

Supporting Information

Phase-controlled synthesis and the phase-dependent HER and OER performances of Nickel selenide nanosheets by an electrochemical deposition route

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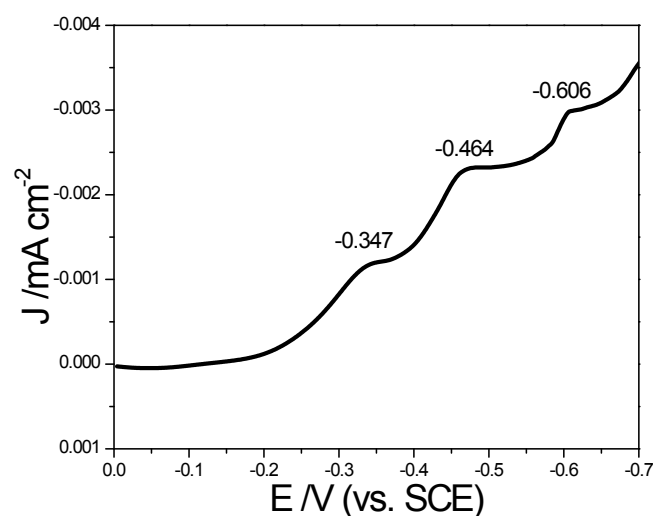


Figure S1. Linear sweep voltammetry (LSV) curve of the electrolyte containing NiCl_2 , SeO_2 and LiCl in the potential window of 0.0 – (–0.7) V at a scan rate of 2 mV s^{-1} .

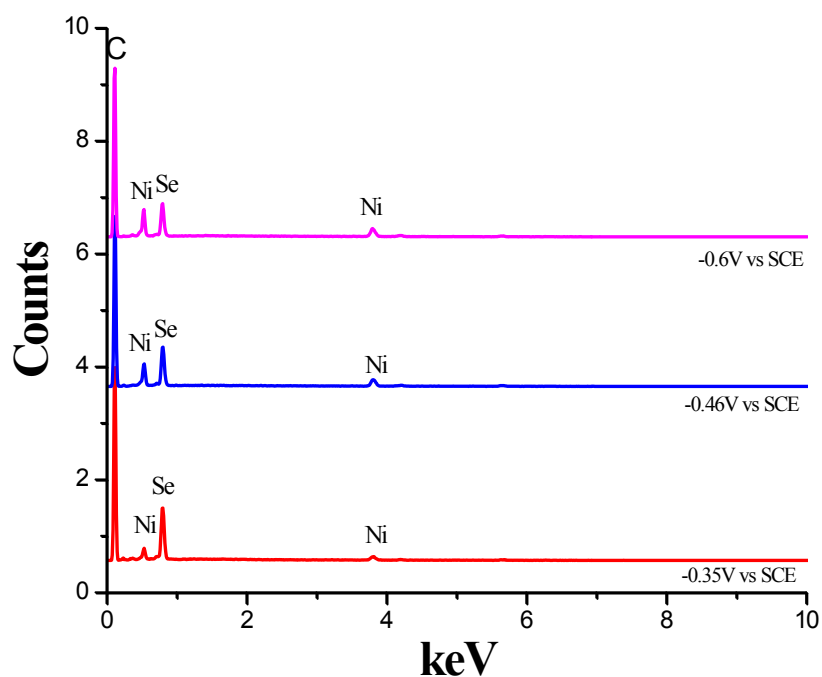


Figure S2. EDS analyses of the products deposited from the same electrolyte at various potentials for 60 min: (a) -0.35, (b) -0.46 and (c) -0.6V (vs SCE).

