

Nanosheet arrays derived from ZIF-67 grown on three-dimensional frameworks for electrocatalytic oxygen evolution reaction

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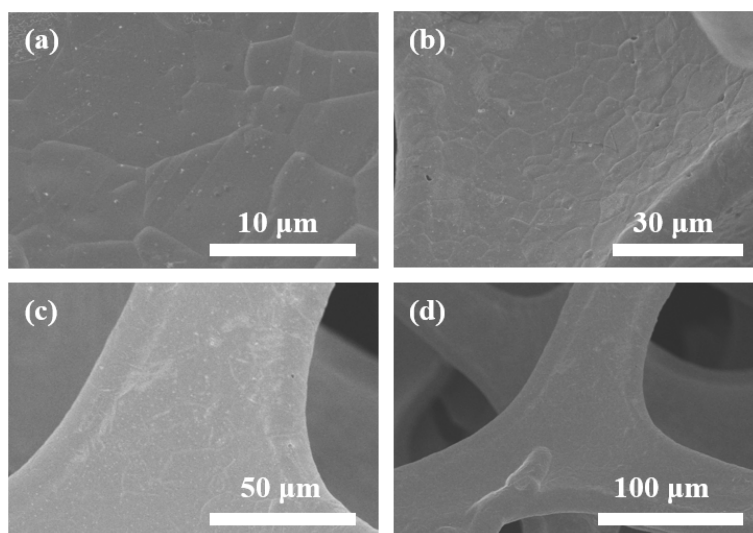


Fig. S1 SEM images of acidified NF in different sizes.

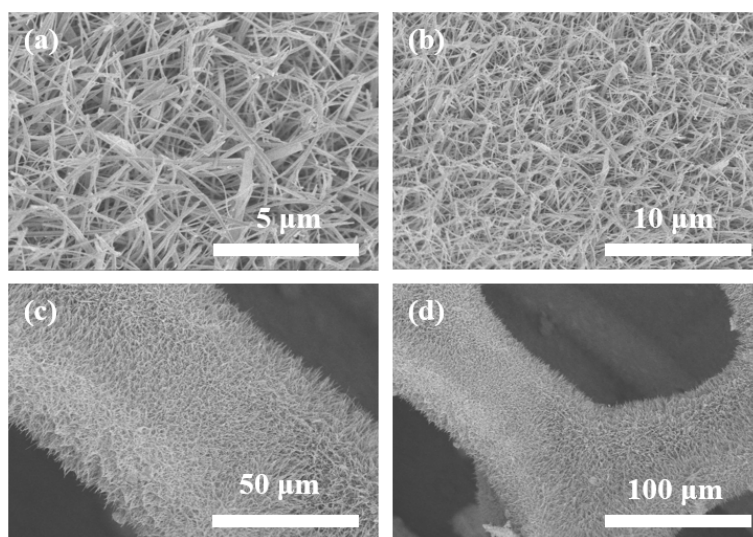


Fig. S2 SEM images of NiSe_x/NF in different sizes.

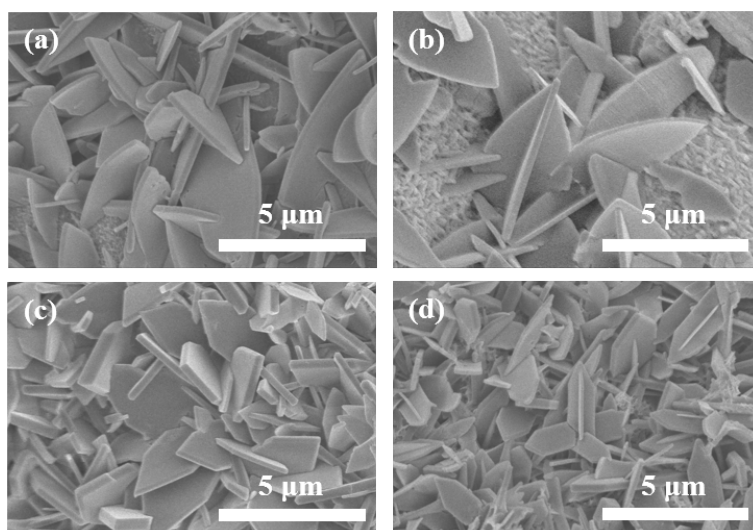


Fig. S3 SEM images of ZIF-67/NiSe_x/NF with Se content of (a) 4 mg, (b) 8 mg, (c) 16 mg and (d) 32 mg, respectively.

