Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Two-dimensional nickel cyano-bridged coordination polymer thermally derived potent electrocatalysts for alkaline hydrogen evolution reaction

Manar M. Abdel Naby[1,2], Mohamed B. Zakaria[3,4]*, Haitham M. El-Bery[5], Gehad G. Mohamed[1,6], Mohamed E. El-Khouly[1]*

[1] Institute of Basic and Applied Science, Egypt-Japan University of Science and Technology (E-JUST), New Borg El-Arab City, Alexandria, Egypt

[2] Department of Chemistry, Faculty of Science, Ain Shams University, Cairo, Egypt

[3] Department of Chemistry, Faculty of Science, Tanta University, 31527 Tanta, Egypt

[4] Alexander von Humboldt (AvH) Foundation, 53173 Bonn, Germany

[5] Department of Chemistry, Faculty of Science, Assiut University, Assiut, Egypt

[6] Department of Chemistry, Faculty of Science, Cairo University, Cairo, Egypt

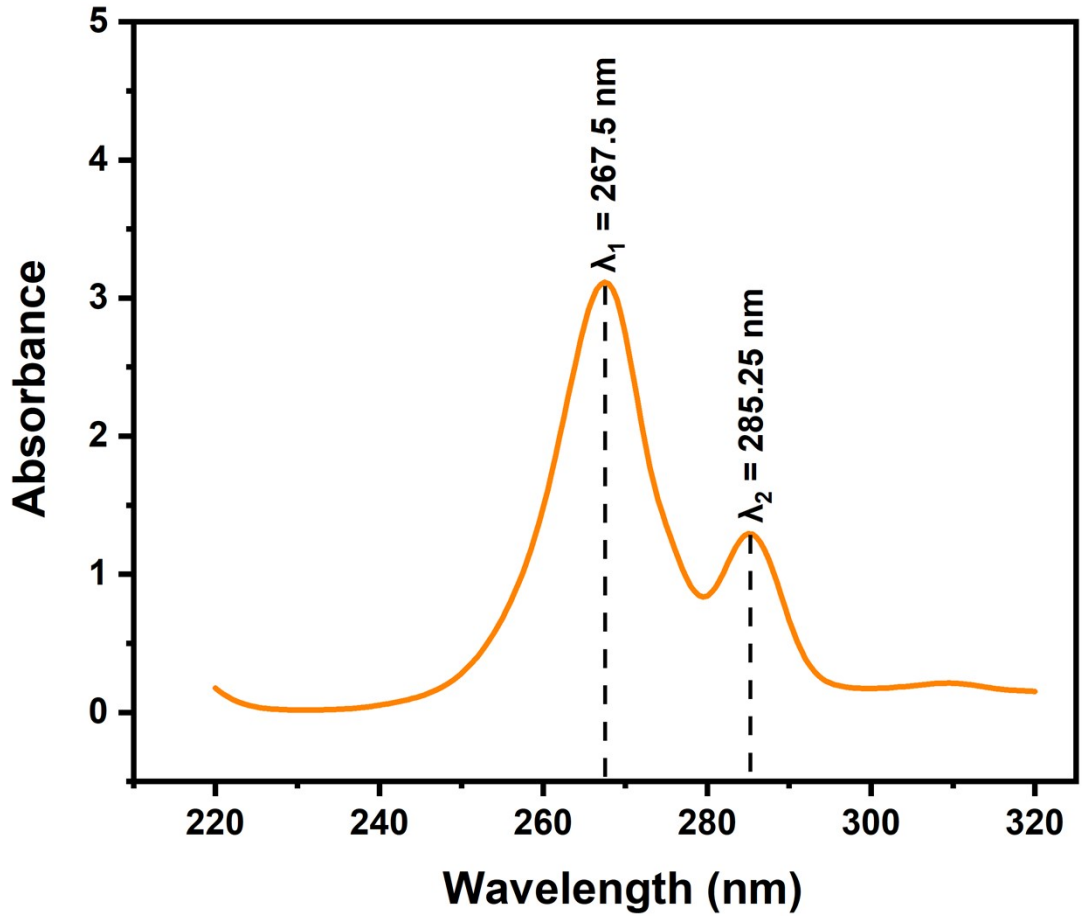

Fig. S1. UV absorption spectrum of potassium tetracyanonickelate complex $K_2[Ni(CN)_4].xH_2O$.

