Supporting Information

Measuring the Optical Absorption Cross-sections of Au-Ag Nanocages and Au Nanorods by Photoacoustic Imaging

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Table S1. Physical and chemical parameters of Au-based nanostructures shown in Figure 1.

Nanostructures		Atomic composition (%)[a]		Dimensions[b]
		Au	Ag	
Fig. 1A	Nanocages	21	79	Outer length: 45.0 ± 7.1 nm Wall thickness: 5.8±1.1 nm
Fig. 1B	Nanocages	27	73	Outer length: 32.0 ± 4.9 nm Wall thickness: 4.0 ± 1.2 nm
Fig. 1C	Nanorods	100	0	Length: 44.0 ± 7.9 nm Width: 19.8 ± 6.5 nm
Fig. 1D	Nanospheres	100	0	Diameter: 150 ± 17 nm

[a]The atomic compositions of the nanocages were obtained by energy-dispersive X-ray spectroscopy (EDX).

[b]All dimensions were estimated based on TEM images.

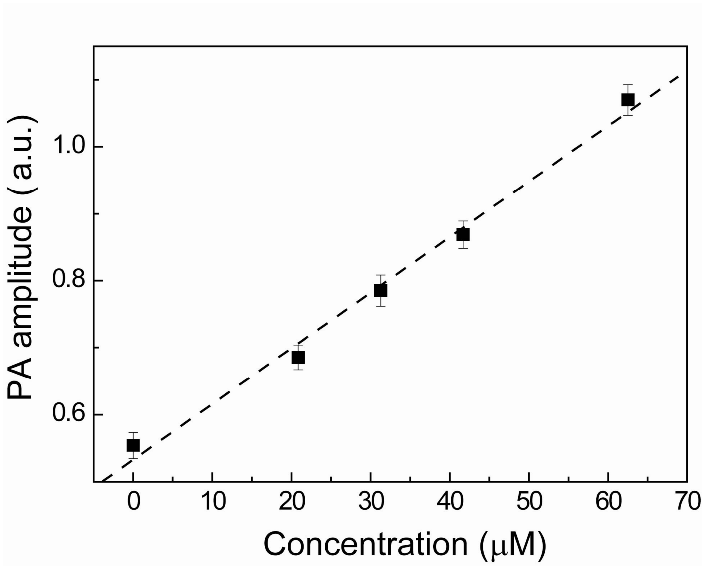

Figure S1. A plot of the PA amplitude against the concentration of methylene blue.

