Supplementary Information

Generation of Dual Anion Vacancies on CeO$_2$/Co$_4$N interfaces to Facilitate Hydrogen Evolution Reaction in Alkaline Solution

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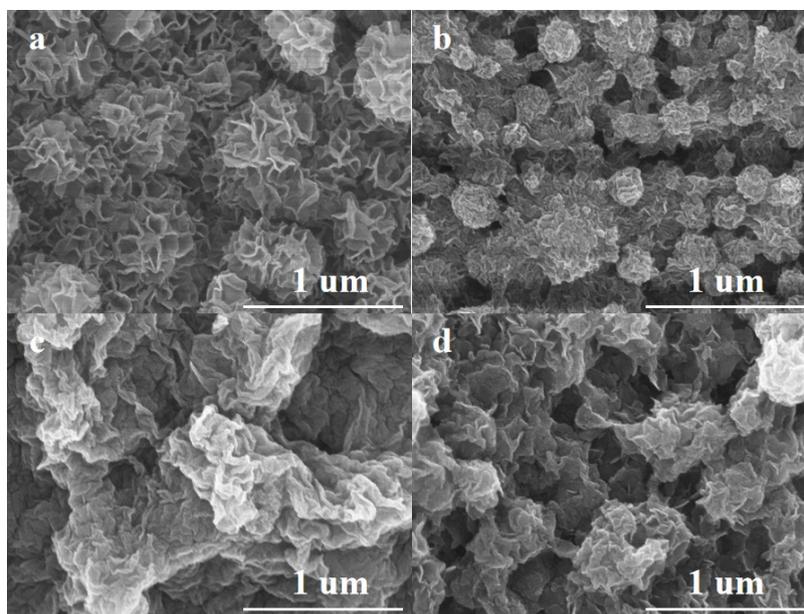
Figure S1. Figure S1. SEM images of various $CeO_2/Co(OH)_2$ precursors. (a) current density of 20 mA/ cm^2 and deposition for 5 min, (b) current density of 20 mA/ cm^2 and deposition for 10 min, (c) current density of 30 mA/ cm^2 and deposition for 5 min and (d) current density of 30 mA/ cm^2 and deposition for 10 min.
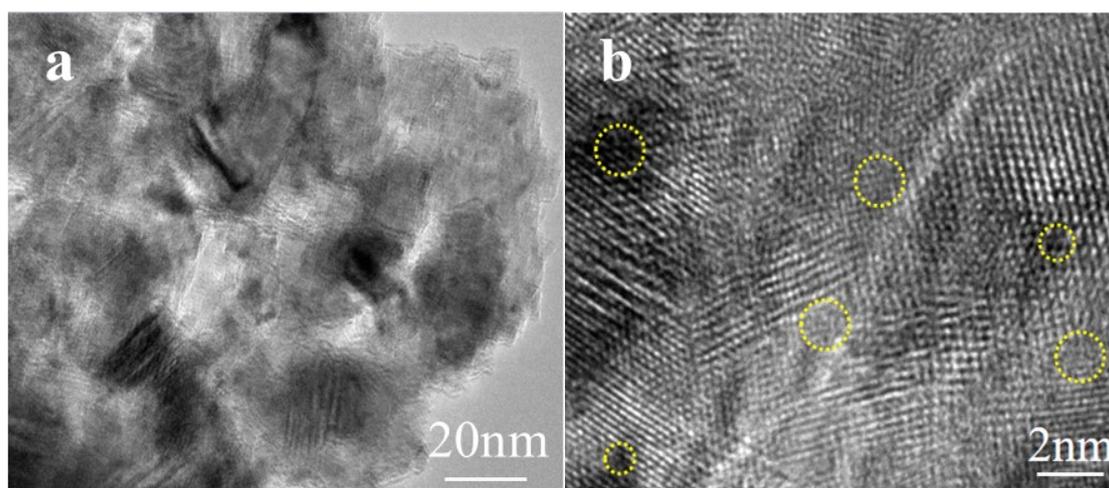
Figure S2. (a) TEM and (b)High-resolution TEM image of CeO_2/Co_4N.
