

Electronic supplementary information

Real time plasmonic spectroscopy of the interaction of Hg^{2+} with single noble metal nanoparticles

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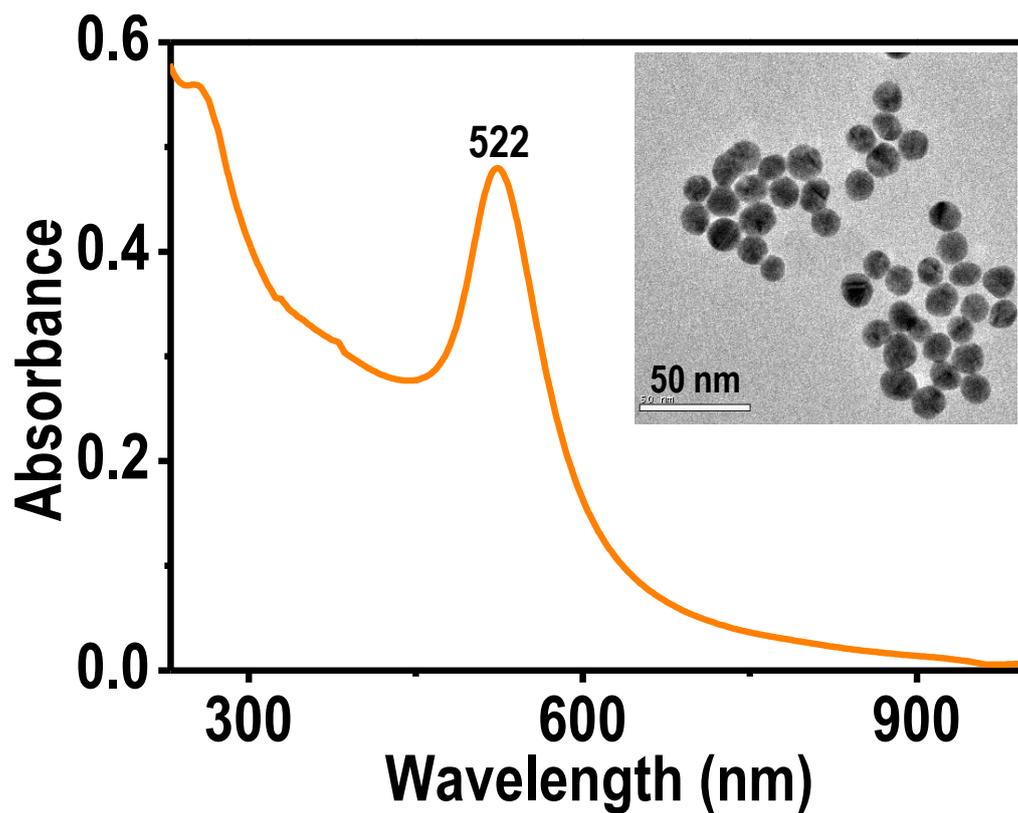


Fig. S1 UV-vis absorption spectrum of as-prepared Au@citrate NPs. Inset is the TEM image of Au@citrate NPs.

