Supplementary Material (ESI) for Green Chemistry

Supporting Information

A greener synthesis of nanoparticles: Sunlight formation of gold nanodecahedra for ultra-sensitive lead-ion detection

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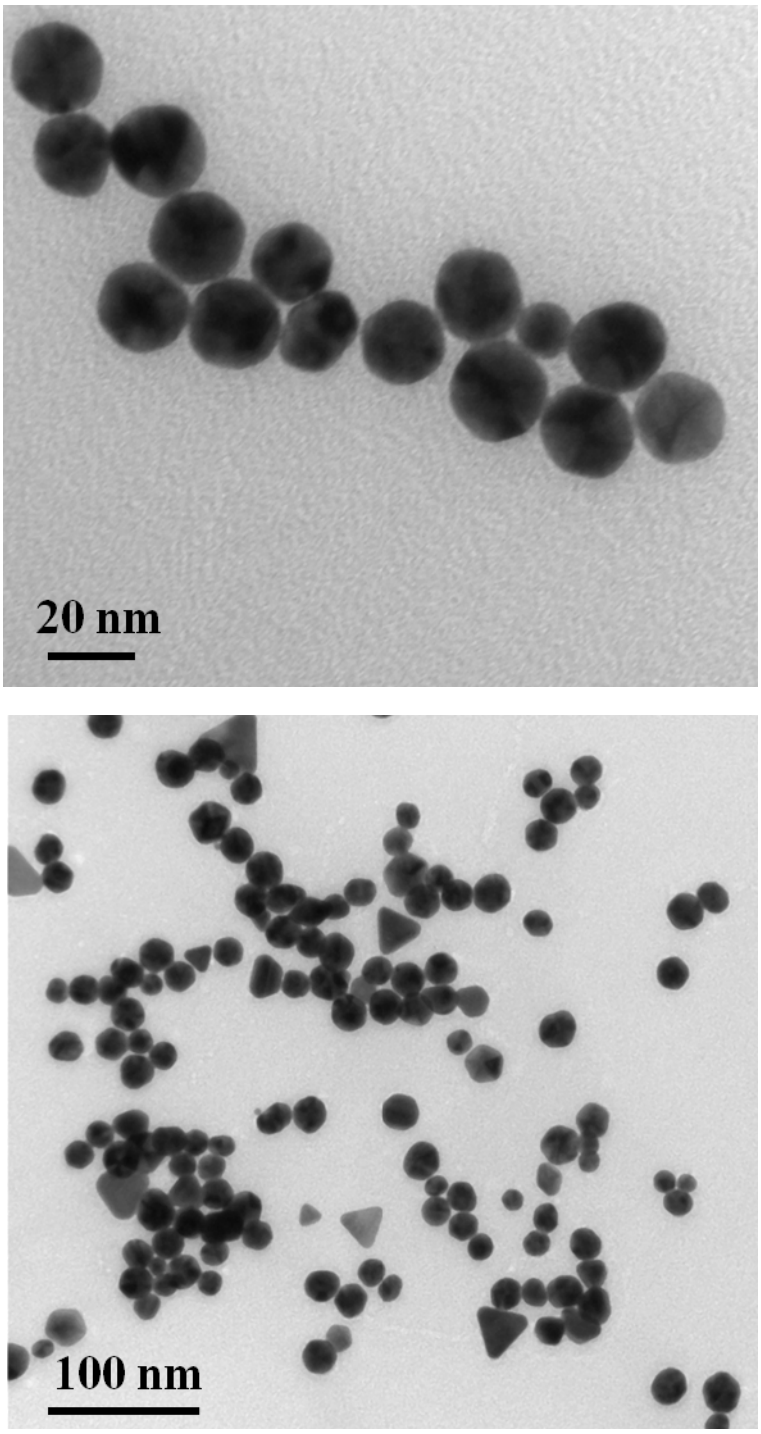

Figure S1. TEM images of the Au decahedral nanoparticles collected after 300 min of solar irradiation.

