Abstract

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Investigation of luminescence parameters of novel glasses with composition TeO2-ZnO-NaF-MoO2-Er2O3 as laser material

Fluoroquaternary glasses within system 70TeO2-10ZnO-10NaF-(10??x)MoO2-xEr2O3 doped with different concentration of xEr2O3 ions were prepared by using melt-quenching technique. The amorphous nature of the glasses confirmed by using X-ray diffraction. Physical parameters viz.: density (?), molar volumes (Vm), refractive index (n), an optical energy gap (Eg) and Urbach energy (?E) values of prepared glasses were evaluated. Moreover, the Judd–Ofelt parameters ?2, ?4, ?6, the oscillator strength type transition probabilities, Smeas, Scal, spectroscopic quality factors, X, branching ratio, ?R and radiative lifetimes, ?R, of several excited states of Er3+ have been computed. The gain cross-section of laser transition level from 4I13/2???4I15/2 and stimulated emission cross-section estimated with different concentration of Er2O3 ions in all present glasses. Here the spectroscopic properties indicate that these glasses doped with Er3+ are a promising candidate for optical applications.