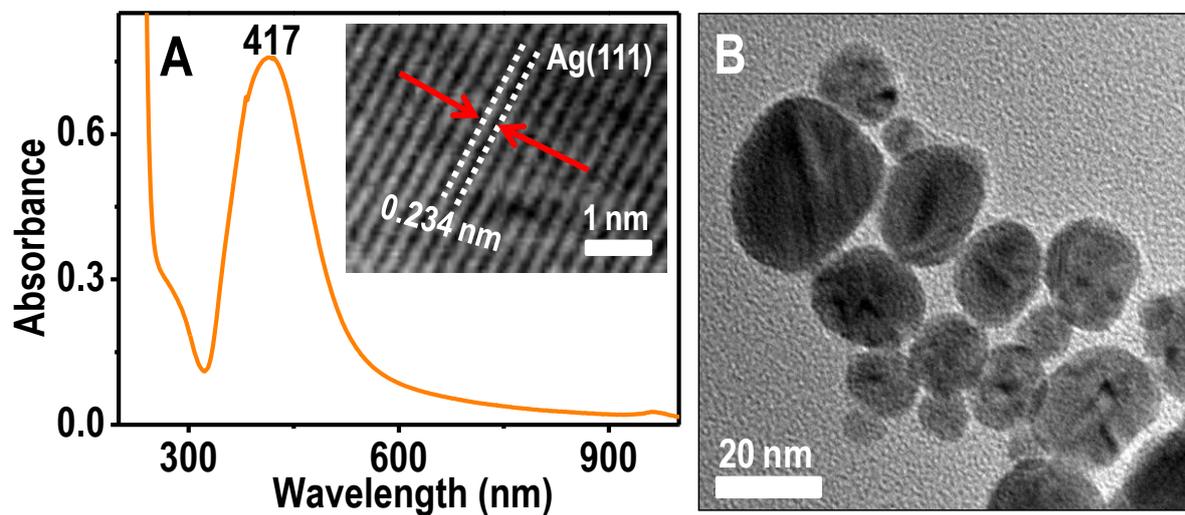


Fig. S2 UV-vis absorption spectrum (A) and TEM image (B) of as-synthesized Ag@citrate NPs. Lattice plane and inter planar distance of Ag(111) in a single NP are shown as inset of A.

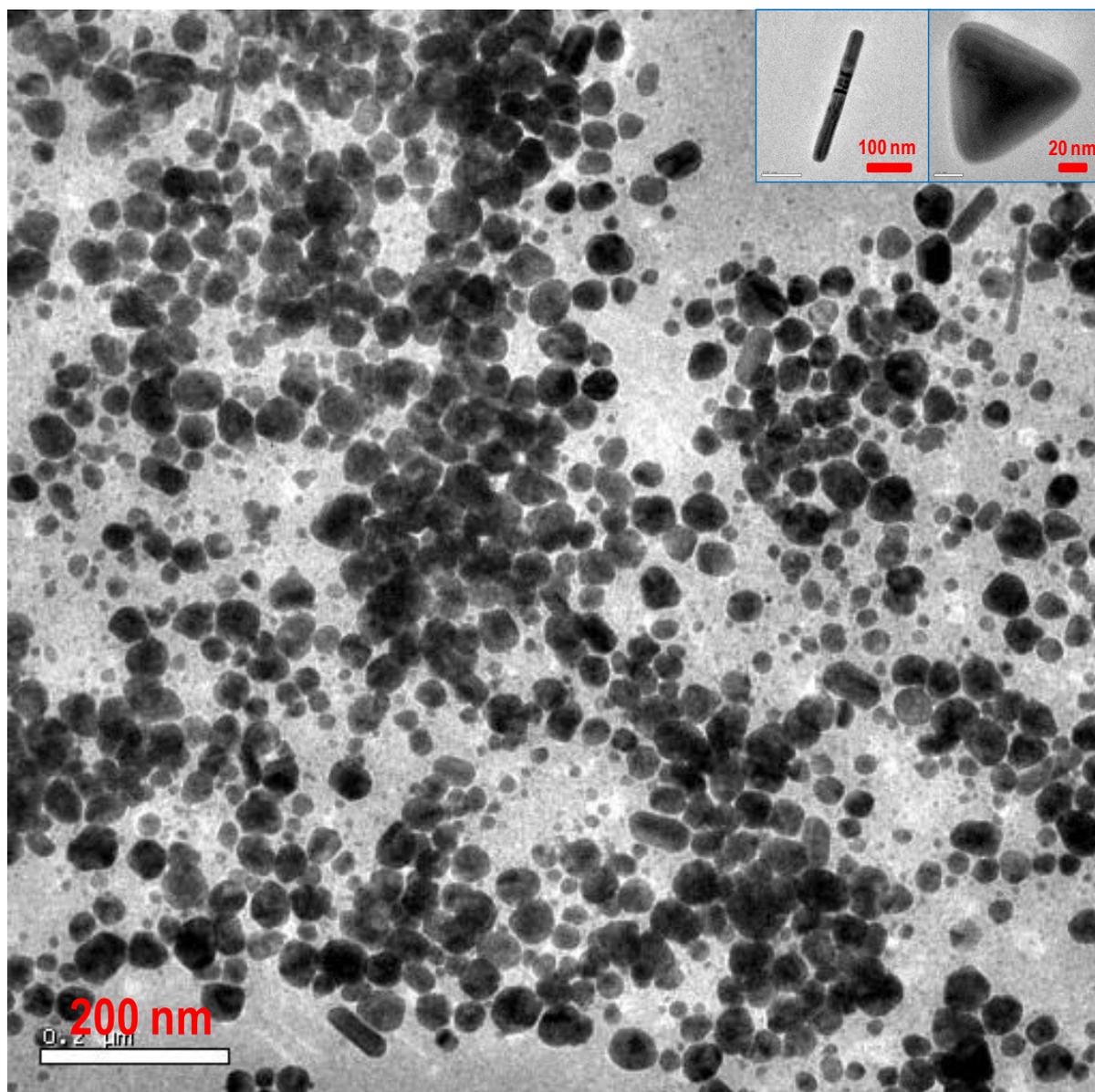


Fig. S3 Large area TEM image of as-synthesized Ag@citrate particles which shows polydispersity along with different morphologies. A single nanorod and a triangle are shown as insets.