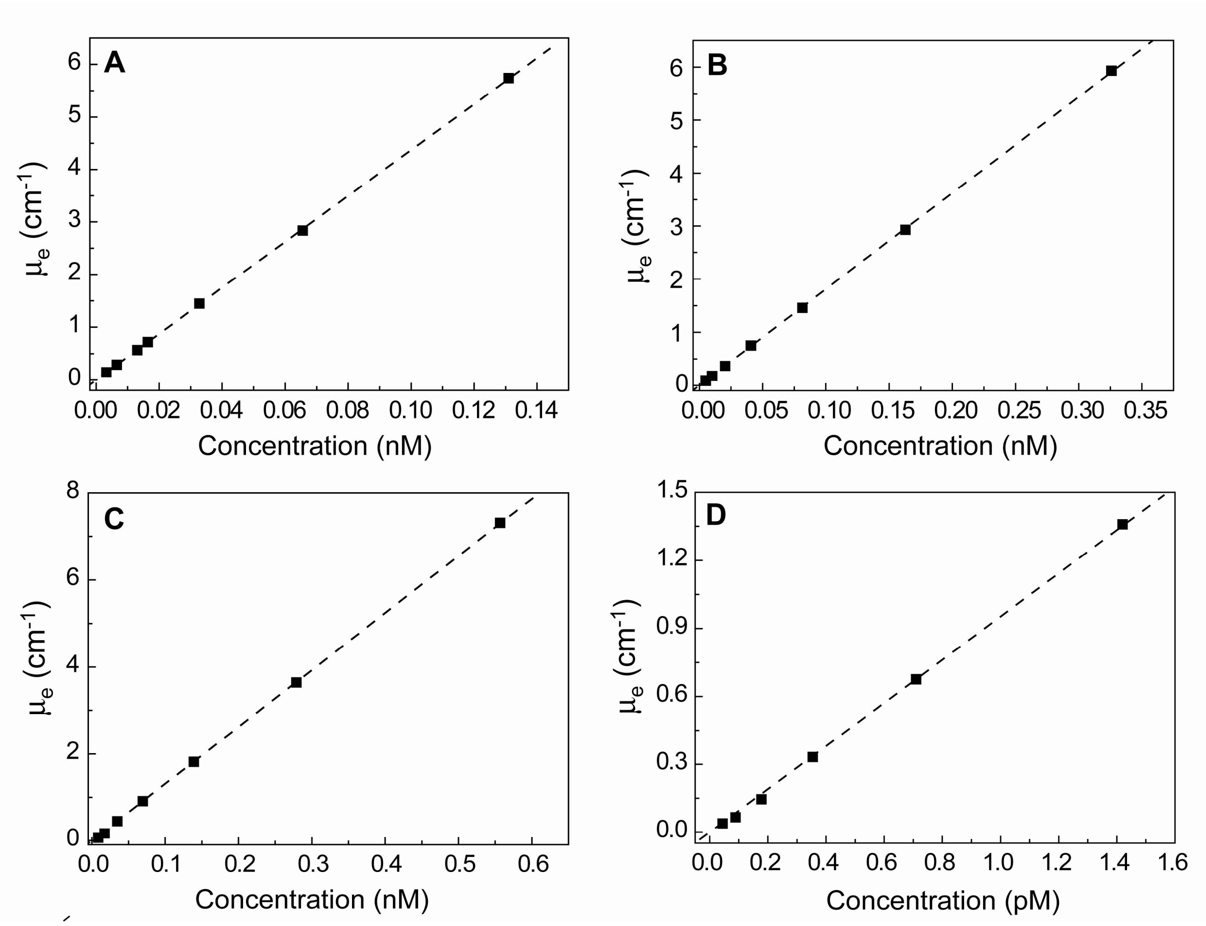

Figure S2. Plots of the extinction coefficient (μ_e) at 638 nm against the concentrations of Au-based nanostructures, where the extinction spectra were recorded using a conventional UV-vis-NIR spectrometer. (A) Au-Ag nanocages (outer edge length 45.0 nm, wall thickness 5.8 nm), (B) Au-Ag nanocages (outer edge length 32.0 nm, wall thickness 4.0 nm), (C) Au nanorods (44.0×19.8 nm^2 in length × width), and (D) Au nanospheres (150 nm in diameter). From these values, the optical extinction cross sections were obtained using the Beer-Lambert law.

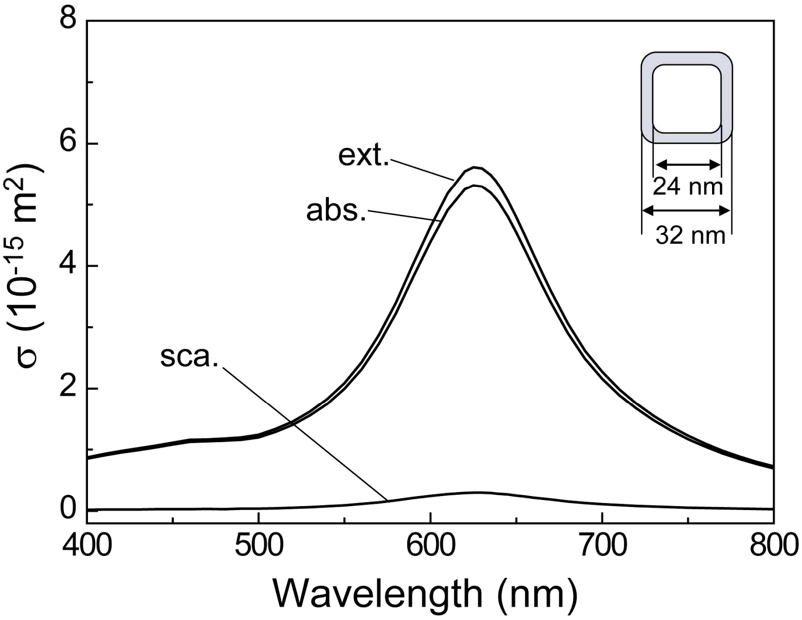

Figure S3. Calculated cross sections of the Au-Ag nanocages (32 nm in outer edge length and 4 nm in wall thickness) with 6-nm snipped corners. The extinction and absorption cross sections at 638 nm are 5.39×10^{-15} and 5.11×10^{-15} m^2, respectively, and the ratio of absorption to extinction cross sections is 0.95. The inset shows the corresponding geometry used for the calculation. Abbreviation: ext.= extinction; abs.= absorption; sca.= scattering.