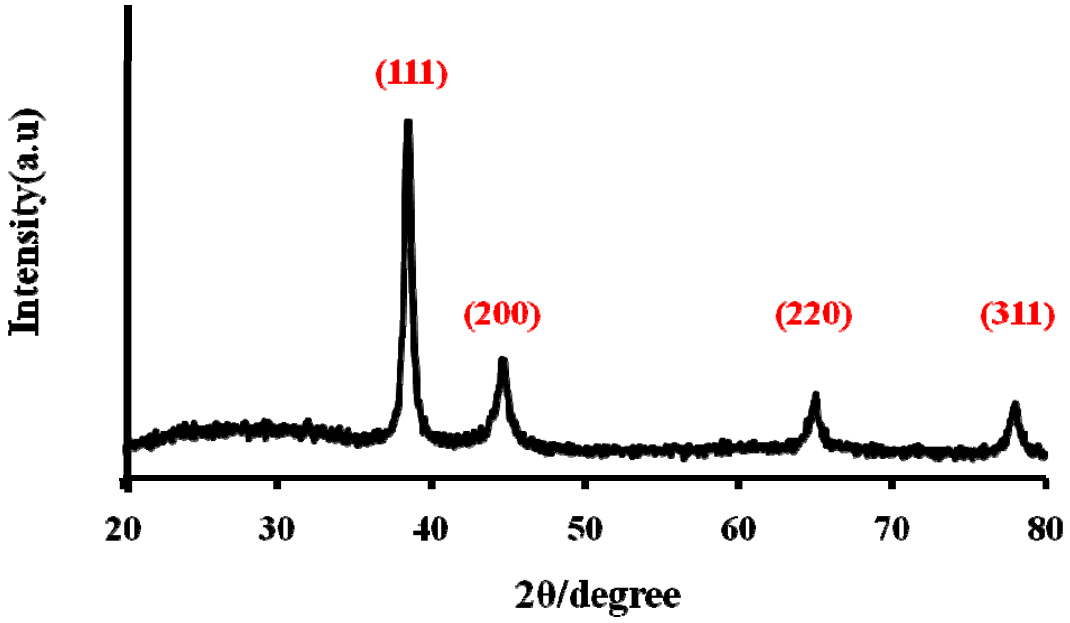

Figure S2. X-ray diffraction patterns (XRD) spectrum of Au decahedral nanoparticles.