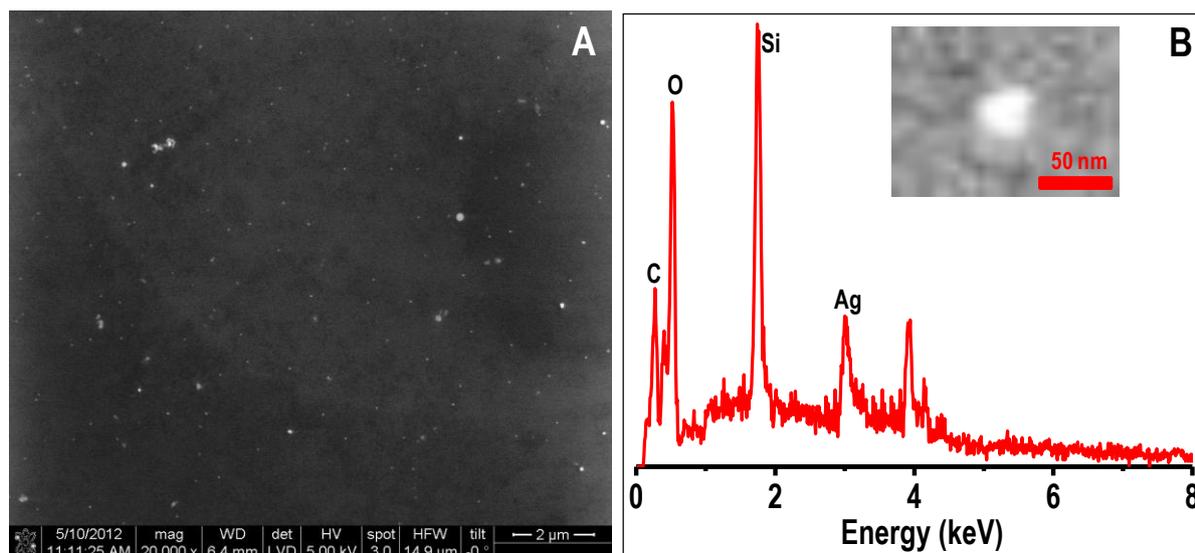


Fig. S4 A) Large area FESEM image of immobilized Ag@citrate particles on glass substrate. B is the EDAX spectrum of one of the particles (inset of B). Data indicate the presence of silver. Si is from the substrate used. O is also partly from the substrate.

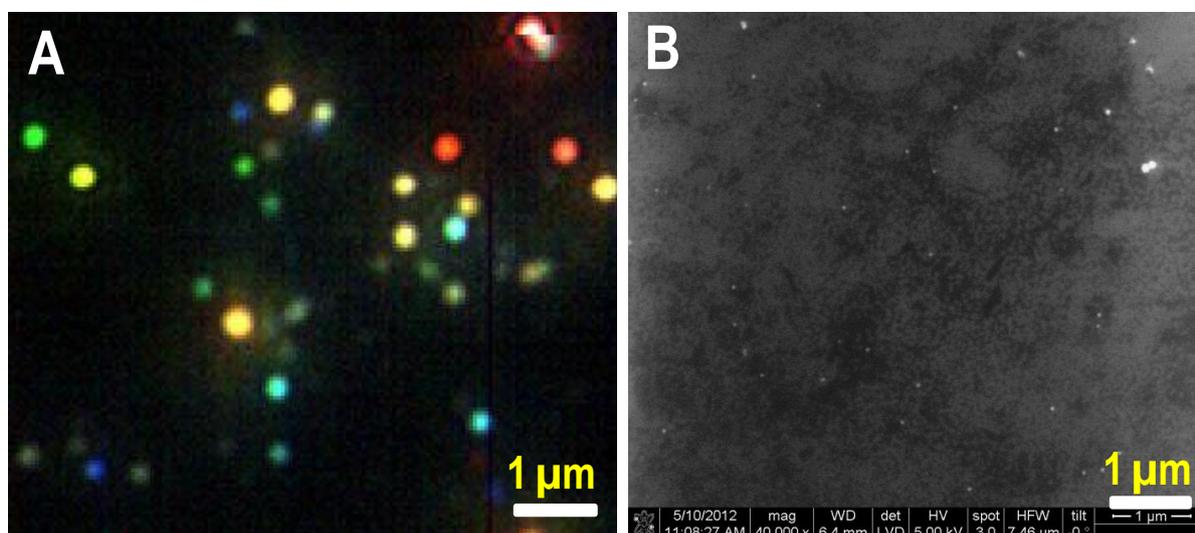


Fig. S5 Comparison of number of particles in HSI (A) and FESEM (B) images of immobilized (on glass slide) Ag@citrate nanoparticles in a given area ($7.2 \times 6.2 \mu\text{m}^2$). The number of particles in A and B are 33 ± 3 and 35 ± 3 , respectively.

