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Effect of the sensitizer on the doped emitters

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Abstract

Spectroscopic studies of triply ionised rare earth ions doped into a variety of hosts have been the subject of great interest since more than five decades. The research in this area is still very active due to the need for new photonic materials for different applications. For instance the materials for optical amplifiers, lasers, optical fibers, sensors and frequency upconvertors, etc. must present high chemical durability, large transparency in the spectral window of interest and must allow the incorporation of large amount of rare earth ions in their host matrices. In hosts with low cut-off phonon energies, the optical properties of active ions introduced as doping is enhanced by several folds. In order to make appropriate devices the concentration of the emitters needs to be kept low to avoid any concentration quenching. An alternative way to compensate the deleterious effect of the concentration quenching is to modify the environment around the rare earth ions or to use a sensitizer. The upconversion emission due to the absorption of two or more lower energy photons followed by emission of higher energy photon is gaining significant interest due to the availability of low cost near infra red diode lasers and potential applications in the optical devices. The frequency upconversion in rare earth ions doped materials has been studied by different workers.

In the present paper, the effect of sensitizer on the photoluminescence intensity of the erbium ions with Yb^{3+} ions codoped in Ttellurite based lithium oxide glass upon diode laser excitation at 980nm has been discussed. The effect of sensitization is observed to be responsible for the variation in the luminescence intensity of the active ions.

Biography

Currently, Vineet Kumar Rai is working as Associate Professor in the Department of Applied Physics at Indian School of Mines, Dhanbad, Jharkhand, India. He has published about sixty papers in different international journals, two book chapters and has contributed to a number of national/international conferences/seminars. Presently, he is working in the area of atomic, molecular & Laser Physics, sensors, nanophotonics, linear and non linear optics, etc.