

Dual chalcogenide coordination engineering on self-supported alloy electrode for enhanced hydrogen evolution reaction

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KEYWORDS: HER; Self-supported; Chalcogenide doping; Alloy electrode;

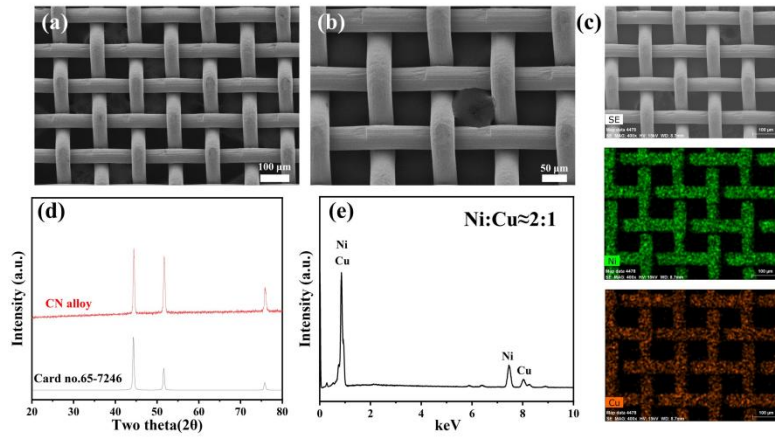


Fig. S1 Monel alloy mesh . (a) Low magnification SEM image, (b) High magnification SEM image, (c) Mapping SEM images, (d) XRD pattern, (e) EDS data

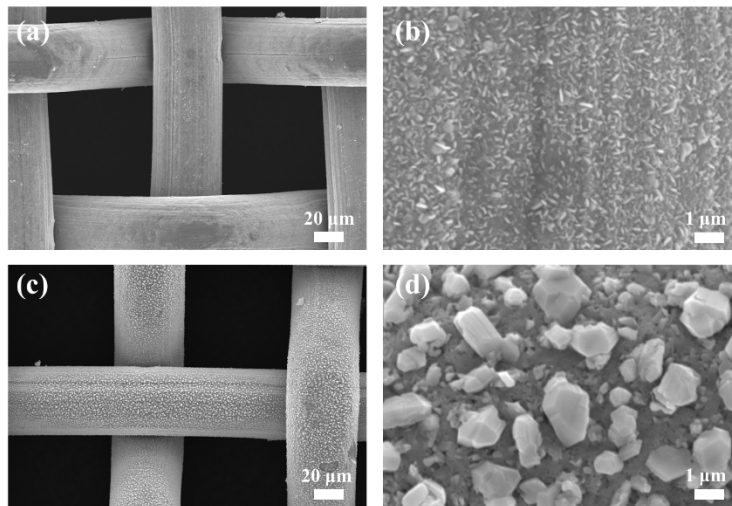


Fig. S2 The SEM images of CNS and CNSe sample. (a-b) CNS, (c-d) CNSe

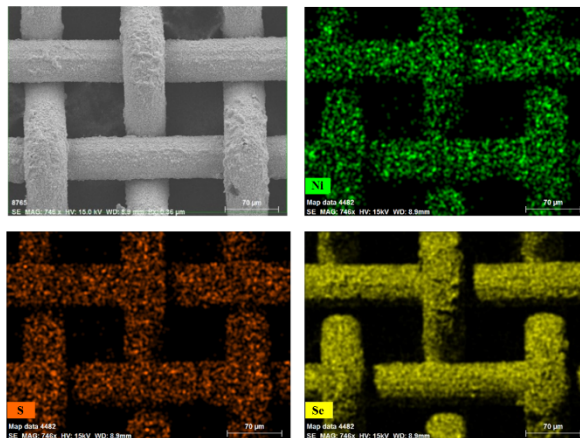


Fig. S3 The EDS mapping image of CNSSe

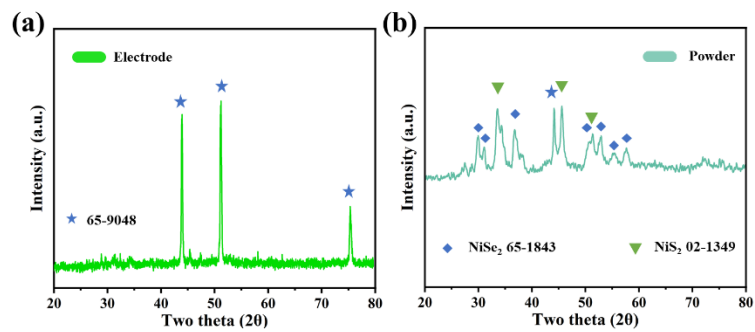


Fig. S4 The XRD pattern of CNSSe. (a) Electrode, (b) Powder after peel off from electrode

