

Supporting Information for

# Solution-Grown Dendritic Pt-Based Ternary Nanostructures for Enhanced Oxygen Reduction Reaction Functionality

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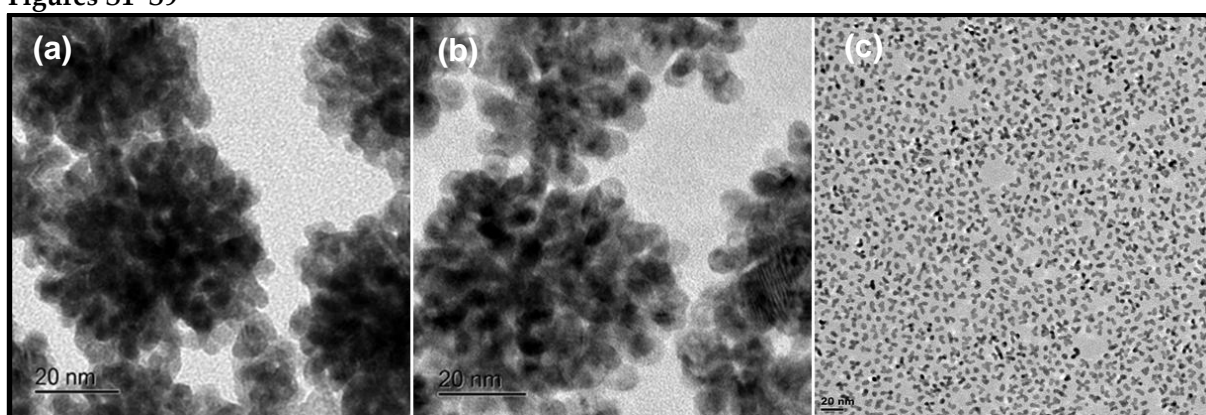
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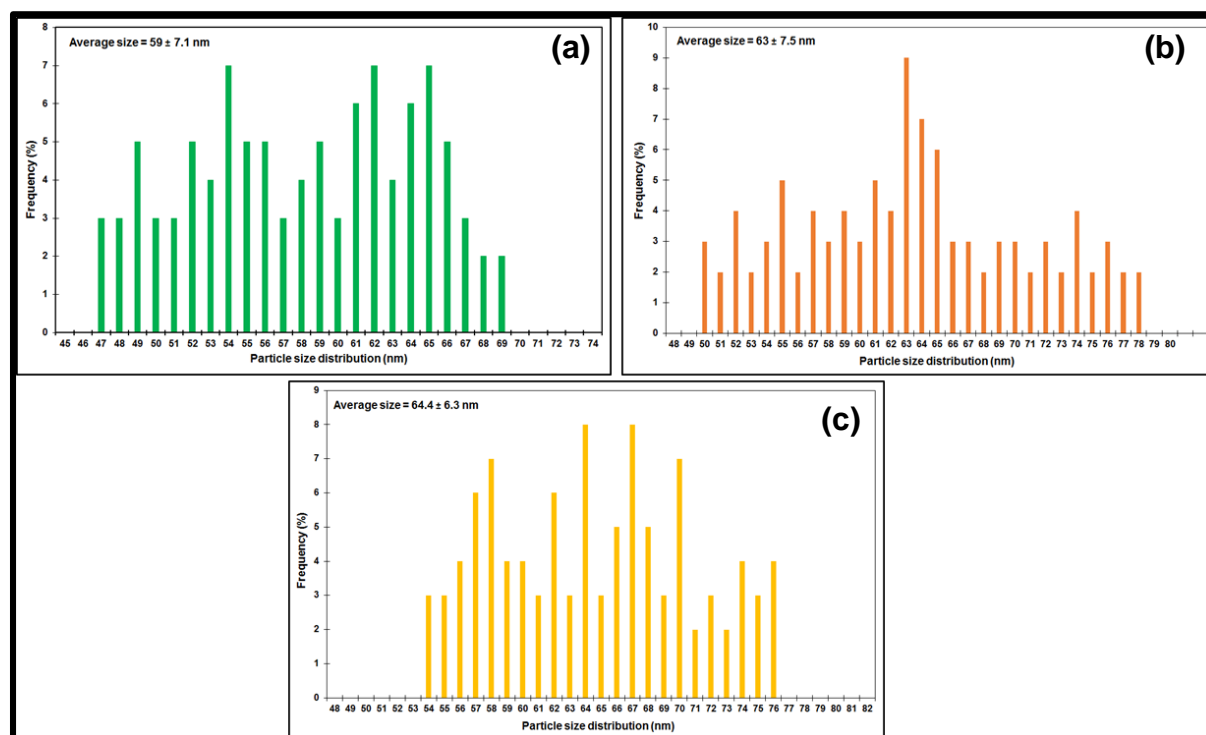
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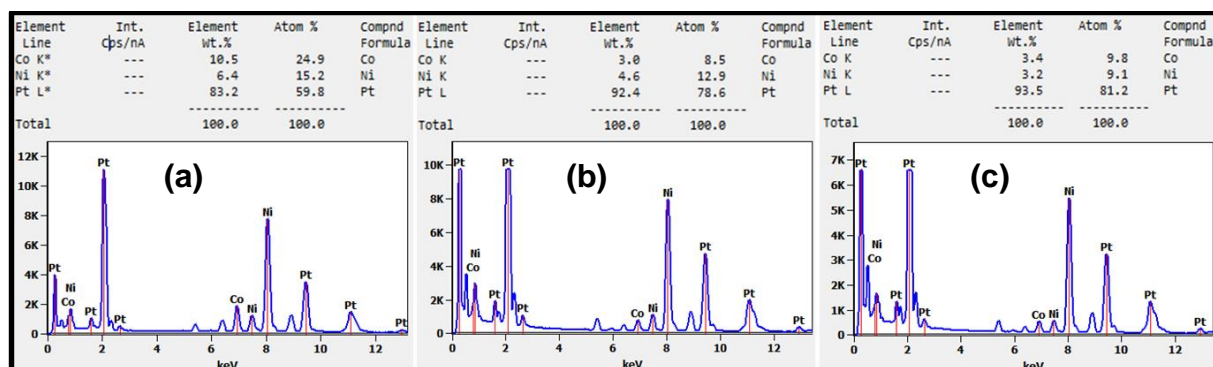
Figures S1–S9



