

Supporting Information

Controlling the Morphology of Au-Pd Heterodimer Nanoparticles by Surface Ligands

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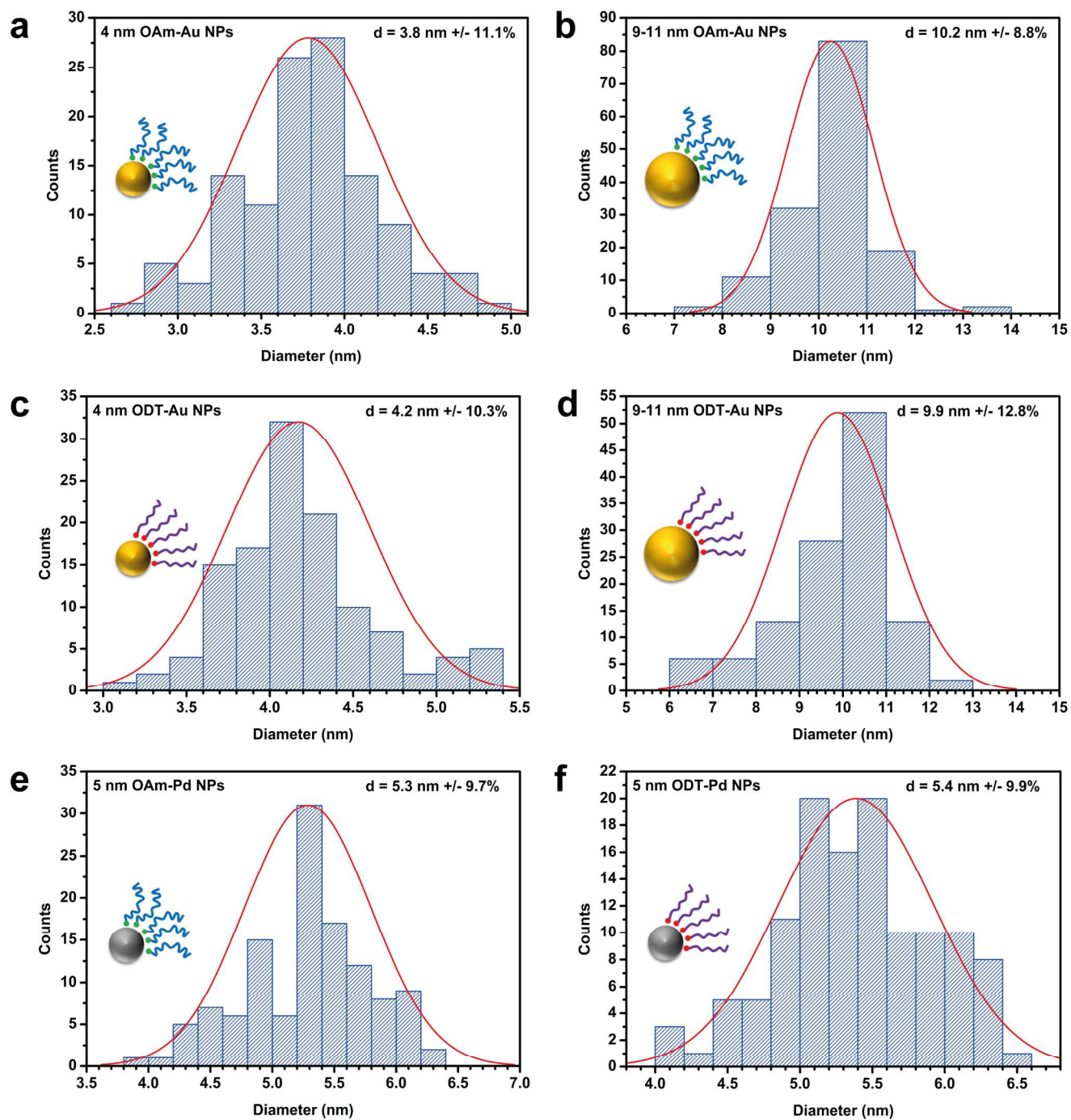


Figure S1. Size distribution histograms of OAm and ODT surface functionalized Au and Pd NPs.

