Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting Information for :

Study of metal nanoparticules stabilised by mixed ligand shell: a striking blue shift of the surface-plasmon band evidencing the formation of Janus nanoparticles

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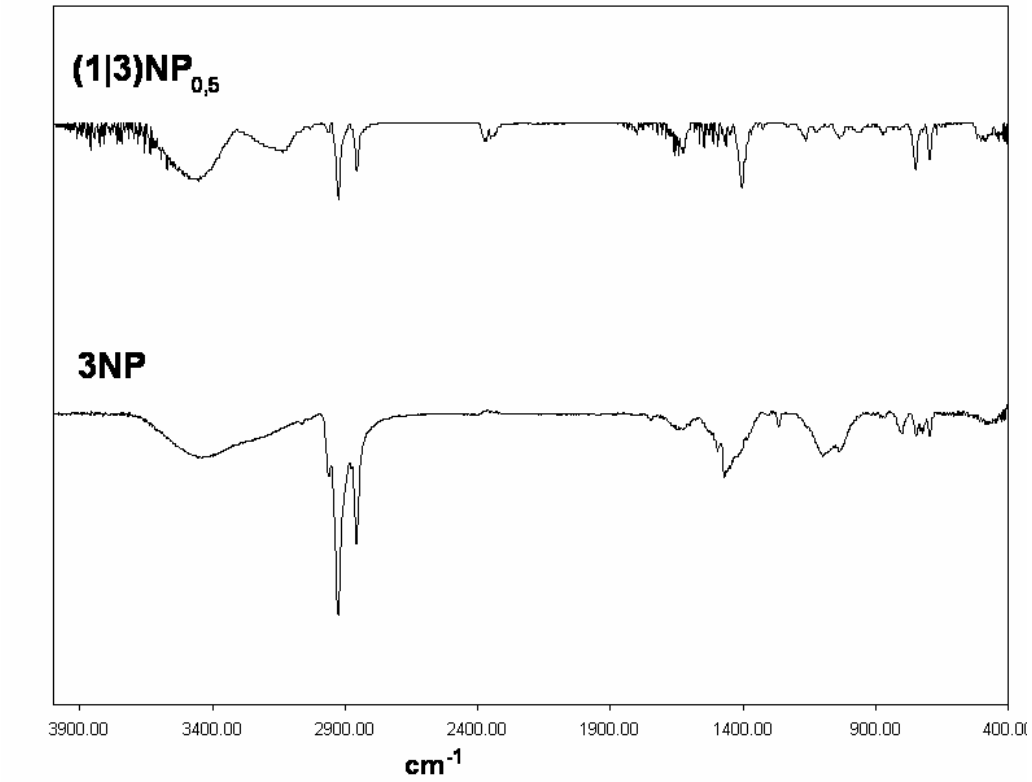
IR spectroscopy

Spectra were recorded on a Nicolet Magna 550. Samples powder were crushed with KBr for experiment.



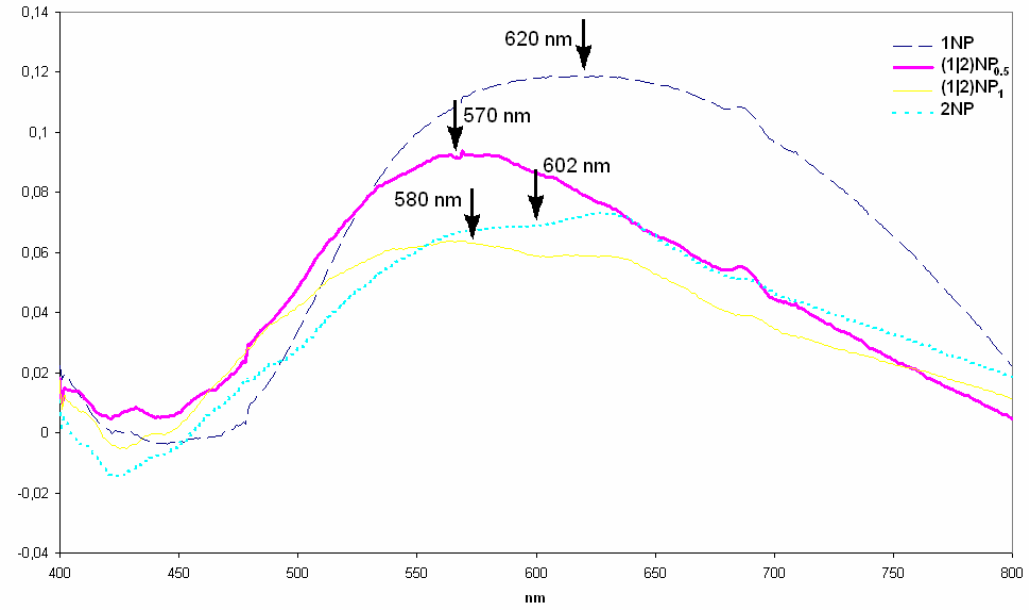
Comparison of the FT-IR spectra of **3NP**, **(1|3)NP**. Note that as in the case of ligand **2**, the C-H stretching peaks are exactly on the same position (at 2850 and 2921 cm^{-1}) in the pure ligand and in the mixed ligand shell. In the mixed ligand shell the peaks identified in the above spectrum as being characteristic for phosphinines are again clearly visible.

