Supporting Information

Iron phthalocyanine coupled with nickel-iron selenide layered hydroxide derivative as dual-functional oxygen electrocatalyst for rechargeable zinc-air batteries

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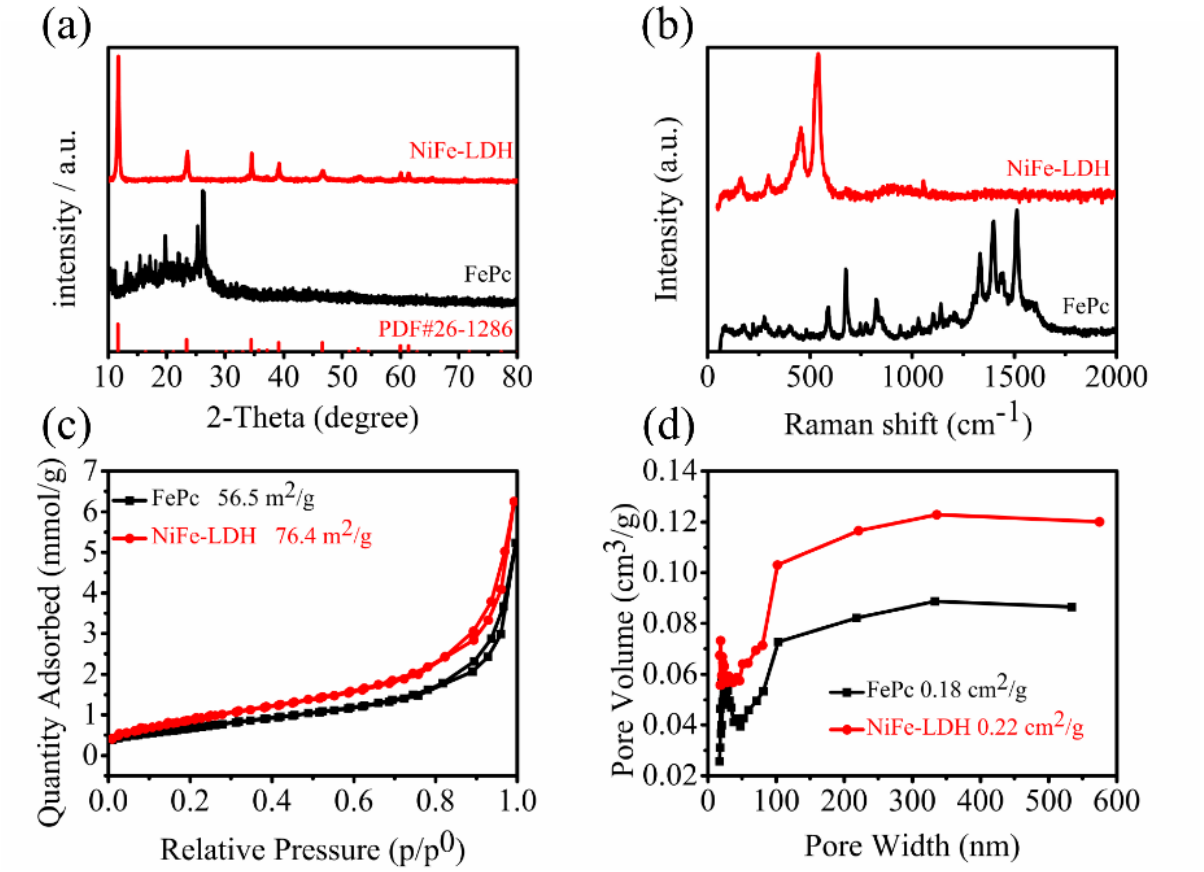

Figure S1. a) XRD, b) Roman, c) Nitrogen adsorption/desorption isotherms, and d) corresponding pore volume patterns of FePc and NiFe-LDH.