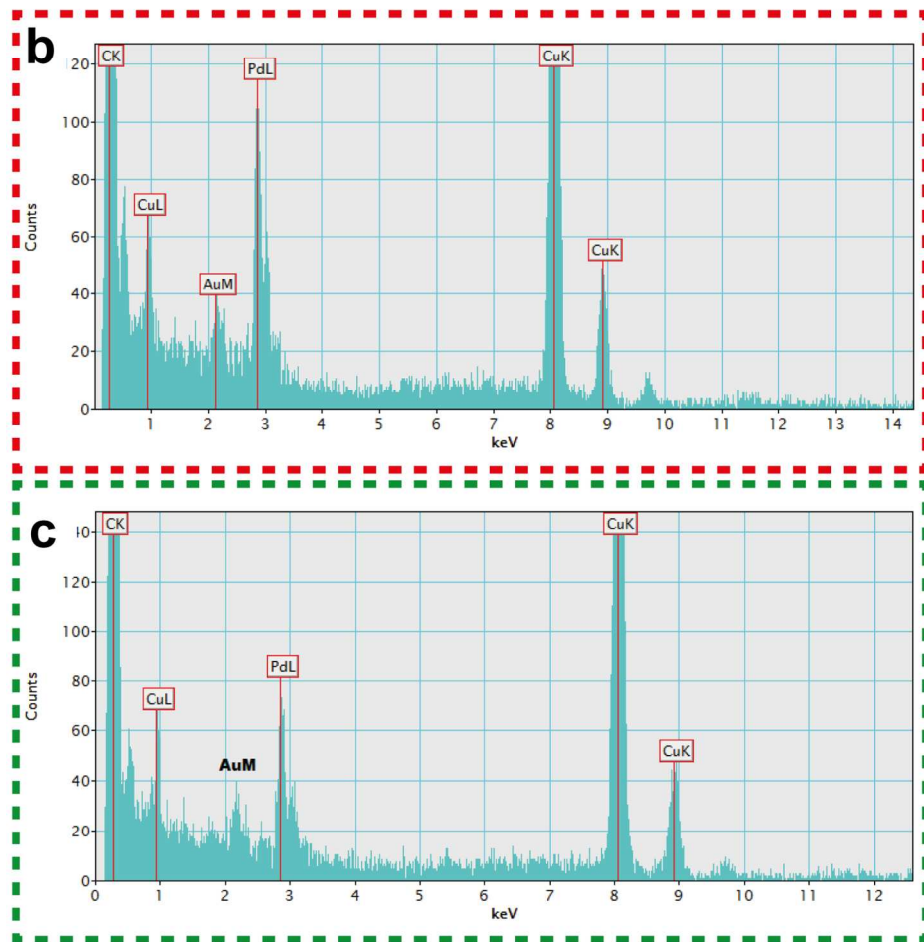
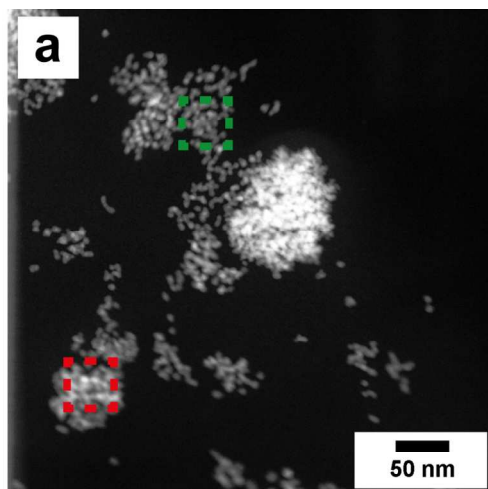


Figure S2. (a) ADF-STEM image of the reaction of 4 nm ODT-Au NPs with $\text{Pd}(\text{ac})_2$ to form Au-Pd heterodimers. (b) EDX spectrum of the red boxed region from (a). (c) EDX spectrum of the green boxed region from (a).

