Electronic Supplementary Material (ESI) for Nanoscale.

Electronic Supplemental Information

Heterostructured Au/Pd-M (M = Au, Pd, Pt) Nanoparticles with Compartmentalized Composition, Morphology, and Electrocatalytic Activity

Patrick S. Lutz,[1] In-Tae Bae,[2] Mathew M. Maye[1]*

[1]Department of Chemistry, Syracuse University, Syracuse, New York, 13244.
[2]Small Scale Systems Integration and Packaging Center, State University of New York at Binghamton, Binghamton New York, 13902
**mmmaye@syr.edu*

Supporting Figures

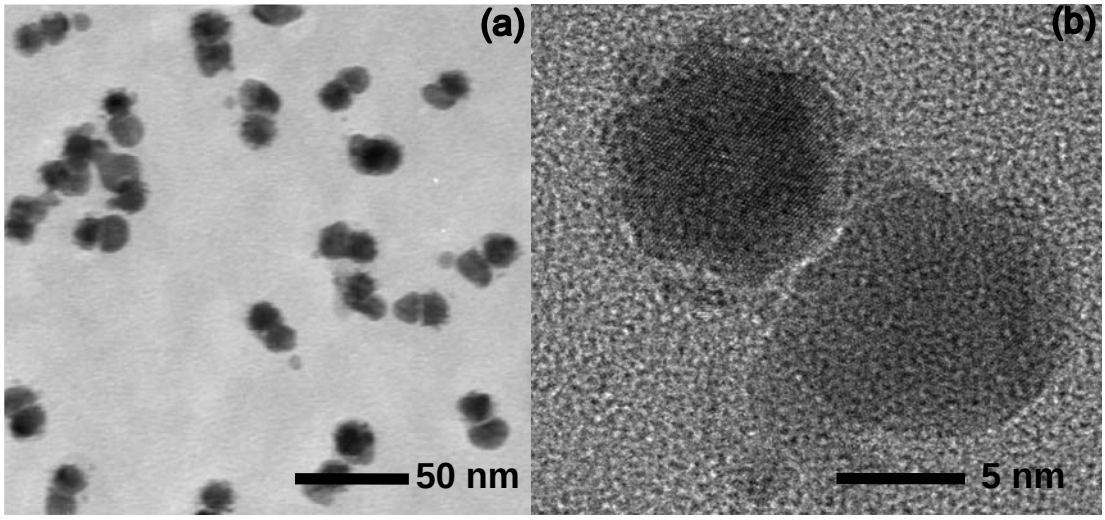

Figure S1. Representative TEM (a) and HRTEM (b) micrographs of Au/Pd-Ag NPs.

