Interfacial Electronic Engineering of NiSe-Anchored Ni-N-C Composite Electrocatalyst for Efficient Hydrogen Evolution

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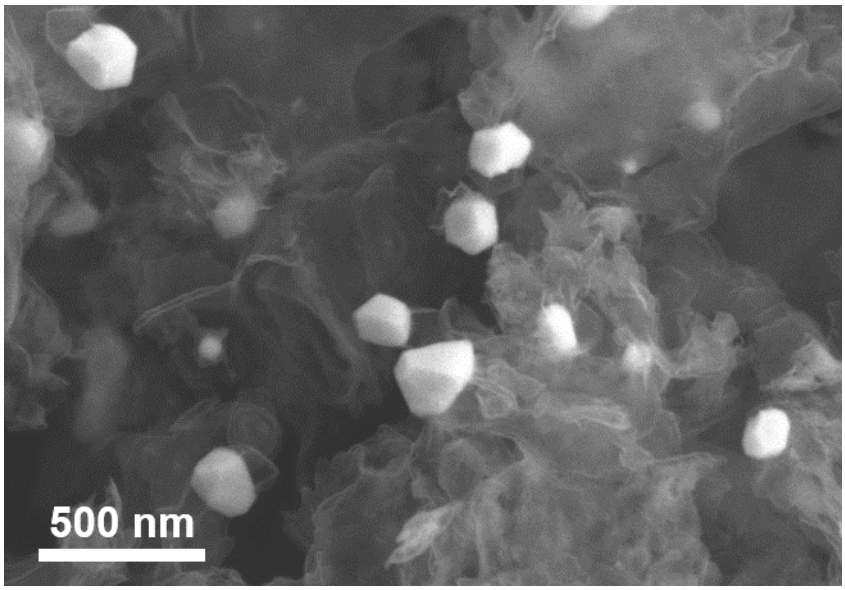

Figure S1. SEM image of NiSe/N-C.

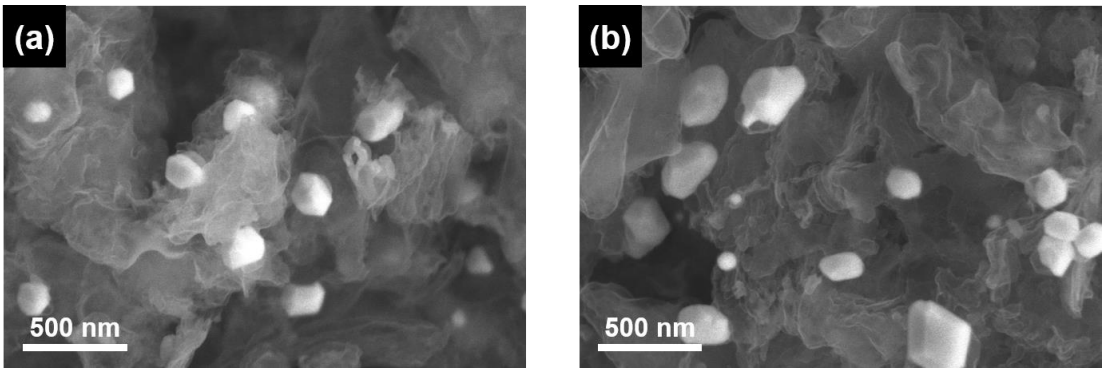

Figure S2. SEM images of (a) NiSe/Ni-N-C@700 and (b) NiSe/Ni-N-C@900.