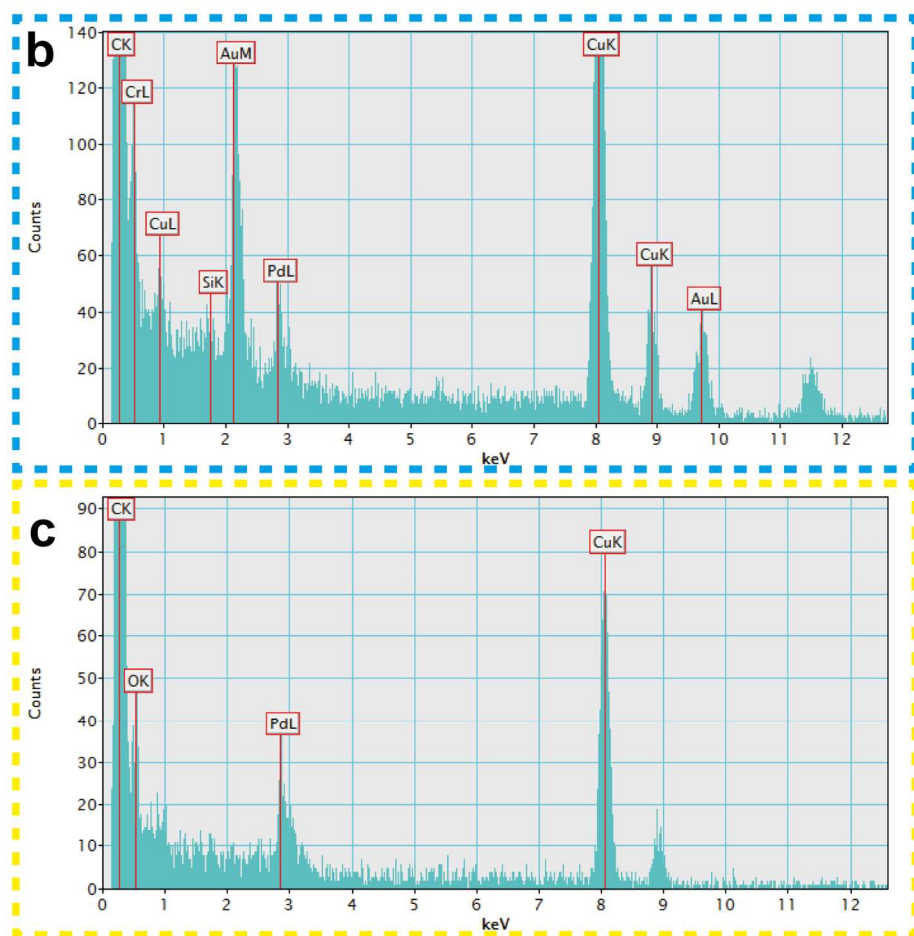
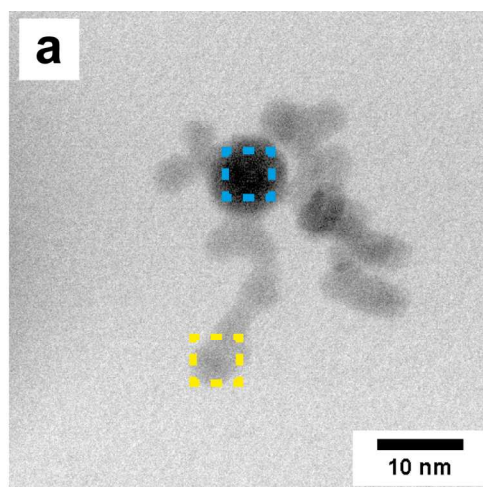


Figure S3. Bright-Field (BF)-STEM image of the reaction of 9-11 nm OAm-Au NPs with $\text{Pd}(\text{ac})_2$ to form Au-Pd heterodimers. (b) EDX spectrum of the blue boxed region from (a) showing the Au content of the NP core. (c) EDX spectrum of the yellow boxed region from (a) showing the Pd content of the NP “blades”. EDX spectra were acquired in ADF-STEM mode (see also Figure 2f).

