

Design of magneto-plasmonic heterostructures formed by Au decorated on magnetic Prussian Blue-type nanocrystals

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Magneto-plasmonic nanoparticles (NPs) (*i.e.* NPs simultaneously showing magnetic and plasmonic properties) have become in recent years an active topic of research. These materials find applications, for example, in nanophotonics, optical biosensing or storage data [1]. In general, magnetoplasmonic particles are formed by the combination of noble and ferromagnetic metals. Thereby, magneto-optical activity of these hybrid systems can be greatly increased due to the plasmon resonance effect provided by noble metal nanoparticles [2]. The study of new magnetoplasmonic systems with an efficient coupling between magnetic and plasmonic properties is a burgeoning research field. In this context, some Prussian Blue Analogues (PBAs) have been proven to be excellent candidates for magneto-optical applications [3] due to their transparency in the visible region and their several advantages with respect to other conventional inorganic materials [4].

Here, we have developed a general protocol for the preparation of hybrid nanostructures formed by NPs of molecule-based magnets based on PBAs decorated with plasmonic Au NPs of different shapes (see Figure 1). By adjusting the pH, Au NPs can be attached preferentially along the edges of the PBA or randomly on the surface. The protocol allows tuning the plasmonic properties of the hybrids in the whole visible spectrum.

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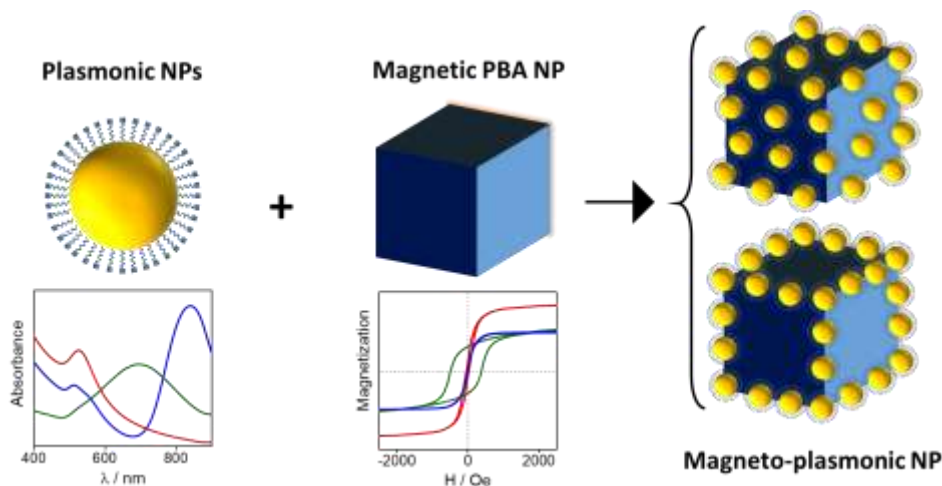


Figure 1: Scheme of the magneto-plasmonic heterostructures formed by the decoration of Au on PBA NPs.