

Supplementary material

Figures S1–S9

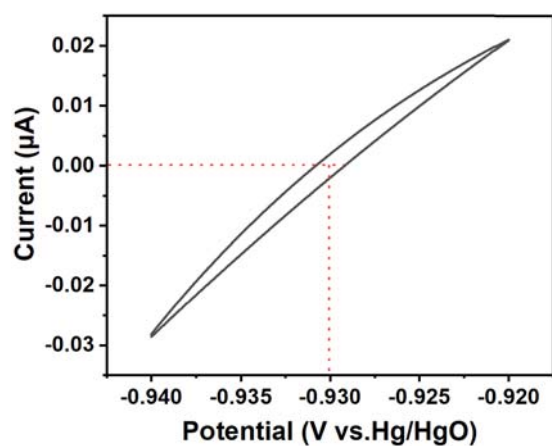


Figure S1: Hg/HgO reference electrode conversion voltage calibration.

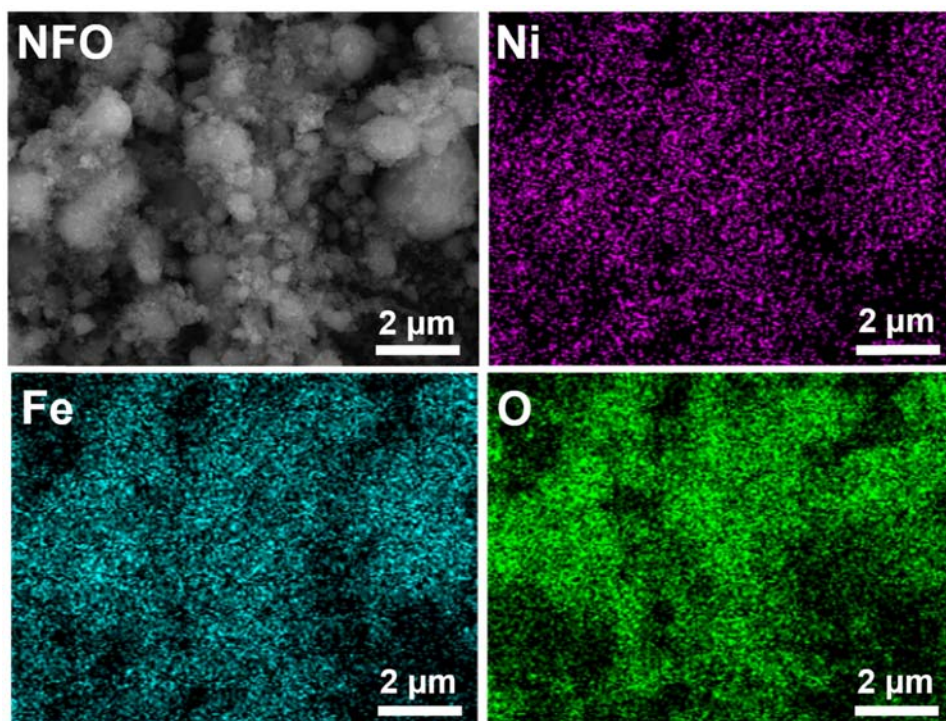


Figure S2: SEM images the corresponding elemental mapping of NFO.