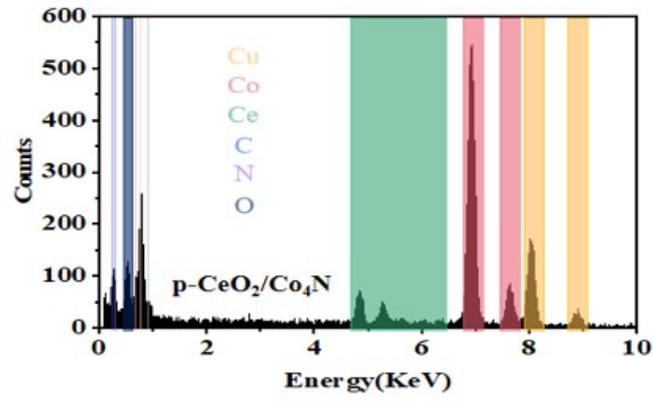
Figure S3. Energy dispersive spectroscopy (EDS) result of p-CeO$_2$/Co$_4$N.
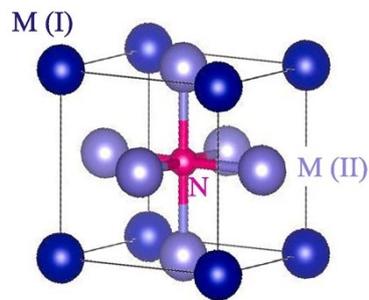
Figure S4.Schematic diagram of Co$_4$N anti perovskite type fcc structure.
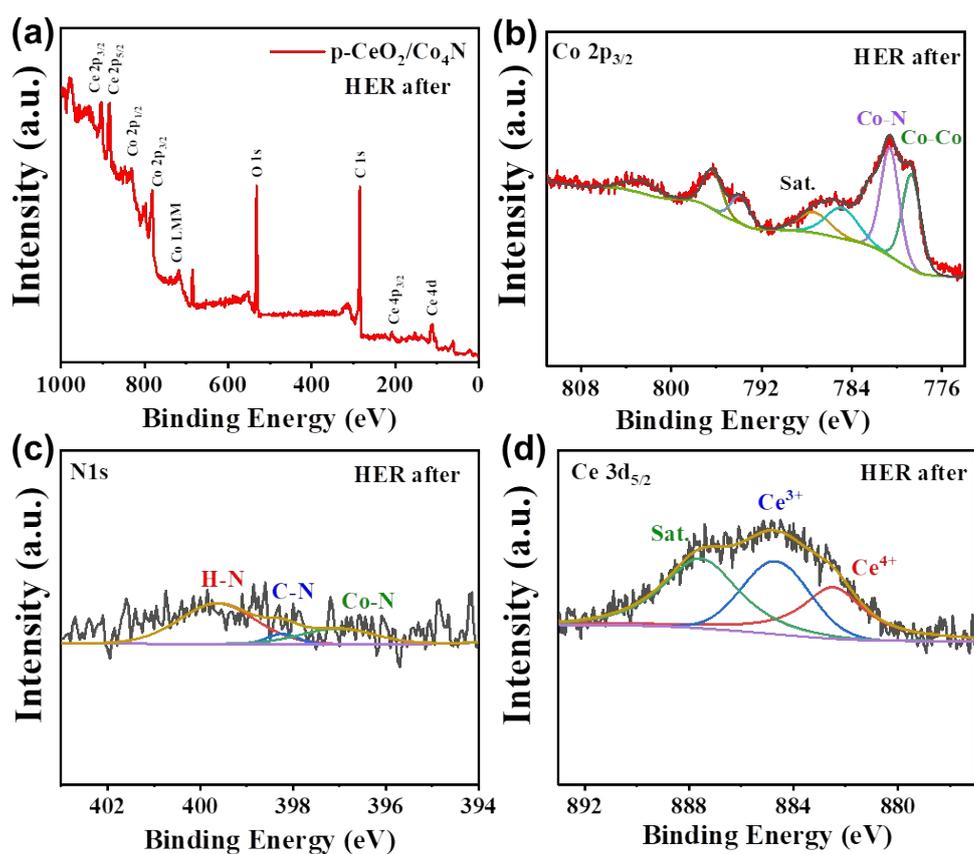
Figure S5. XPS spectra of p-Co4N-CeO2 after HER catalysis test.