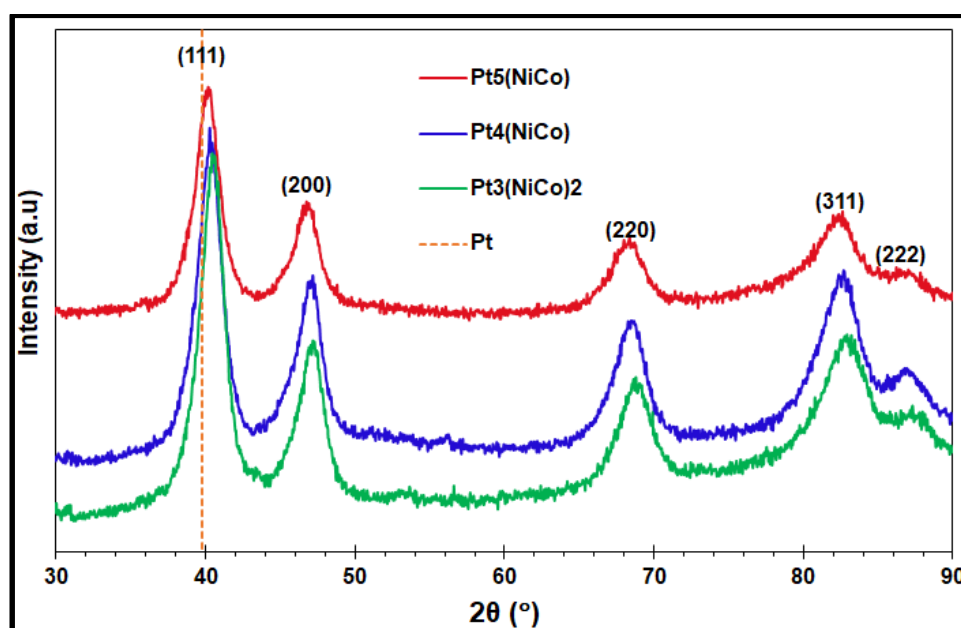
**Figure S1.** Bright field STEM micrographs of binary Pt-based nanostructures, synthesized using 1:1 feed ratios: (a) PtCo, (b) PtNi and (c) PtFe.



