

Electrostatic Interactions for Directed Assembly of Nanostructured Materials: Composites of Titanium Dioxide Nanotubes with Gold Nanoparticles

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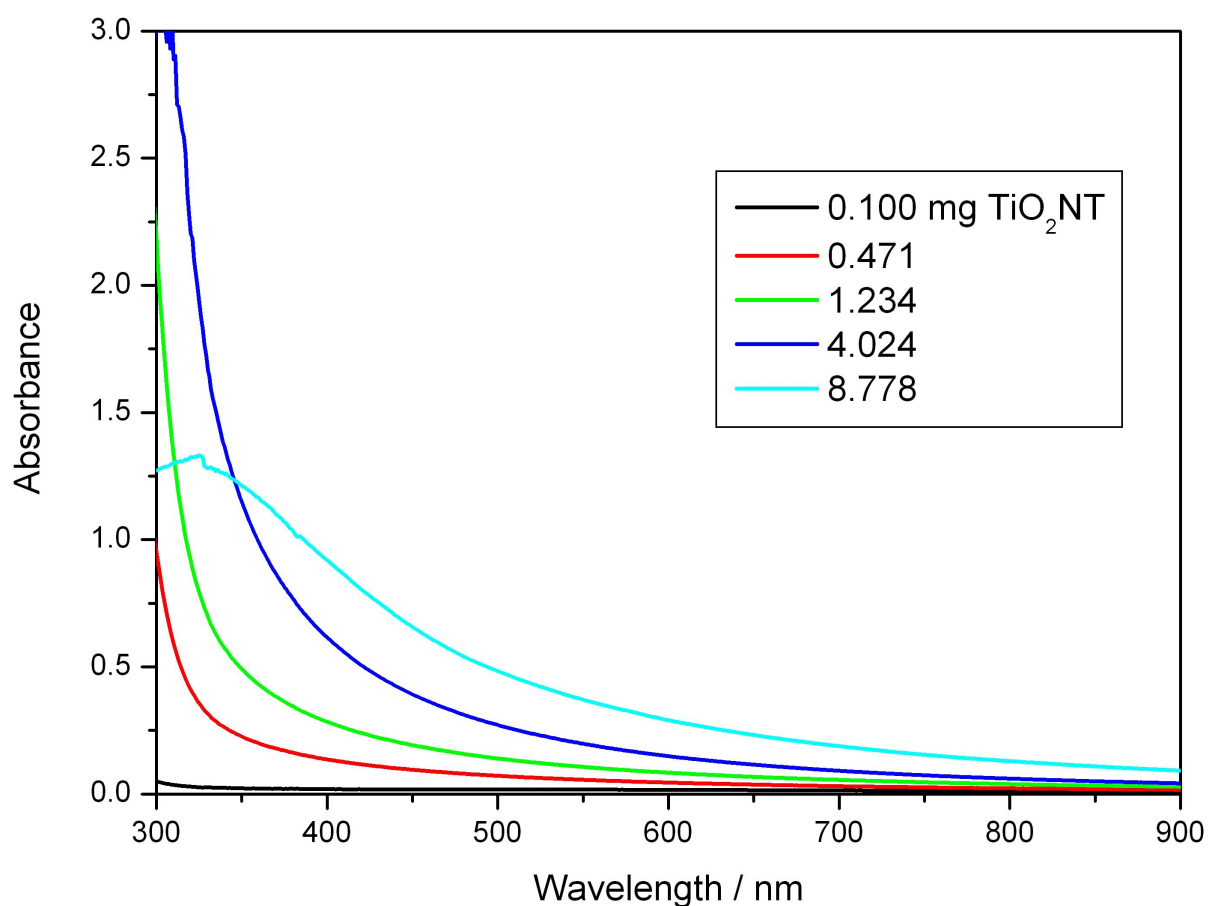


Figure S1. UV-Vis spectra for TiO₂NT suspensions with different TiO₂NT masses in 4 mL deionised water.