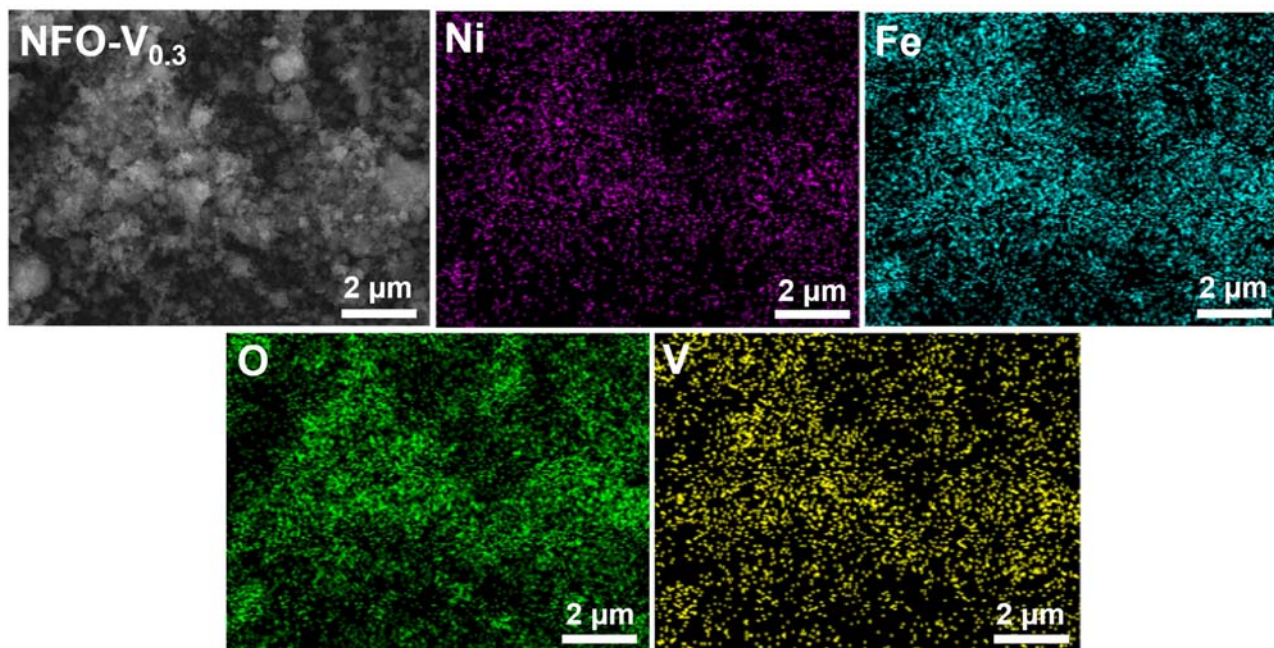


Figure S3: SEM images the corresponding elemental mapping of NFO- $V_{0.3}$.

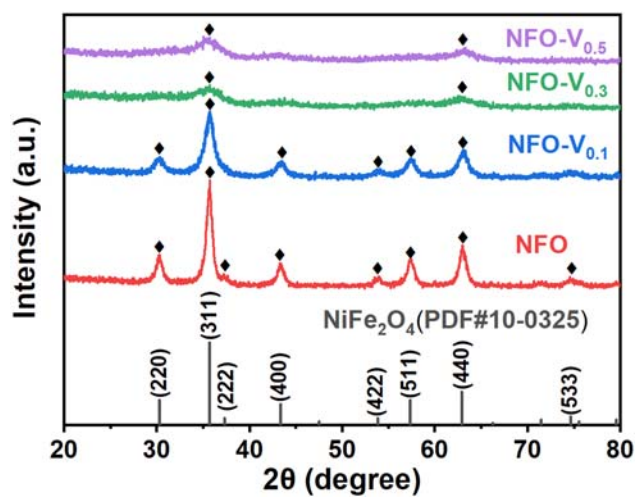


Figure S4: XRD patterns of NFO, NFO- $V_{0.1}$, NFO- $V_{0.3}$ and NFO- $V_{0.5}$.