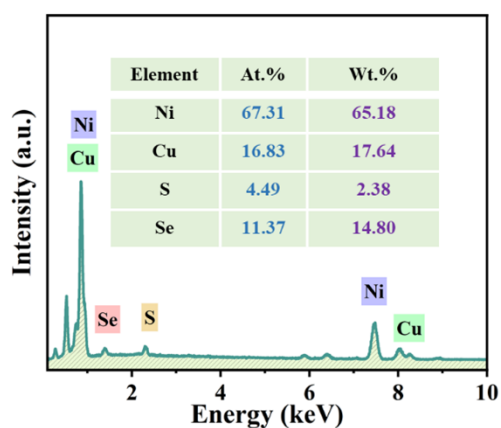


Fig. S5 The EDS mapping data of CNSSe sample

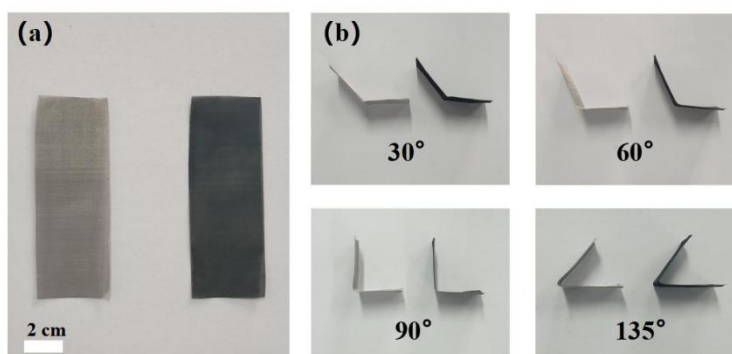


Fig. S6 The Structural stability testing at various bending angle. a) 0°, b) 30°, 60°, 90°, 135°.

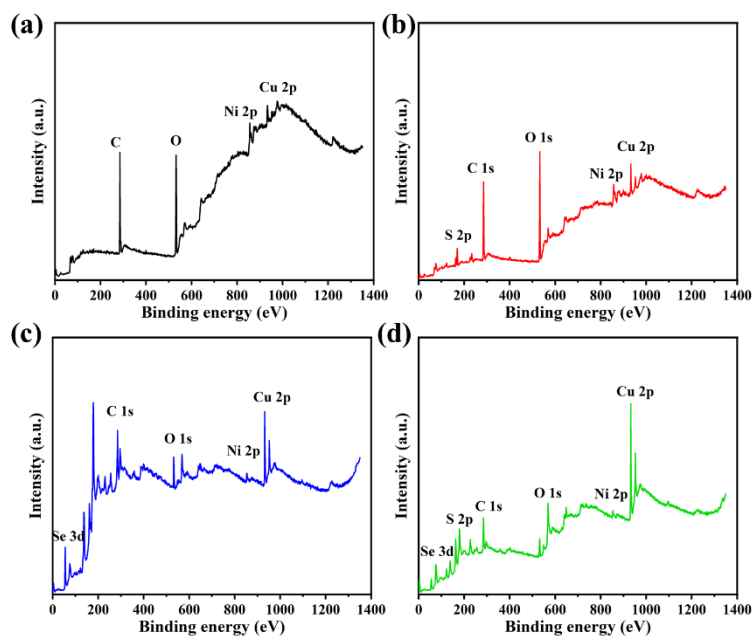


Fig. S7 The survey XPS spectra. (a) CN alloy, (b) CNS, (c) CNSe, (d) CNSSe

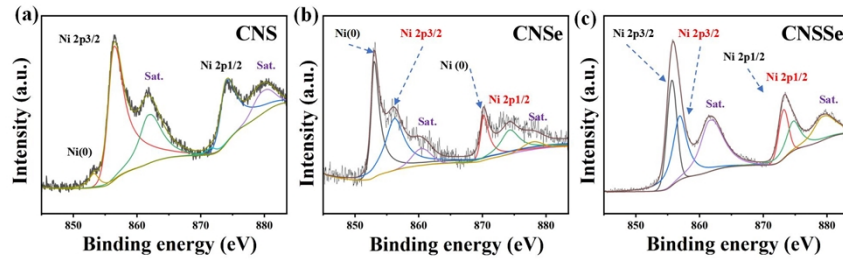


Fig. S8. High-resolution XPS spectra of Ni 2p (a) CNS, (b) CNSe, (c) CNSSe sample