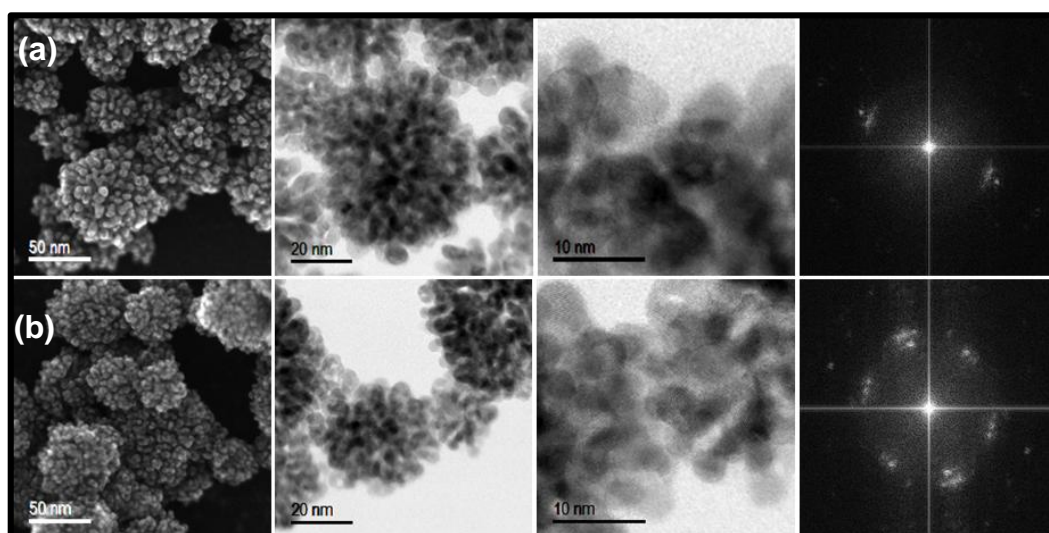
**Figure S2.** Particle size (nm) histograms of (a) Pt<sub>3</sub>(NiCo)<sub>2</sub>, (b) Pt<sub>4</sub>(NiCo) and (c) Pt<sub>5</sub>(NiCo) alloy nanostructures.



**Figure S3.** EDX spectra and elemental compositions of (a)  $\text{Pt}_3(\text{NiCo})_2$ , (b)  $\text{Pt}_4(\text{NiCo})$  and (c)  $\text{Pt}_5(\text{NiCo})$  ternary alloy nanostructures.



**Figure S4.** XRD patterns of  $\text{Pt}_3(\text{NiCo})_2$ ,  $\text{Pt}_4(\text{NiCo})$  and  $\text{Pt}_5(\text{NiCo})$  nanoalloys. The {111} peak position of pure Pt is indicated.



**Figure S5.** SEM (SE) images, BF-STEM images, HR-STEM images and the corresponding FFT patterns of binary (a) PtNi and (b) PtCo nanostructures.

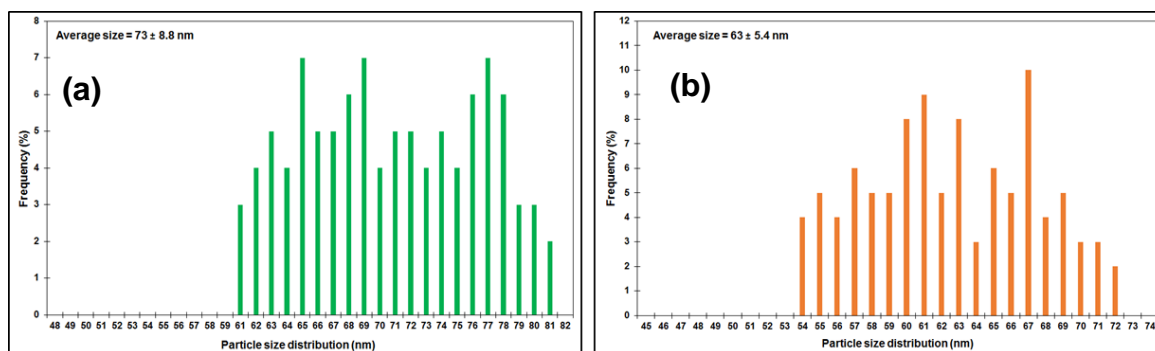


Figure S6. Particle size (nm) histograms of (a) PtNi and (b) PtCo nanostructures.