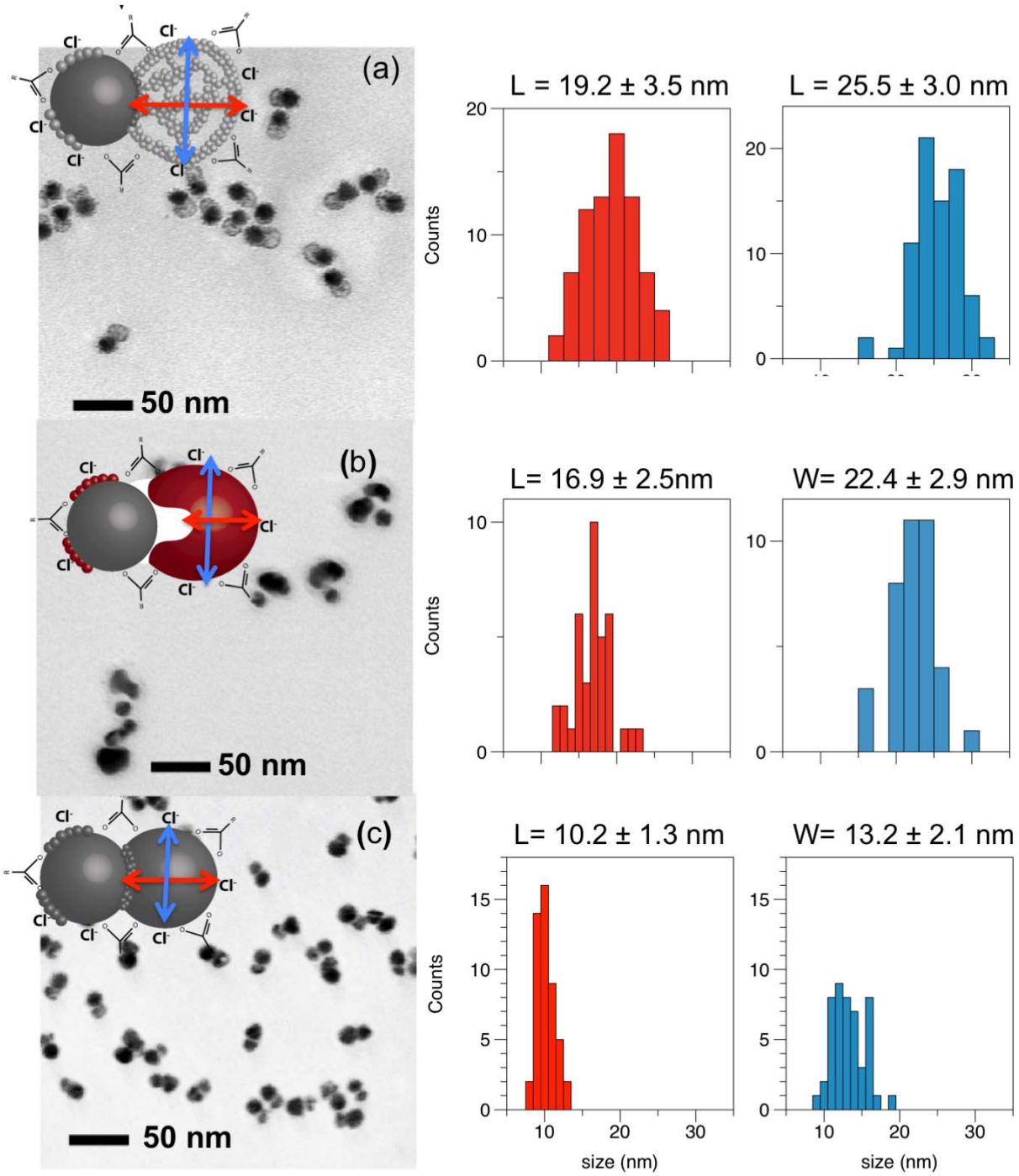

Figure S2. Representative TEM micrographs of Au/Pd-Pt (a), Au/Pd-Au (b), and Au/Pd-Pd (c) NPs with corresponding length (i) and width (ii) statistics of new domain (see inset).

