Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C

Phosphonate-stabilized silver nanoparticles: One-step synthesis and monolayer assembly

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Electronic Supplementary Information (ESI)

1. STABILITY OF AMP-CAPPED Ag NANOPARTICLES (NPs)

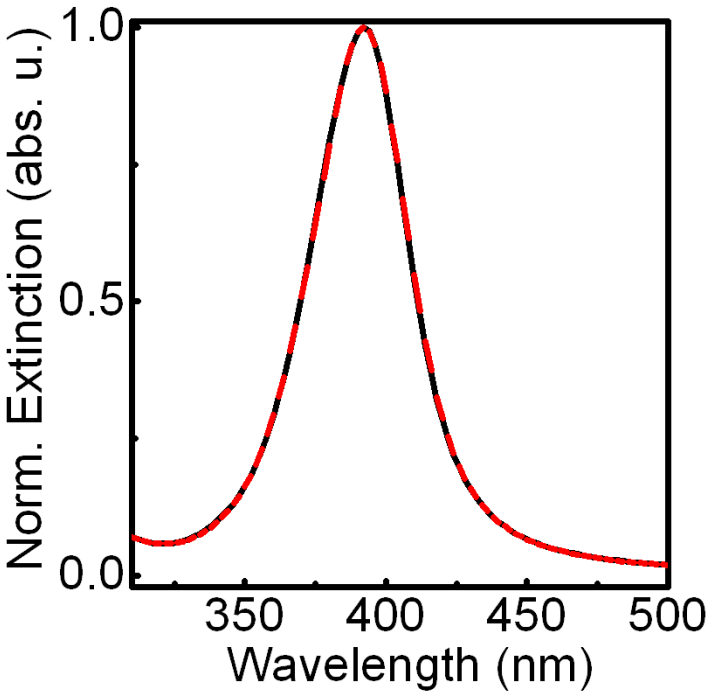

Fig. S1. UV-vis spectra of AMP-capped Ag NPs (Sample C, Table 1) shortly after synthesis (black line) and after storage under Ar atmosphere for 2 months (red line). Note that the black and red lined practically overlap.

2. AMP-CAPPED Ag NP SOLUTIONS OF DIFFERENT pH VALUES AND MODEL CALCULATIONS FOR Ag NP DIMERS

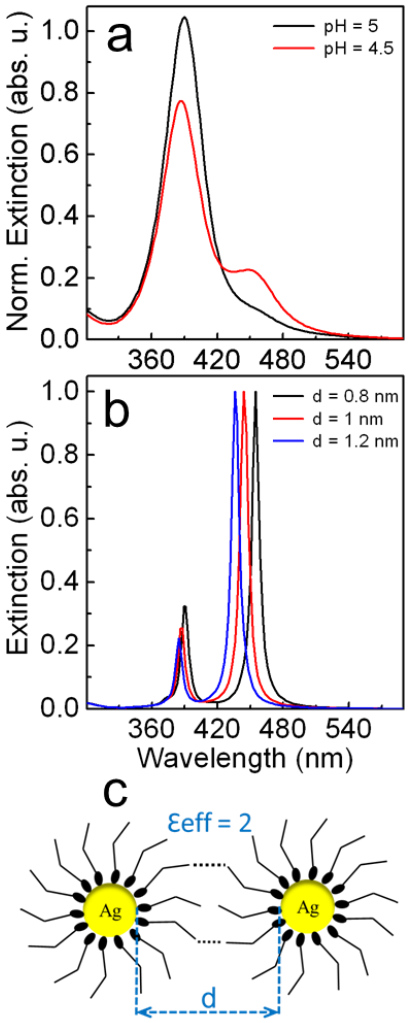

Fig. S2. (a) Measured transmission UV-vis spectra of Ag NP solutions (Solution B, Table 1) at different pH values. (b) Model calculations (see ref. 83) for Ag NP dimers in solution, for increasing spacing d between the NPs in the dimer, as shown schematically in (c) (not drawn to scale).

3. COMPARISON OF MEASURED AND CALCULATED UV-VIS SPECTRA OF AMP-CAPPED Ag NPs

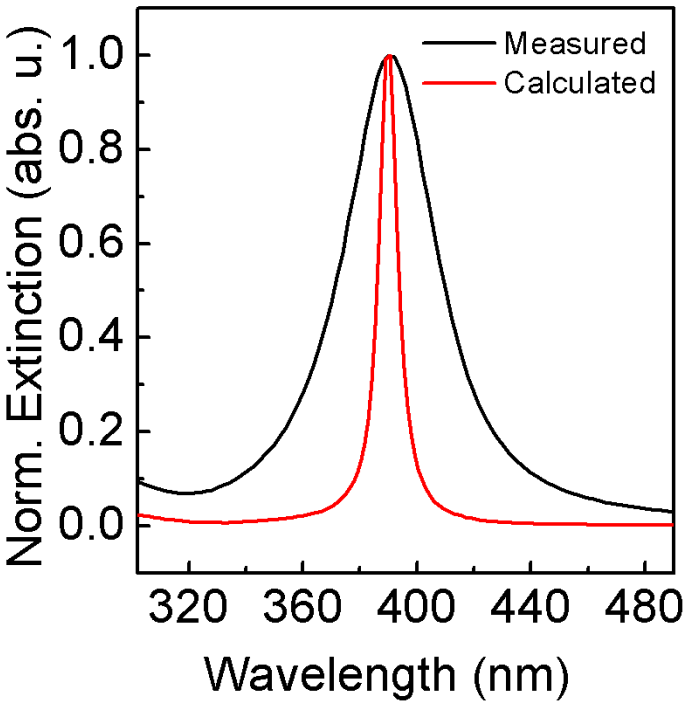

Fig. S3. Experimental (black line) and calculated (red line) UV-vis spectra for AMP-capped Ag NPs (Solution A, Table 1). Parameters used in the calculation (see ref. 83): ε_o (environment) = 1.768; ε_c (NP coating layer) = 2.25; thickness of the coating layer = 0.4 nm.