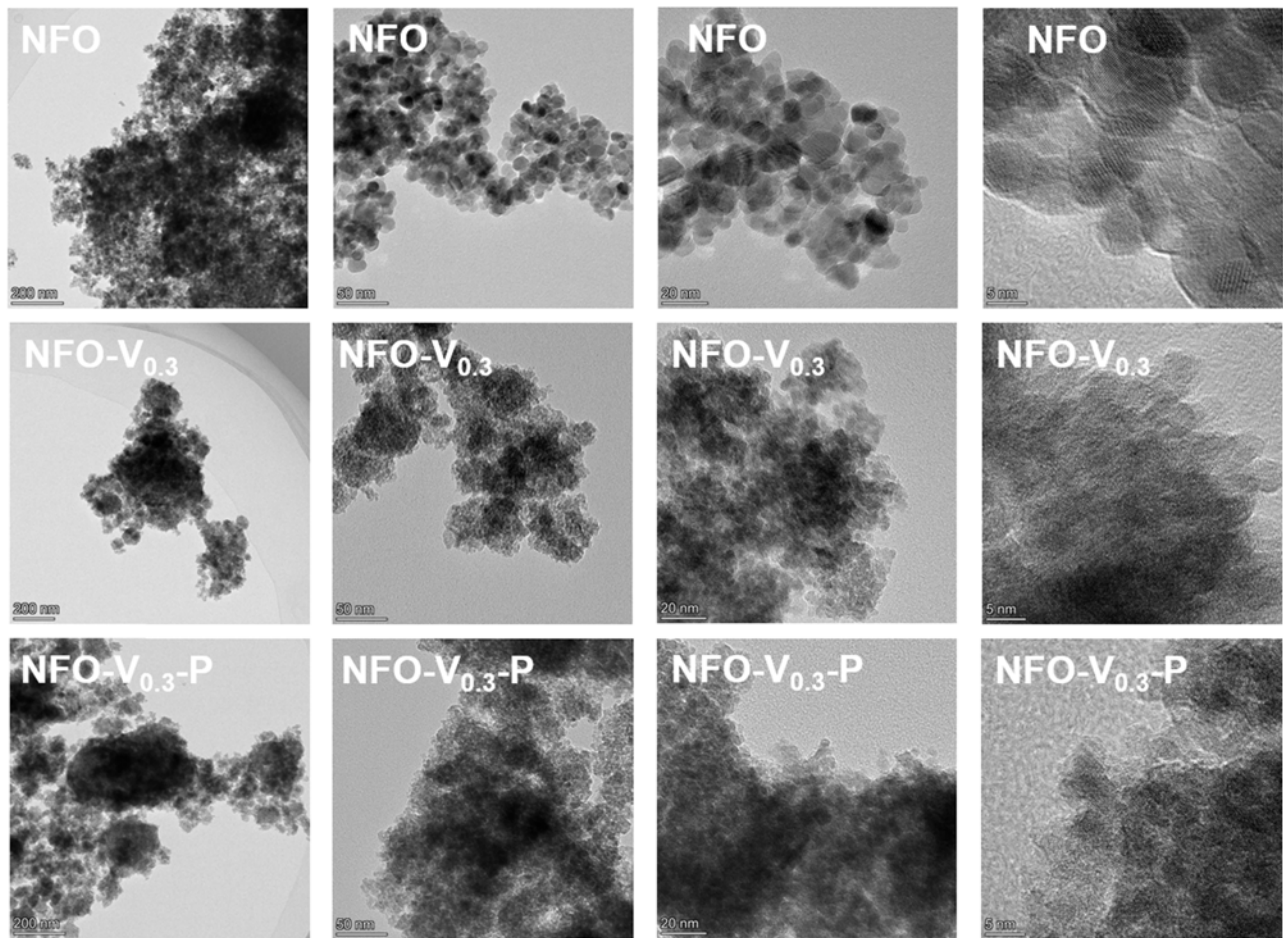


Figure S5: TEM images of NFO, $\text{NFO-V}_{0.3}$ and $\text{NFO-V}_{0.3}\text{-P}$.