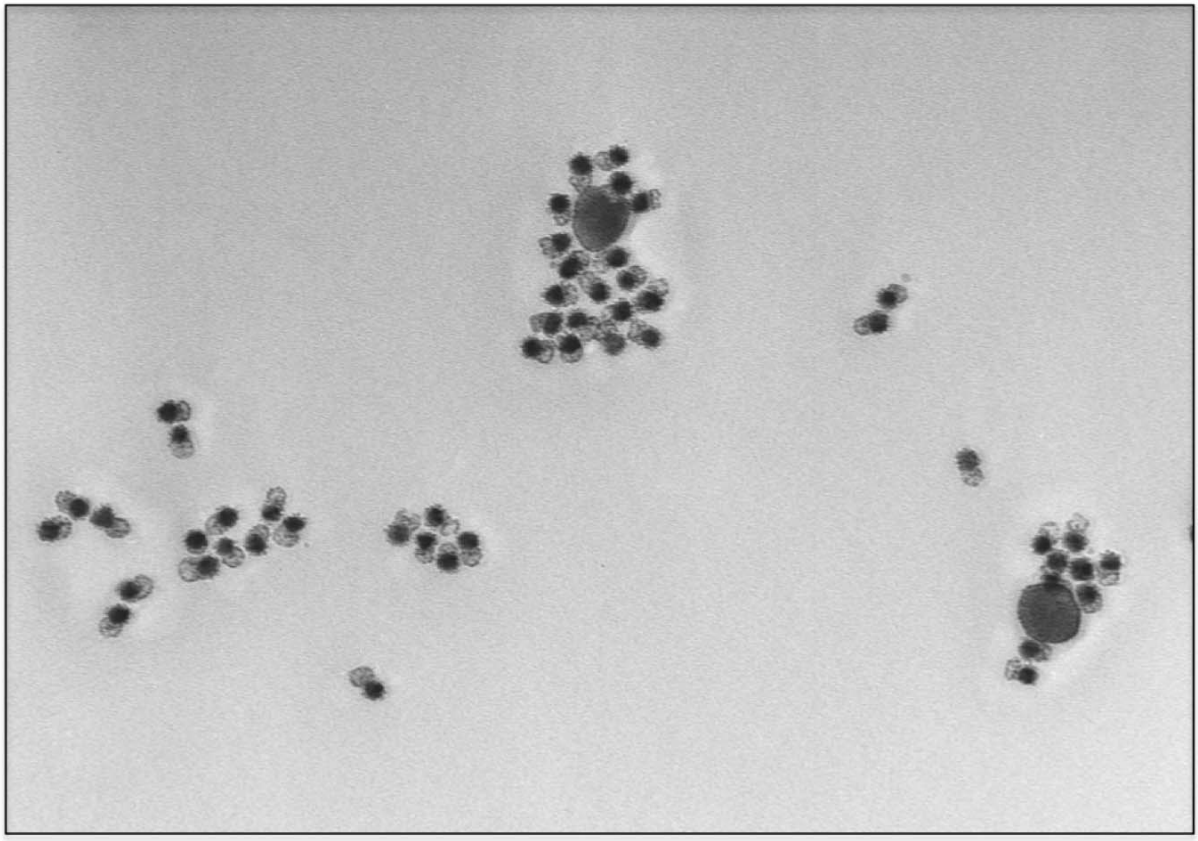

Figure S3. Additional low resolution TEM of Au/Pd-Pt NPs. Statistical analysis reveals that 90% of all NPs have asymmetric Pt domains.