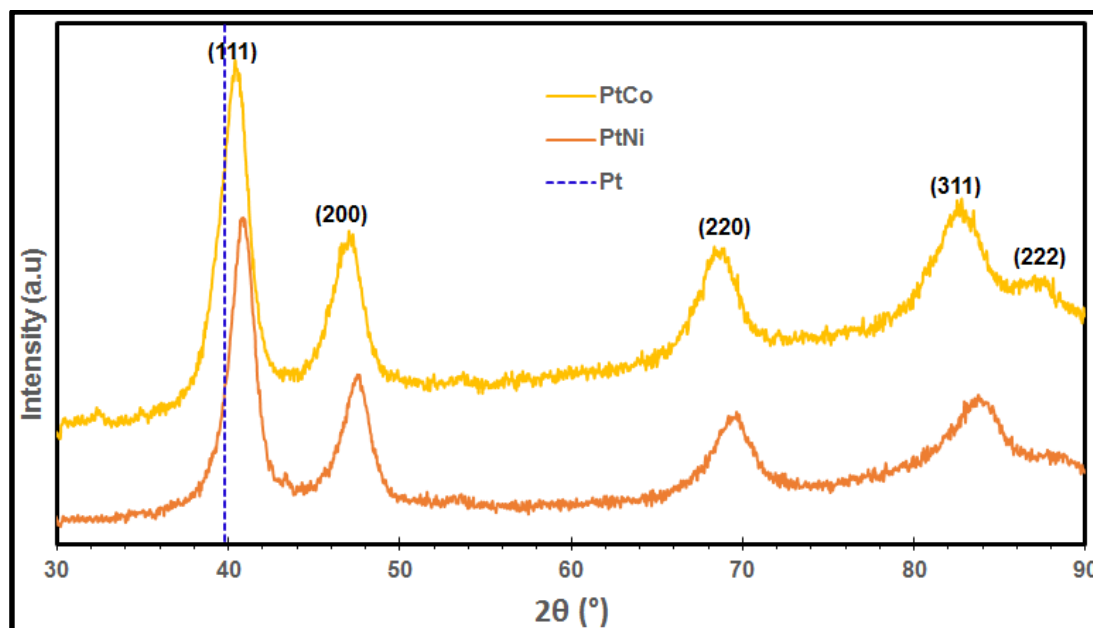


Figure S7. XRD patterns of binary PtCo and PtNi alloy nanoparticles. The position of the Pt(111) peak is shown as a dotted line.