Table The detail parameters

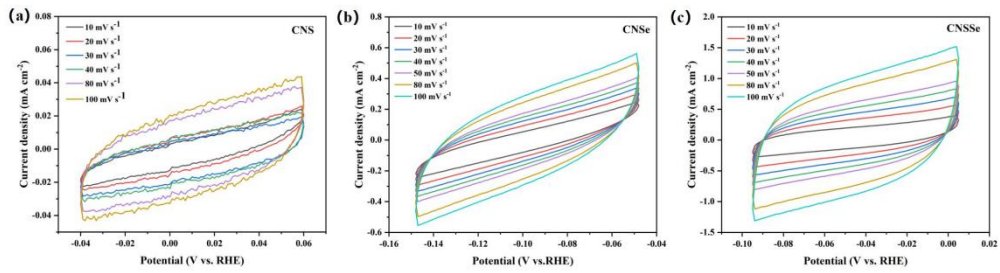


Fig. S9. The CV curves of a) CNS sample, b) CNSe sample, c) CNSSe sample

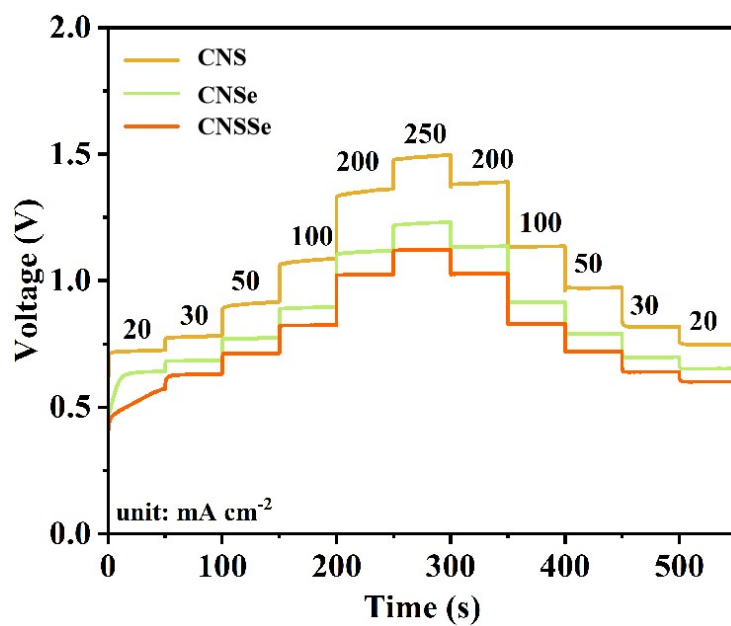


Fig. S10. Multi-steps of chronopotentiometry measurement of electrode at different current densities

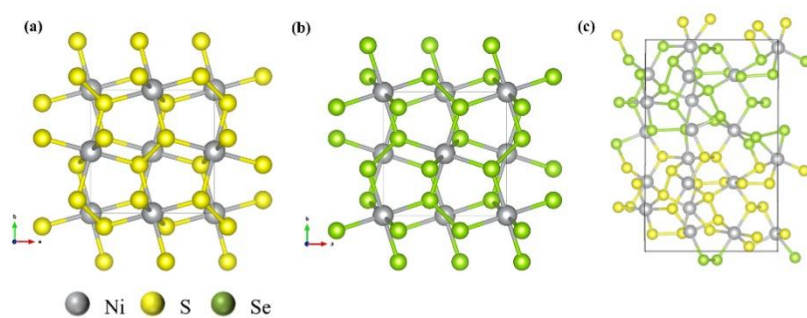


Fig. S11 Structural modeling of (a) NiS₂, (b) NiSe₂, and (c) NiSSe.

Table S1. The R_{ct} and R_Ω values from the equivalent circuit

Catalyst	R _Ω	R _{ct}
CN	1.8	9
CNS	2.1	8.4
CNSe	1.3	6.9
CNSSe	1.4	4.5