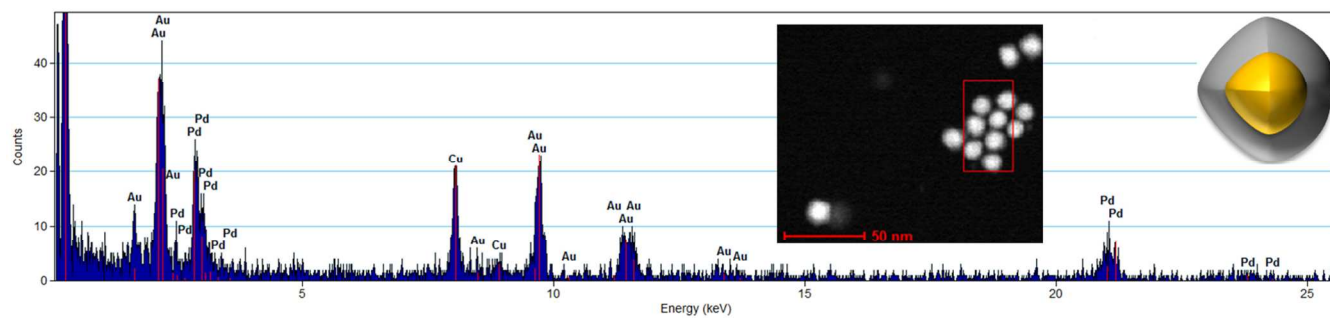


Figure S4. STEM image along with EDX spectrum of boxed ODT-Au@Pd NPs.