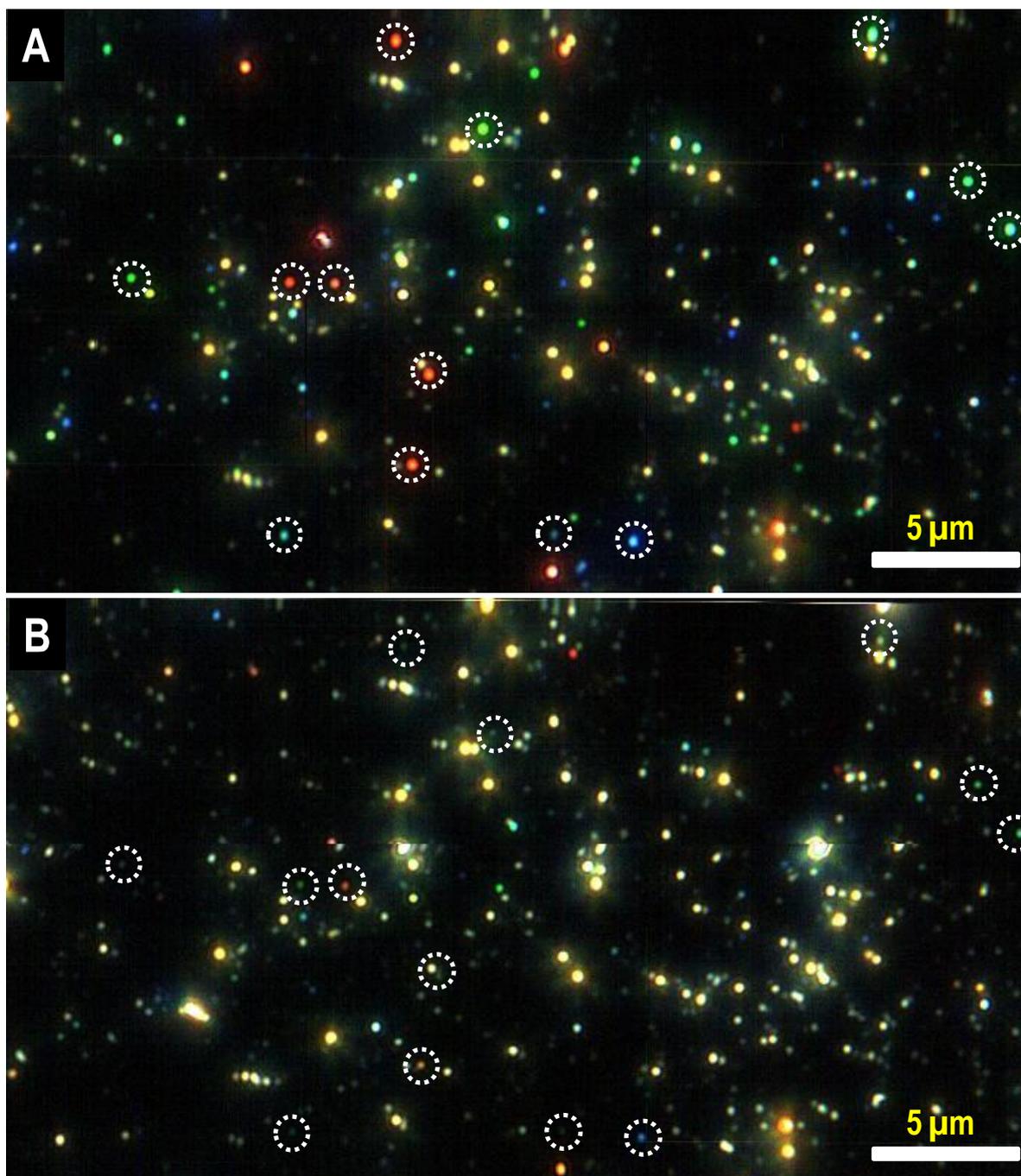


Fig. S6 Large area HSI of immobilized Ag@citrate NPs before and after treating 5 ppm Hg²⁺ for 6.0 h (A and B, respectively). Changes in colors of some of the NPs are marked with dotted circles, for comparison.

