

Synthesis of novel hybrid Au-TiO₂ nanoparticles for plasmonic photocatalysis in water remediation

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Abstract

Titanium dioxide (TiO₂) is one of the most used photocatalysts during wastewater treatment due to its relevant properties. However, TiO₂ is limited by its large bandgap (≈ 3 eV), which results in poor efficiency upon visible light irradiation.[1] To overcome this limitation, Au can be employed because its characteristic localised surface plasmon resonance band takes place in the visible region. Nevertheless, most of the works use the spherical gold nanoparticles in Au:TiO₂, [2] limiting the spectral irradiation region in the 500-550 nm, and wasting a large portion of visible radiation. Herein, new methods have been explored to synthesis hybrid Au:TiO₂ nanoparticles with metal shape anisotropy that expand the plasmonic absorption covering both visible and near IR regions.

References

- [1] Singh S, Mahalingam H, Singh PK, Applied Catalysis A: General, 462-463 (2013) 178-195
- [2] Kochuveedu ST, Jang YH, Kim DH, Chem. Soc. Rev., 42 (2013) 8467-8493

Figures

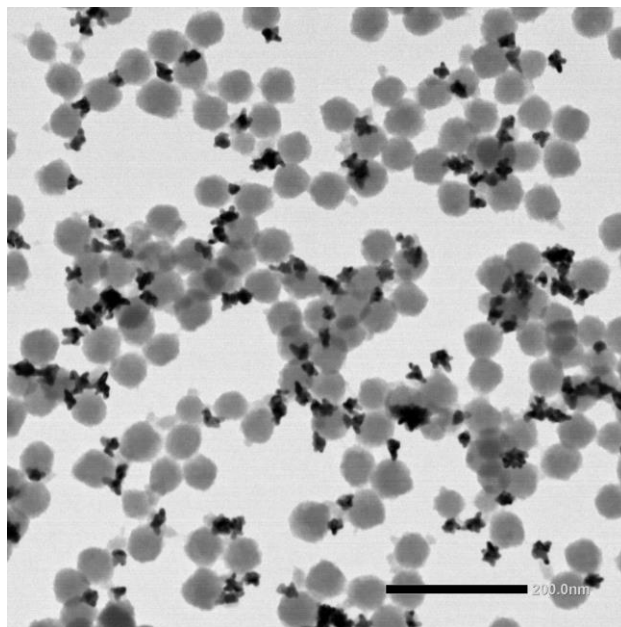


Figure 1: TEM image of hybrid Au:TiO₂ nanoparticles synthesized

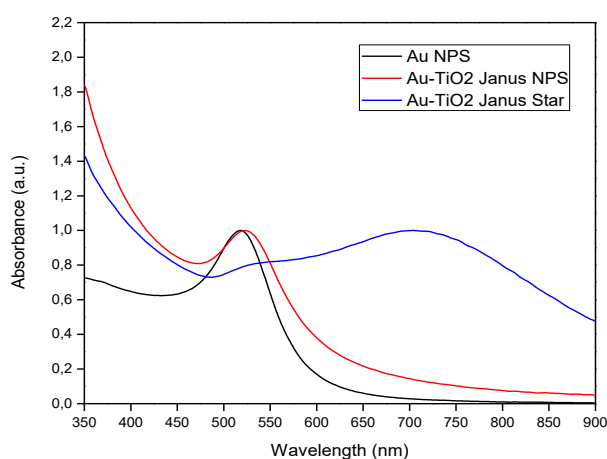


Figure 2: Absorption spectra of gold, hybrid Au:TiO₂ nanoparticles with different morphology by UV-Vis.