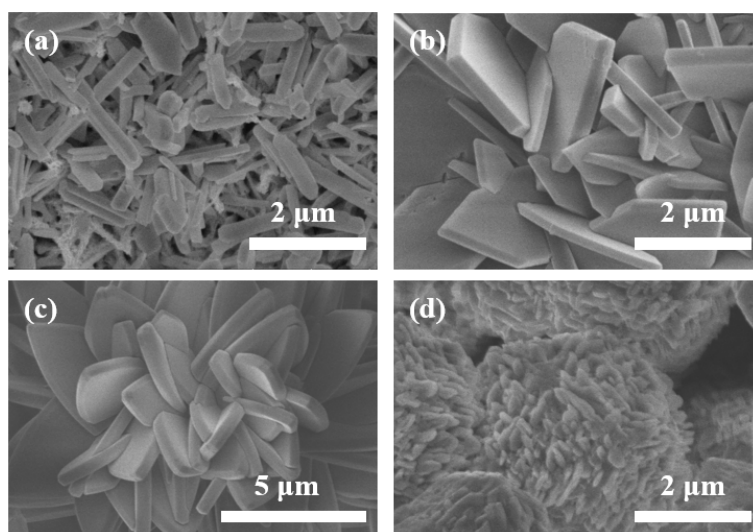


Fig. S4 SEM images of ZIF-67/NiSe_x/NF with molar ratios of Co²⁺ to 2-MeIm of (a) 1:4, (b) 1:8, (c) 1:16 and (d) 1:32, respectively.

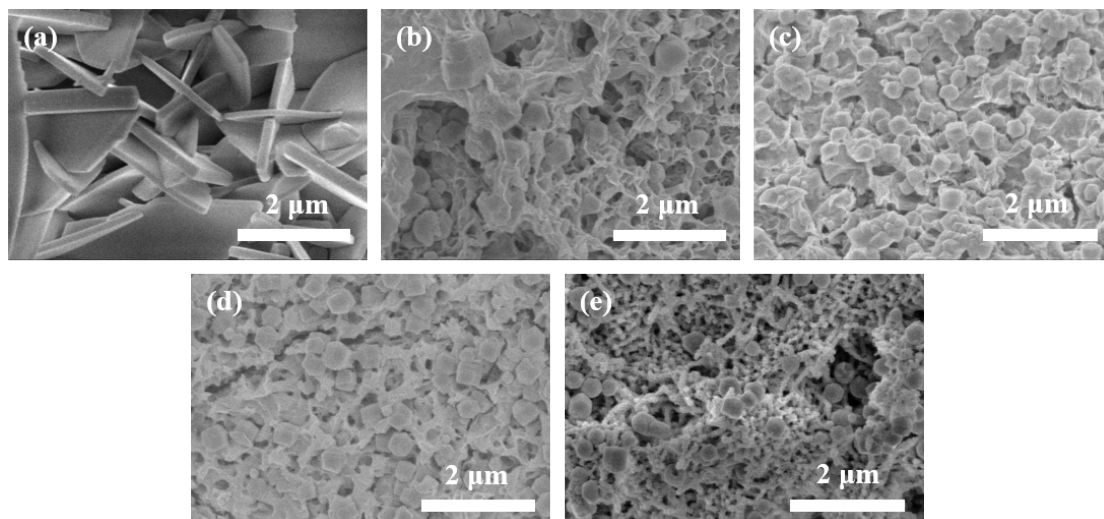


Fig. S5 SEM images of ZIF-67/NiSe_x/NF prepared under the solvent volume ratio of methanol to water = 0:1 (a), 1:3 (b), 1:1 (c), 3:1 (d) and 1: 0 (e) for the synthesis of ZIF-67.