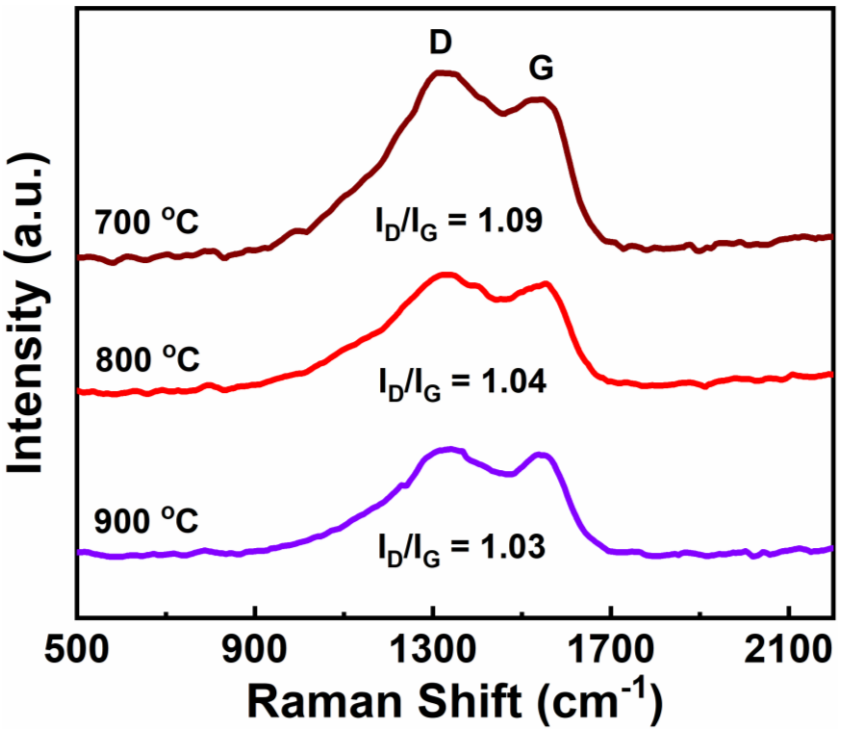

Figure S3. Raman spectra of NiSe/Ni-N-C pyrolyzed at 700 °C, 800 °C, and 900 °C.

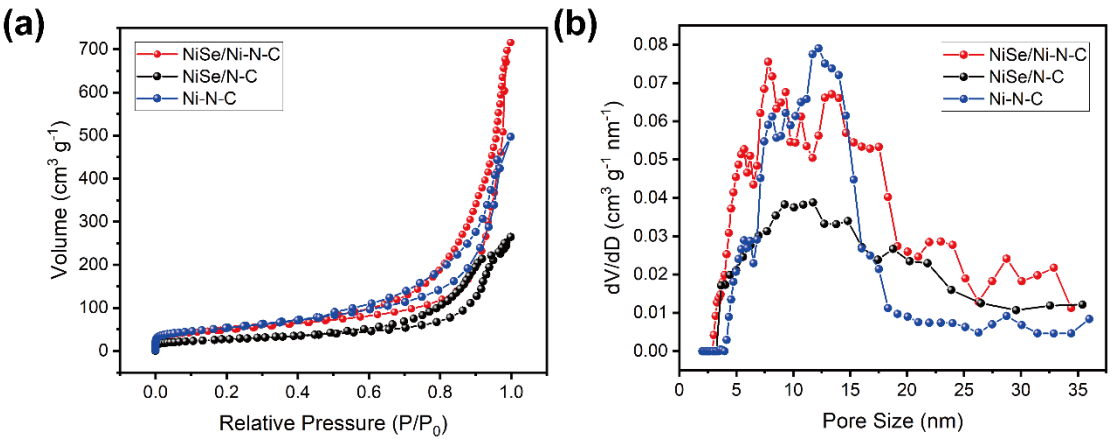

Figure S4. (a) N_2 adsorption isotherms at 77 K and (b) pore size distributions of NiSe/Ni-N-C.

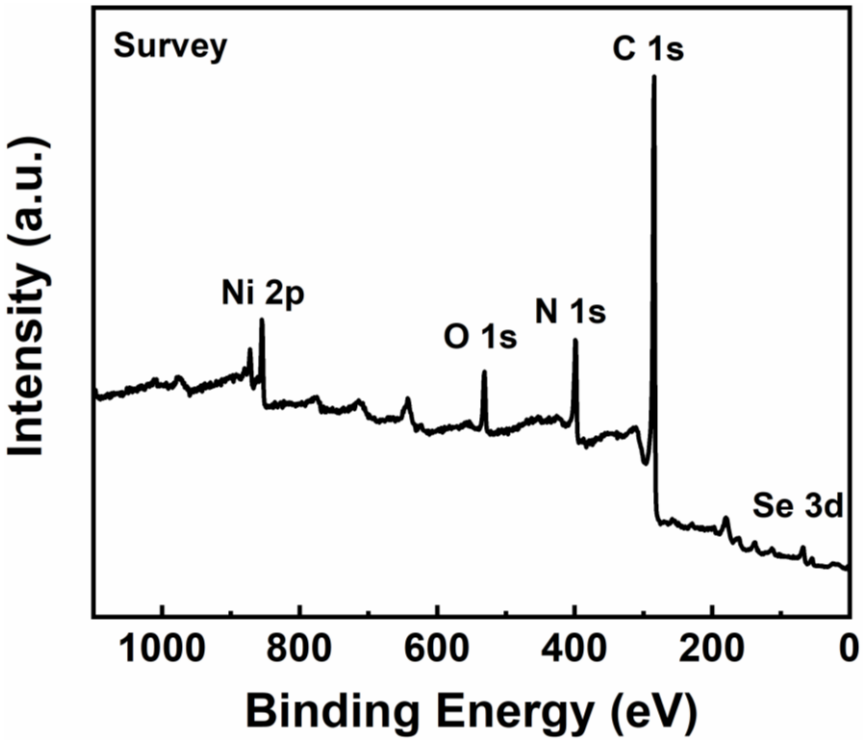

Figure S5. Survey XPS spectrum of NiSe/Ni-N-C.

