

Supporting Information

Nickel Sulfides for Electrocatalytic Hydrogen Evolution under Alkaline Conditions: A Case Study of Crystalline NiS, NiS₂, and Ni₃S₂ Nanoparticles

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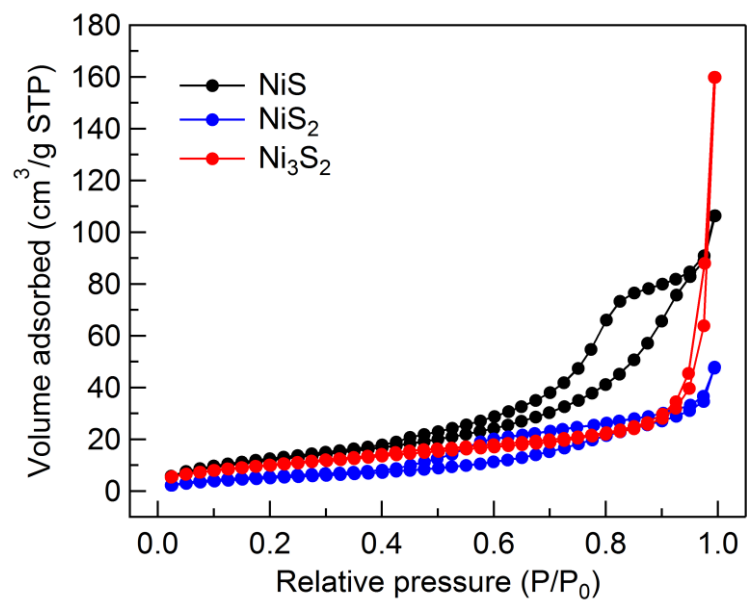


Figure S1. N₂ sorption isotherms of NiS (black), NiS₂ (blue), and Ni₃S₂ (red).

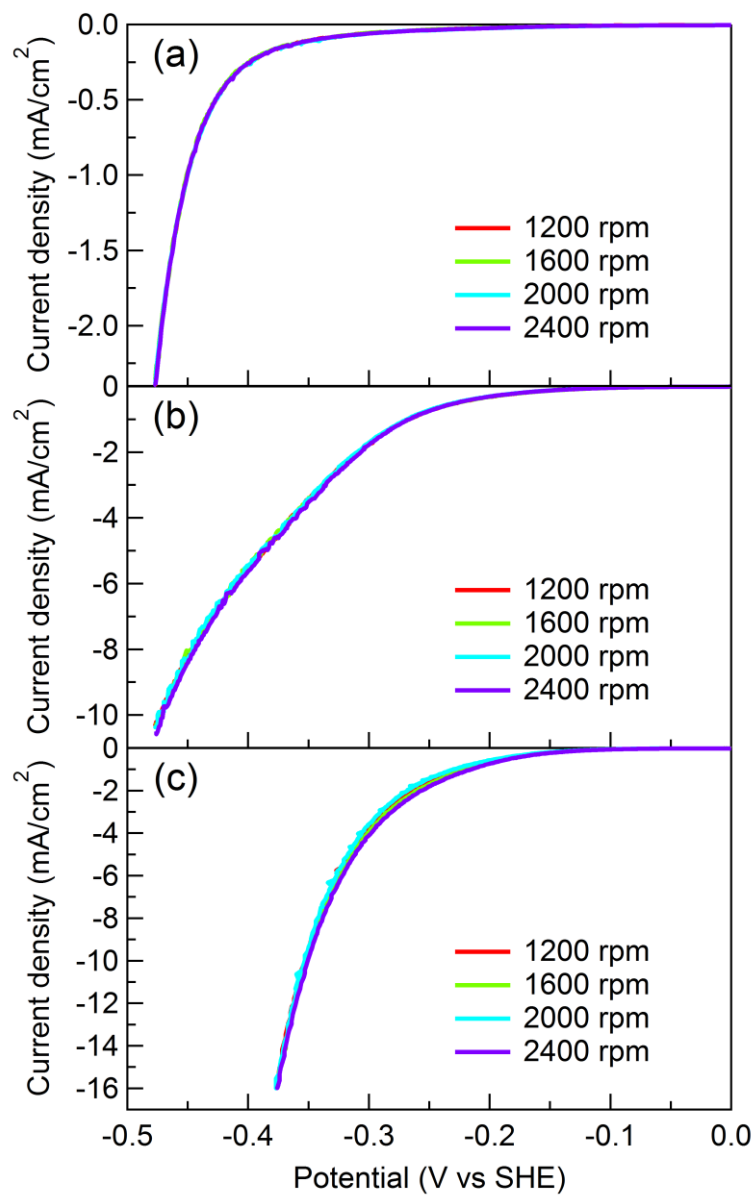


Figure. S2. Rotation rate dependence of linear sweep voltammograms of (a) NiS, (b) NiS₂, and (c) Ni₃S₂ in 1.0 M KOH.