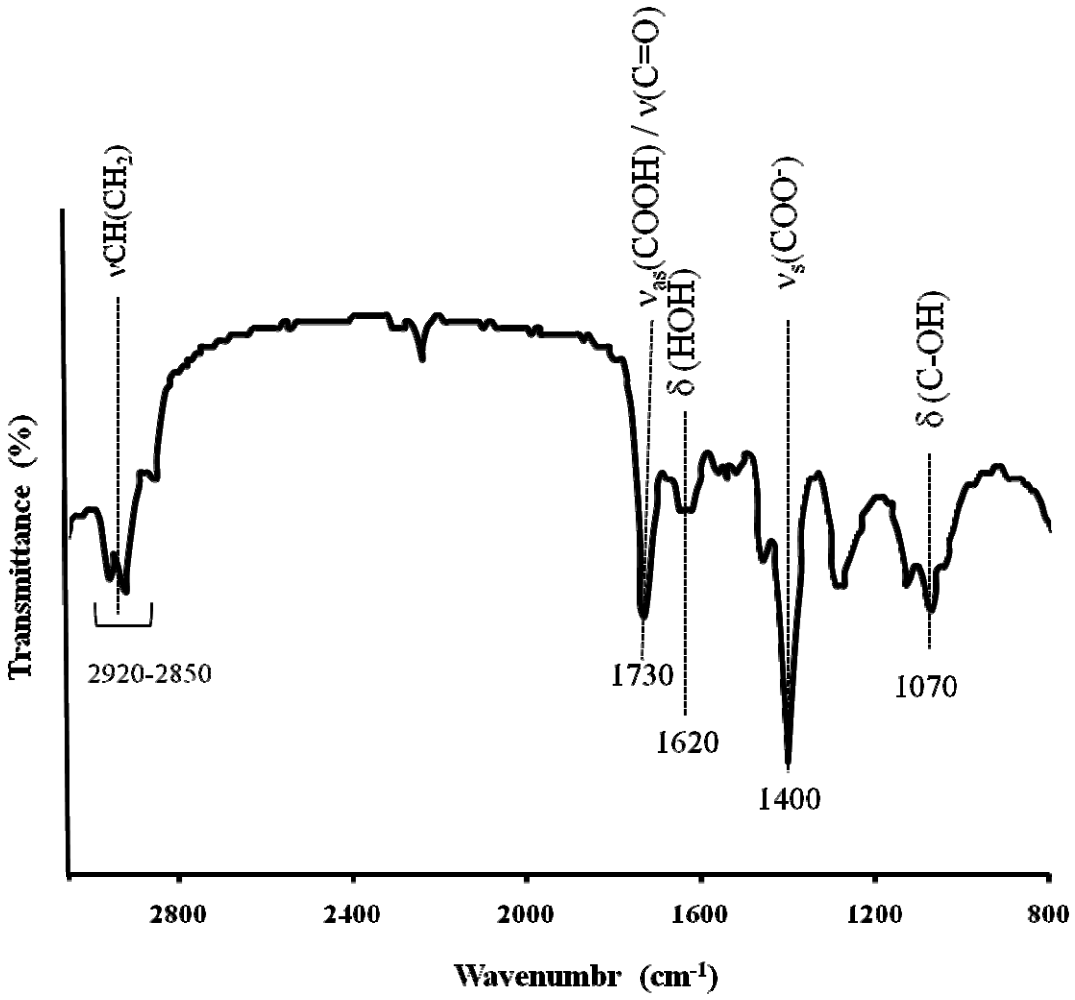

Figure S3. FT-IR spectrum of Au decahedral nanoparticles collected after 300 min of solar irradiation.