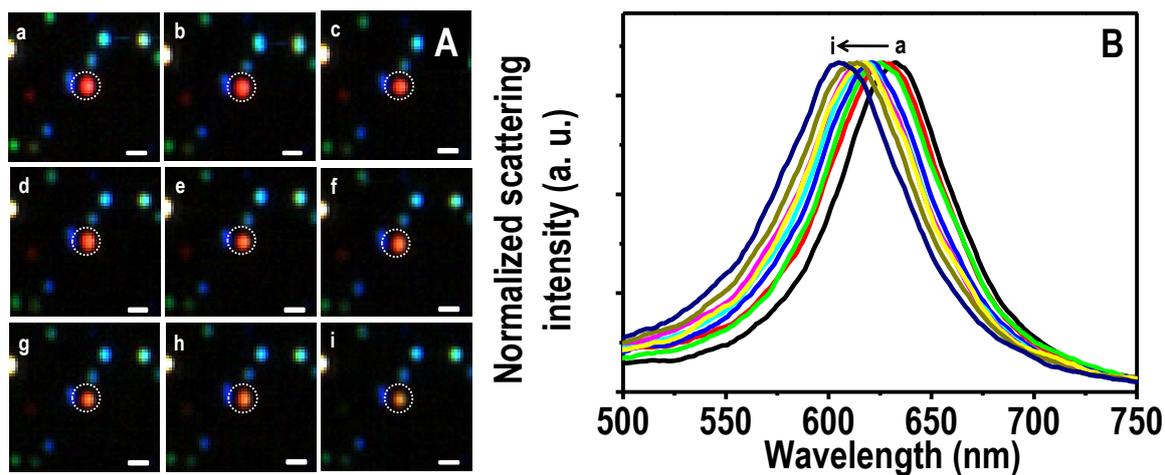


Fig. S7 HSI (A) of immobilized Ag@citrate NPs after passing 5 ppm Hg^{2+} for 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0 and 6.0 h (a-i, respectively). Scattering spectra (B) of red particle (marked with dots) with time (a-i). Scale bars of images in A are 500 nm.

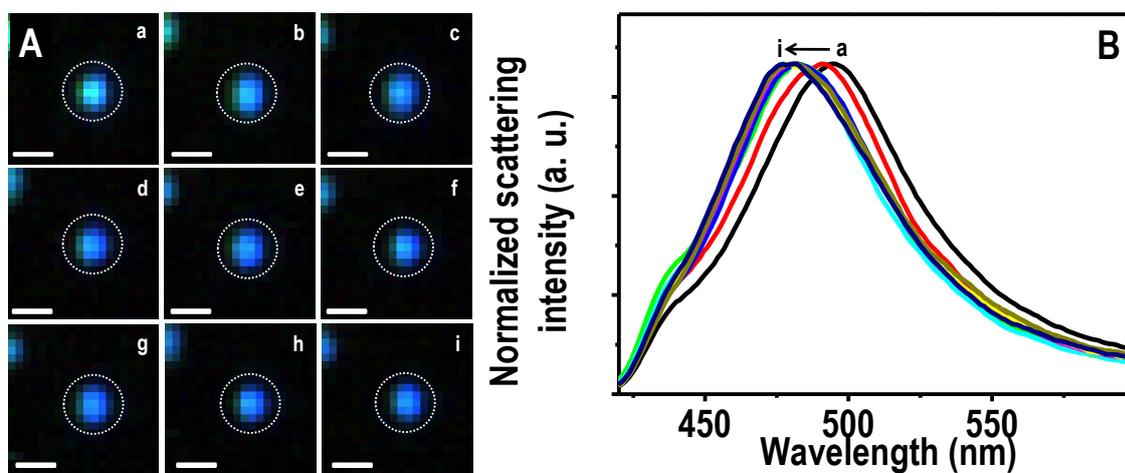


Fig. S8 HSI (A) of immobilized Ag@citrate NPs after passing 5 ppm Hg^{2+} for 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0 and 6.0 h (a-i, respectively). Scattering spectra (B) of blue particle (marked with dots) with time (a-i). Scale bars of images in A are 400 nm.