It was difficult to evaluate the quantity of **2** or **3** to be added to displace half the quantity of **1** at the NP surface, first because the area protected by **1**, **2** and **3** on the NP surface are necessarily different and secondly because the chemical affinity of **1**, **2** and **3** for the gold surface are different. Previous works on ligand exchange reactions at the surface of **1NP** showed that 2 equivalents (*vs* **1**) of **2** or **3** were able to displace all the **1** ligands. (Goettmann, F., Moores, A., Boissière, C., Le Floch, P. & Sanchez, C. *Small*, 2005, **1**, 636-639.). This is why we choose to work with 0.5 and 1 equivalents of ligands (*vs* **1**).

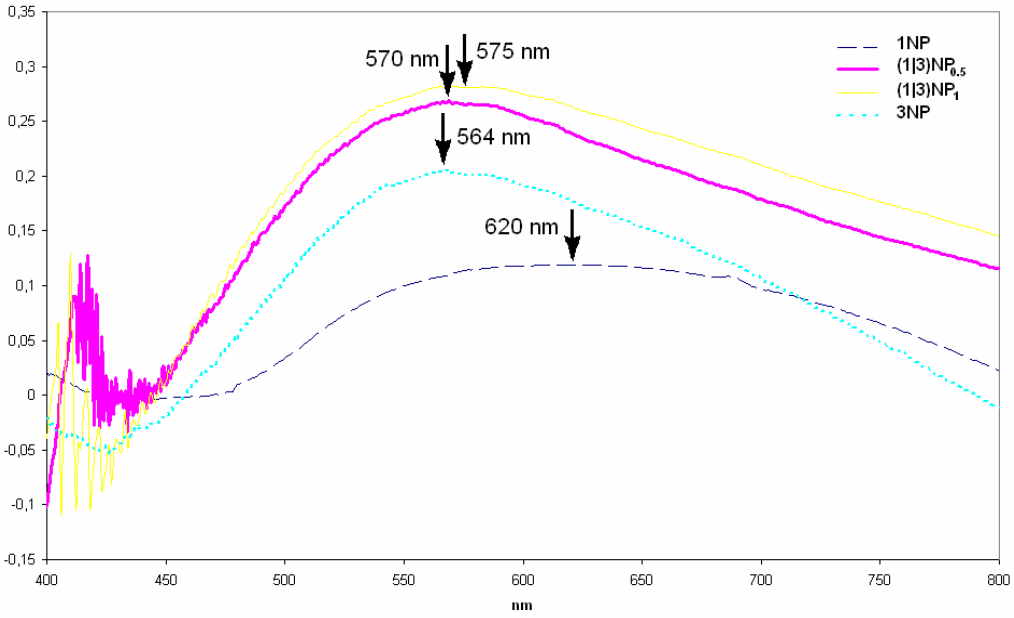
UV-visible spectroscopy:

UV-visible spectrum was recorded on a UVIKONxs using 1cm quartz cuvettes. Solvent used was THF. Concentration of the solutions was around 1.5 mmol.L^{-1}.