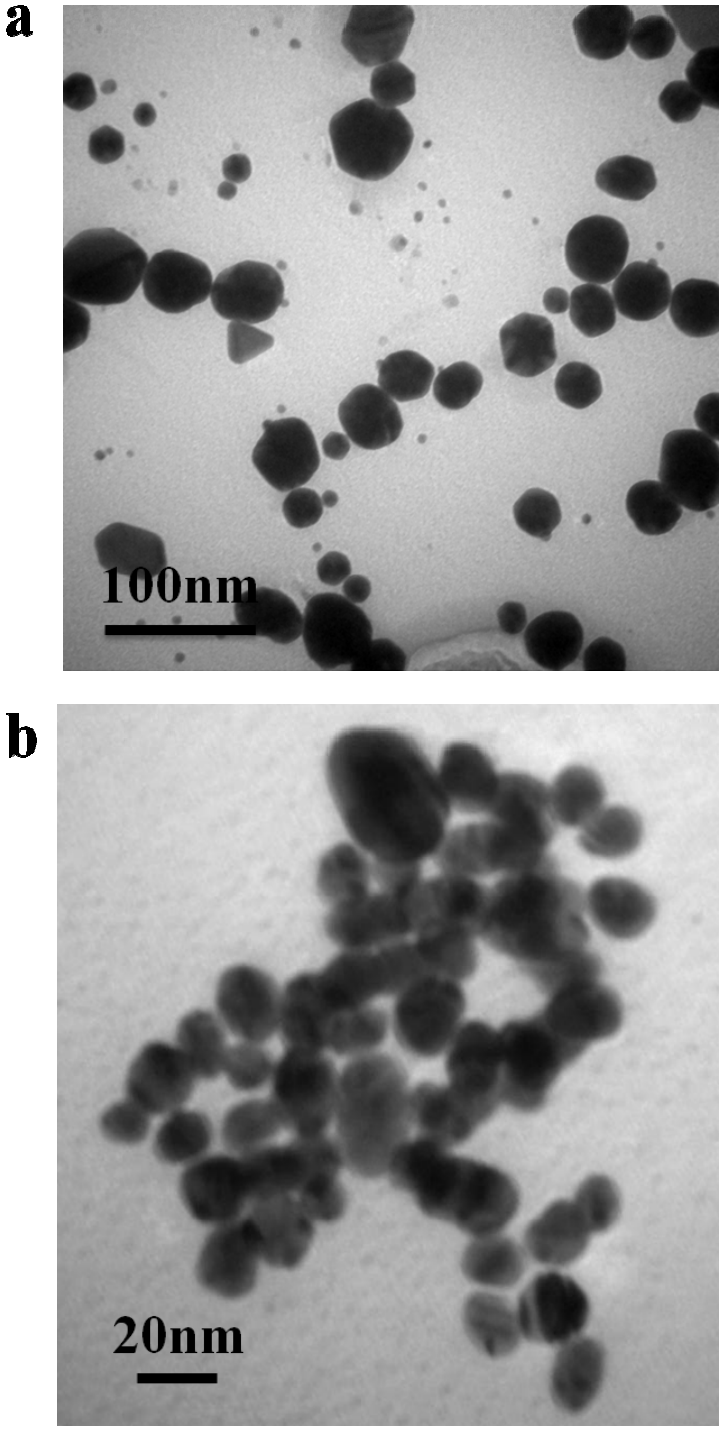

Figure S4. TEM images of Au nanoparticles (synthesized using tri-sodium citrate concentrations of (a) 38.8 mM and (b) 77.6 mM) after 300 min of solar irradiation. The $HAuCl_4$ concentration was kept at 1 mM.

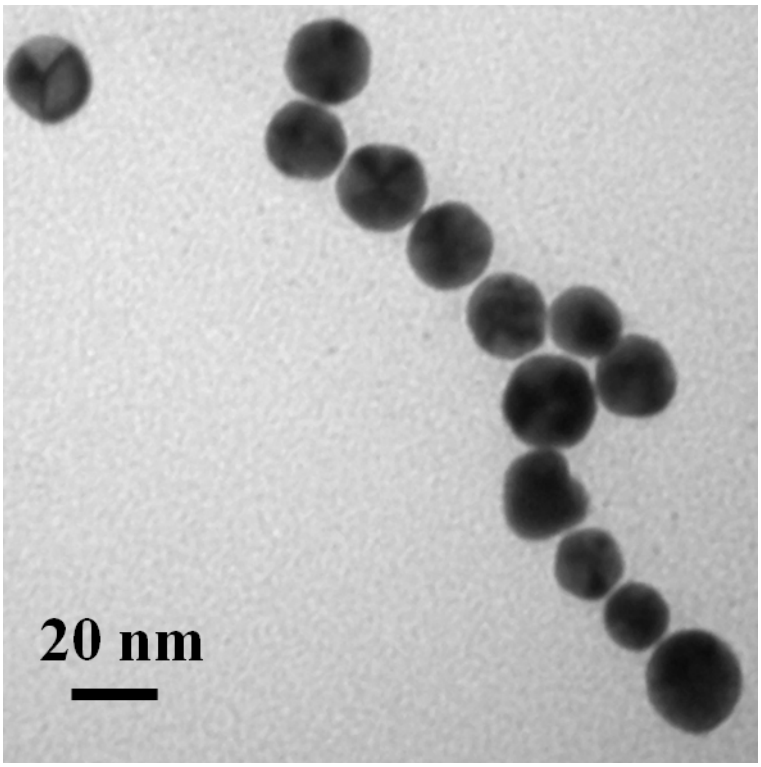

Figure S5. TEM image of Au decahedral nanoparticles using 10 ml of $HAuCl_4$ (1 mM) and 2 ml of tri-sodium citrate (7.76 mM) collected after 300 min of solar simulator irradiation.