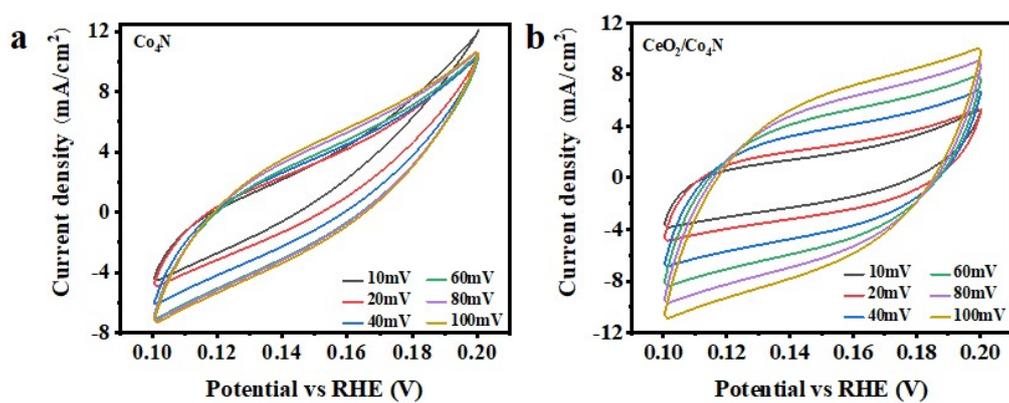
Figure S6. CV curves of (a) Co_4N and (b) CeO_2/Co_4N in the 0.1-0.2 V non-Faraday voltage interval.
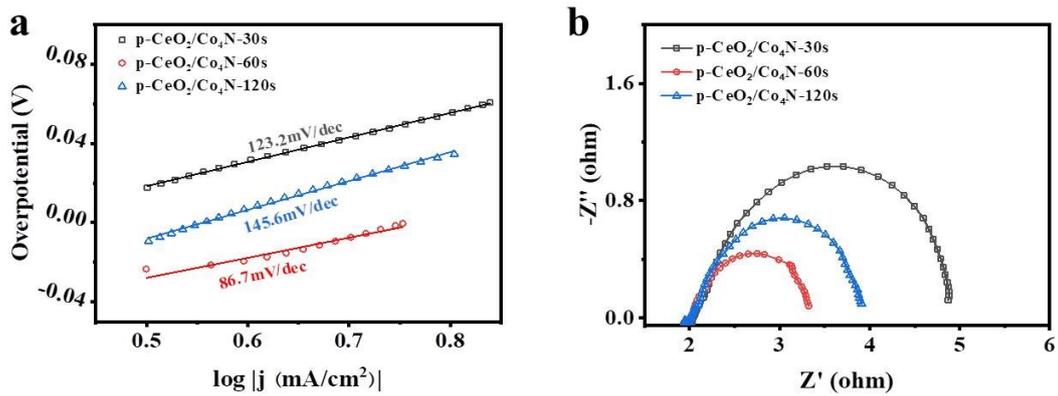
Figure S7. (a) The corresponding Tafel slope plots and (b) Electrochemical impedance spectroscopy of the p-CeO$_2$/Co$_4$N samples under plasma treatment for 30s, 60s and 120s.