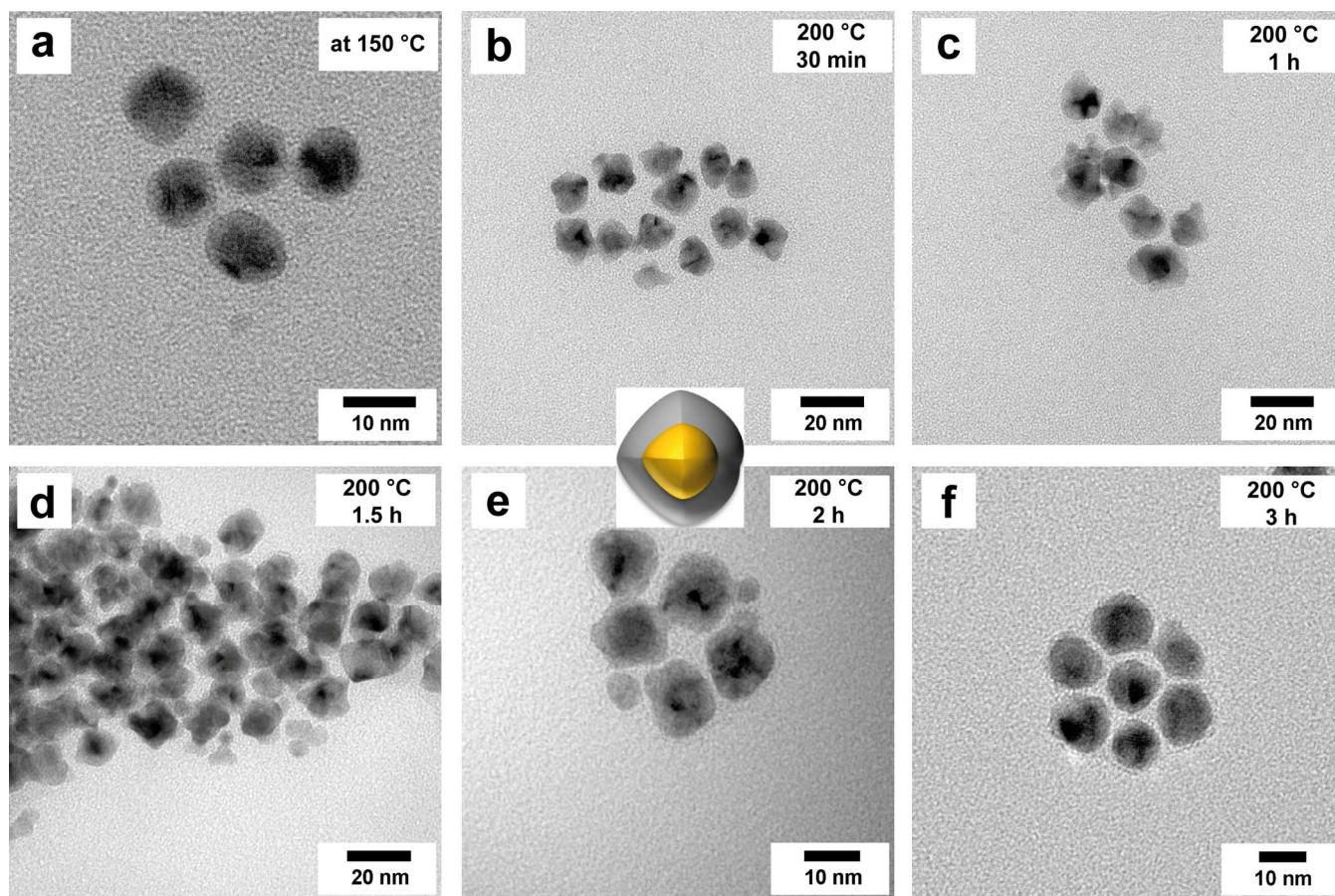


Figure S5. TEM images of ODT-Au@Pd NPs quenching studies at different reaction times and temperatures.

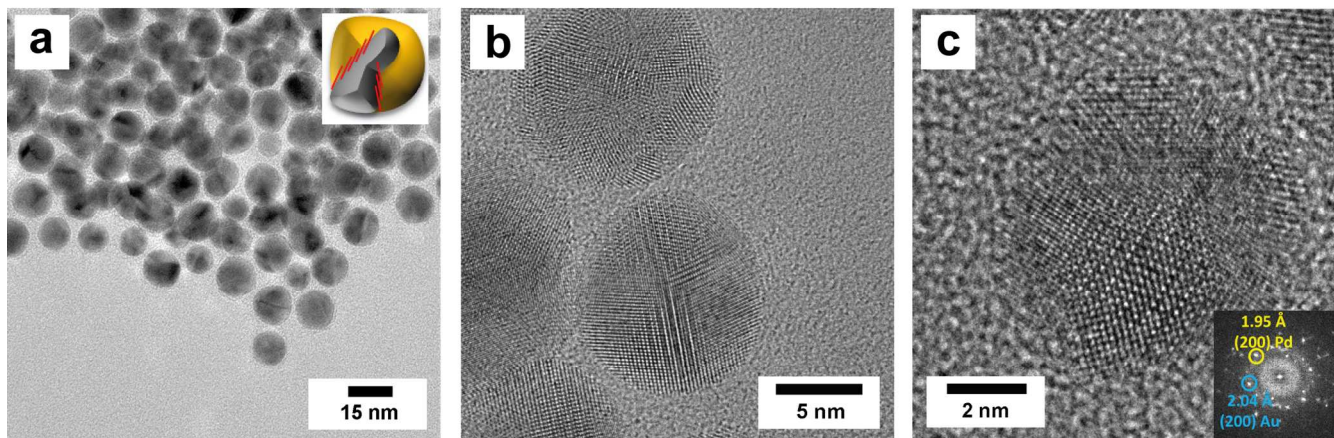


Figure S6. (a) TEM image of ODT-Au@Pd NPs with a Au:Pd ratio of 3:1. (b, c) Aberration corrected HR-TEM images of NPs from (a) with Au and Pd reflexes marked in FFT (insert in c).