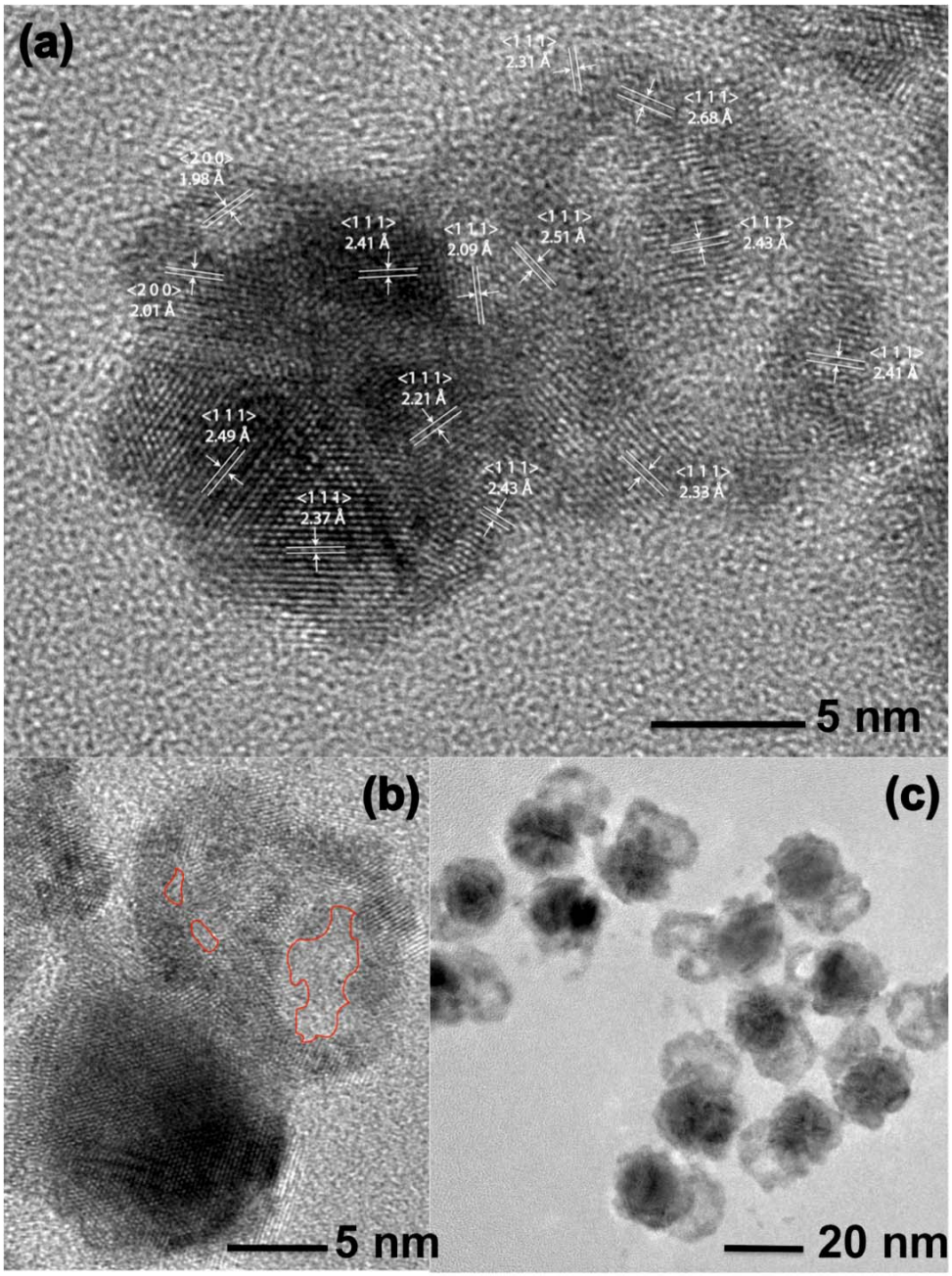

Figure S4. Additional HRTEM micrographs of AuPd-Pt NPs (a-c).

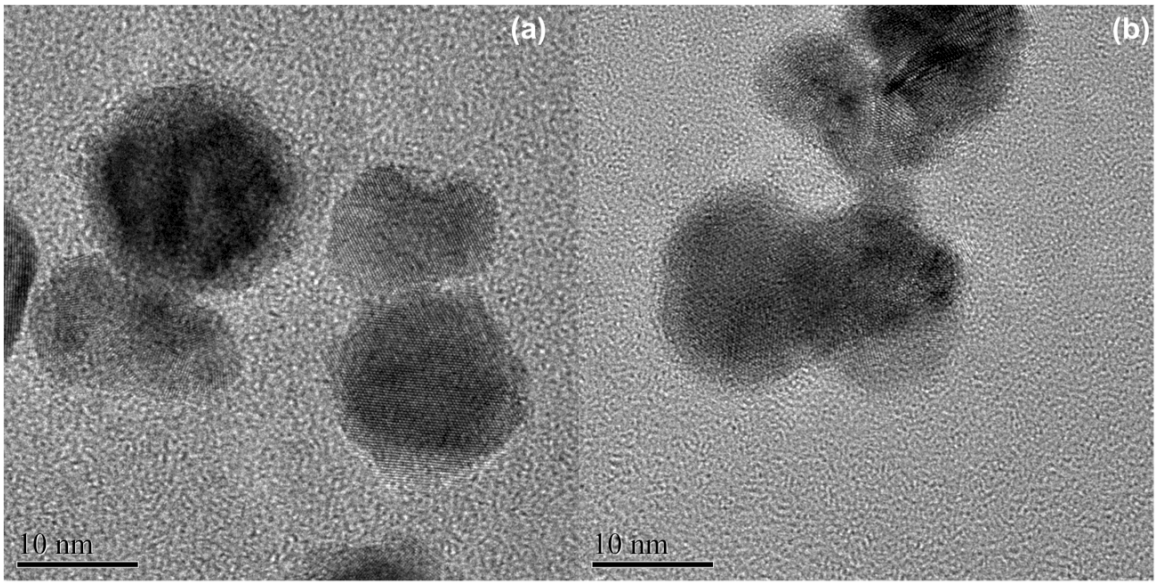

Figure S5. Additional HRTEM micrographs Au/Pd-Pd NPs (a-b).