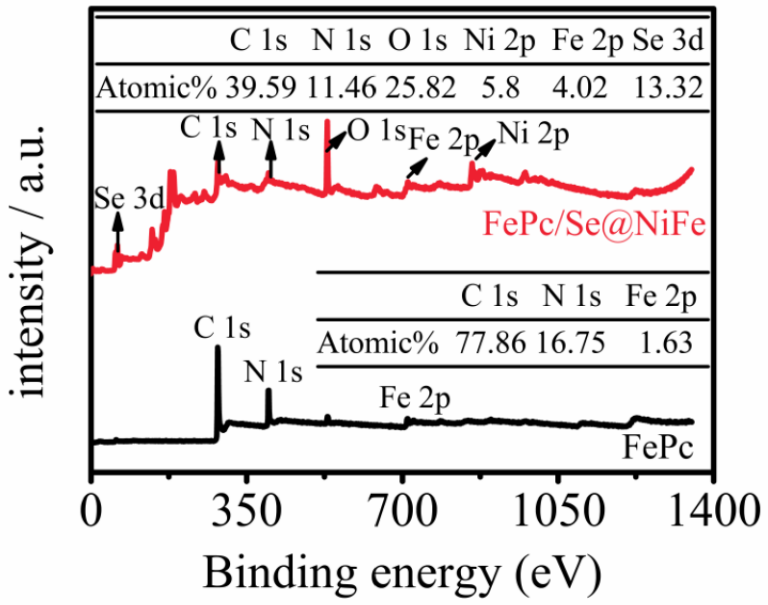

Figure S2. XPS survey spectra of the FePc and FePc/Se@NiFe, and the corresponding percentage of atoms were inserted.

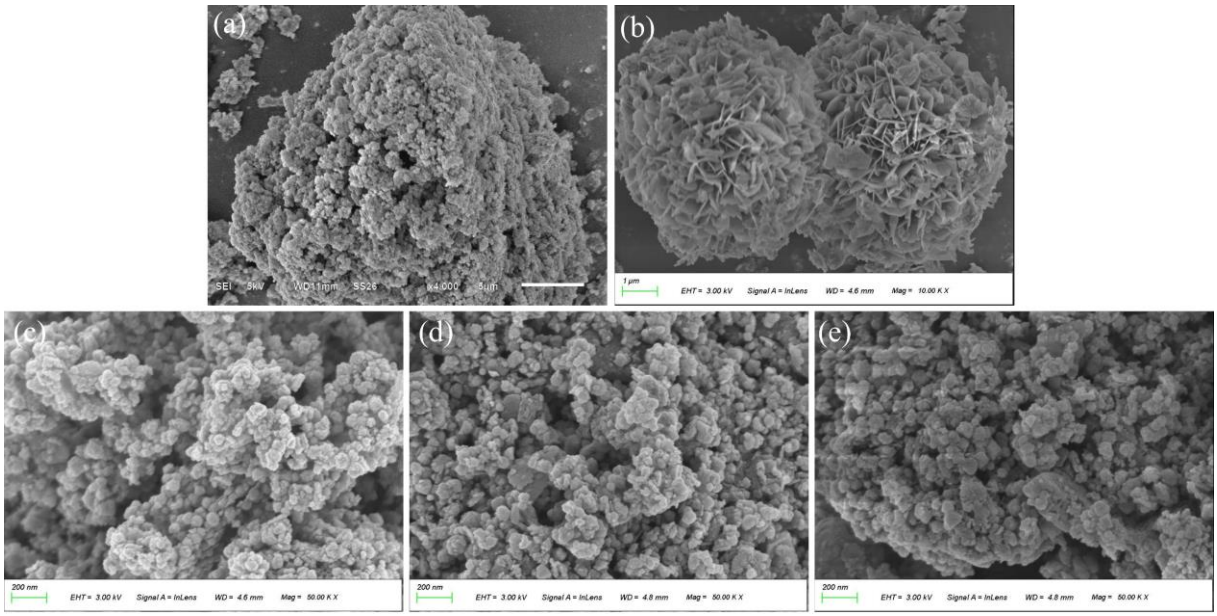

Figure S3. SEM images of (a) FePc, (b) NiFe-LDH, (c) Se@NiFe, (d) FePc/Se@Ni and (e) FePc/Se@Fe.