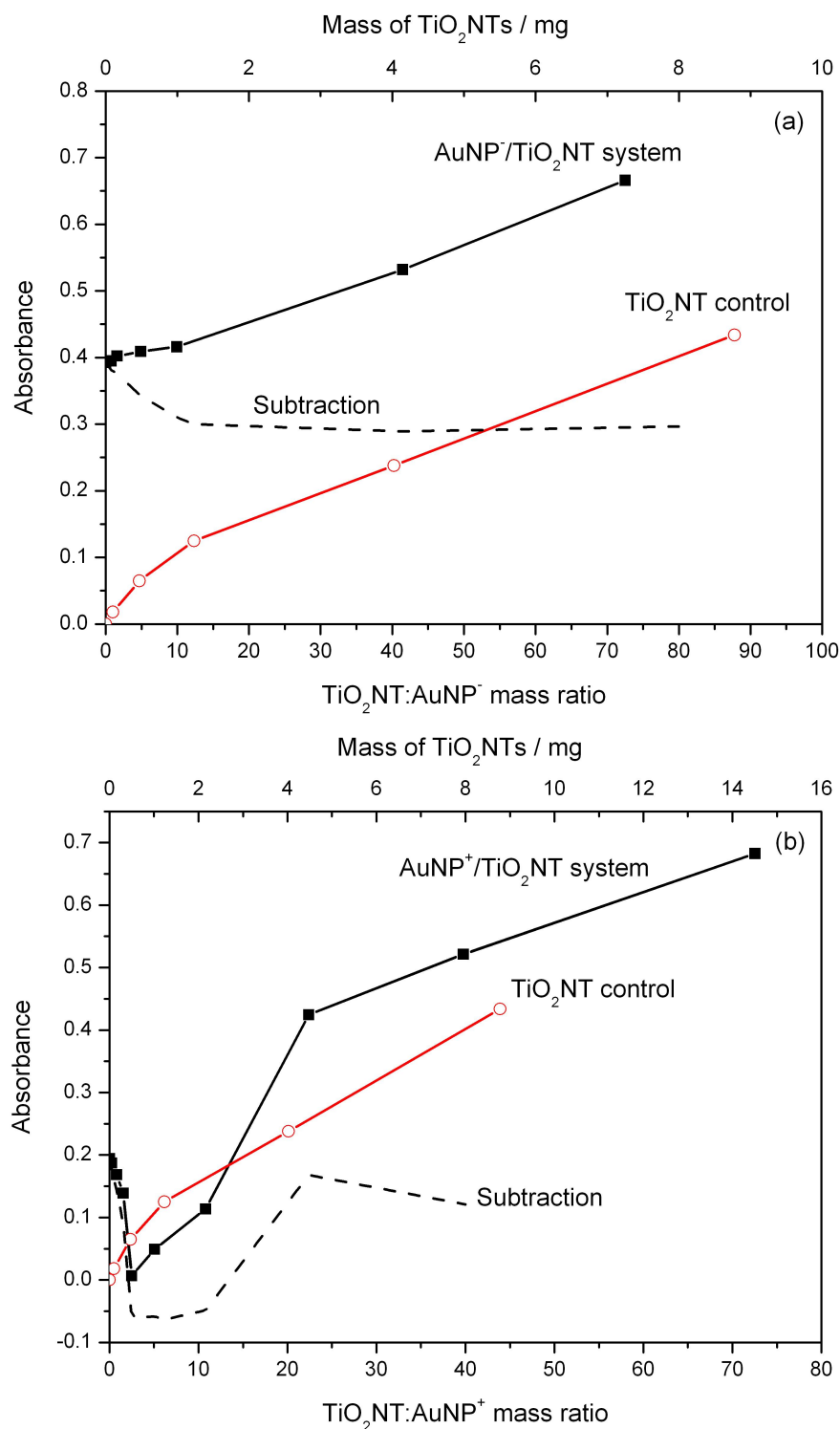


Figure S2. Dependence of UV-Vis absorbances at 520 nm on $\text{TiO}_2\text{NT}:\text{AuNP}$ mass ratio for (a) $\text{AuNP}^-/\text{TiO}_2\text{NT}$ and (b) $\text{AuNP}^+/\text{TiO}_2\text{NT}$ systems. Dashed lines represent absorbance of $\text{AuNP}^-/\text{TiO}_2\text{NT}$ systems after subtracting absorbance of TiO_2NT .