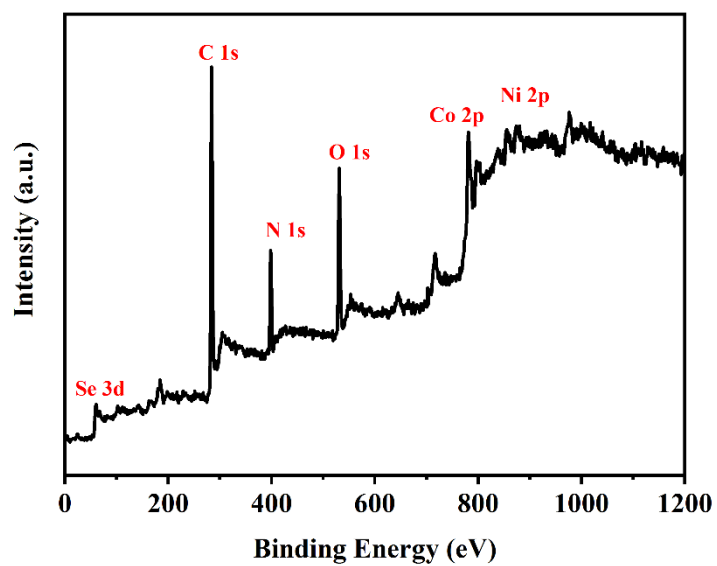


Fig. S6 XPS survey spectrum of the ZIF-67/NiSe_x/NF-1 catalyst.

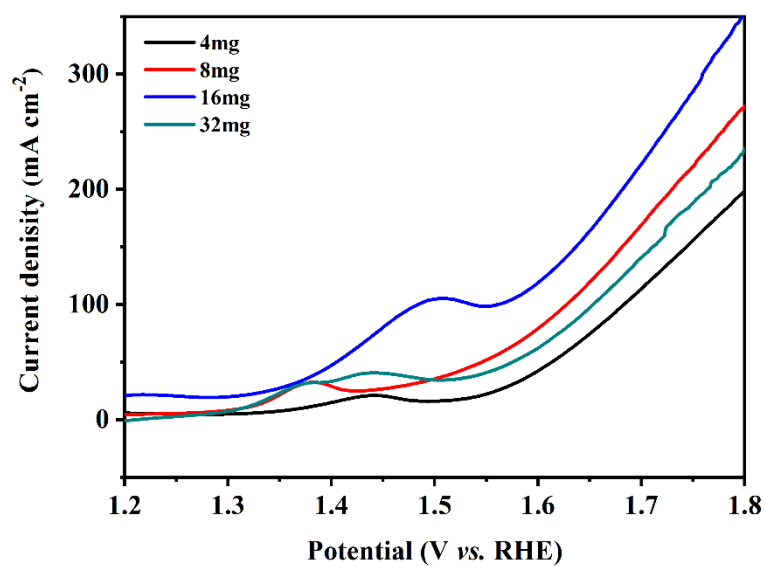


Fig. S7 The LSV curves of 4 mg, 8 mg, 16 mg, and 32 mg of Se, respectively.