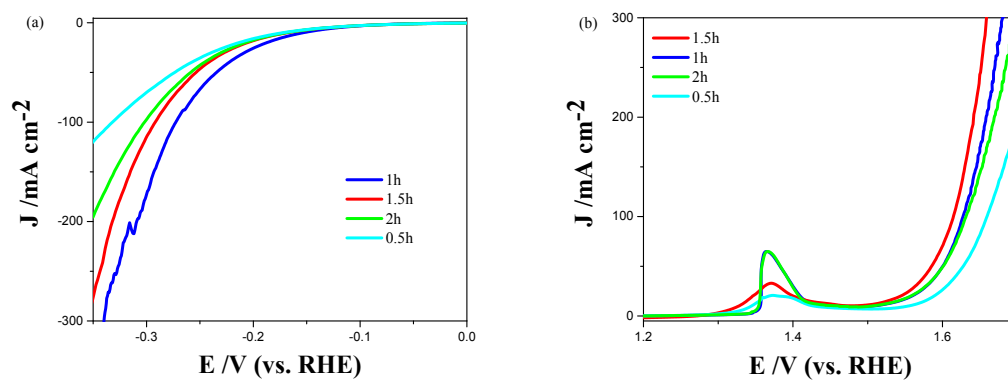


Figure S3. (a) HER and (b) OER electrocatalytic performance comparisons for the NiSe/NF electrodes obtained at different deposition durations.

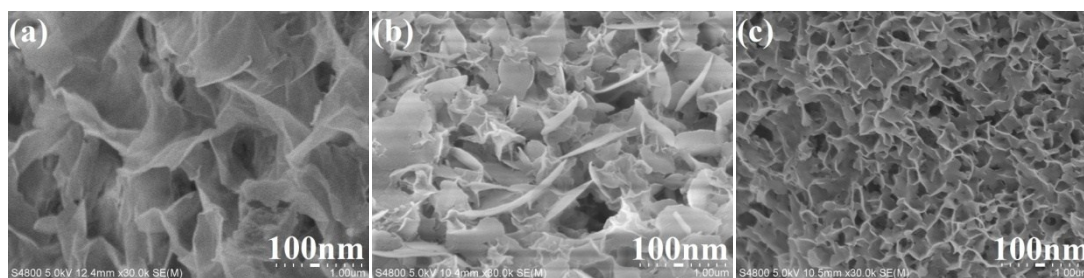


Figure S4. the typical FESEM images of the NiSe nanofilms deposited at -0.46 V for various

durations: (a) 0.5, (b) 1.5 and (c) 2.0 h.

Table S1. Comparison of OER and HER electrocatalytic efficiency between NiSe₂/NF and different nickel selenide catalysts.

	Catalyst	Current density J /mA cm ⁻²	Overpotential /mV vs. RHE	Electrolyte	Reference
HER	Ni ₃ Se ₄	10	203	1 M KOH	ACS Appl. Mater. Interfaces, 2017, 9, 8714.
HER	NiSe ₂ NSs	10	184	1 M KOH	Chem. Mater., 2015, 27, 5702.
HER	Ni ₃ Se ₂ /CF	10	100	1 M KOH	Catal. Sci. Technol., 2015, 5, 4954.
HER	NiSe ₂ NSs/CP	10	184	1 M KOH	Chem. Mater. 2015, 27, 5702.
HER	NiSe/NF	10	96	1 M KOH	Angew. Chem., Int. Ed., 2015, 54, 9351.
HER	NiSe ₂ /NF	10	102	1 M KOH	This work
OER	Ni ₃ Se ₂ /CF	50	340	1 M KOH	Catal. Sci. Technol., 2015, 5, 4954.
OER	NiSe ₂	10	410	0.1 M KOH	ACS Appl. Mater. Interfaces, 2016, 8, 5327.
OER	Ni ₃ Se ₂	10	310	0.3 M KOH	Energy Environ. Sci., 2016, 9, 1771.
OER	NiSe/NF	20	270	1 M KOH	Angew. Chem., 2015, 127, 9483.
OER	NG/NiSe ₂ /NF	20	307	0.1 M KOH	J. Mater. Chem. A, 2017, 5, 3981.
OER	NiSe ₂ /NF	20	274	1 M KOH	This work