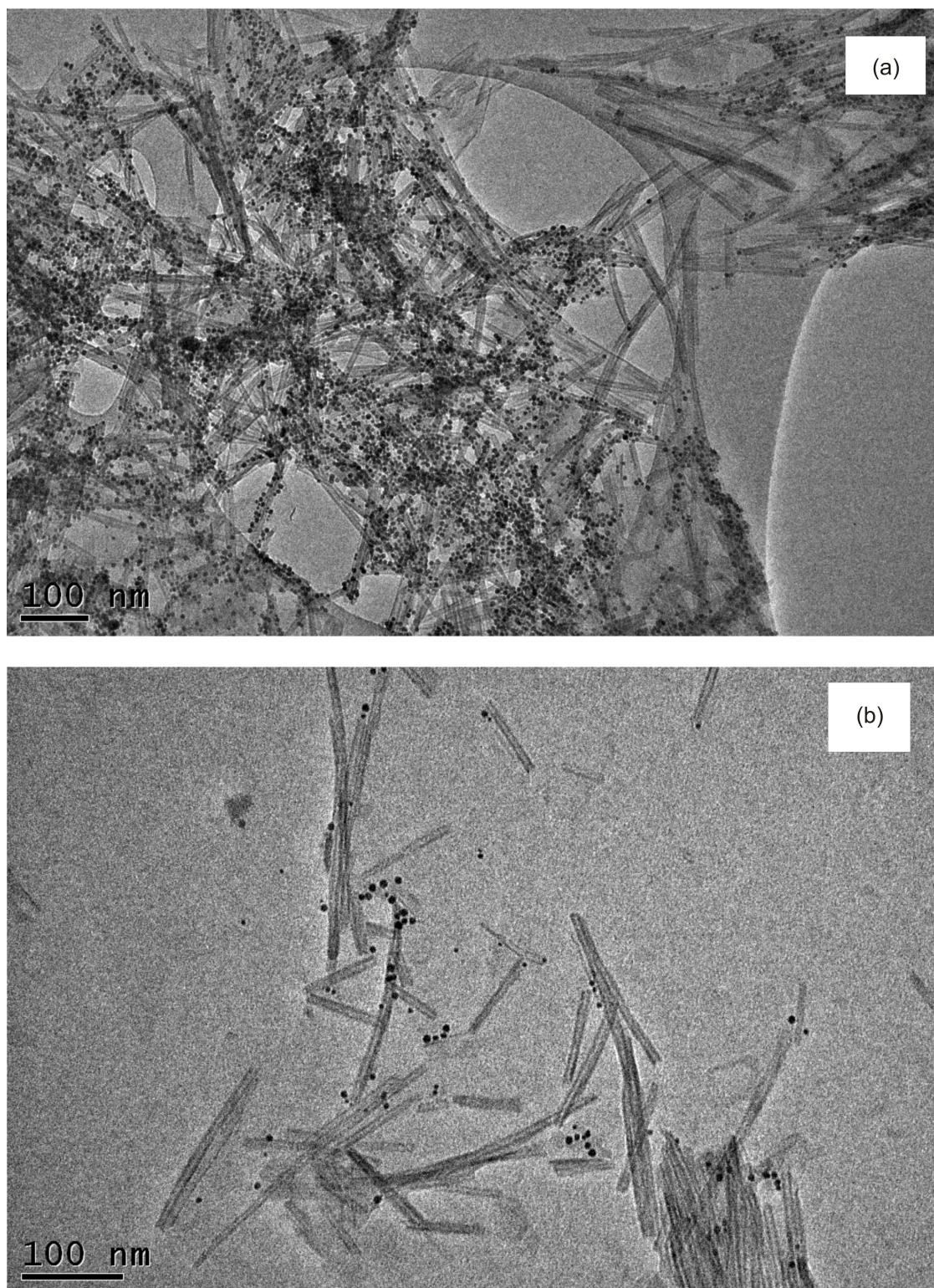


Figure S3. TEM images for the precipitates taken from AuNP⁺/TiO₂NT system with TiO₂NT:AuNP⁺ mass ratios of (a) 10.8 and (b) 39.8.

From Figure S3(a), it can be observed that the density of gold nanoparticles in some regions is lower than in other regions. Considering that beyond the isoelectric point supernatants always contain isolated TiO_2NT (as shown in Figure S4), irrespective of the separation method used, e.g. filtration, centrifugation or sedimentation, the sample always contains a mixture of nanoparticle decorated nanotubes and isolated nanotubes. We believe that the nanotubes with low gold nanoparticle density observed in TEM come from the supernatant, which decreases the apparent homogeneity of the nanoparticle distribution.