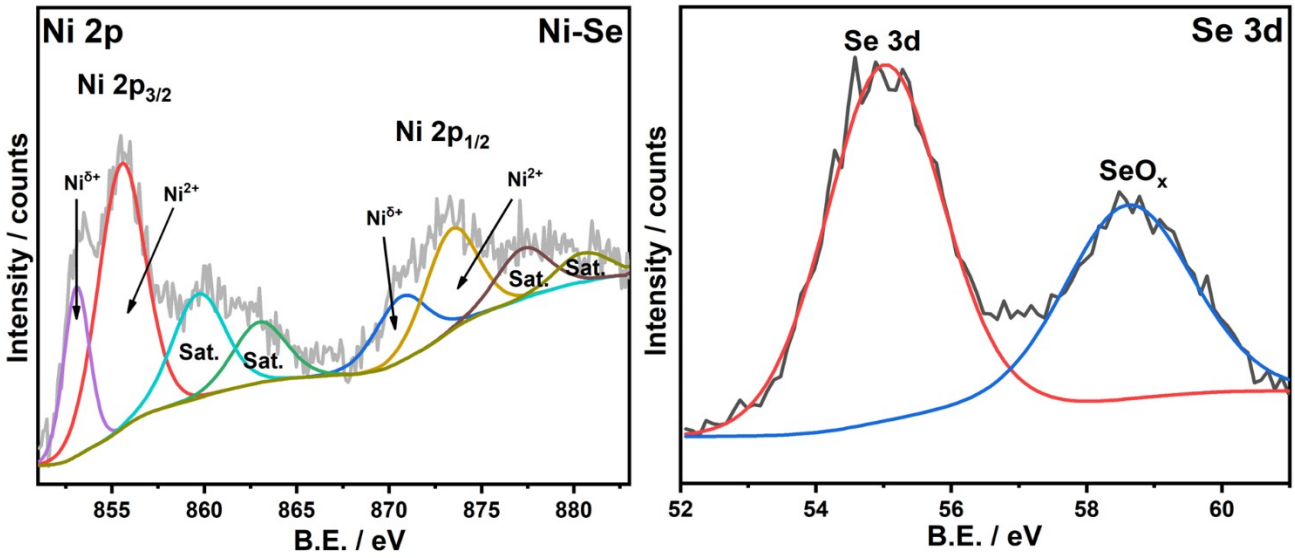

Fig. S2. XPS spectra of the core levels of Ni 2p and Se 3d.

