Supporting Information

The (0001) Surfaces of α-Fe₂O₃ Nanocrystals are Preferentially Activated for Water Oxidation by Ni Doping

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Figure S1. Nitrogen adsorption-desorption isotherms of (A) Hem-1, (B) Hem-2, (C) Hem-3, (D) Hem-4, and (E) Hem-5 samples.



Figure S2. Fe 2p XPS spectra of (A) clean and Ni-deposited at different levels on Hem-3 samples before annealing, and (B) clean and Ni-doped at different levels on Hem-3 samples after annealing.



Figure S3. XPS spectra of clean, Ni-deposited, and Ni-doped Hem-1 samples.

Ni/(Ni+Fe) %	Hem-1	Hem-2	Hem-3	Hem-4	Hem-5
Ni-1	9.2	8.1	8.6	7.2	7.7
Ni-2	16.2	14.3	15.9	13.5	14.0
Ni-3	30.9	29.2	28.7	26.4	27.1

Table S1. Ni/(Ni+Fe) atomic ratio by XPS of α -Fe₂O₃ nanoplates in different sizes and shapes obtained with different concentrations of Ni deposition.



Figure S4. Current-potential plots in the dark for (a) Hem-1, (b) Hem-2, (c) Hem-3, (d) Hem-4, and (e) Hem-5 samples without Ni, and with different levels of Ni doping (Ni deposition followed by subsequent heating to 700 K in N_2). These measurements were made in 0.1 M KOH with a sweep rate of 10 mV/s. The insets show magnification of the regions where the onset potential occurs. Only anodic scans are shown here.

Current density at 1.0 V _{Ag/AgCl} (mA/cm ²)	Hem-1	Hem-2	Hem-3	Hem-4	Hem-5
No Ni	1.33 ± 0.22	1.52 ± 0.18	1.59 ± 0.15	1.69 ± 0.12	1.75 ± 0.10
Ni-1	2.67 ± 0.22	2.48 ± 0.20	2.40 ± 0.18	2.33 ± 0.13	2.25 ± 0.12
Ni-2	3.48 ± 0.24	3.27 ± 0.20	3.01 ± 0.20	2.79 ± 0.15	2.64 ± 0.10
Ni-3	3.15 ± 0.26	2.97 ± 0.20	2.82 ± 0.18	2.71 ± 0.14	2.57 ± 0.10

Table S2. Current densities at 1.0 $V_{Ag/AgCl}$ for hematite samples before doping and after different levels of Ni doping for the oxygen evolution reaction are shown for different sizes and shapes. All experiments were taken three times to ensure reproducibility.



Figure S5. Electrochemical stability of (a) Hem-1, (b) Hem-2, (c) Hem-3, (d) Hem-4, and (e) Hem-5 samples without Ni, and with different levels of Ni doping (Ni deposition followed by subsequent heating to 700 K in N₂). These measurements were made at 0.8 $V_{Ag/AgCl}$ in 0.1 M KOH.



Figure S6. Electrochemical activity of (a) Hem-1, (b) Hem-2, (c) Hem-3, (d) Hem-4, and (e) Hem-5 samples without Ni, and with different levels of Ni doping (Ni deposition followed by subsequent heating to different temperatures in N_2). These measurements were made at 0.8 $V_{Ag/AgCl}$ in 0.1 M KOH.