Gold Nanoparticles Bearing an $\alpha$-Lipoic Acid-based Ligand Shell: Synthesis, Model Complexes and Studies Concerning Phosphorescent Platinum(II)-Functionalisation

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The surface functionalisation of gold nanoparticles (GNPs) with luminescent platinum complexes has been investigated, utilising $\alpha$-lipoic acid derivatives for GNP stabilisation. Model complexes have been studied to mimic the chemisorption chemistry required to afford GNPs protected by an $\alpha$-lipoic acid-based ligand shell with terminal functionalisation suitable for metal coordination, and the unambiguous binding of the cyclic disulfide moiety at a zero-valent precious metal core through oxidative addition has been confirmed by X-ray crystallography. Subsequently, gold nanoparticles bearing the $\alpha$-lipoic acid-based ligand shell have been prepared and characterised, and a synthetic methodology for the immobilisation of Pt$^{II}$ luminophores onto their surface has been established.

Key words: Gold, Luminescence, Nanoparticles, Platinum, Self-assembly