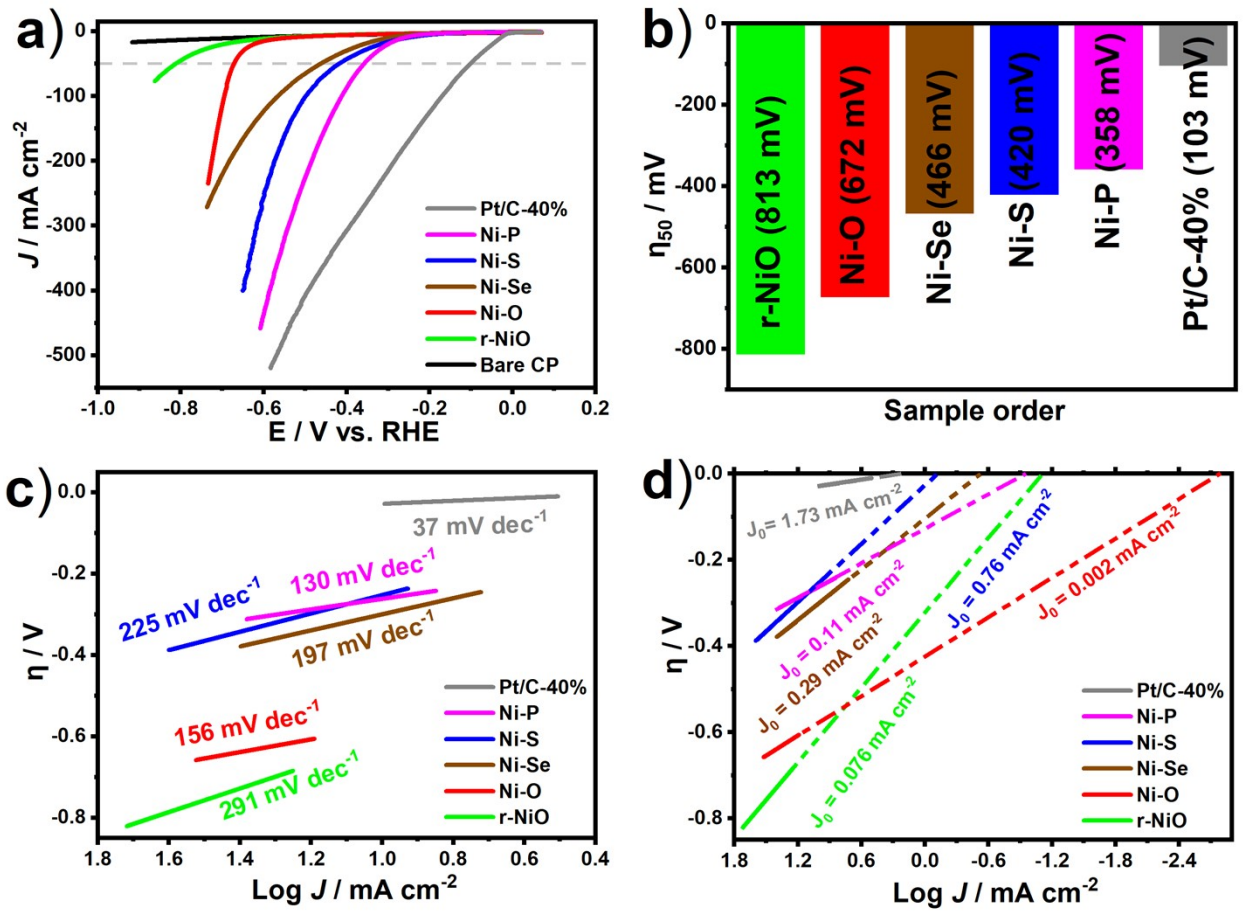

Fig. S3. (a) LSV curves after iR_s-compensatation at a scan rate of 10 mV S–1, (b) the overpotential value of each electrode at a current density of 50 mA cm-2, (c) the corresponding Tafel plots of Ni-O, Ni-S, Ni-Se, Ni-P, r-NiO, and Pt/C-40% electrodes, and (d) the estimated exchange currents related to Tafel plots of each electrode.