Table S1. XPS elemental analysis of NiSe/Ni-N-C

Name	Atomic (%)	Weight (%)
C	78.34	66.15
N	10.08	9.93
O	6.85	7.72
Ni	3.28	13.62
Se	1.45	2.58

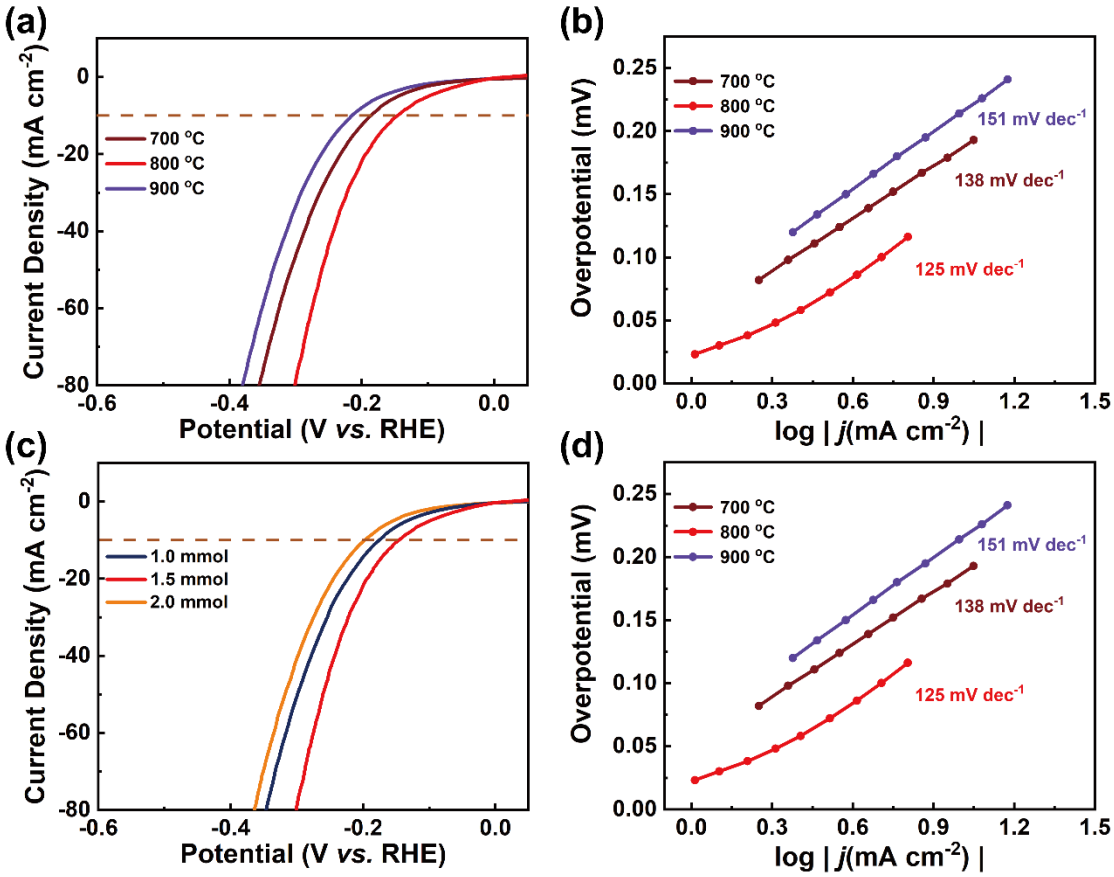

Figure S6. (a) HER LSV curves and (b) Tafel plots of NiSe/Ni-N-C pyrolyzed at 700 °C, 800 °C, and 900 °C in 1.0 M KOH. (c) HER LSV curves and (d) Tafel plots of NiSe/Ni-N-C with the addition of 1.0 mmol, 1.5 mmol, and 2.0 mmol $NiCl_2$ in 1.0 M KOH.

