

عنوان مقاله:

Metallic Nanoparticles Enhanced Surface Plasmon Resonance in Tellurite Glass

محل انتشار:

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خلاصه مقاله:

The role of gold NPs in the luminescence enhancement of tellurite glass is presented. We use the concept of localized surface plasmon resonance (LSPR) from metallic nanoparticles (NPs) in rare earth (RE) ions doped tellurite glass to modify their optical properties. The LSPR has the ability to encounter problem related to the decrease in emission intensity caused by nonradiative decay of excited levels and thereby enhance the luminescence. Incorporating gold NPs inside the glass matrix by dispersing or arranging as arrays, the plasmon can be excited that modify the radiative decay rates. The emission wavelength, intensity and lifetime of the excited energy levels is found to depend both on the RE ions and the chemical environment of the RE ions excited state that interacts with the surrounding NPs. The strength of the local electric field around the metal NPs is greatly affected by the metallic screening and concentration of light in NPs. The optical properties of the glass depend on the size and shape of NPs. In addition, different annealing time of glass formation also contributes to the photoluminescence enhancement due to the growth of NPs. The photoluminescence enhancement or quenching effect can be understood by the energy transfer between the NPs and RE excited states through coupled multiple dipole theory. The study and exploitation of LSPR and local field properties of metallic NPs embedded in glasses matrix may show different levels of enhancement in fluorescence

کلمات کلیدی:

LSPR, Nanoparticles, Up-conversion, Photoluminescence

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