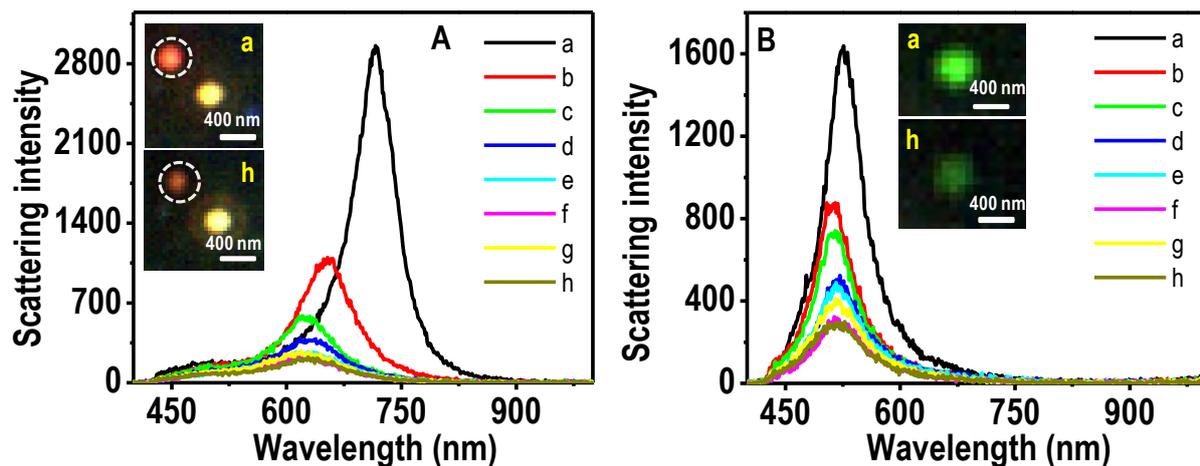


Fig. S9 Time-dependent scattering spectra of red (A) and green (B) particles. Insets of A and B are the HSI images of red and green particles after the treatment of 5 ppm Hg^{2+} for 0.5 and 6.0 h. “a-h” are the times 0.0, 0.5, 1.5, 2.0, 2.5, 3.0, 4.0 and 6.0 h, respectively.

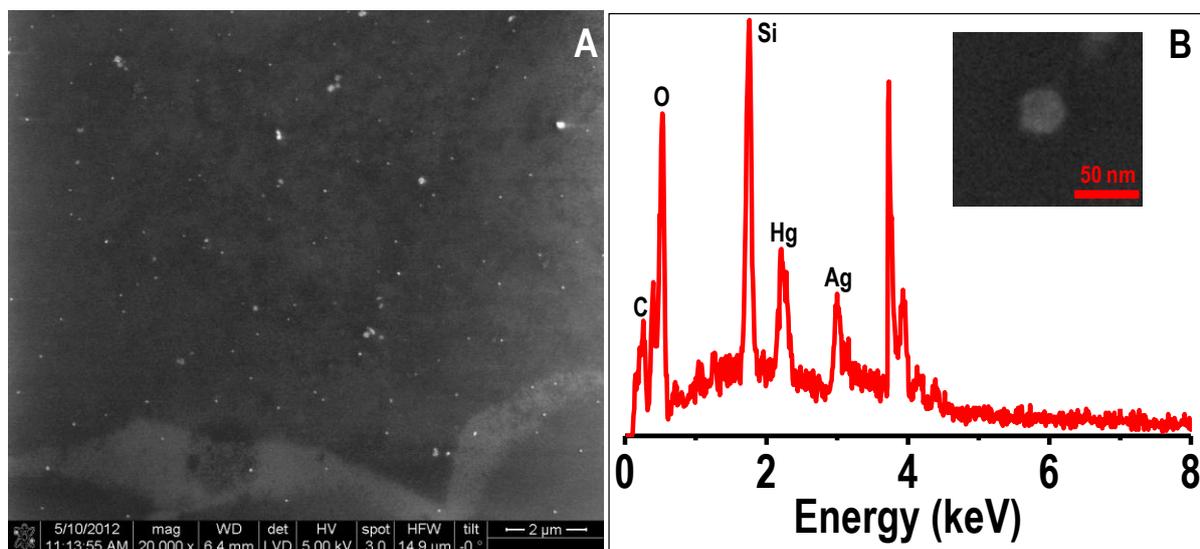


Fig. S10 A) Large area FESEM image of immobilized Ag@citrate particles after treating 5 ppm Hg^{2+} for 3.0 h on glass substrate. B is the EDAX spectrum of one of the particles (inset B) indicating the presence of silver and mercury. Si is from the substrate used. O is also partly from the substrate.