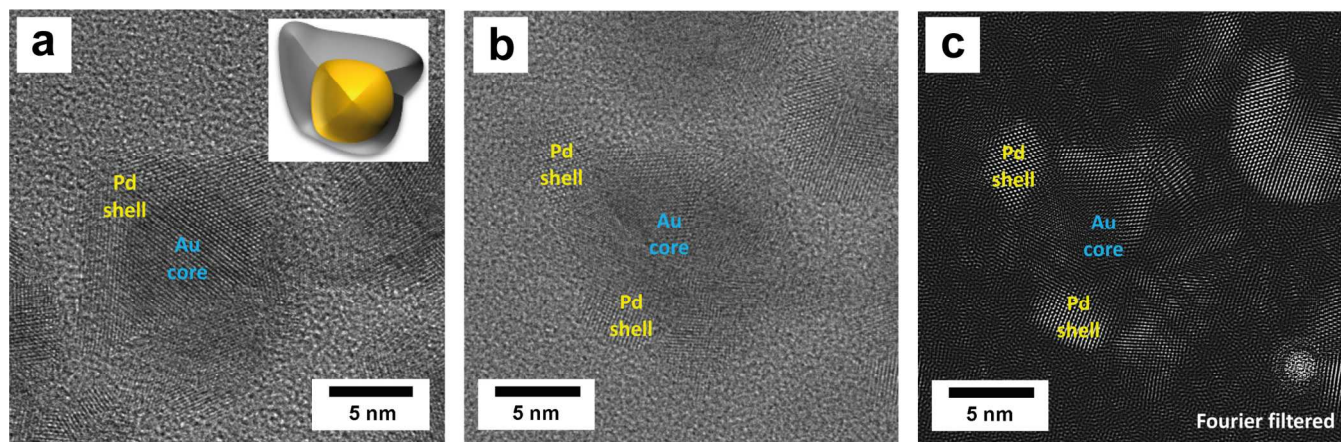


Figure S7. (a, b) Aberration corrected HR-TEM images of ODT-Au@Pd NPs with a Au:Pd ratio of 1:3 showing Au core and Pd shell. (c) Fourier filtered image of (b) showing accretions of Pd in the Pd shell structure.

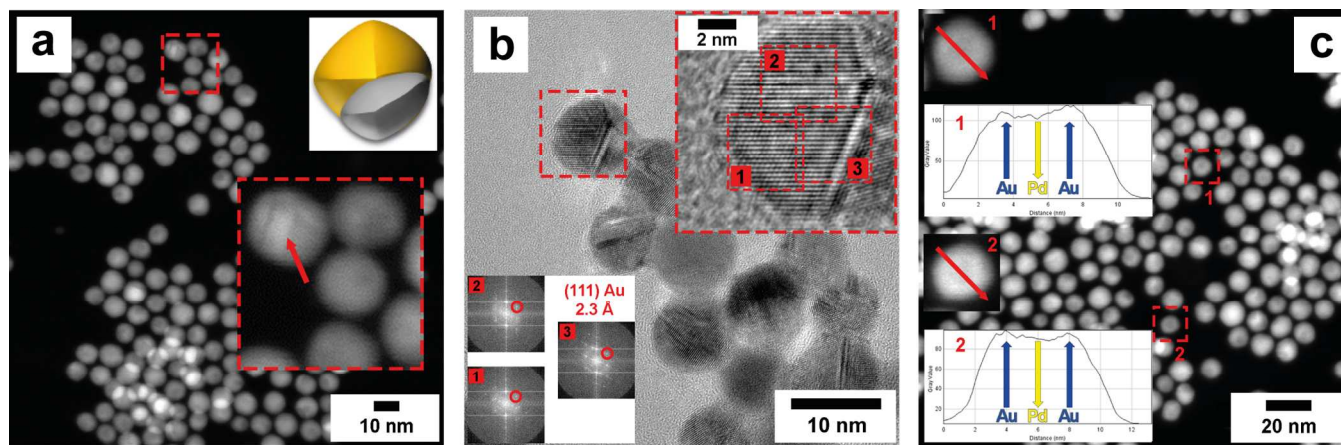


Figure S8. (a) HAADF-STEM image and (b) HR-TEM image of OAm-Pd@Au NPs showing domain boundaries of Au rich domains. (c) HAADF-STEM image and grey value profile for two OAm-Pd@Au NPs showing core-shell structure.

