

S2-17. Optical properties of Eu 3+ and Tb 3+ - doped tin dioxide nanoparticles prepared by coprecipitation method

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Rare earth (RE) ion doped phosphors have attracted great interest during the past several decades due to their unique physical and chemical properties. RE ions can display many meaningful properties in optics, electronics, and magnetics, originating from f-f electronic transitions within the 4f shell. Doping of wide band gap of metal-oxide semiconductors with RE proved to be a successful tool for tailoring their electrical, optical and microstructural properties. Tin dioxide combines high electrical conductivity with optical transparency. The luminescence of pure SnO₂, observed in the UV and/ or visible region (350-550 nm) is generally correlated with the presence of crystalline defects, mainly oxygen vacancies, the most likely candidates for recombination centers in emission processes for SnO₂ samples. In this work, the incorporation of the Tb³⁺ and Eu³⁺ - doped SnO₂ nanoparticles were prepared by coprecipitation method. In semiconductor nanocrystals, lattice distortions near the surface may produce distinct RE³⁺ environments, which may be enough to affect their band structure and to relax the dipole-forbidden rule. SnO₂:Eu³⁺ presents the appropriate energetic configuration, which takes effect the luminescence in visible range. The ground state (7F₀) and some of the metastable excited levels of Eu³⁺ ion (5D₀, 5D₁) are situated in the band gap of SnO₂. It allows to observe a typical orange/red emission from the excited 5D₀ to 7F_J (J=0-4) levels. SnO₂: Tb³⁺ presents the transition 5D₄→ 7F₆ more intense than 5D₄→7F₅ and exhibit bluish emission in chromaticity diagram. The CIE parameters and CCT values were also varied and the emission color can be tuned from warm to cool light. In addition, this work opens the possibility to produce new functionalized nanoparticles with control of luminescent properties for photonic and biomedical applications.

S2-18. Photothermal properties of gold-silver hollow nanoparticles on silica optical phantoms

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In this work, we present a study of the photothermal effects of gold-silver (Au-Ag) hollow nanoparticles (HNPs) inside of silica (SiO₂) optical phantoms as a diffuse medium for near-infrared (NIR) light. First we fabricate optical phantoms with SiO₂ nanospheres embedded into a transparent polyester resin matrix, homogeneously dispersed on it, where the tuning of the optical properties is controlled by changing the concentration of the nanospheres in the medium. The photothermal effect of the hollow Au-Ag HNPs illuminated with NIR light has been already proved by some researches, however in few investigations the photothermal effects are studied on turbid optical phantoms that mimic living tissues. This research shows experimental results of the temporal variation of the superficial temperature in cylindrical and rectangular SiO₂ optical phantoms with different Ag-Au HNPs concentration, locations and depths inside the optical phantoms by illuminating with a laser beam operating at a wavelength of 808 nm. In addition, to evaluate the photothermal effects of the system, some thermodynamic parameters as the efficiency of light-heat conversion and the constant of heat dissipation of the Au-Ag HNPs are calculated by using the temporal temperature profiles measured by an infrared camera.