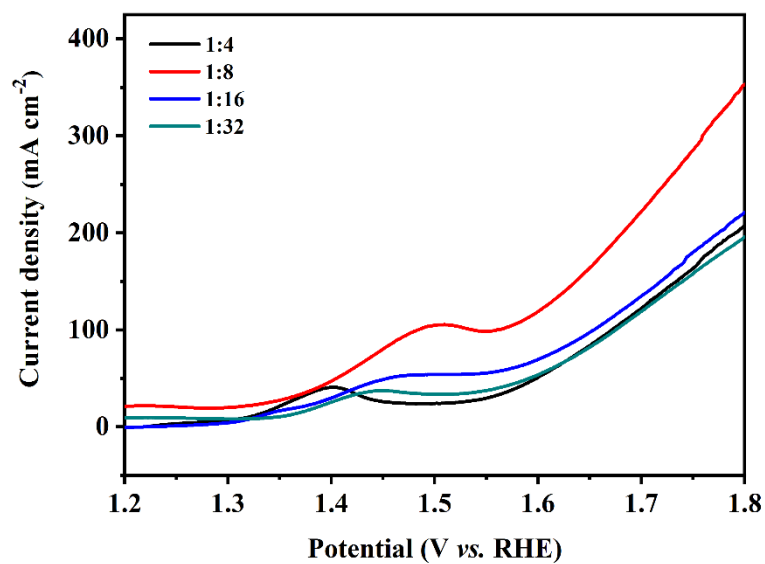


Fig. S8 LSV curves with molar ratios of Co²⁺ to 2-MeIm at 1:4, 1:8, 1:16, and 1:32, respectively.

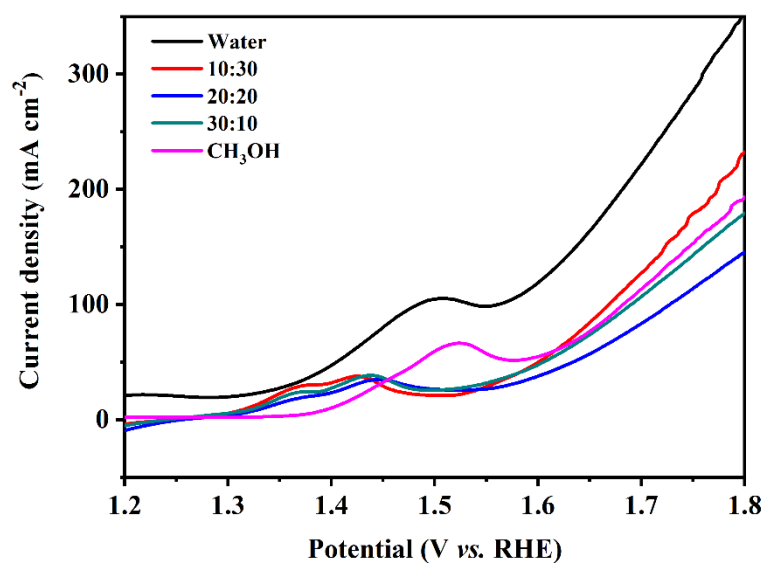


Fig. S9 LSV curves of solvent ratio of water to methanol = 1:0, 1:3, 2:2, 3:1, 0:1 for synthesizing ZIF-67.

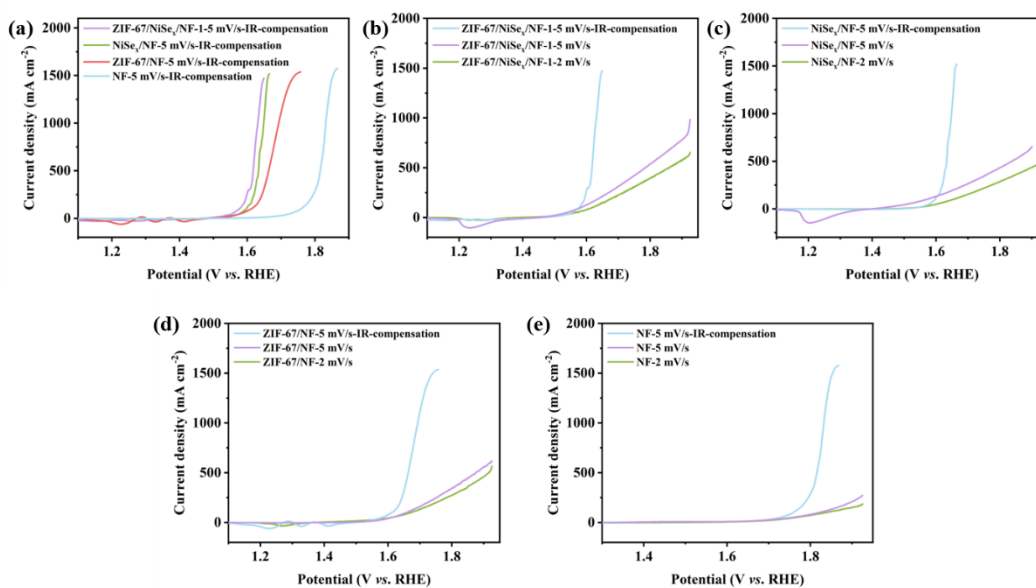


Fig. S10 (a) LSV curves of pure NF, NiSe_x/NF, ZIF-67/NF, and ZIF-67/NiSe_x/NF-1 with IR correction in 1.0 M KOH; LSV curves of (b) ZIF-67/NiSe_x/NF-1, (c) NiSe_x/NF, (d) ZIF-67/NF, and (e) pure NF with and without IR corrections.