4. SELF-ASSEMBLY OF Ag NPs ON 4-ATP MODIFIED Au SUBSTRATES

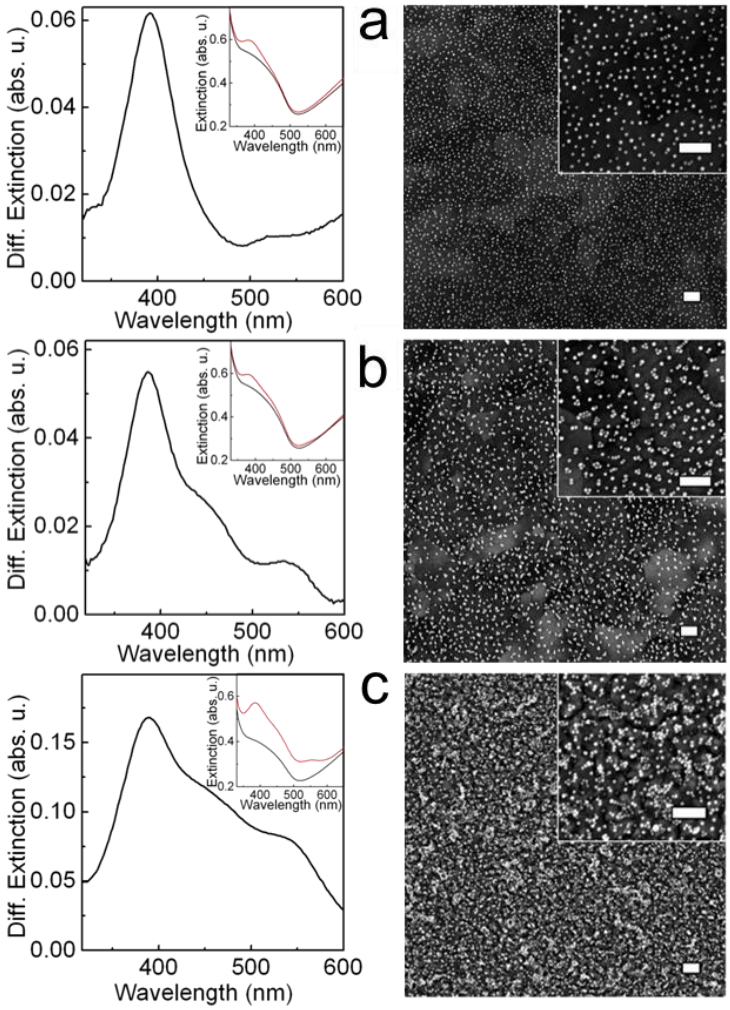

Fig. S4. Transmission UV-vis difference spectra, obtained by subtracting the spectra of the bare Au (insets, black lines) from the spectra of Ag NPs adsorbed on 4-ATP modified Au substrates (insets, red lines) (left panels) and HRSEM images (right panels) for self-assembly of AMP-capped Ag NPs (Solution B, Table 1) on 4-ATP modified Au substrates (20 nm thick). NP assembly was carried out under the following conditions: (a) Solution pH ~5, overnight adsorption; (b) solution pH ~4.5, 2 h adsorption; (c) solution pH ~4.5, overnight adsorption. Scale bars: 100 nm.

5. INFLUENCE OF THE COLLOID SOLUTION CONCENTRATION ON THE AMOUNT OF ADSORBED NPs

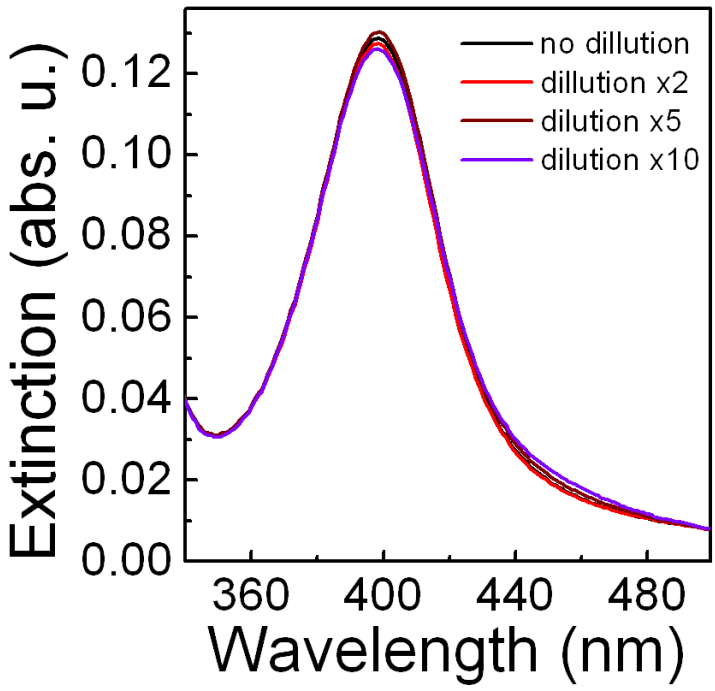

Fig. S5. UV-vis spectra of TMSPEDA-functionalized glass substrates after binding of Ag NPs (Sample B, Table 1) from colloidal solutions of varying concentration. The original (undiluted) NP solution concentration was ~46 nM.