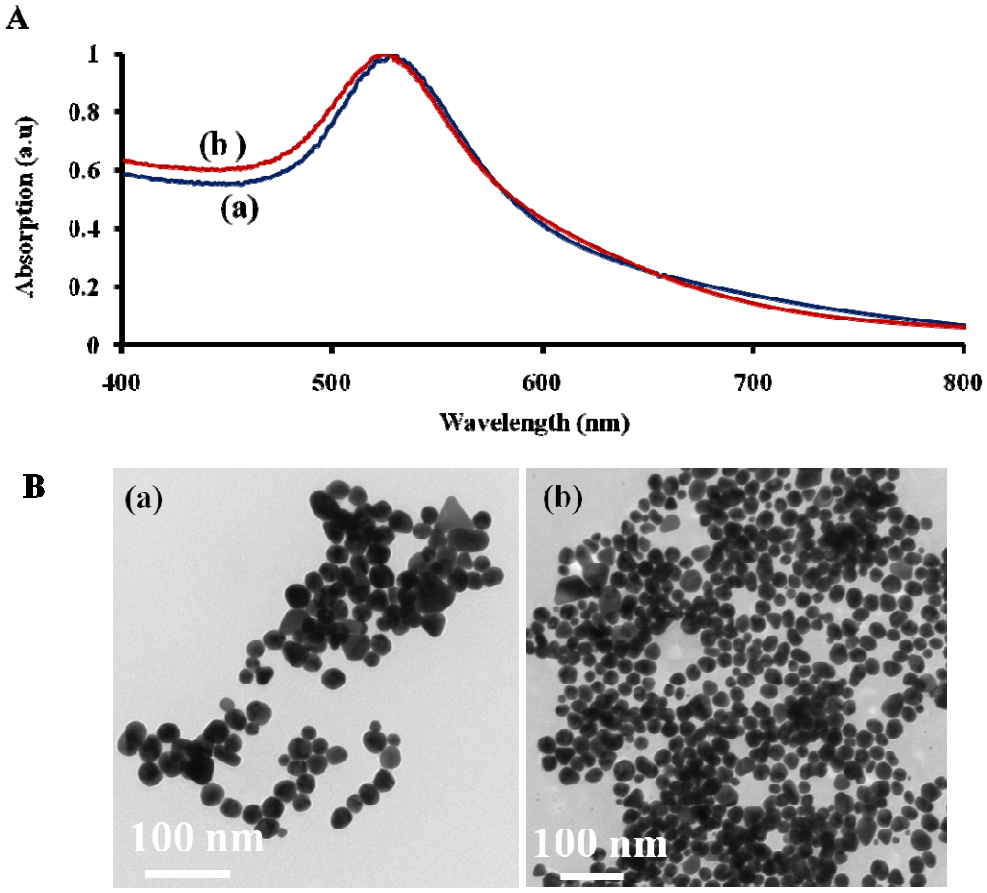

Figure S6. (A) The UV-Visible spectra and (B) TEM images of Au nanoparticles. (a): heating mixture at 34 ^{o}C for 5 h. (b) mixture kept in the dark for 5 h. The mixture contained 10mL of $HAuCl_4$ (1mM) and 2mL of trisodium citrate (7.76mM).

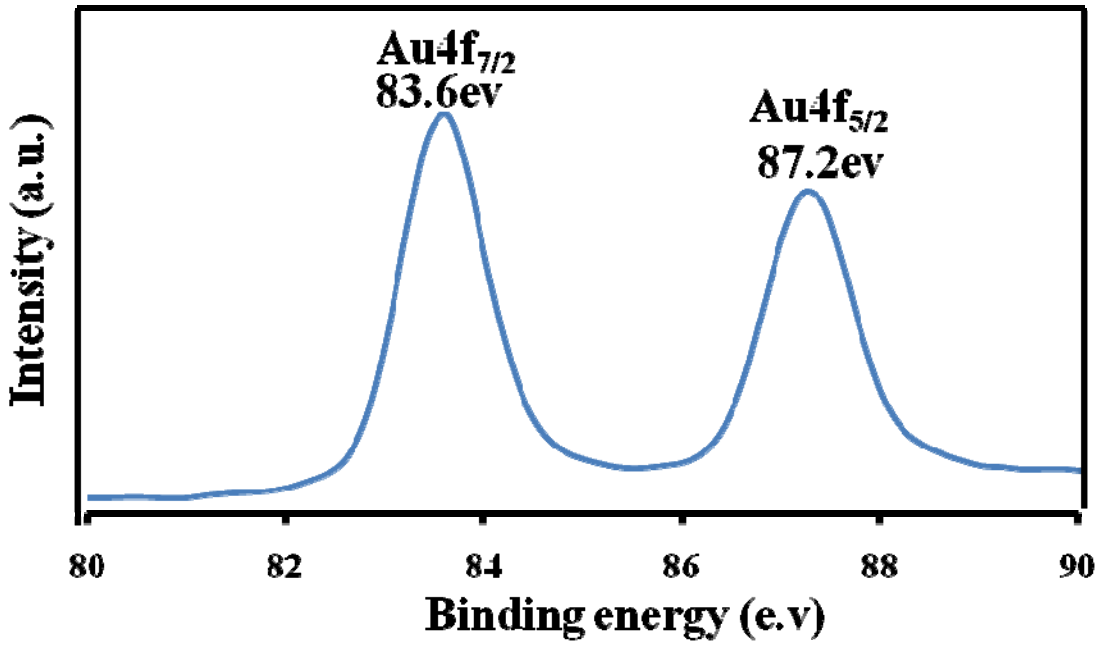

Figure S7. The high-resolution XPS spectrum of Au 4f core-level for Au decahedral nanoparticles.

