Supplementary information for B905530D

Preparation of small silver, gold and copper nanoparticles which disperse well in both polar and non=polar solvents.

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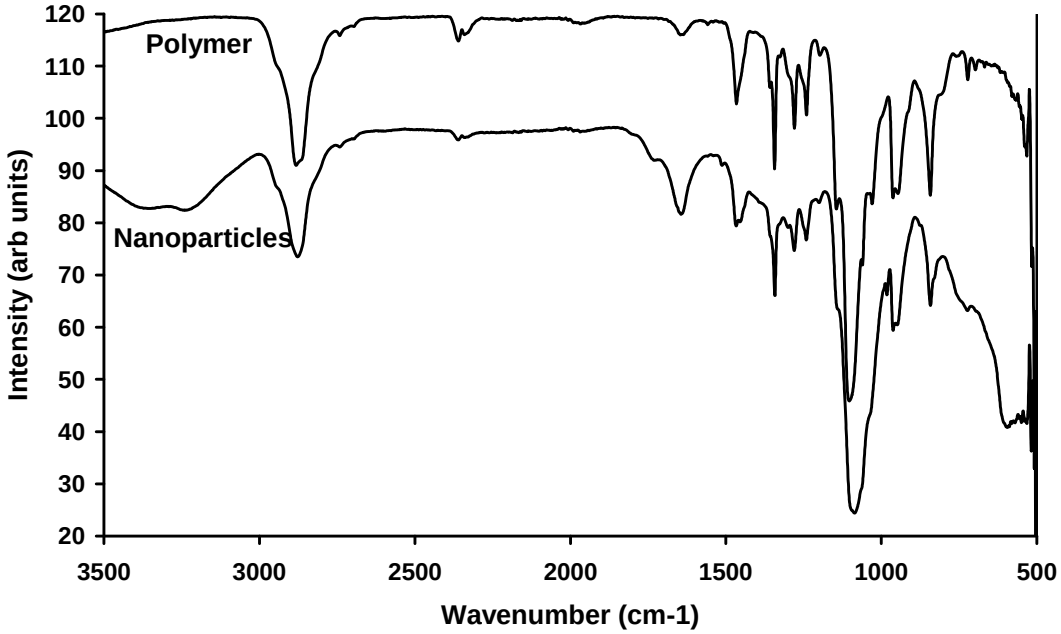
Estimate of surface coverage of capping agent:

Due to the lo volatility of the polymer TGA will not give any information regarding bound and unbound MPEGSH as it decomposes before it evaporates. Surface coverage were estimated from the microanalysis data. Atomic radii of Ag, Au and Cu were taken to be 145pm, Au 144pm Cu 128pm based on metal-metal distanced in the crystal. The density of the metal was taken to be Ag 10.1 gcm^{-3}, Au 19.3 gcm^{-3}, Cu 8.94 gcm^{-3}. The average particle sizes were taken from the TEM data.

The composition of the final products were; Ag 29% metal, Au1, 15.3% metal, Au2 13% metal and Cu 37% metal.
The final masses of the samples including the capping agent were; Ag 103.3mg, Au1 74.7 mg, Au2 106.4 mg and Cu 74.6mg.

Assuming the particles to be spherical (as per TEM) and using the average particle size and quoted density it is possible to get an approximate mass of one metal nanoparticle. It is similarly possible, using the atomic radii, to calculate the number of atoms on the surface of a spherical particle. The maxiumum number of moles of bound capping agent is then calculated assuming a 1:1 binding of capping agent to surface atoms of metal. The percentage potential mass coverage is then calculated bassed on the amount of capping agent in the final material compared to the maxiumum value. A value approaching or exceeding 100% is consistent with total surface coverage. Values of <<100% are poorly covered.

FT-IR spectra of capping polymer (MPEGSH) and nanoparticles.



Powder diffraction pattern showing peak shape of lines for the polymer attached to the nanoparticle, 750D polymer and 2000D polymer