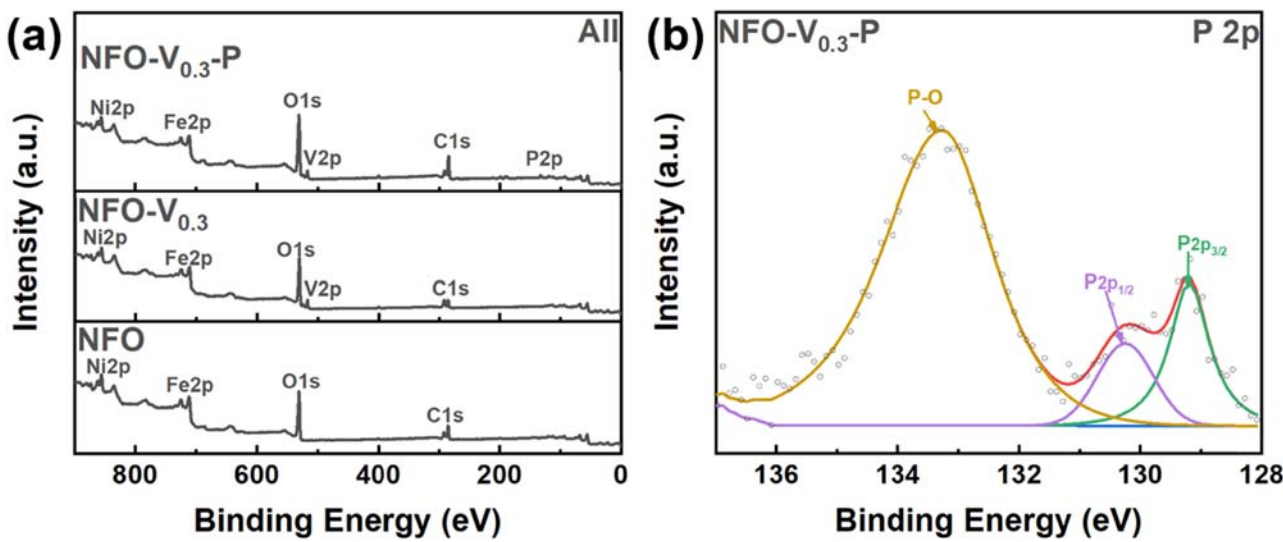


Figure S6: XPS spectra of (a) $\text{NFO-V}_{0.3}$ in V 2p region and $\text{NFO-V}_{0.3}\text{-P}$ in (b) V 2p region, (c) P 2p region.

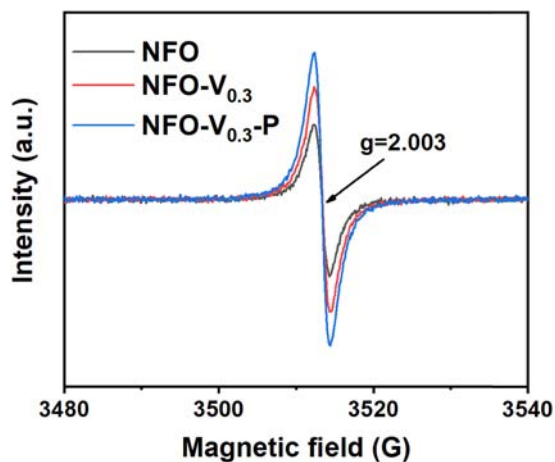


Figure S7: EPR spectra of NFO, NFO- $V_{0.3}$ and NFO- $V_{0.3}$ -P.