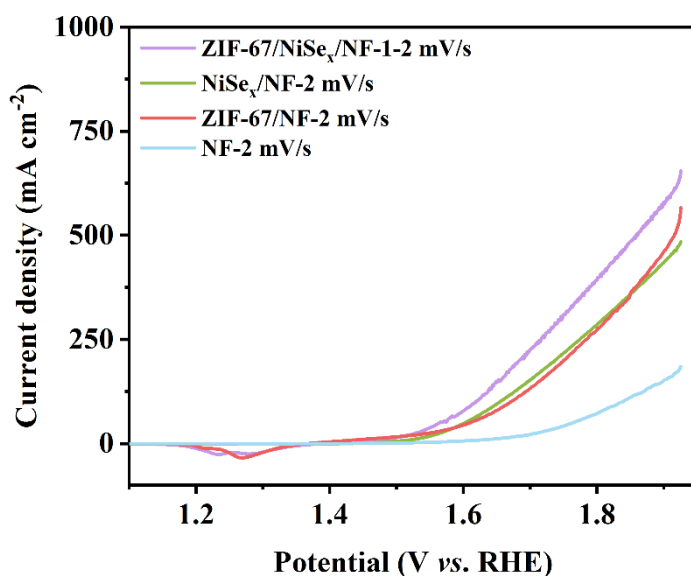


Fig. S11 LSV curves of pure NF, NiSe_x/NF, ZIF-67/NF, and **ZIF-67/NiSe_x/NF-1** at a scanning speed of 2 mV/s.

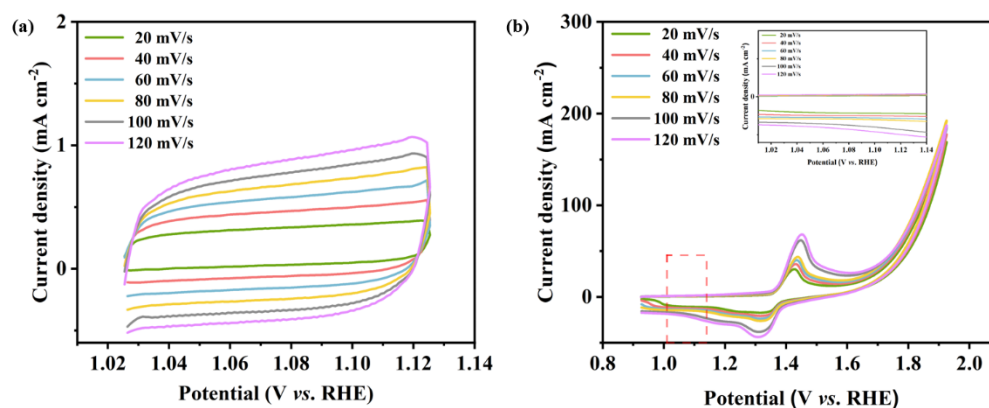


Fig. S12 (a) Cyclic voltammetry (CV) curves of the catalysts recorded from 1.024 to 1.124 V at different rates (20 to 120 mV s⁻¹) for NF in 1.0 M KOH; (b) CV curves of the catalysts recorded from 0.9254 to 1.9254 V at different rates (20 to 120 mV s⁻¹) for NF in 1.0 M KOH.

