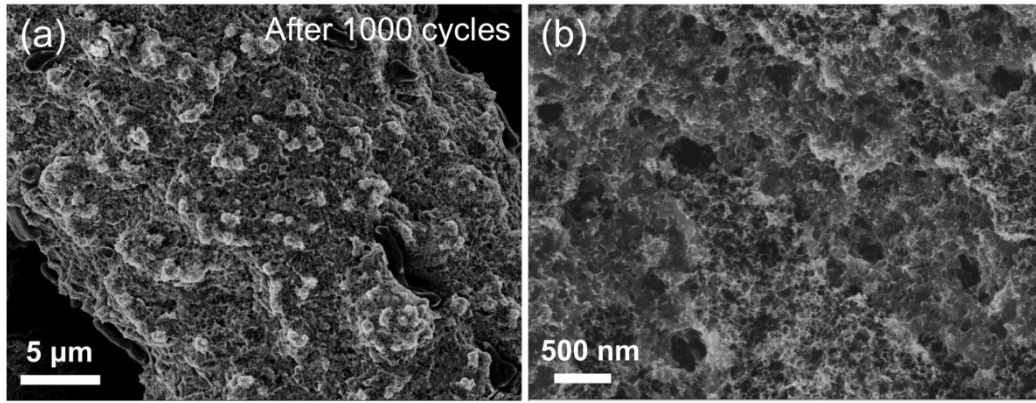


Figure S8. (a-b) SEM images of Co:ZnS/CoS₂ (Co:Zn=20%) heterostructure nanowires after the 1000 cycles.