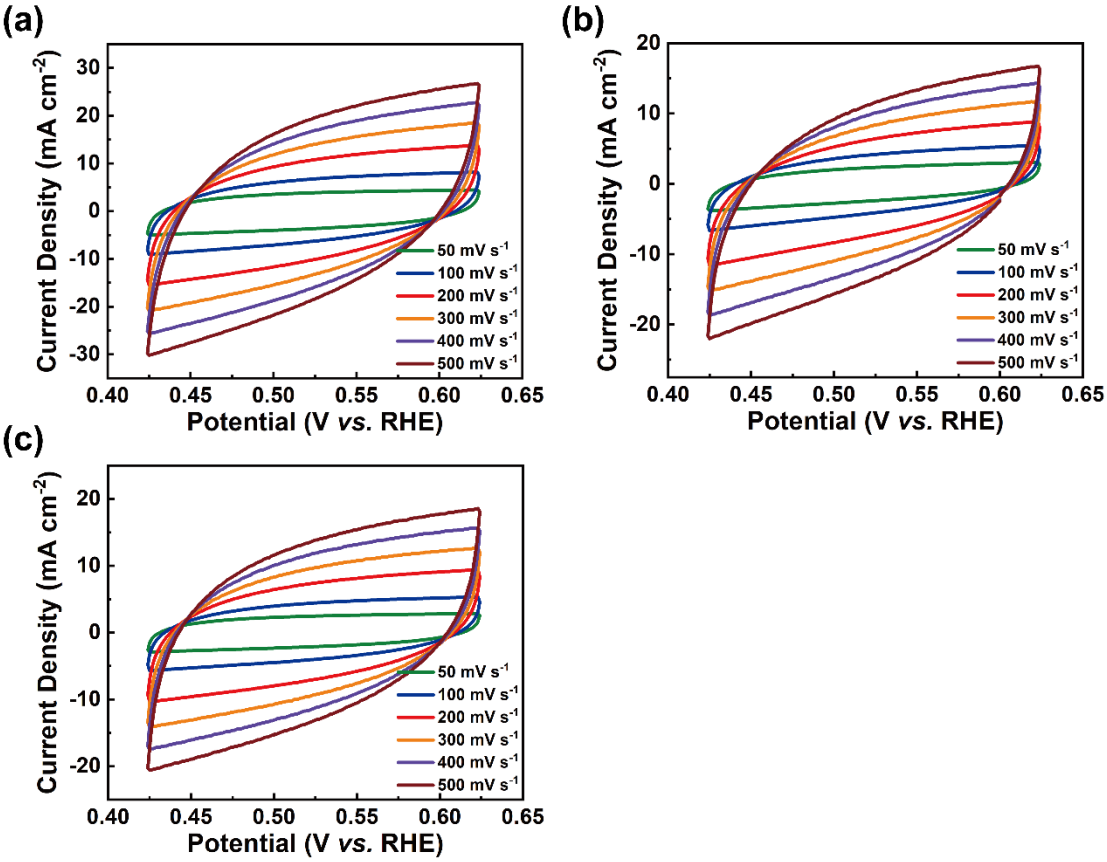

Figure S7. CV spectra of (a) NiSe/Ni-N-C, (b) Ni-N-C, and (c) NiSe/N-C with various scan rates (50-500 mV s^{-1}) in 1.0 M KOH.

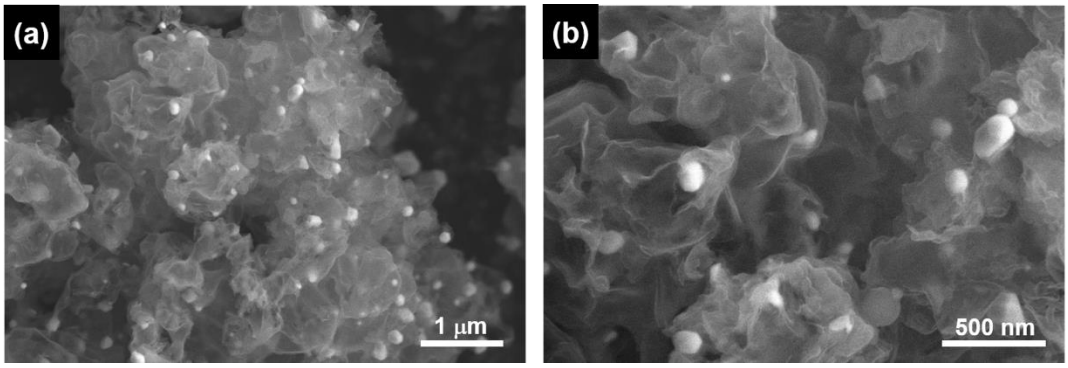

Figure S8. SEM image of NiSe/Ni-N-C after 2000 catalytic CV cycles.

Table S2. Summary of HER performances of NiSe/Ni-N-C and other reported TMSes electrocatalysts in 1.0 M KOH.

Catalysts	Tafel slope (mV/dec)	Overpotential (mV)@10mA/cm^2	Stability (h)	References
NiSe/Ni-N-C	**125**	**146**	**12**	**This work**
$CoSe_2$-NC	95	234	14	[1]
$NiSe_2$@NG	37.8	248	18	[2]
$Ni_{0.85}Se$@NC	97	135	10	[3]
$NiSe_2$@NC	88	162	40	[4]
$MoSe_2$-NiSe@carbon	80.6	180	10	[5]
NiSe@NC	55.3	250	12	[6]
$CoS_{0.46}Se_{0.54}$@C	105.43	251	-	[7]
$Co_{0.85}Se$@NC	125	230	10	[8]
CoNiSe/NC	66.5	100	3.33	[9]

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