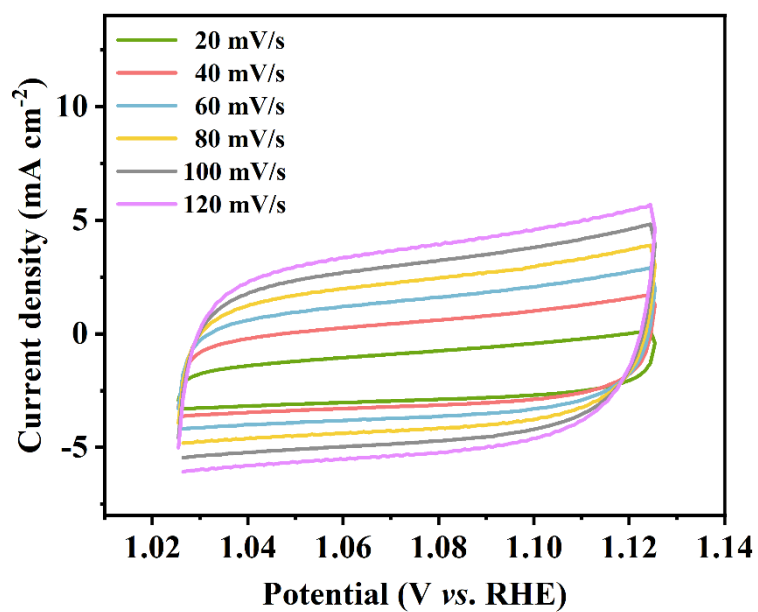


Fig. S13 CV curves of the catalysts recorded from 1.024 to 1.124 V at different rates (20 to 120 mV s⁻¹) for NiSe_x/NF in 1.0 M KOH.

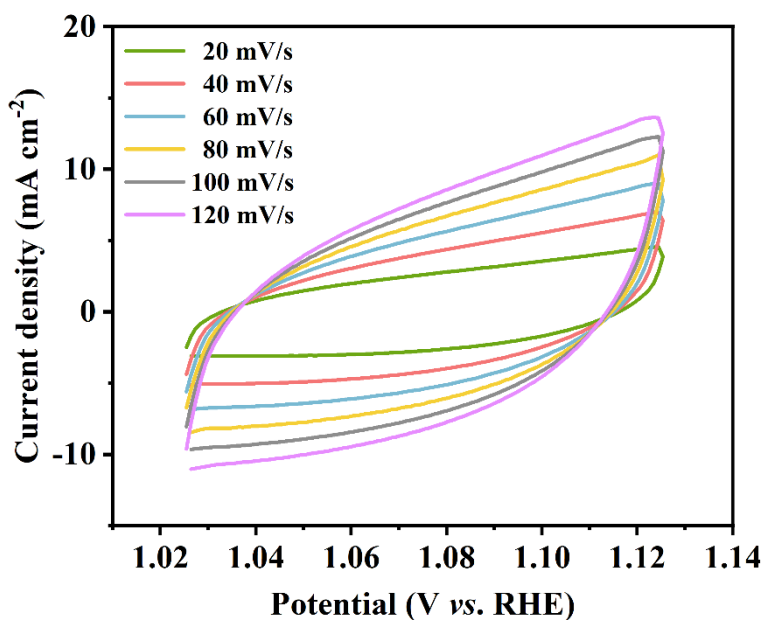


Fig. S14 CV curves of the catalysts recorded from 1.024 to 1.124 V at different rates (20 to 120 mV s⁻¹) for ZIF-67/NF in 1.0 M KOH.