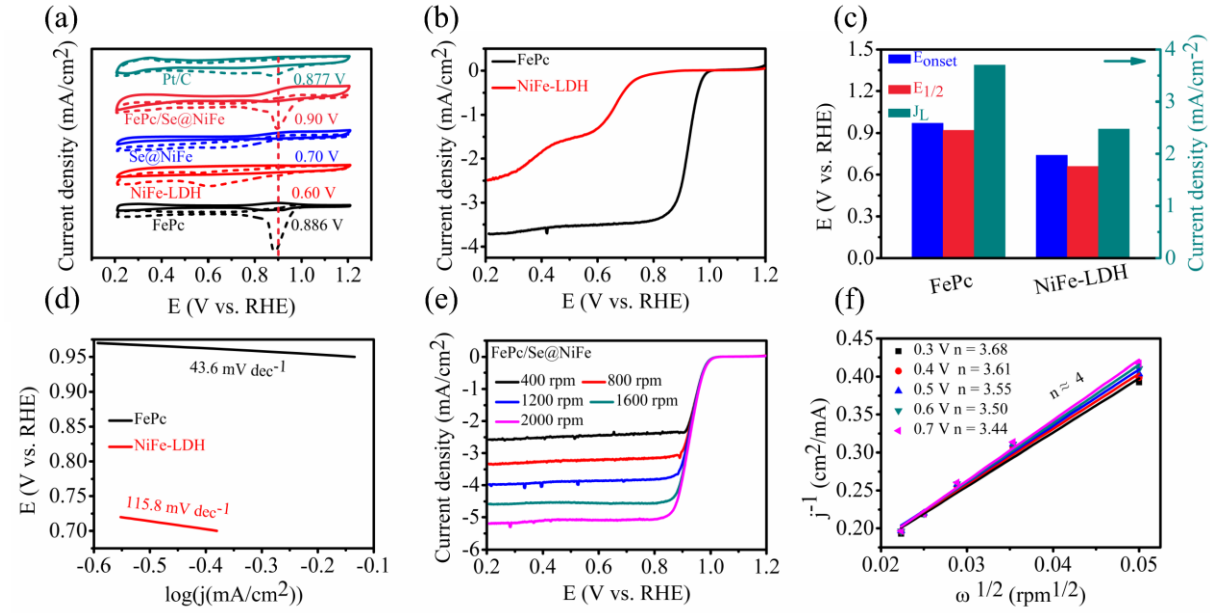

Figure S4. (a) CVs of the FePc, NiFe-LDH, Se@NiFe, FePc/Se@NiFe and Pt/C in N_2 and O_2-saturated 0.1 M KOH. (b) LSVs of the FePc and NiFe-LDH under O_2-saturated 0.1 M KOH at a rotation speed of 1600 rpm in 0.1 M KOH. (c) Corresponding E_{onset}, $E_{1/2}$ and J_L. (d) Tafel plots. (e) LSV curves of FePc/Se@NiFe tested at 400~2000 rpm. (f) Koutecky-Levich (K-L) plots of the FePc/Se@NiFe at different applied potentials.

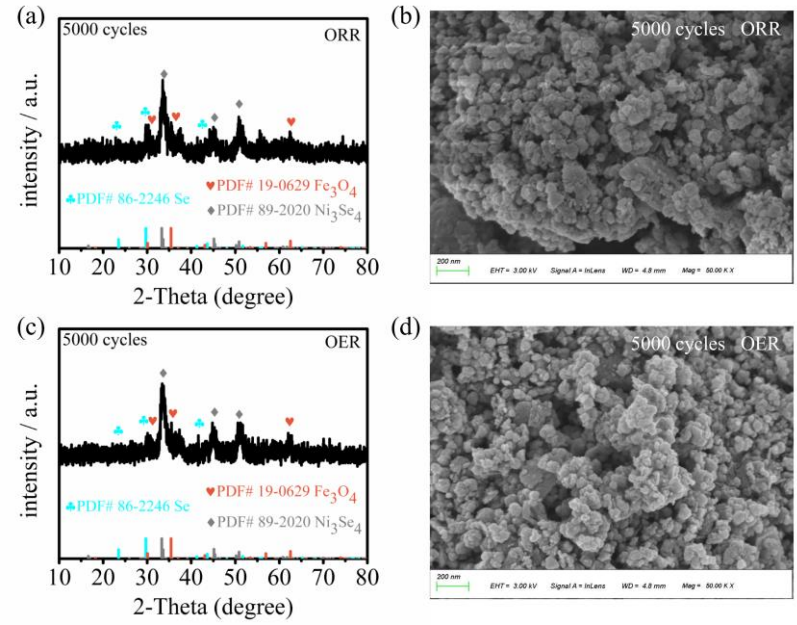

Figure S5. XRD and SEM patterns of FePc/Se@NiFe before and after 5000 CV cycles in ORR and OER.