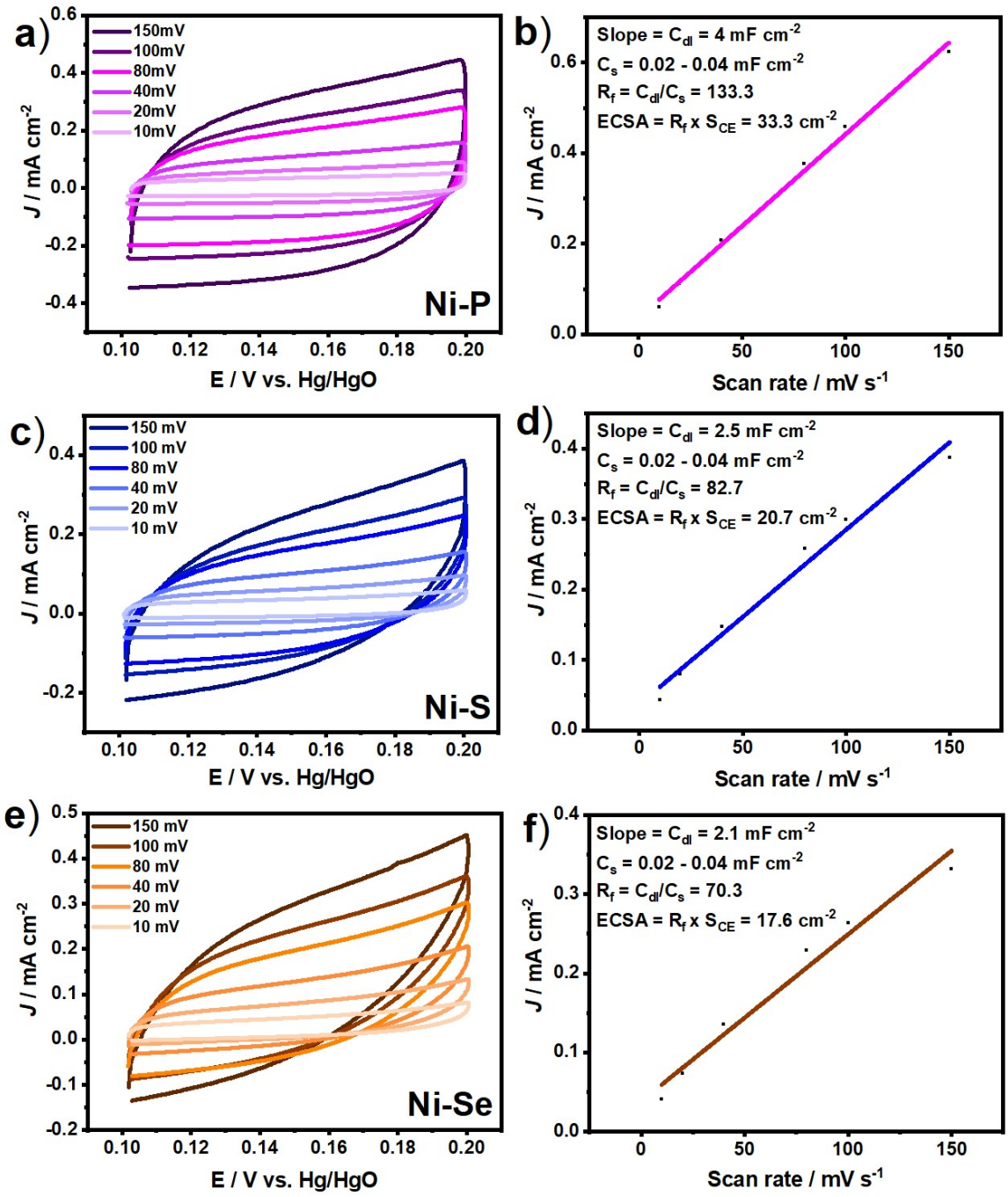

Fig. S4. a, c, e) CV at different scan rates (10, 20, 40, 80, 100, and 150 mV s^{-1}), b, d, f) double layer charging current versus scan rate curves of Ni-P, Ni-S and Ni-Se.

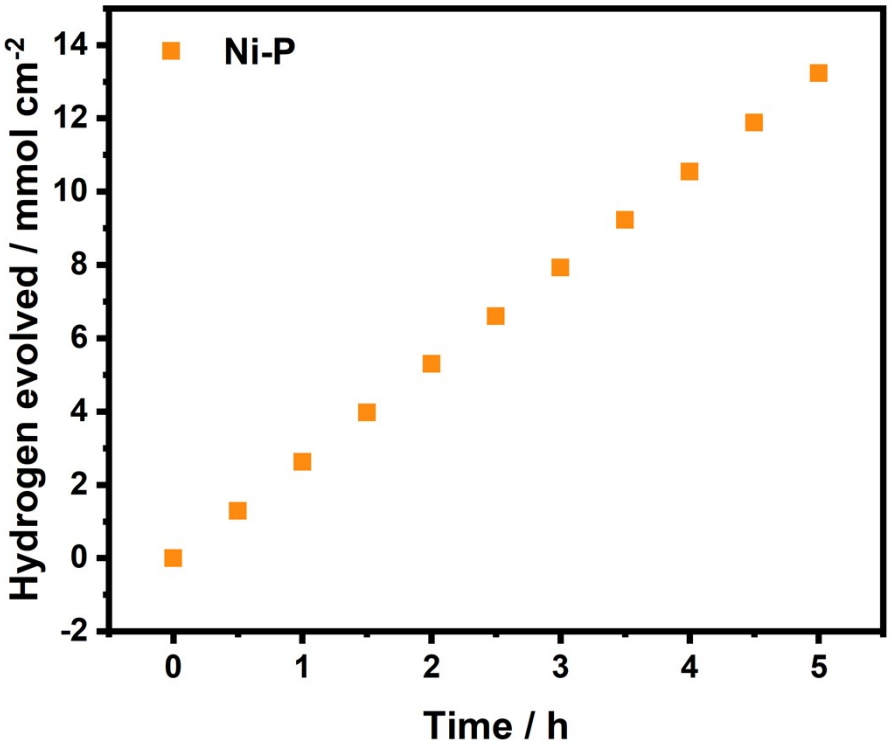

Fig. S5. The time course of H_2 evolution via on-line GC-TCD system for Ni-P.