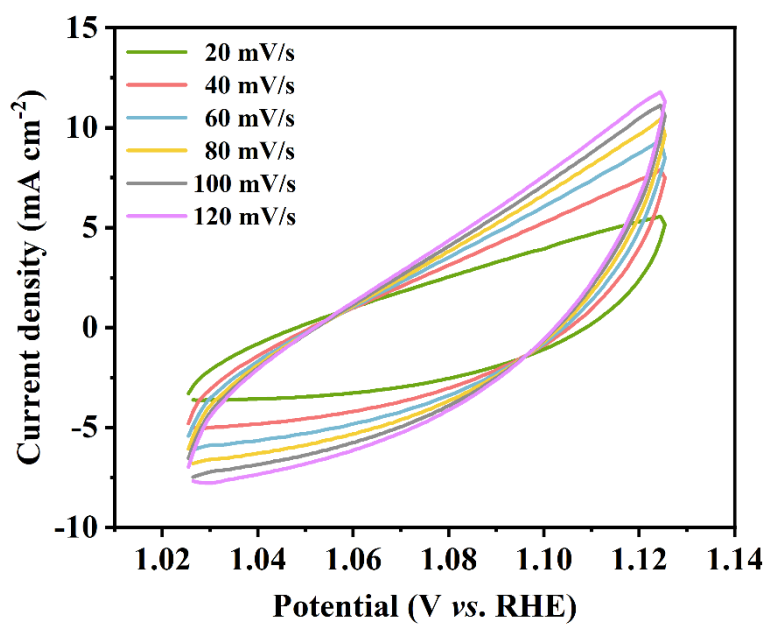


Fig. S15 CV curves of the catalysts recorded from 1.024 to 1.124 V at different rates (20 to 120 mV s⁻¹) for **ZIF-67/NiSe_x/NF-1** in 1.0 M KOH.

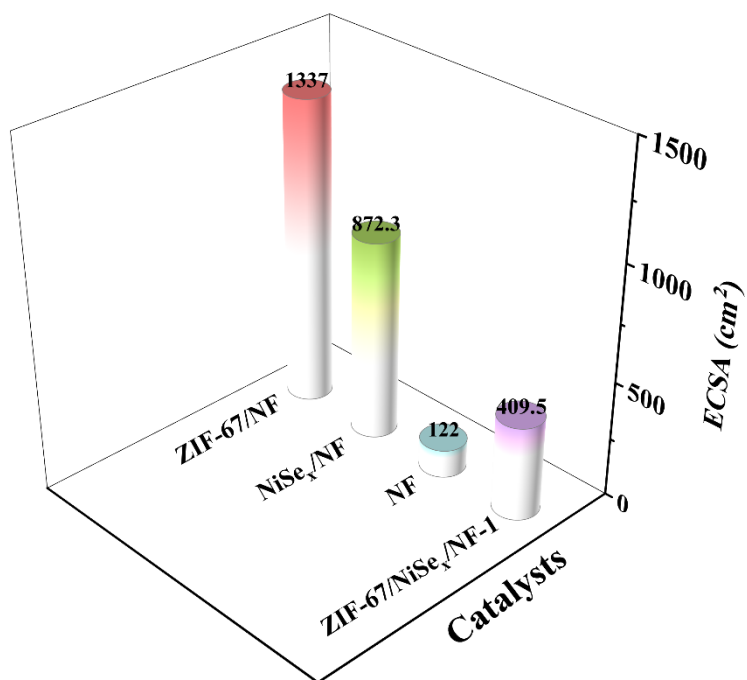


Fig. S16 ECSA of pure NF, NiSe_x/NF, ZIF-67/NF, and **ZIF-67/NiSe_x/NF-1**.

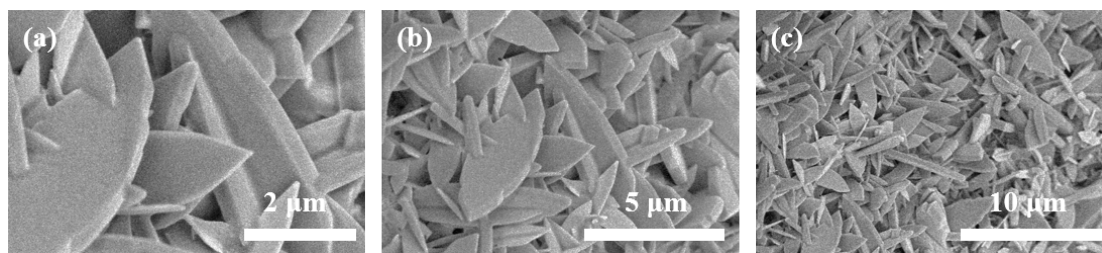


Fig. S17 SEM images of **ZIF-67/NiSe_x/NF-1** after 55 h stability test.