UV spectra of **1NP**, **(1|2)NP$_n$** (n=0.5, 1), **2NP**



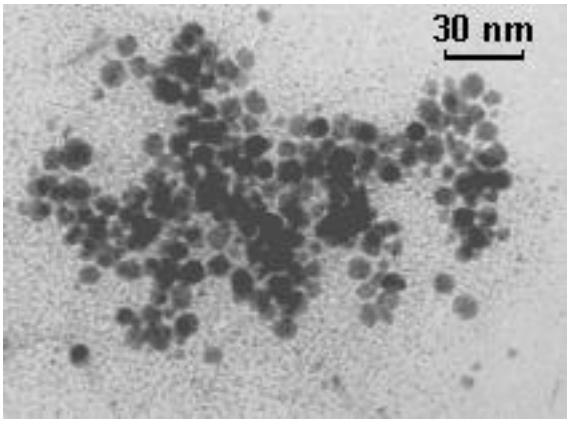
UV spectra of **1NP**, **(1|4)NPx** (x=0.5, 1), **4NP**.



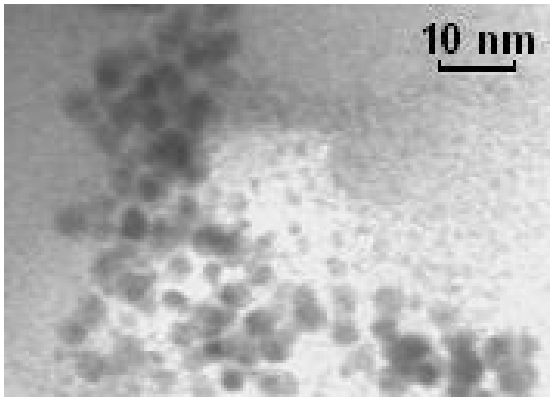
Transmission Electron Microscopy

Samples were visualized with a JEOL 100 cxII. Pictures of samples **1NP**, (**1|2)NP**$_1$, **2NP** with or without water are presented below. Experiments with water were performed by adding water to the THF solution of NPs. The value x is a volumic percentage.

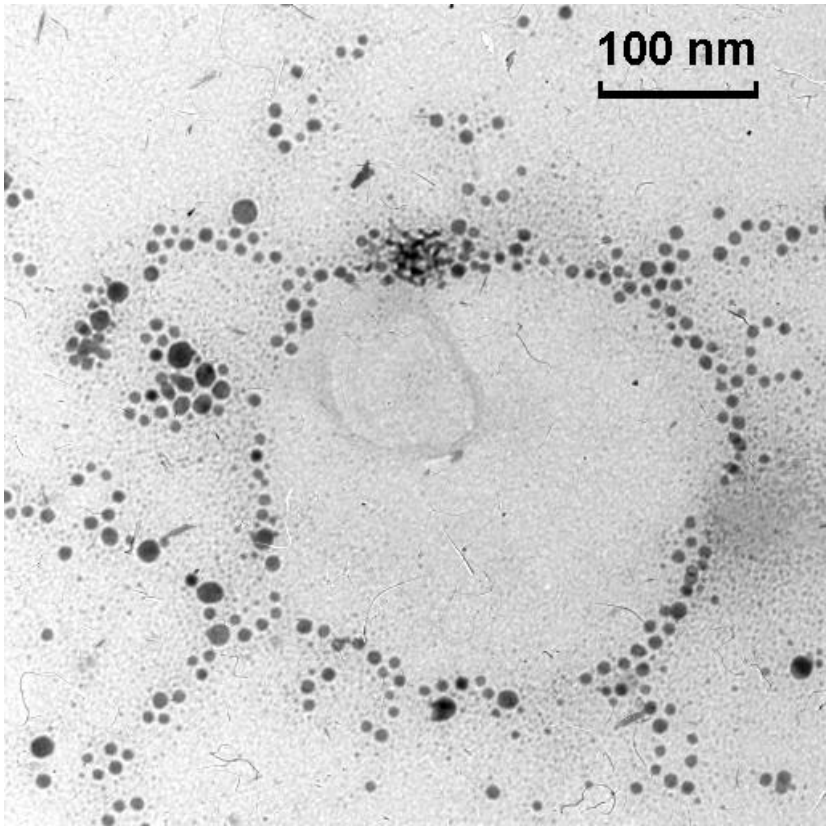
1NP



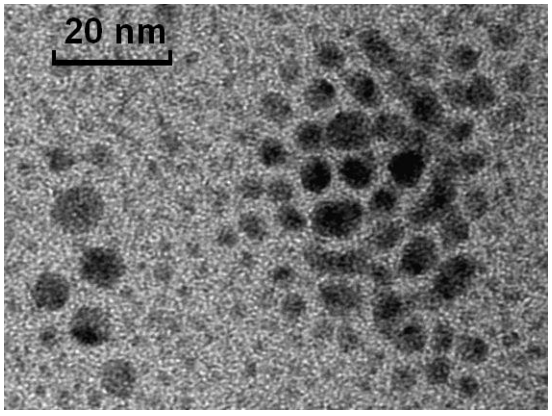
1NP + water (x=10 %)



