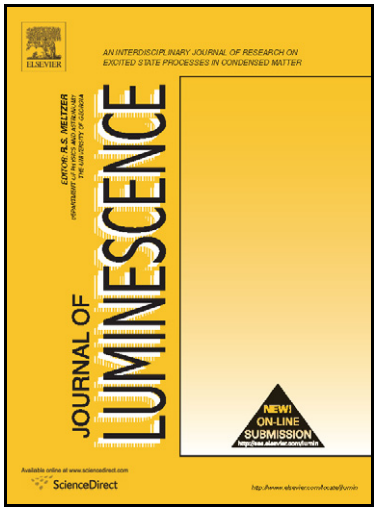

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Abstract

Silver nanoparticles (NPs) embedded Er^{3+} ions doped magnesium-tellurite glasses are prepared using melt quenching technique. Heat treatment with different time intervals above the glass transition temperature is applied in order to reduce the silver ions (Ag^{+}) to silver NPs (Ag^{o}). The transmission electron microscopy (TEM), differential thermal analyses (DTA), UV-Vis-NIR absorption spectroscopy and photoluminescence (PL) spectroscopy are used to examine annealing time dependent structural and optical properties. The characteristics temperatures such as glass transition temperature (T_g), crystallization temperature (T_c) and melting temperature (T_m) obtained from DTA for an as prepared sample are 322 ^{o}C, 450 ^{o}C and 580 ^{o}C respectively. TEM image clearly shows the homogeneous distribution of silver NPs with an average diameter ~12 nm. The observed localized surface plasmon resonance (LSPR) band is evidenced at 534 nm. Furthermore, the infrared to visible frequency up-conversion (UC) emission under 786 nm excitation exhibits three emission bands centered at 532nm, 554 nm and 634 nm corresponding to $^{2}H_{11/2}\rightarrow{}^{4}I_{15/2}$, $^{4}S_{3/2}\rightarrow{}^{4}I_{15/2}$ and $^{4}F_{9/2}\rightarrow{}^{4}I_{15/2}$ transitions of Er^{3+} respectively. Intensity of all the bands is found to enhance by increasing the annealing time up to 24 Hrs. However, further increase in the annealing time duration (~ 40 Hrs) reduces the intensity. Enhancement in the luminescence intensity is understood in terms of the local field effect of the silver NPs whereas the quenching is attributed to the energy transfer from Er^{3+} ions to silver NPs.