Green synthesis of plasmonic metal nanoparticles for future biosensor applications

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Metallic nanoparticles (NPs) have nowadays many applications, especially for biosensors.[1,2] The huge versatility of these materials is mainly based on their unique optical properties which can be tuned tailoring their size, shape and composition. In any case, the synthesis of noble metal nanoparticles with narrow size distribution using green chemistry is still quite challenging. For instance, most of the synthetic procedures to obtain monodisperse gold nanoparticles need apart from tight temperature control, several synthetic steps and the use of not biofriendly surfactants and polymers.[3]

This work opens up a new green synthetic route to obtain spherical nanoparticles of different composition (Au, Au@Ag or Au@Pd) and narrow size distributions in water and at room temperature. This method is based on a seeded growth method where Fe(II) acts as a mild reducing agent and the citrate ions as capping ligand (**Figure 1**).[4]

The proposed methodology gives rise to metal nanoparticles stabilized by citrate ions which facilitate the further bioconjugation with biomolecules by ligand exchange expanding their potential applicability.

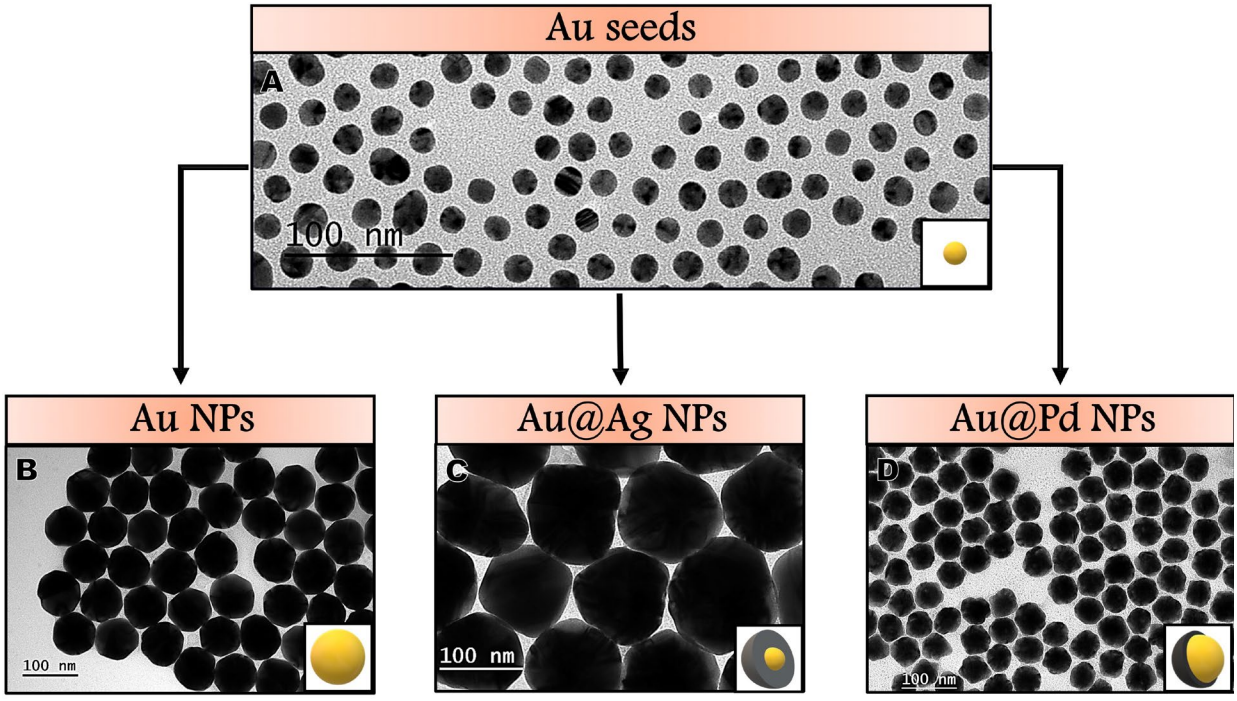

Figure 1: Schematic representation of different synthesized NPs: (A) Au Seeds, (B) Au NPs, (C) Au@Ag NPs and (D) Au@Pd NPs.

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