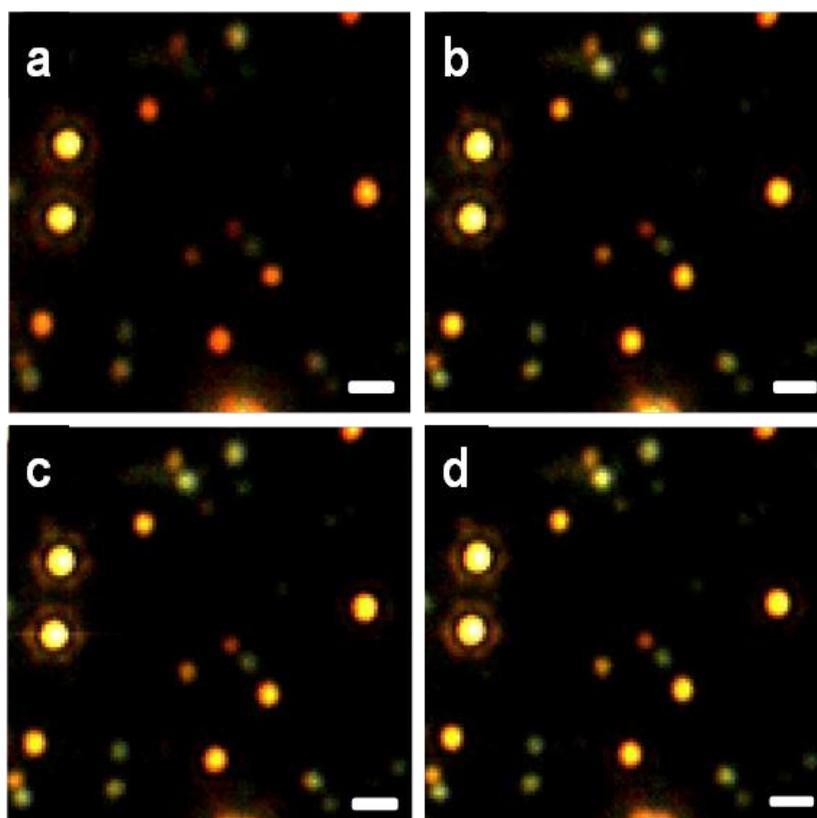


Fig. S11 HSI images of immobilized Au@citrate NPs after passing 5 ppm Hg^{2+} for 0.0, 2.0, 4.0 and 6.0 h (a-d, respectively). Scale bars in the images are 500 nm.

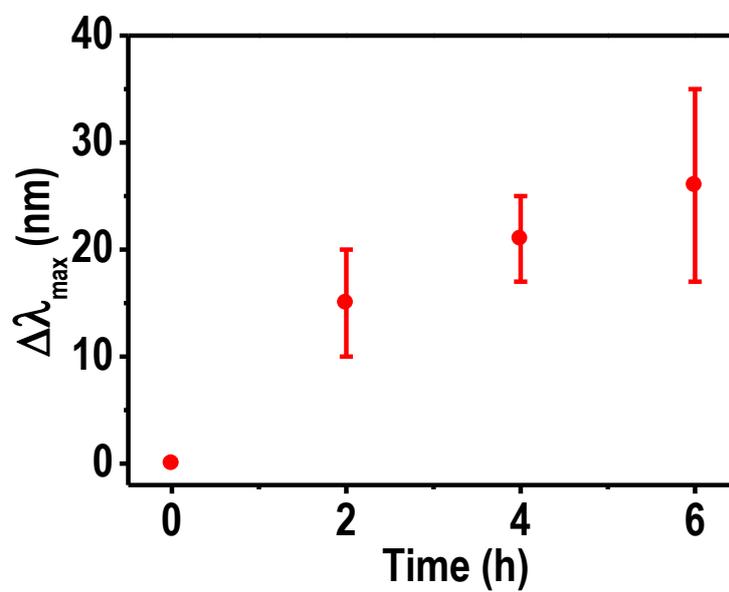


Fig. S12 A plot of average blue shift ($\Delta\lambda_{\max}$) of 5 red Au@citrate particles treated with Hg^{2+} with time.