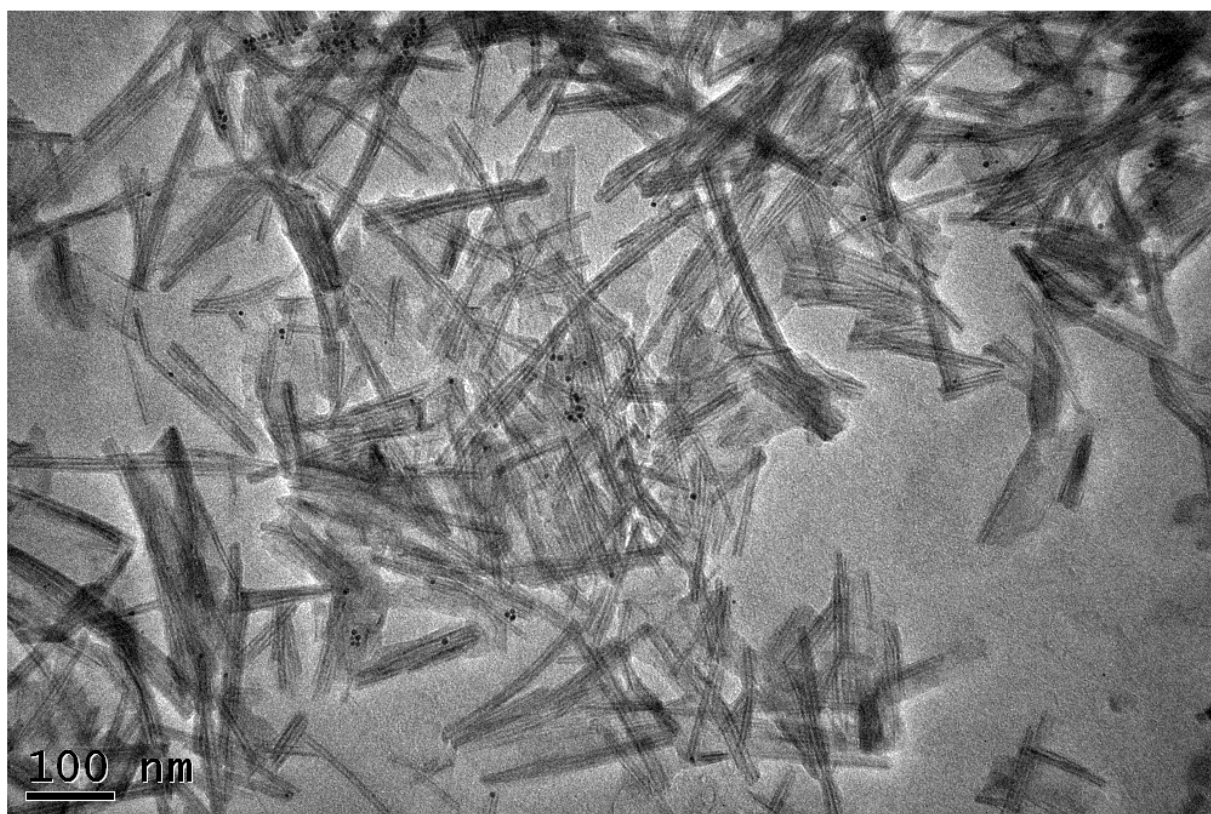


Figure S4. TEM images for the supernatant taken from $\text{AuNP}^+/\text{TiO}_2\text{NT}$ system with $\text{TiO}_2\text{NT}:\text{AuNP}^+$ mass ratio of 39.8.

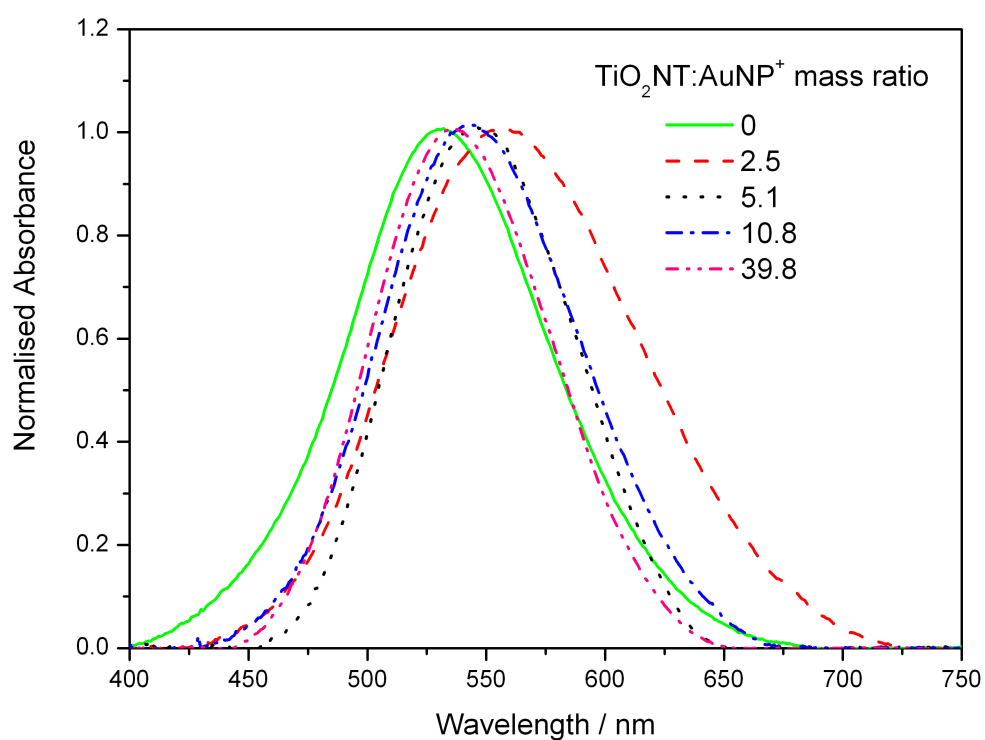


Figure S5. Normalised surface plasmon peaks from nanotube-nanoparticle composites taken from the $\text{AuNP}^+/\text{TiO}_2\text{NT}$ mixtures.