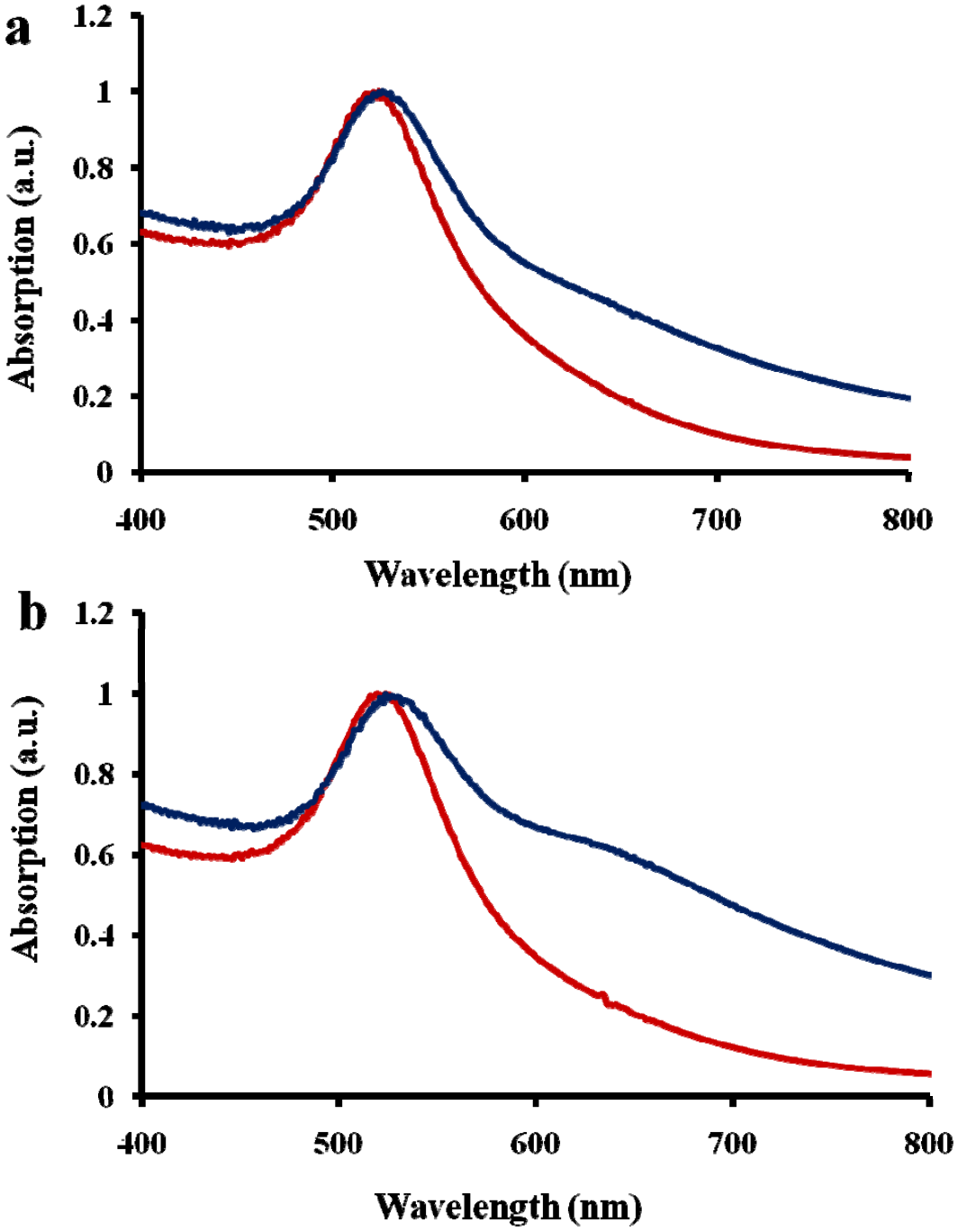

Figure S8. The UV-Vis spectra of (a) label-free Au decahedral nanoparticles and (b) GSH-modified Au decahedral nanoparticles for colloidal solutions containing (Hg^{2+}, Mn^{2+}, Ni^{2+}, Fe^{3+}, Zn^{2+}, Ca^{2+}, and Pb^{2+}) with (blue line) and without (red line) Pb^{2+}. The concentration of each metal ion was 1 ppm.