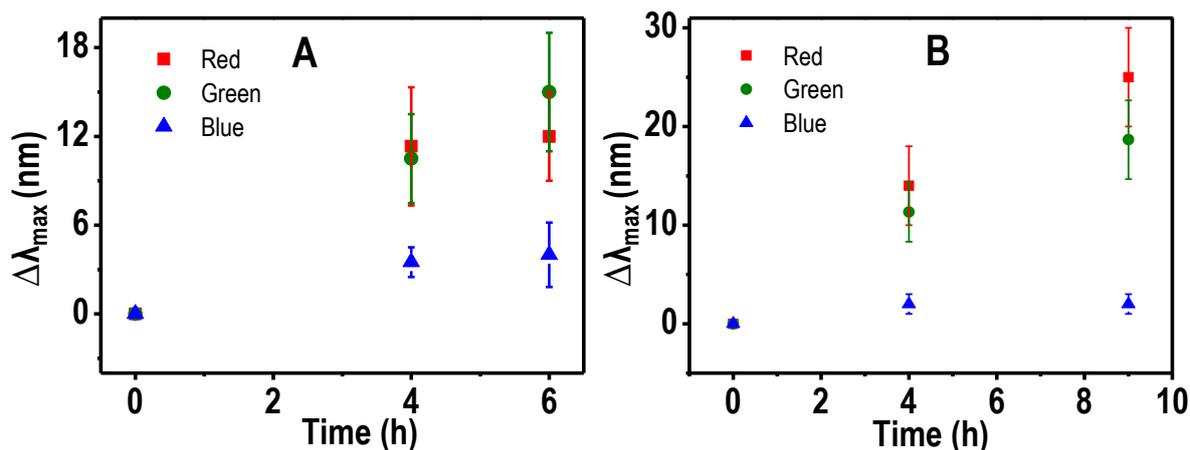


Fig. S13 Plots of average blue shift ($\Delta\lambda_{\max}$) of 5 particles of each color (red, blue and green) after passing DI and tap waters (A and B, respectively) with time.

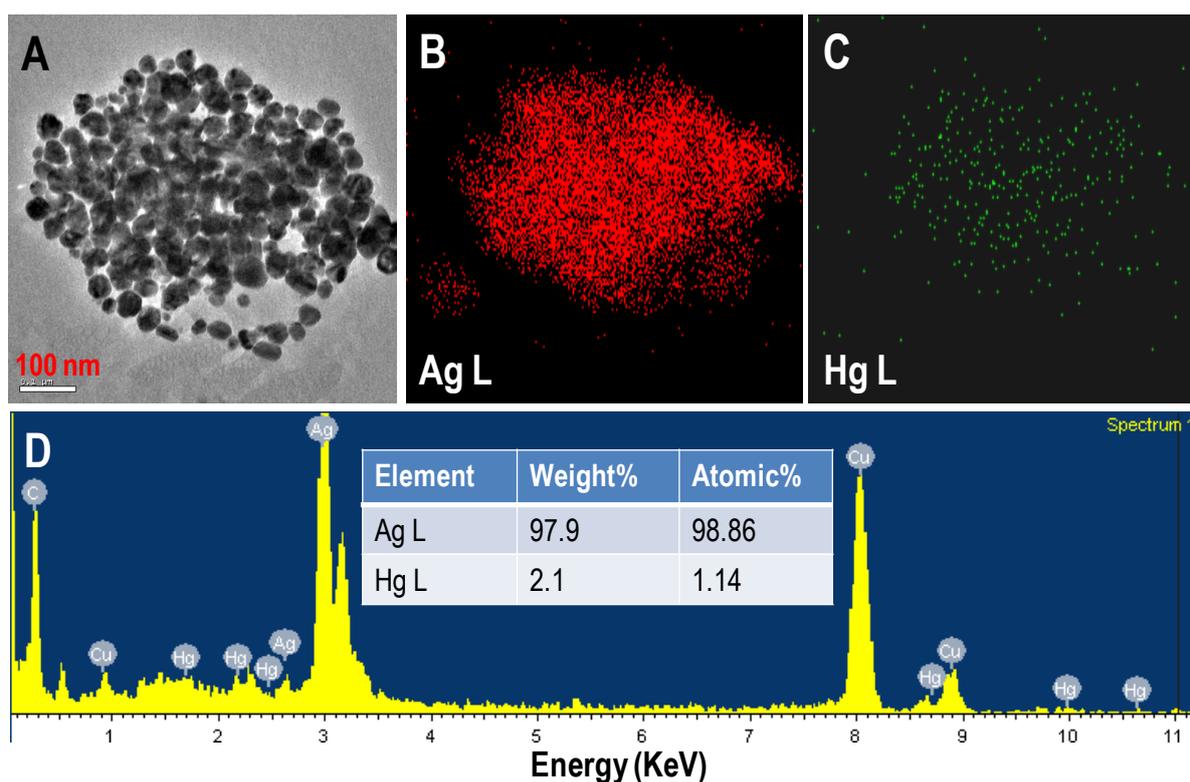


Fig. S14 TEM image (A) and elemental maps of Ag and Hg (B and C, respectively) of an aggregate of Ag@citrate NPs formed with interaction of 5 ppm Hg^{2+} for 6.0 h. D is EDAX spectrum of A in which a table of quantitation of elements is shown as inset. The EDAX image is rotated by 45° in comparison to the TEM image.