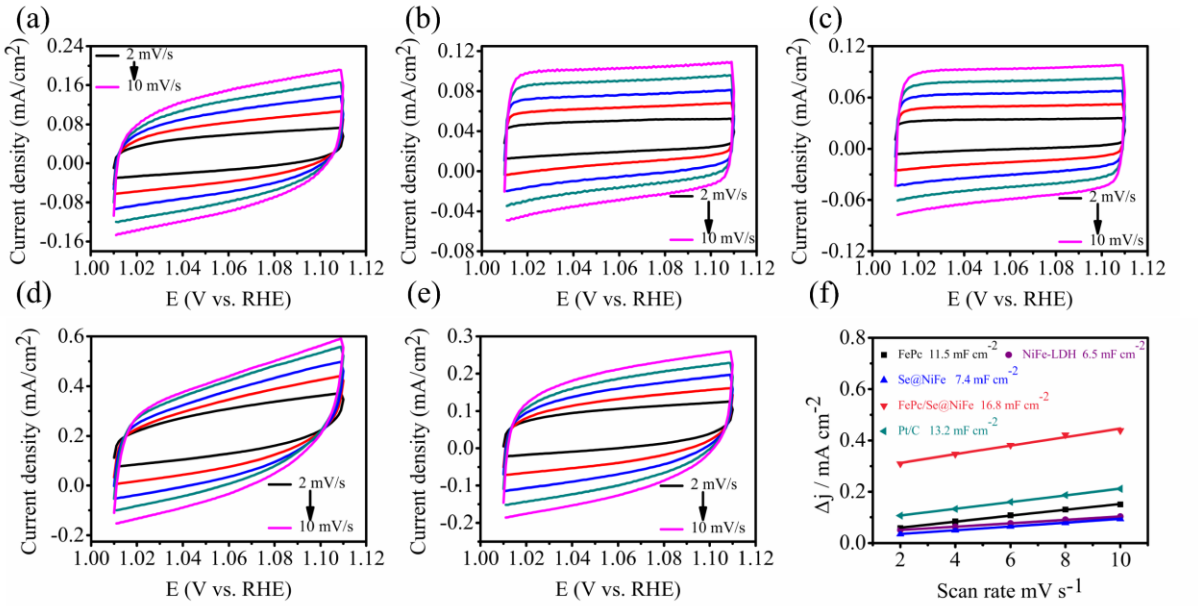

Figure S6. CVs of (a) FePc, (b) NiFe-LDH, (c) Se@NiFe, (d) FePc/Se@NiFe and (f) Pt/C at different sweeping rates in 0.1 M KOH. (f) linear fitting of scan rates with capacitive current densities for the prepared catalysts.

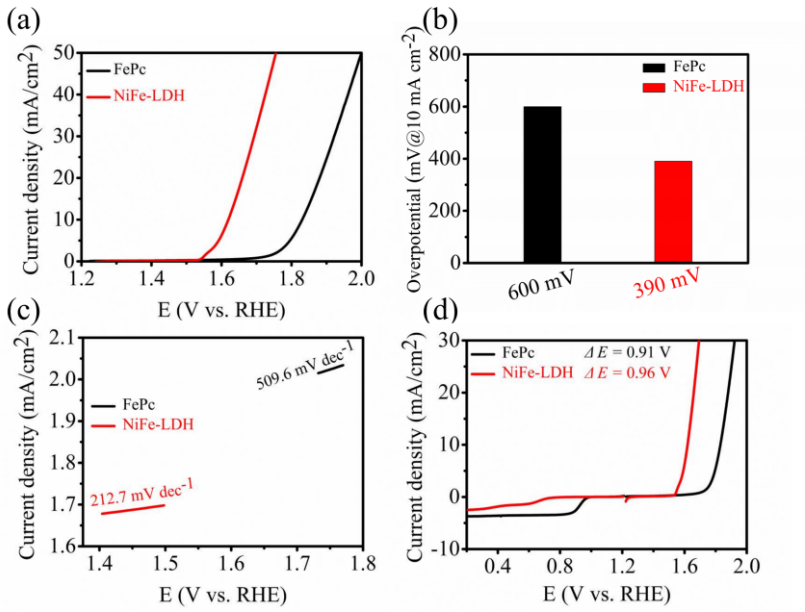

Figure S7. (a) OER polarization curves of FePc and NiFe-LDH in the 1.0 M KOH solution. (b) Corresponding overpotentials at 10 mA cm^{-2} (η_{10}). (c) Tafel plots. (d) ORR and OER polarization curve comparison.