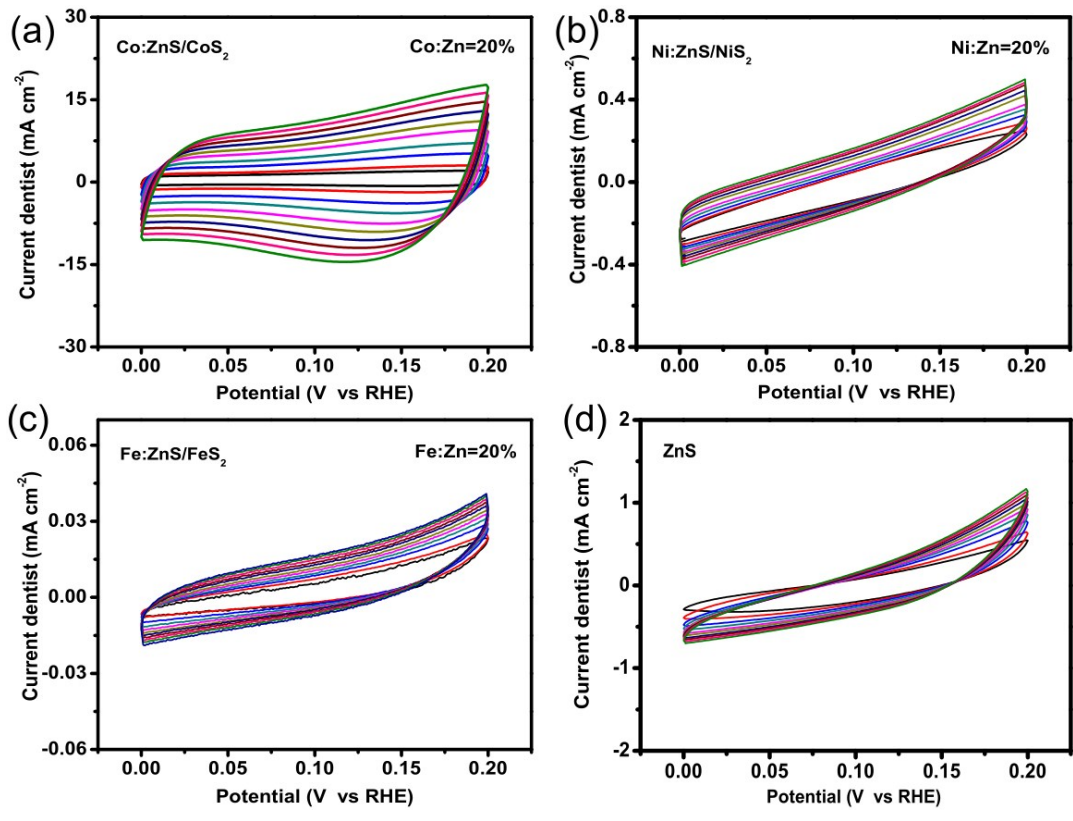


Figure S9. (a-d) cyclic voltammograms of Co:ZnS/CoS₂ (Co:Zn=20%), Ni:ZnS/NiS₂ (Ni:Zn=20%), Fe:ZnS/FeS₂ (Fe:Zn=20%), and ZnS were measured in the non-faradaic capacitance current range at scan rates of 5, 10, 20, 30, 40, 50, 60, 70, 80, and 90 mV s⁻¹.

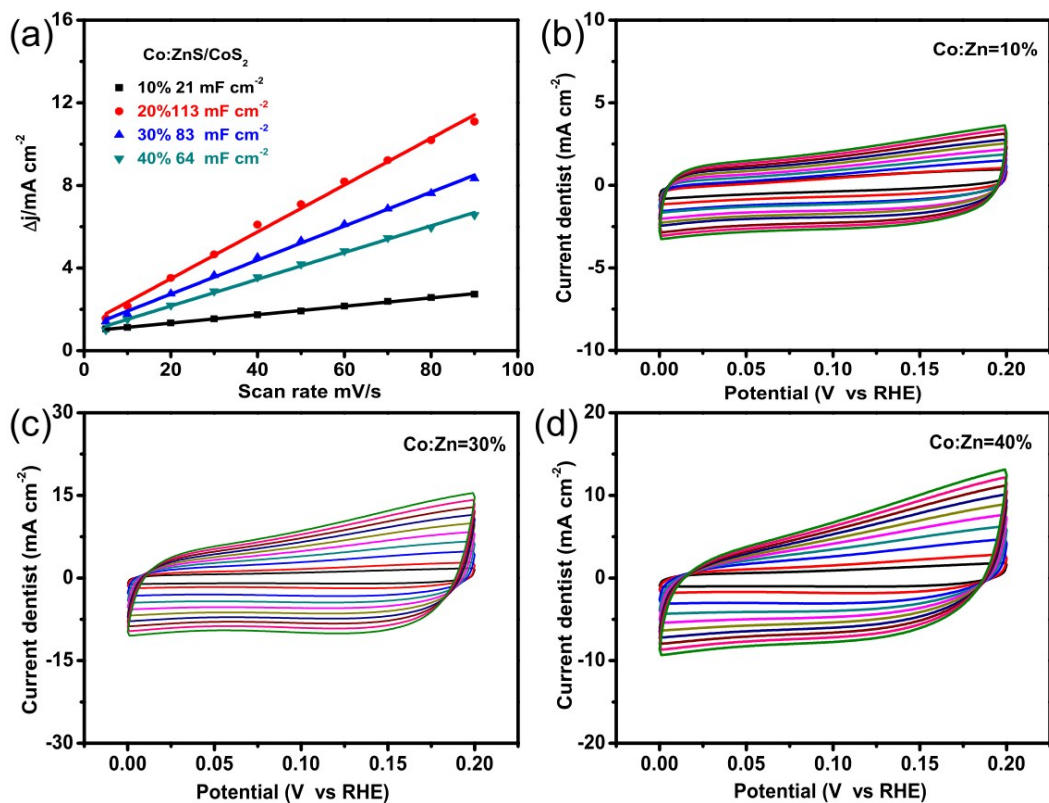


Figure S10. (a) The capacitive currents at 0.1V as a function of scan rate for Co:ZnS/CoS₂ (Co:Zn=10%, 20%, 30%, 40%) heterostructure nanowires; (b-d) cyclic voltammograms of Co:ZnS/CoS₂ (Co:Zn=10%, 30%, 40%,) were measured in the non- faradaic capacitance current range at scan rates of 5, 10, 20, 30, 40, 50, 60, 70, 80, and 90 mV s^{-1} .