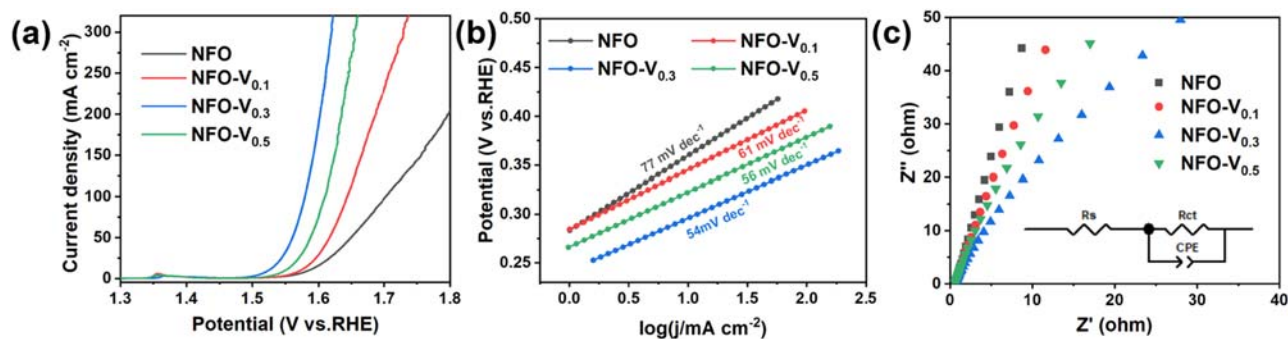


Figure S8: (a) iR-corrected LSV curves, (b) Tafel plots and (c) Nyquist plots of NFO, NFO- $V_{0.1}$, NFO- $V_{0.3}$ and NFO- $V_{0.5}$.

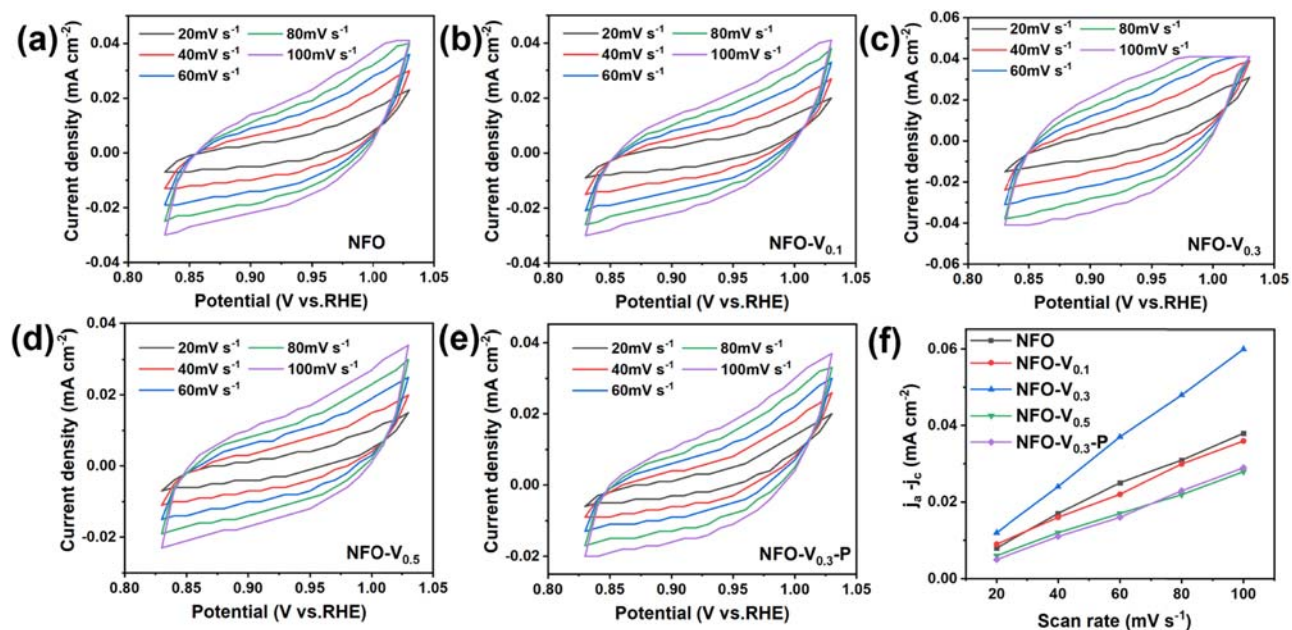


Figure S9: (a-e) CV curves of NFO, NFO- $V_{0.1}$, NFO- $V_{0.3}$, NFO- $V_{0.5}$ and NFO- $V_{0.3}$ -P. (f) The electrochemical C dl of the above catalysts.