Supporting Information

Photoacoustics for listening to Metal Nanoparticles

Super-Aggregates

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Materials

Solvents were purchased from Sigma-Aldrich Co.: Dichloromethane, Chloroform, Ethanol, Toluene. Reagents were purchased from Sigma-Aldrich Co and used without further purification: Silver nitrate (AgNO₃), Tetraoctylammonium bromide (TOAB), Sodium borohydride (NaBH₄), Sodium Sulfate Anhydrous (Na₂SO₄). Trans-bis(triphenylphosphine)Platinum(II) dichloride,¹ 4,4’-diethylibiphenyl,² and trans,trans-4,4’ diethynyl(bistributylphosphine-Pt(II)thioacetyl) biphenyl, (Pt-DEBP) and Silver nanoparticles functionalized with Pt-DEBP were prepared according to our previous studies.³

Synthesis procedure

In brief, AgNPs functionalized with Pt-DEBP used in this work were prepared by using a Ag/Pt-DEBP ligand molar ratio 1.4/1, as follows: 0.0454 g, (0.27 mmol) of AgNO₃ solved in 4.5 mL of deionized water were mixed with 0.0805 g, (0.147 mmol) of tetraoctylammonium bromide (TOAB), in 10 mL of toluene; after 10 min vigorous mixing, 0.296 (0.382 mmol) of Pt-DEBP solved in 10 mL of toluene and 0.0581 g (1.5 mmol) of sodium borohydride in 5 mL of deionized water were added. The reaction mixture was allowed to react for 2 h at room temperature, then the crude product was recovered by extraction with water/toluene affording a brown suspension of AgNPs (yield 27%wt).

Characterizations: UV-Vis (CHCl₃), λ_max (nm): 420; FTIR (film from CH₂Cl₂), ν (cm⁻¹): 2955, 2927, 2867 ν(CH₂ and CH₃); 2120 ν(C≡C); 1622 ν(SC=O), 1600 δ(Ar-H); 1488, 1459, 1261 δ(CH₂ and CH₃); FarIR (film from CH₂Cl₂), ν (cm⁻¹): 578 (vPt-C); 460, 396 (vPt-P); 308, 252 (vPt-S); 228 (vAg-S).
Methods

Fourier transform infrared (FTIR) spectra were recorded as films from CH$_2$Cl$_2$ solutions using KRS5 (TlBr-TlI) cells with a Bruker Vertex 70 single beam spectrophotometer in the range 4000-400 cm$^{-1}$, resolution 4 cm$^{-1}$. FarIR spectra were obtained with the same spectrophotometer but using a silicon beam splitter and run under dry N$_2$ (100 L/h), 500-200 cm$^{-1}$ range. UV-Vis spectra were recorded in CHCl$_3$ with a Varian Cary 100 spectrophotometer in the 190-900 nm range using quartz cuvettes with optical path length 1 cm, resolution 1 nm. Deionized water, obtained from Zeneer Power I Scholar-UV (18.4 MΩ·cm), was degassed for 15 minutes with Argon, before use.
Fig S 1: UV-vis Absorption spectrum of Pt-DEBP thiol (a) and of the corresponding AgNPs-Pt-DEBP (b) in CHCl₃ solution. In the inset in fig (a), the drawing of the molecular structure of Pt-DEBP.
References