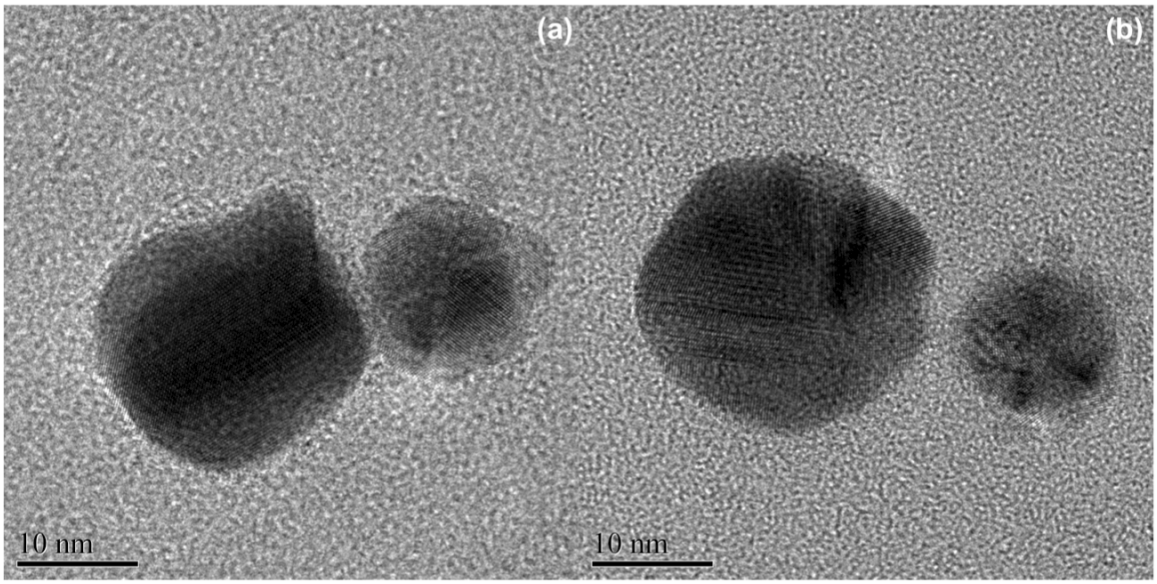

Figure S6. Additional HRTEM micrographs Au/Pd-Au NPs (a-b).

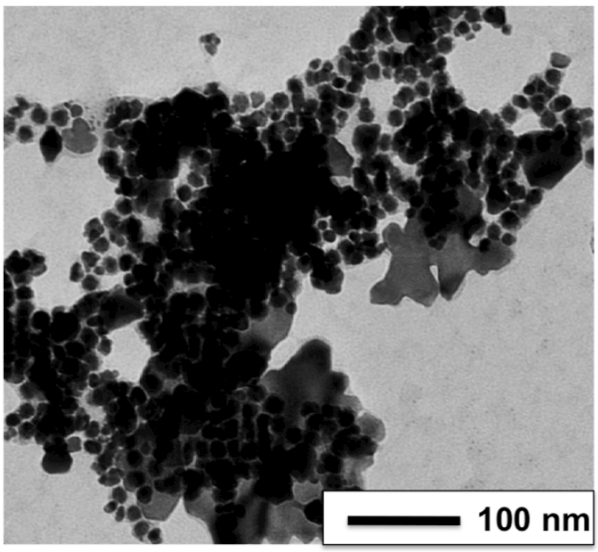

Figure S7. Representative TEM micrographs of Au/Pd-Au NP exchanged at 95 ^{o}C with no excess citrate.