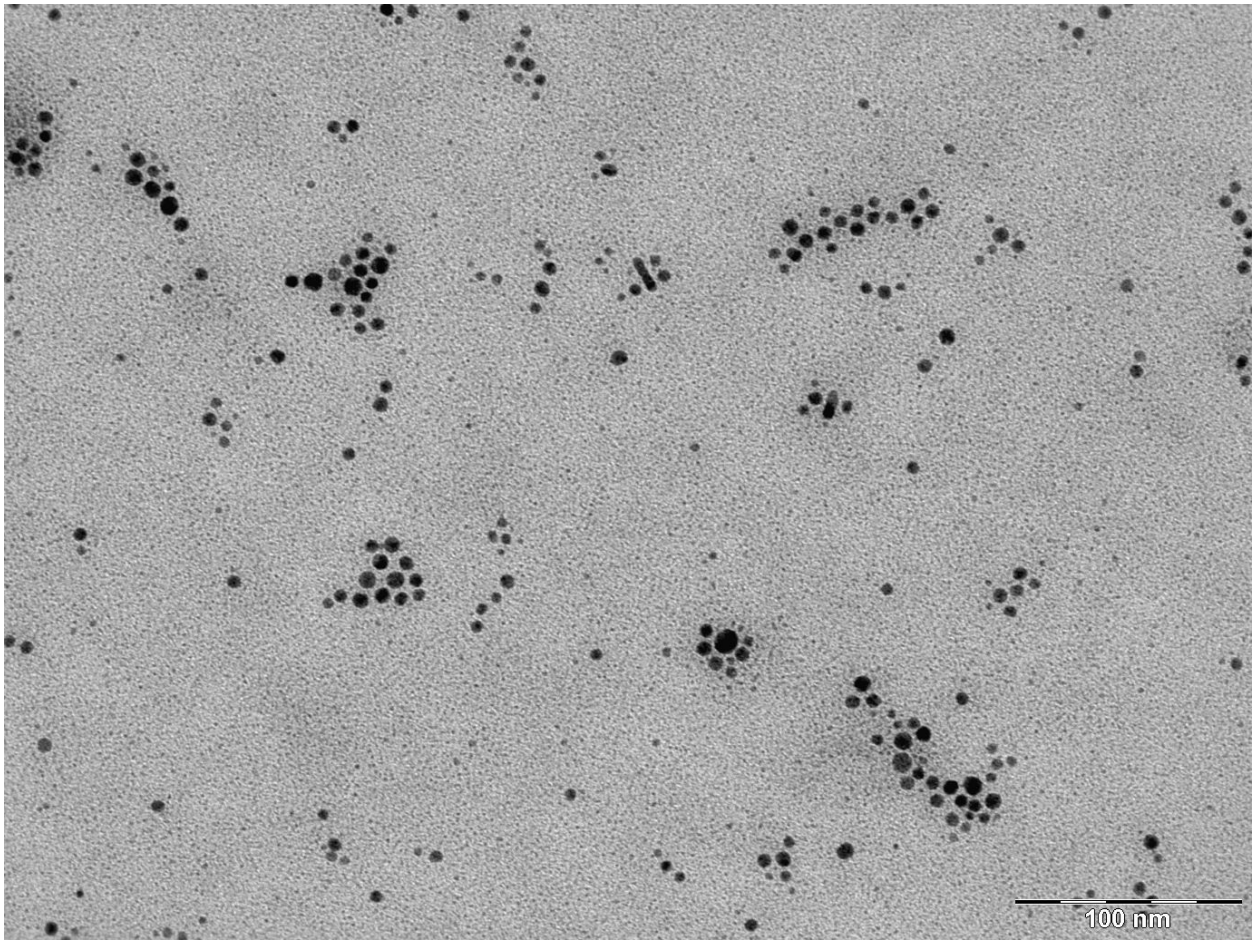
(1|2)NP$_{0.5}$ + water (x=50 %)



(1|2)NP$_1$



(1|2)NP$_1$ + water (x=10 %)



2NP + water (x=10 %)