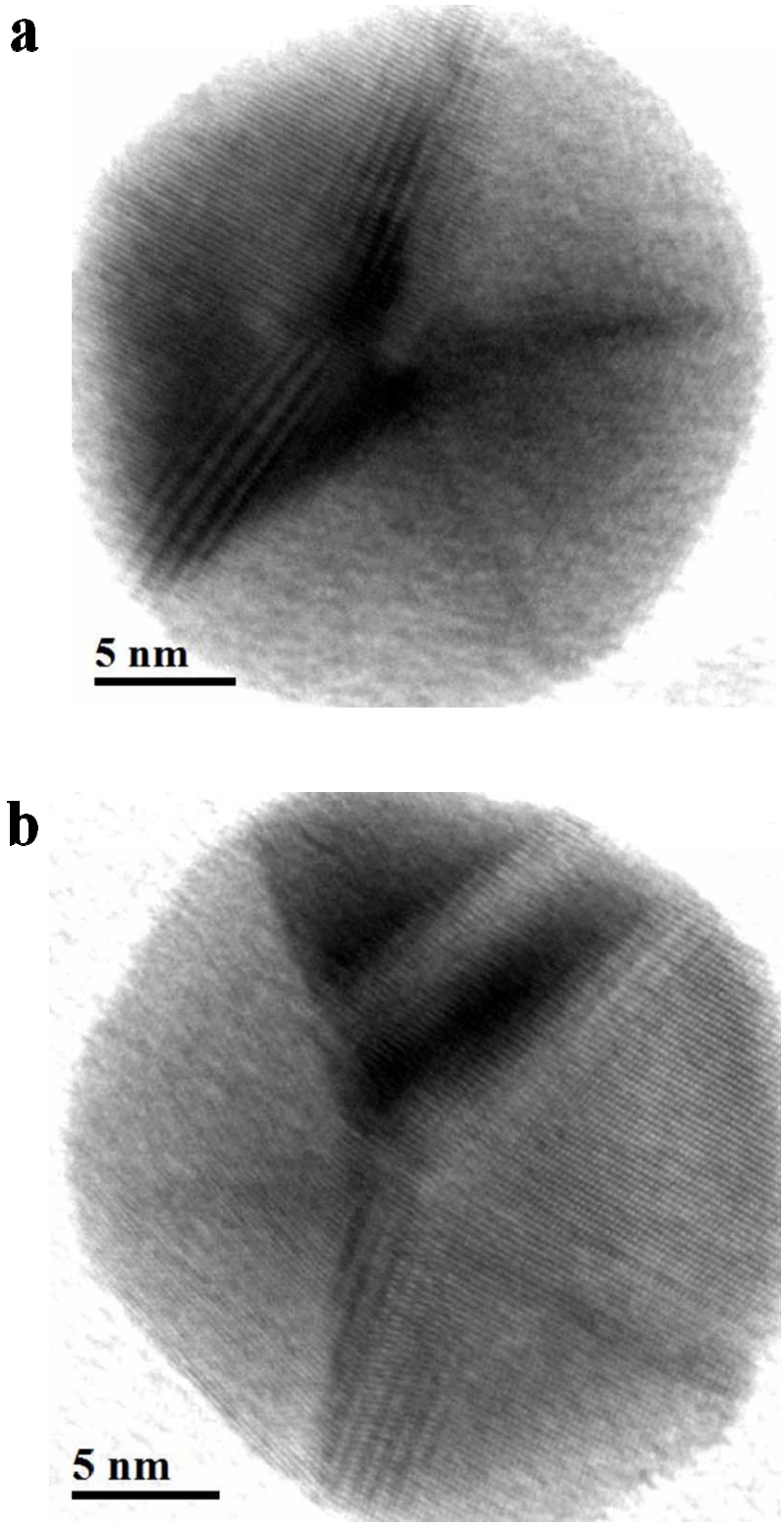

Figure S9. HR-TEM images of Au decahedral nanoparticles indicating splitting at the central axis and stack faults.

