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Influence of Silver Ions on the Growth Mode of Platinum on Gold nanorods

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SUPPORTING INFORMATION

Description of control experiments:

Since removal of Ag^+ through cleaning of the Au nanorod dispersion also involved removing other species such as NO_3^- and HCl , control experiments were carried out to identify the origin of the optical and morphological differences:

1. Pt growth by selective Ag^+ removal: after washing the nanorod dispersion as described in the main text of the paper, appropriate amounts of KNO_3 and HCl were added to recover the original concentrations of NO_3^- and HCl . Subsequently, Pt deposition was carried out with Au:Pt molar ratios of 0.4 and 1.
2. Pt growth by recovery of starting conditions: after washing the nanorod dispersion as described in the main text of the paper, appropriate amounts of AgNO_3 and HCl were added to recover the original concentrations of NO_3^- and HCl . Subsequently, Pt deposition was carried out with Pt:Au molar ratios of 0.4 and 1.0.

The UV-vis spectra and TEM images of the samples prepared following both routes are shown in Figures S1 and S2, respectively, confirming that growth without Ag^+ leads to overcoating, while when Ag^+ is present (even when added after washing), tip-coating is obtained.

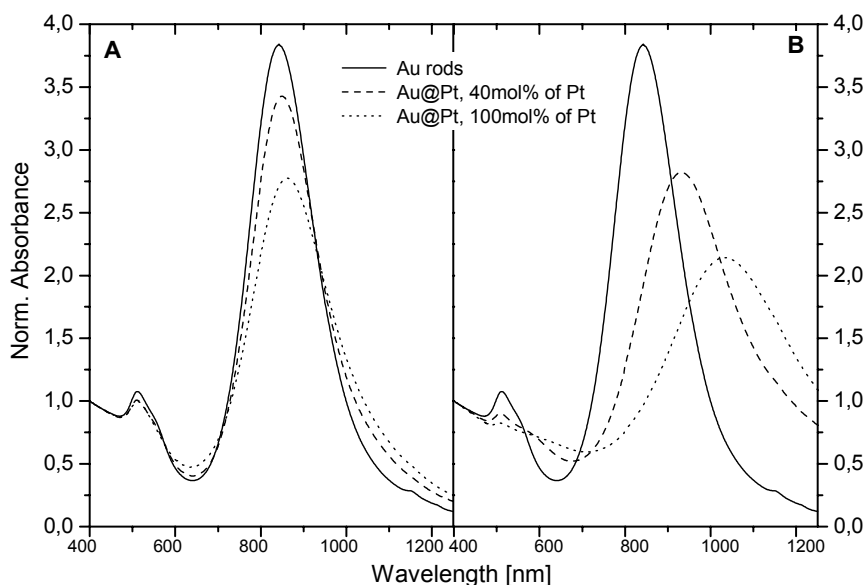


Figure S1. UV-vis spectra of gold nanorods coated with different amounts of platinum (40 and 100 mol%), in the absence (route 1, A) and in the presence (route 2, B) of Ag^+ . All samples contain identical concentrations of NO_3^- , H^+ and Cl^- .

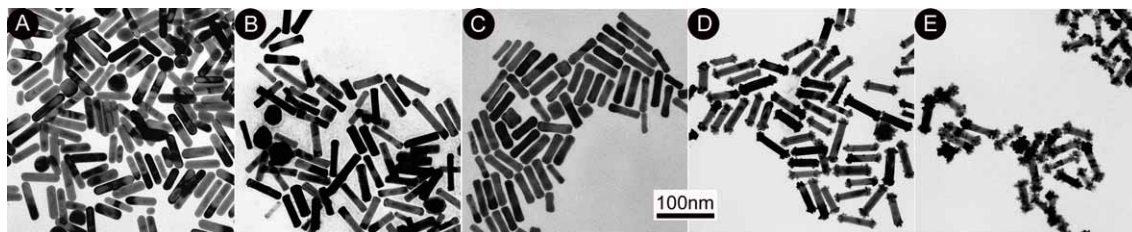


Figure S2. Representative TEM micrographs of the initial Au nanorods (A) and Au@Pt nanorods obtained in the absence (B,C), and in the presence (D,E) of Ag^+ . The Pt:Au molar ratios are 0.4 (B,D) and 1.0 (C,E).