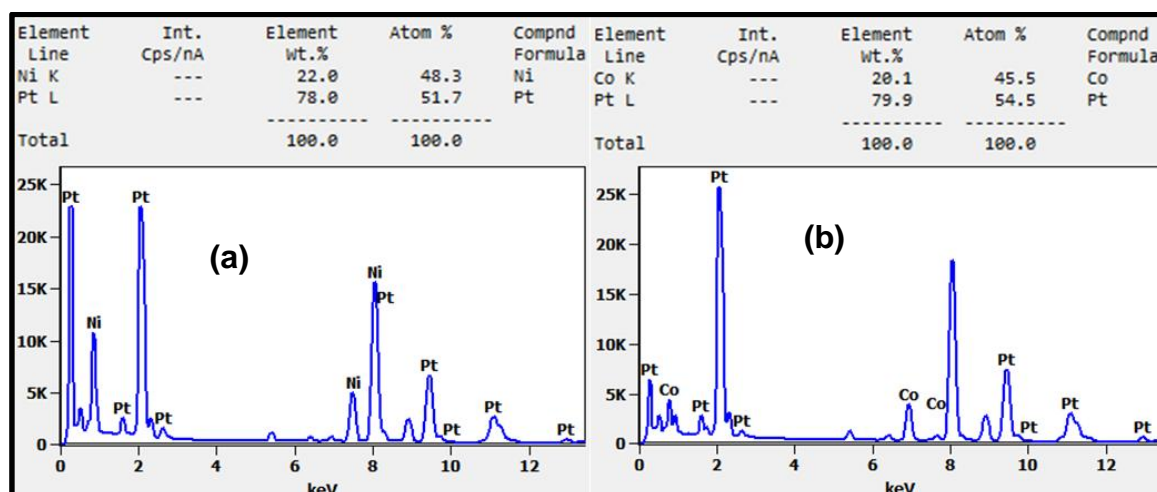
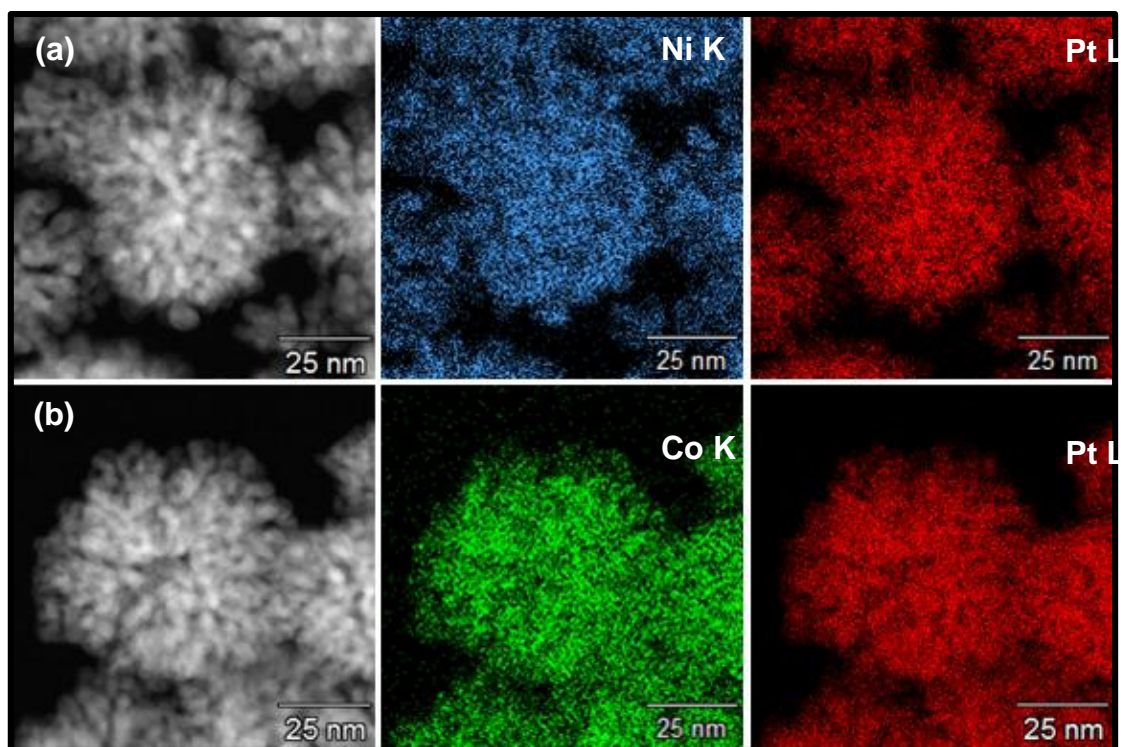
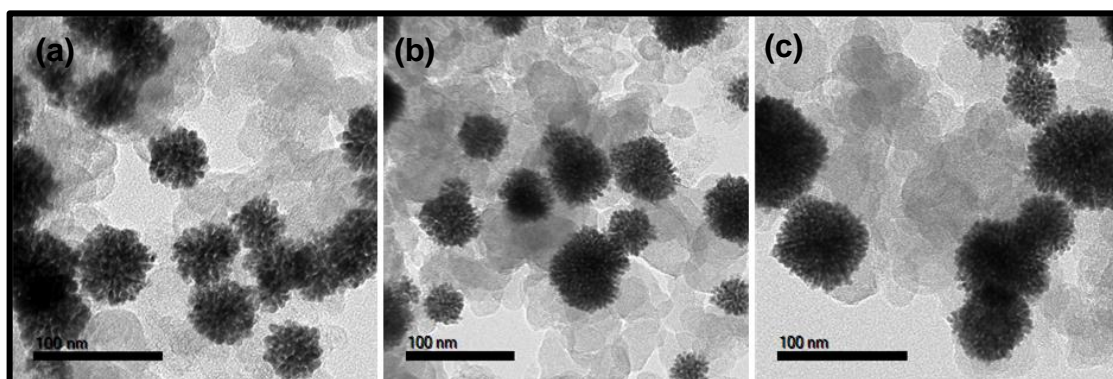


Figure S8. EDX spectra and elemental compositions of (a) PtNi and (b) PtCo binary alloy nanostructures.





**Figure S9.** HAADF-STEM-EDS analysis: nanoscale elemental mapping of (a) PtNi and (b) PtCo nanostructures, showing uniform atomic distributions of alloying elements (Ni or Co) and Pt within individual particles.



**Figure S10.** TEM images of (a)  $\text{Pt}_3(\text{NiCo})_2$ , (b)  $\text{Pt}_4(\text{NiCo})$  and (c)  $\text{Pt}_5(\text{NiCo})$  nanoalloys, dispersed on high surface area carbon (Vulcan XC-72R).