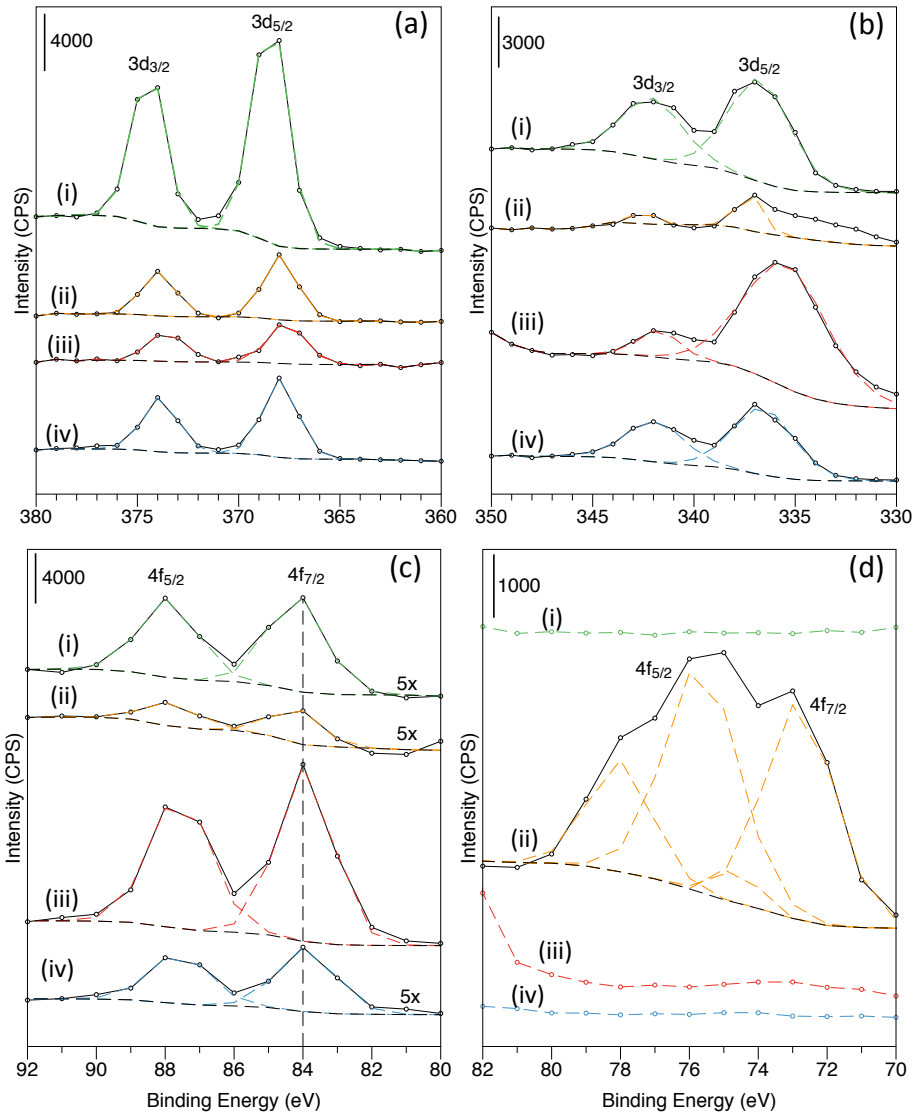

Figure S8. XPS Peak fitting for Ag 3d (a), Pd 3d(b), Au 4f (c), and Pt 4f(d) for Au/Pd-Ag (i), Au/Pd-Pt (ii), Au/Pd-Au (iii), and Au/Pd-Pd (iv).

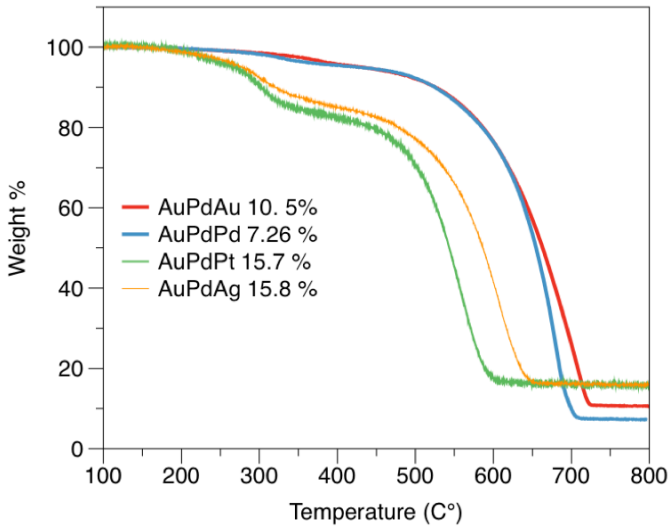

Figure S9. Representative TGA analysis of heterostructured nanoparticles, revealing the weight loss of carbon black support resulting in the finalized weight of the metallic nanostructure as shown in the graphical inset.