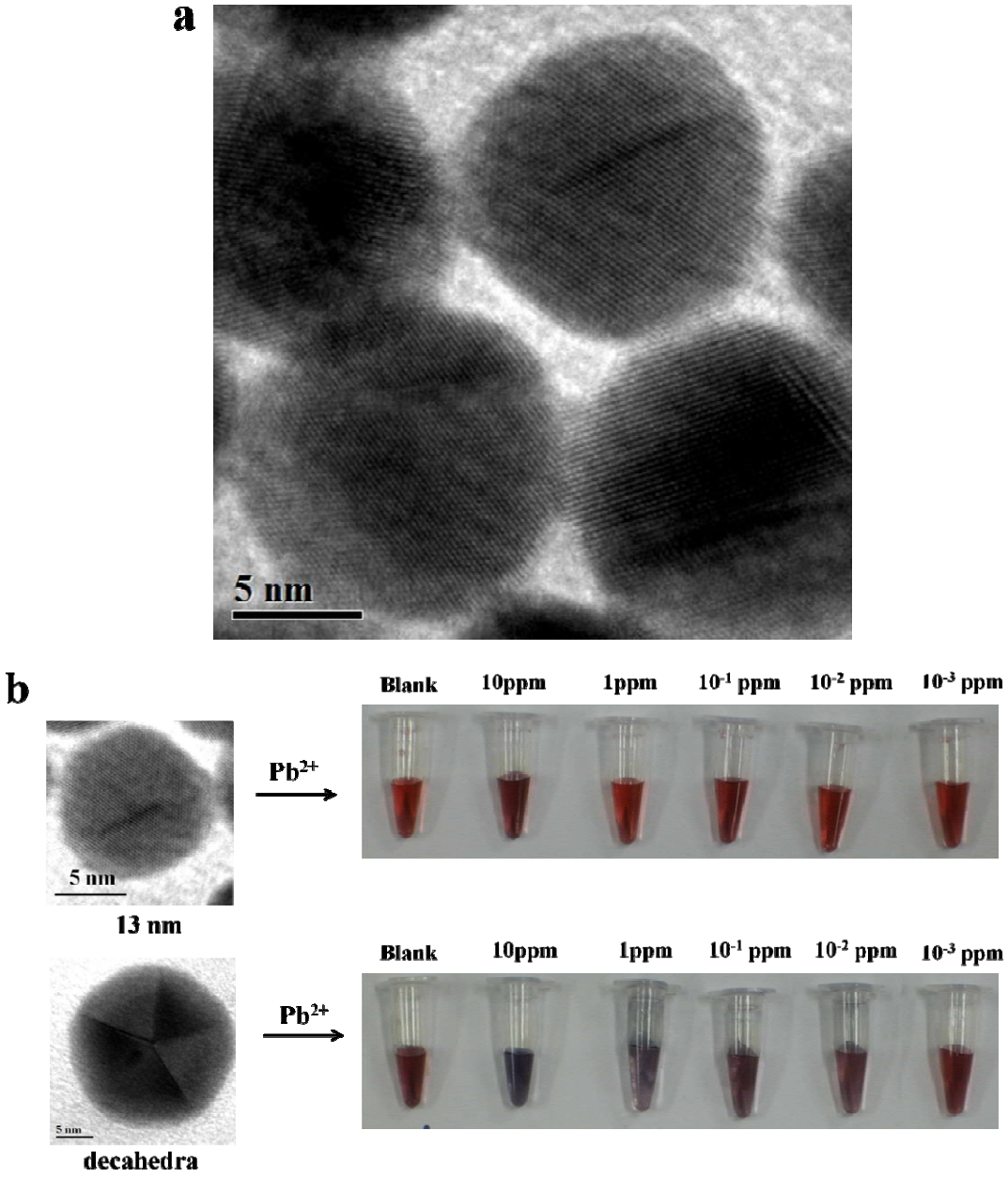

Figure S10. (a) TEM image of citrate-capped 13 nm Au nanoparticles prepared using the thermal method. (b) The color response of the label-free 13-nm Au nanoparticles and label-free Au decahedral nanoparticles for detecting Pb^{2+} in a series of concentrations.