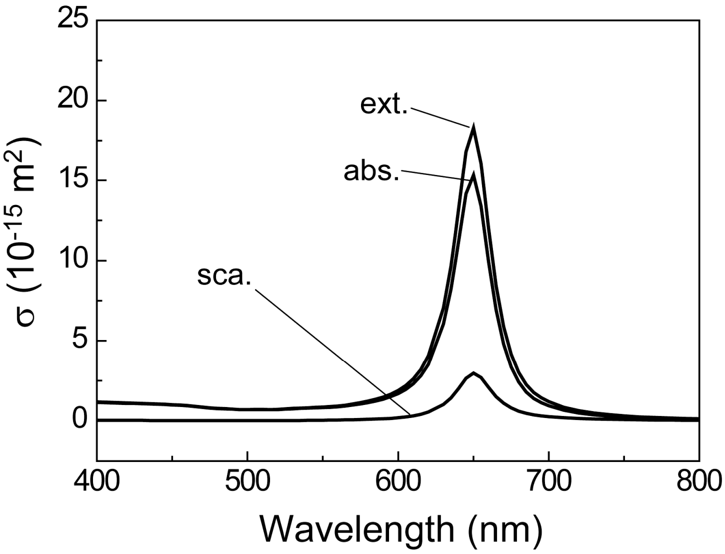

Figure S4. Calculated cross sections of the Au nanorod (44 × 19.8 nm^2 in length × width) with corners rounded when the Au nanorod is aligned perpendicular to the incident beam. The extinction and absorption cross-sections at 638 nm are 9.9×10^{-15} and 11.6×10^{-15} m^{-2}, respectively, and the ratio of absorption to extinction cross sections is 0.85. Abbreviation: ext.= extinction; abs.= absorption; sca.= scattering.

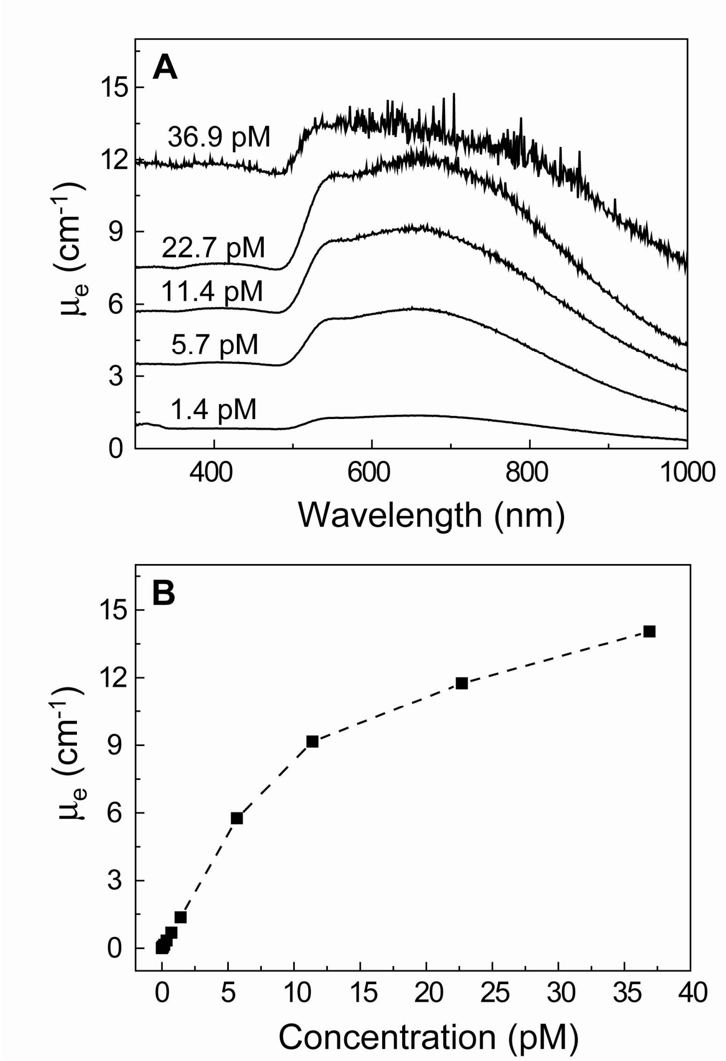

Figure S5. (A) Optical extinction coefficient (μ_e) of the Au nanospheres (150 nm in diameter) at various concentrations. (B) A plot of μ_e against the concentration of the Au nanospheres at 638 nm.