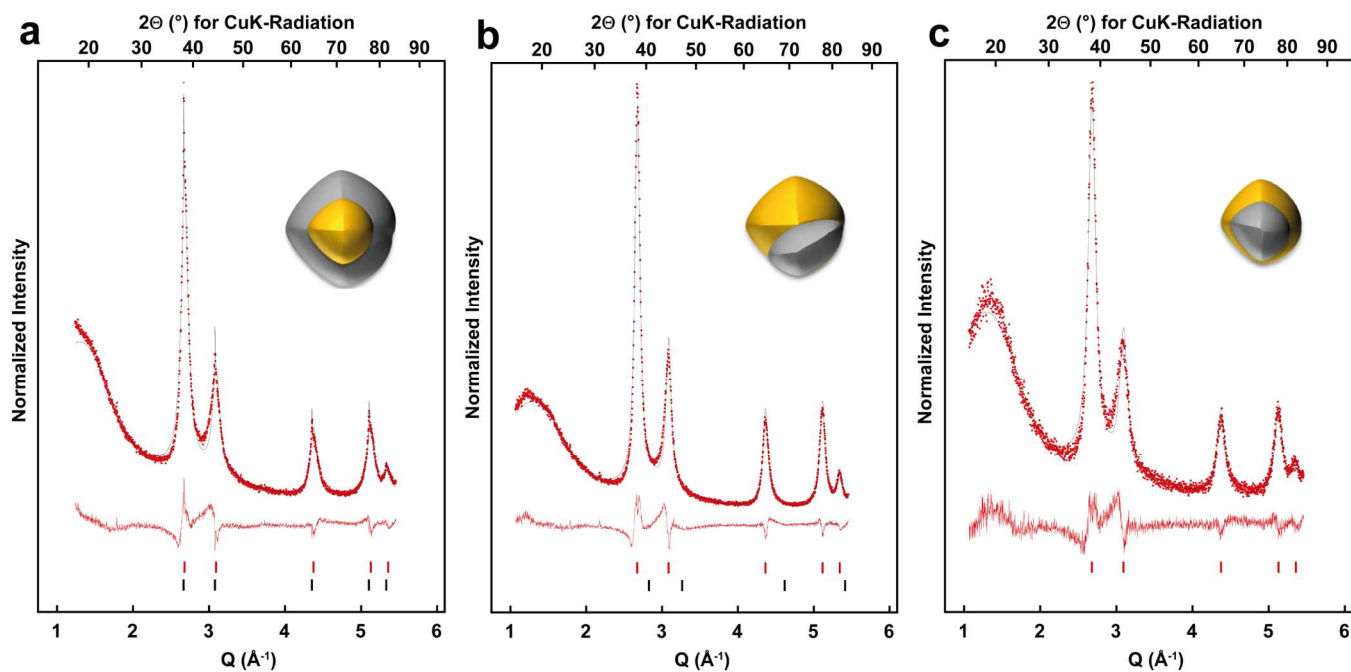


Figure S9. Refinements of powder XRD data for (a) ODT-Au@Pd NPs, (b) OAm-Pd@Au NPs, and (c) ODT-Pd@Au NPs. Red dots mark the experimental data, the black line corresponds to the calculated pattern, and the red line shows the difference between the experimental and calculated data. Red and black ticks mark reflections of Au and Pd, respectively. $Q = [4\pi \sin(\Theta)]/\lambda$ is the scattering vector.

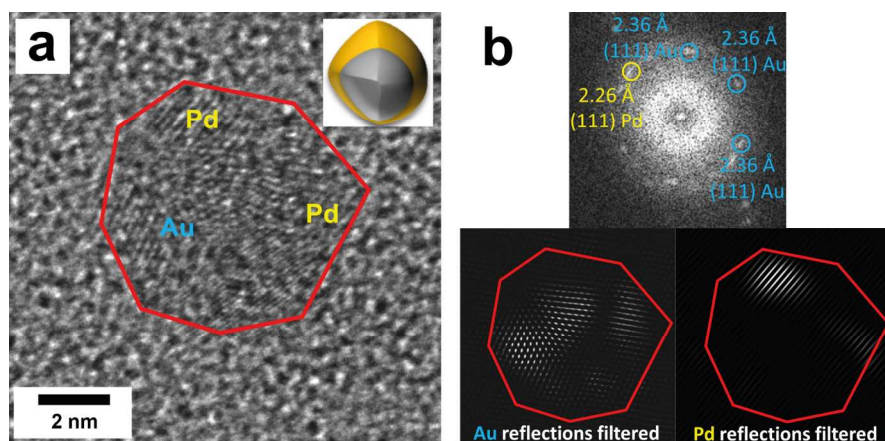


Figure S10. (a) Aberration corrected HR-TEM image of a ODT-Pd@Au NP with distribution of Au and Pd. (b) FFT showing Au and Pd reflections of the NP displayed in (a) along with filtered Au and Pd reflections.