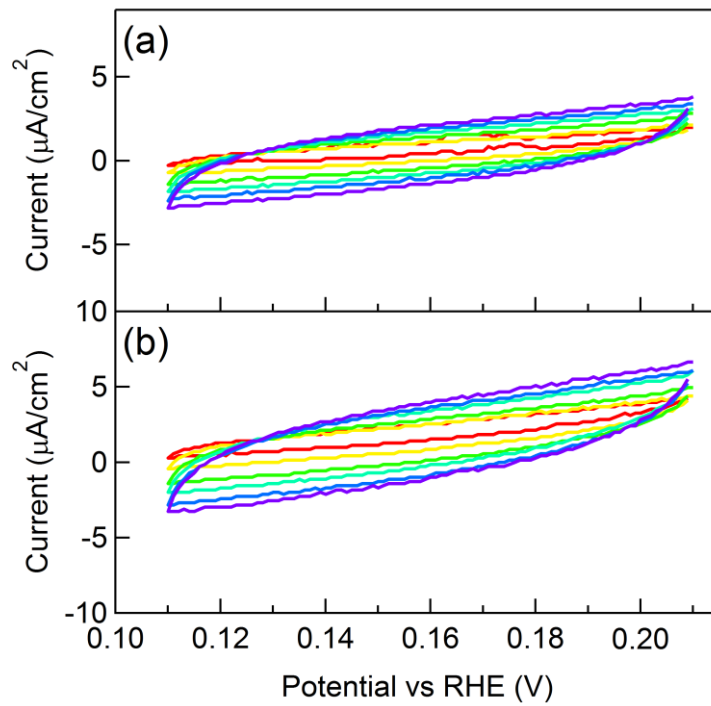


Figure S3. Cyclic voltammograms of (a) NiS and (b) NiS₂ in 0.11 – 0.21 V vs RHE at scan rates from 1 to 10 mV/s in 1.0 M KOH.

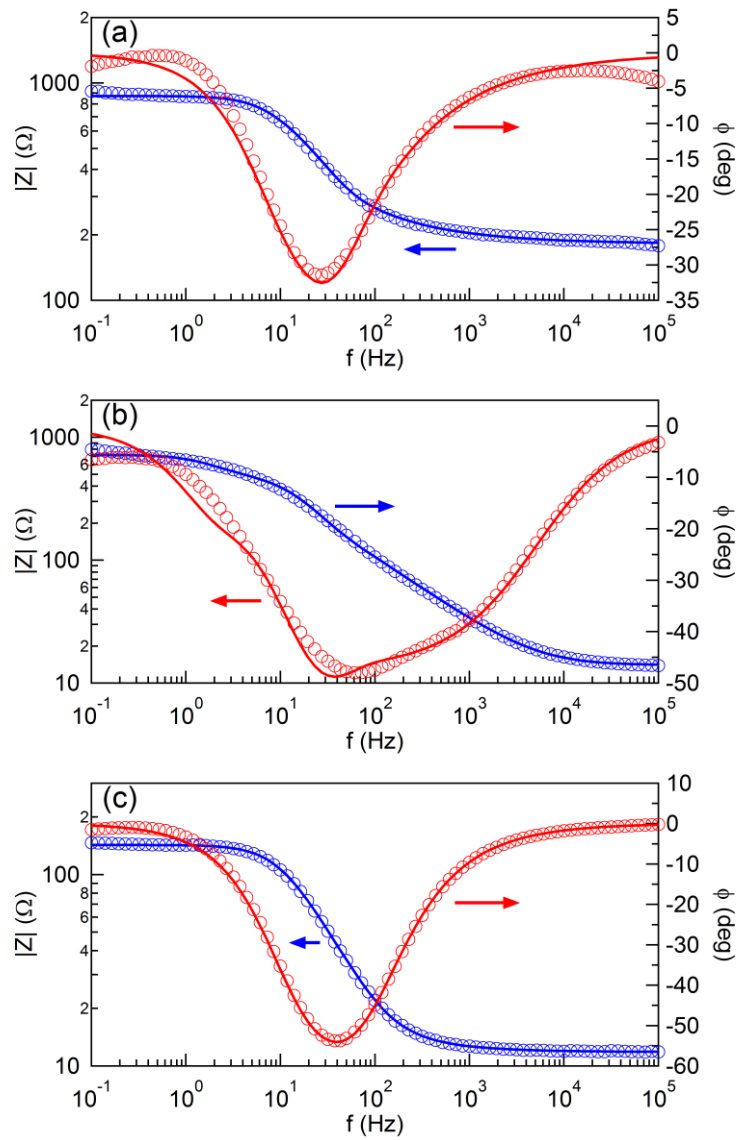
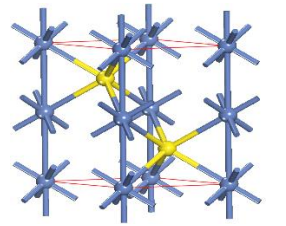
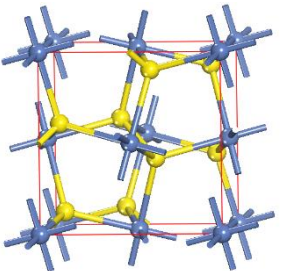
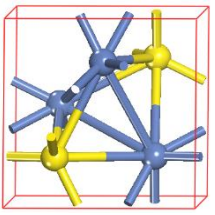


Figure S4. Bode plots (circles) and corresponding fitting curves (solid) of (a) NiS, (b) NiS₂, and (c) Ni₃S₂.

Table 1. The geometry structure, space group, lattice parameter, electronic band gap, and magnetic ground state of NiS, NiS₂ and Ni₃S₂.

Sample	Geometry structure	Space group	Lattice parameter	Electronic	Magnetic ground state
NiS		P63/mmc	a = b = 3.499 Å; c = 5.483 Å	semiconductor band gap ~1.1 eV.	antiferromagnetic
NiS ₂		Pa-3	a = b = c = 5.755 Å	semiconductor band gap ~0.4 eV.	antiferromagnetic
Ni ₃ S ₂		R32	a = b = c = 4.037 Å	metallic	non-magnetic