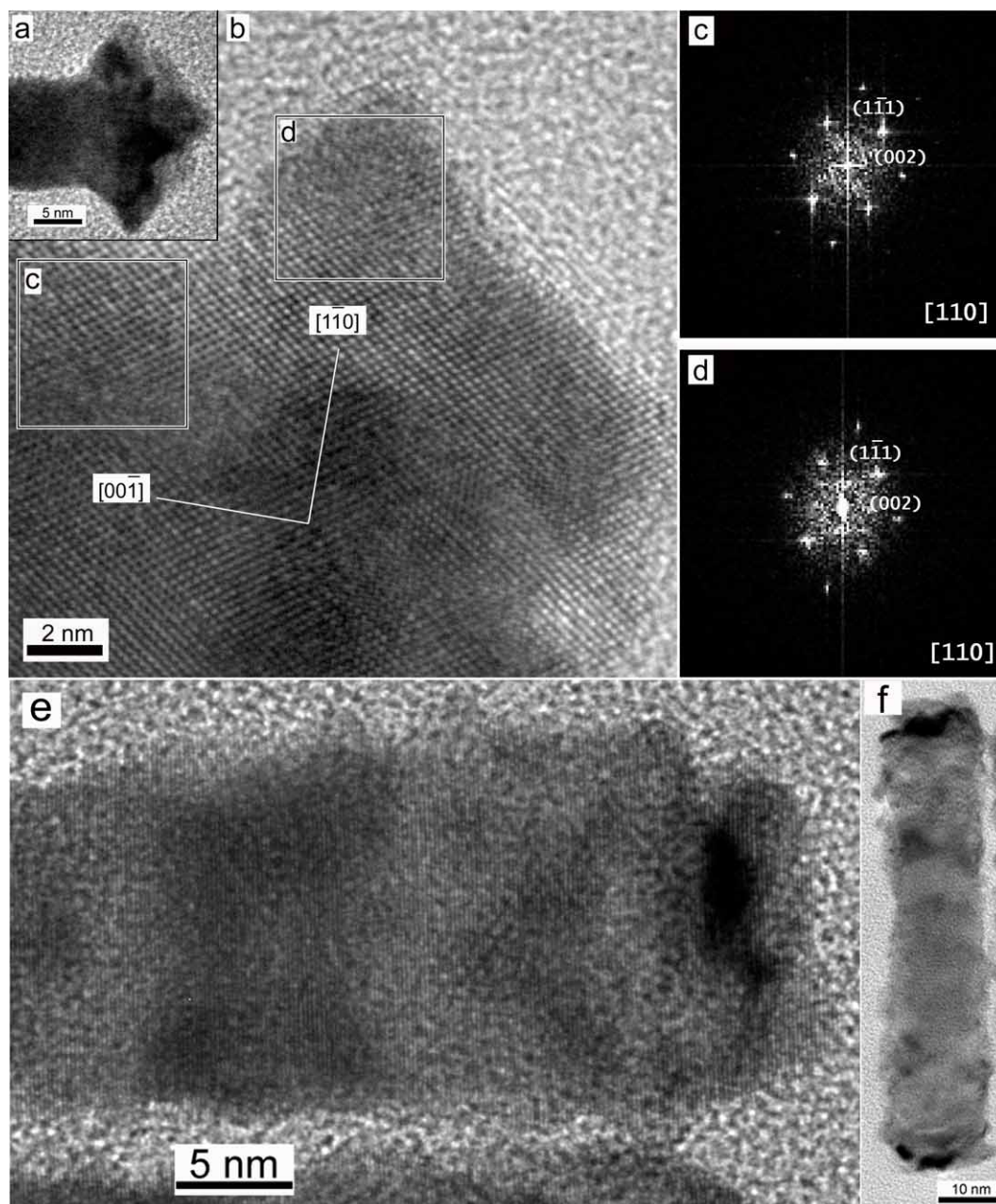


Figure S3. HRTEM images of Au nanorods coated with Pt in the presence (a,b) and in the absence (e,f) of Ag^+ . (c,d) Power spectra in the [110] zone axis orientation from the middle part (c) and tip (d) of Au/Pt rods, taken from the areas indicated in image (b).

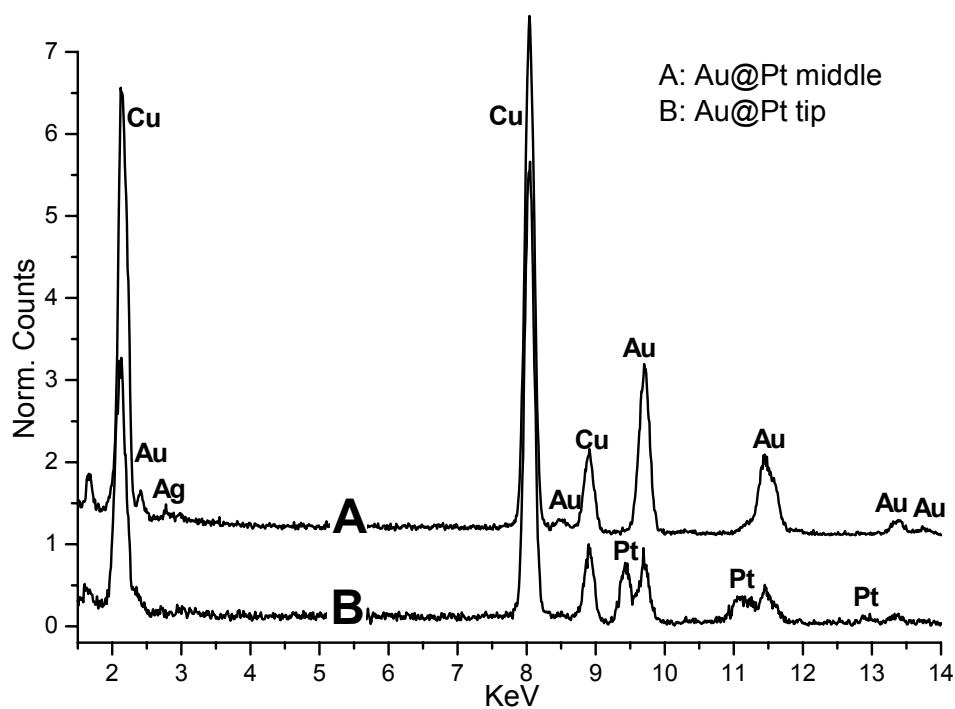


Figure S4. EDS spectra of middle part (A) and tip (B) of coated gold nanorods with platinum in the presence of Ag^+ ions. Note the different ratio between peak intensities for Au and Pt. Also note that sensitivity is probably too low for the detection of metallic silver.