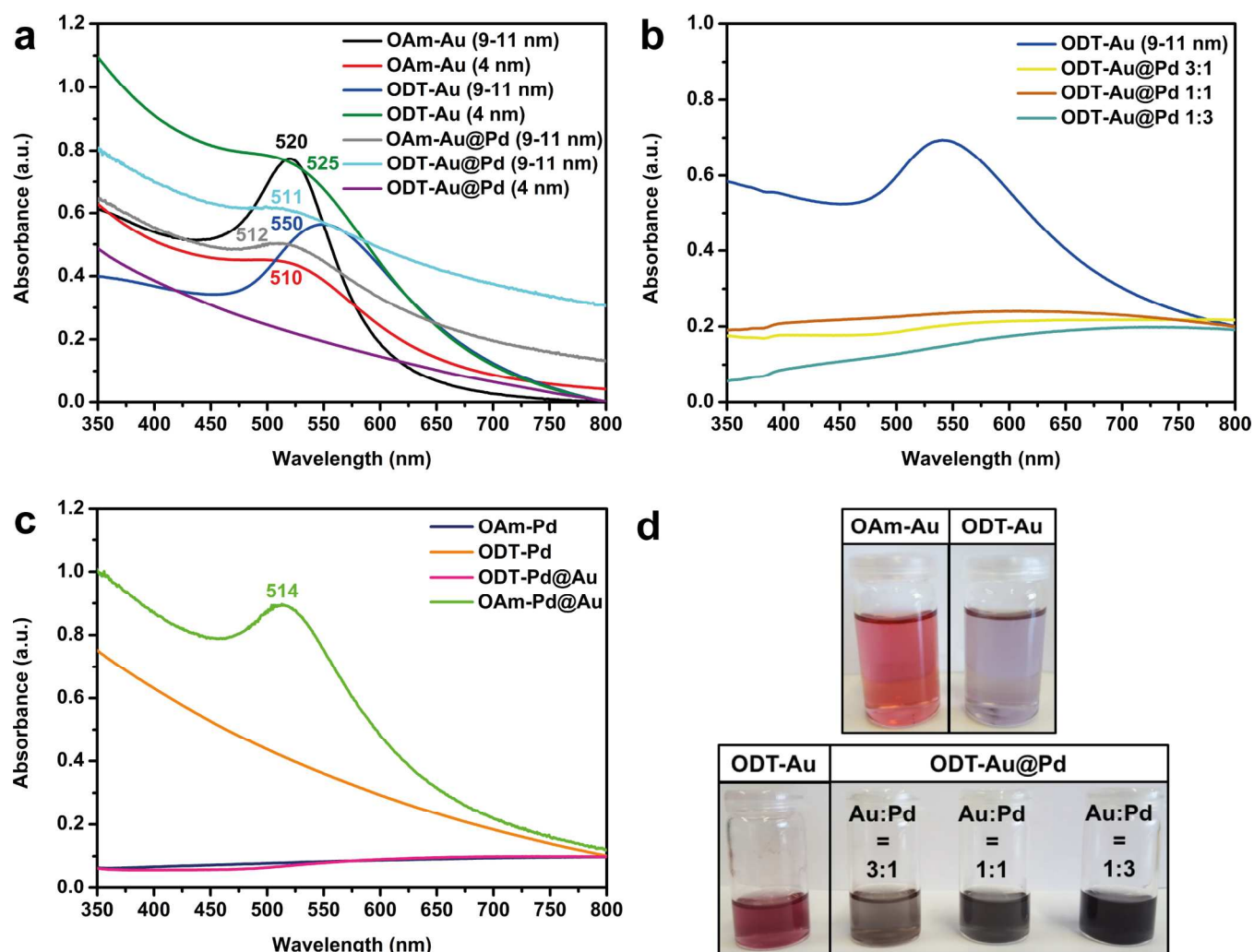


Figure S11. UV-vis spectra of (a) OAm-Au, ODT-Au, OAm-Au@Pd and ODT-Au@Pd NPs of 4 nm and 9-11 nm size. (b) UV-vis spectra of ODT-Au@Pd NPs with different Au:Pd ratios. (c) UV-vis spectra of OAm-Pd, ODT-Pd, ODT-Pd@Au and OAm-Pd@Au NPs. (d) Photographs of different NP dispersions of same NP concentration in cyclohexane.