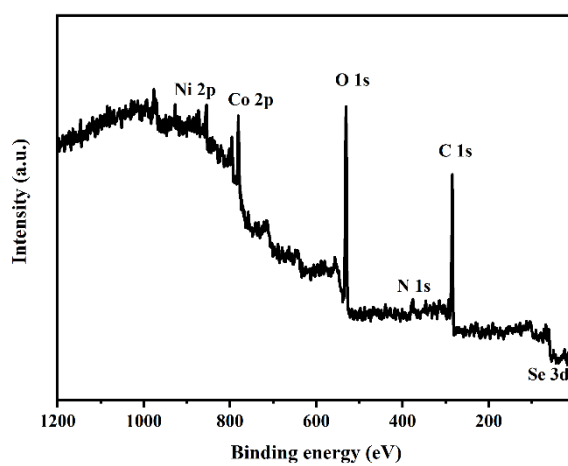


Fig. S18 The XPS survey spectra of **ZIF-67/NiSe_x/NF-1** after 55 h stability test.

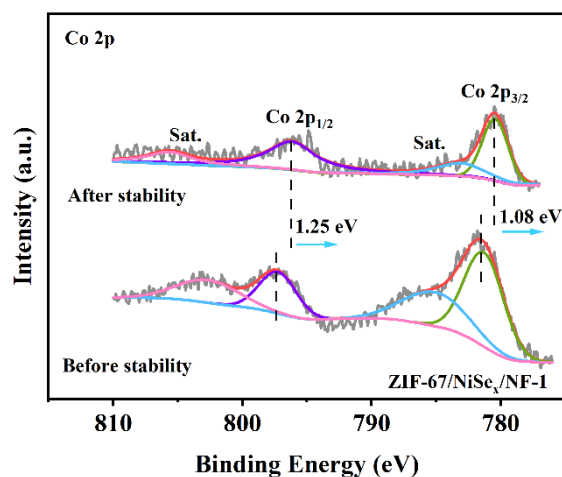


Fig. S19 Co 2p XPS spectra for the initial **ZIF-67/NiSe_x/NF-1** and the one after OER test samples.

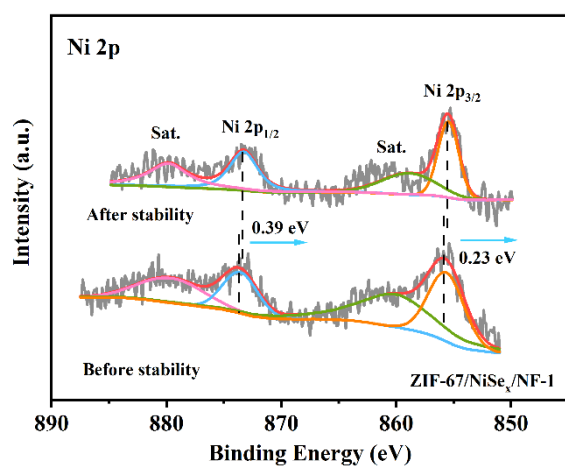


Fig. S20 Ni 2p XPS spectra for the initial **ZIF-67/NiSe_x/NF-1** and the one after OER test samples.

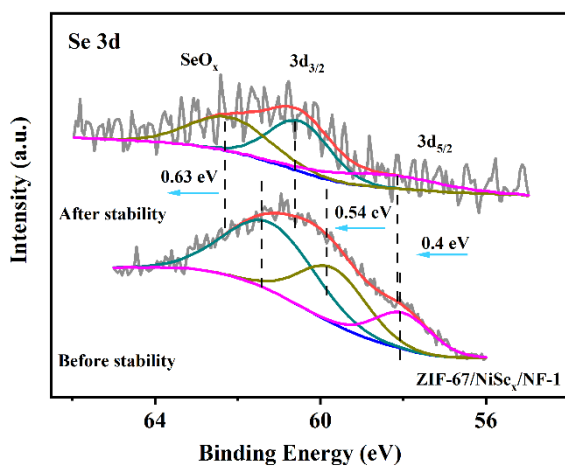


Fig. S21 Se 3d XPS spectra for the initial **ZIF-67/NiSe_x/NF-1** and the one after OER test samples.