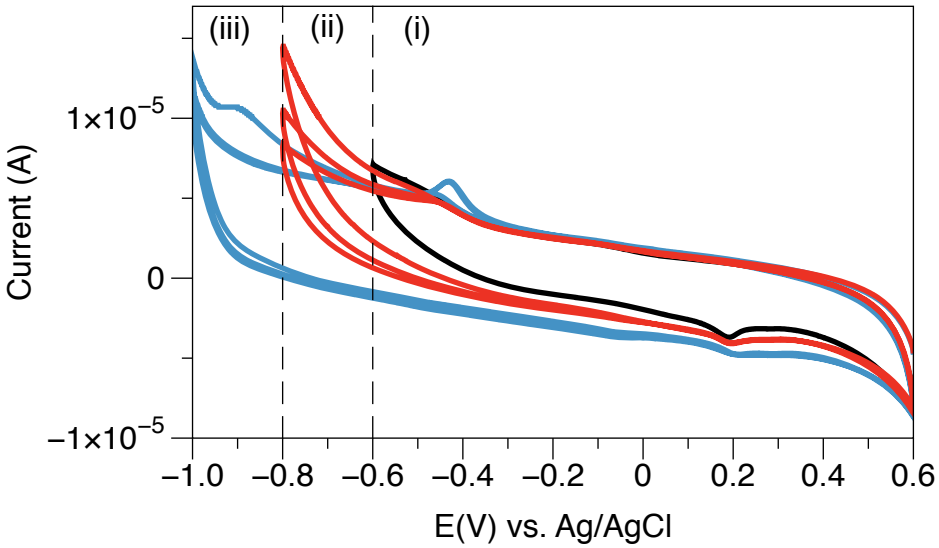

Figure S10. Cyclic voltammetry scans during the surface activation process for Au/Pd-M nanoparticles. The first set of scans begins in the range of -0.6 to 0.6 V (i), followed by a three scan sweep in the potential of -0.8 to 0.6 V, with a finalized three scan sweep in the potential of -1.0 to 0.6 V.

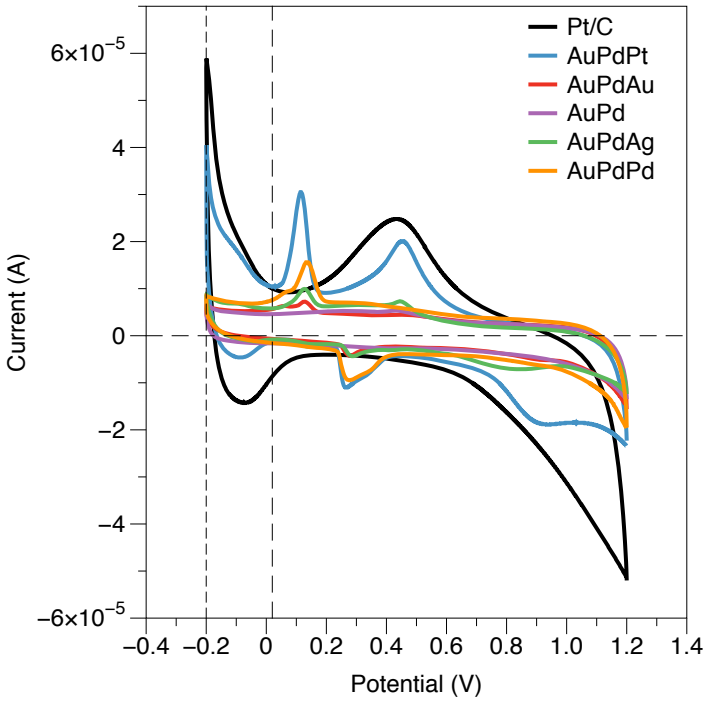

Figure S11. Cyclic voltammetry of nanoparticles in 1 M H_2SO_4, with the hydrogen adsorption region labeled used for ECSA calculations.

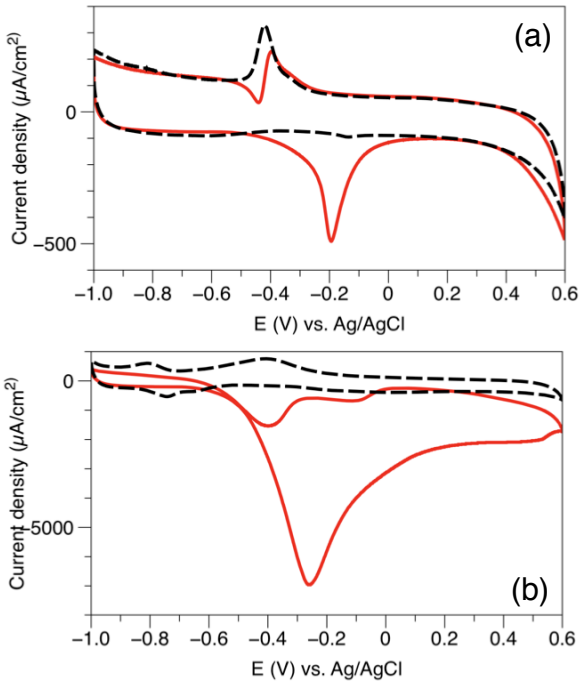

Figure S12. CV of Au/Pd (a) and Pt/C (b) controls in absence (dashed) and presence (solid) of 1.0 M MeOH. CVs are not normalized to metal weight. (0.5 M KOH, GC, 0.07 cm^2, 50 mV s^{-1}).