Abstract

The influence of composition on the thermal stability of tellurite glasses was investigated by using differential scanning calorimetry (DSC). The studied glasses were synthesized by conventional melting quenching method. The best thermal stability and poor crystallization tendency were obtained for the glass composed of $65TeO_2$-15ZnO-$10Na_2O$-5BaO-$3La_2O_3$ doped with Er_2O_3 (2 mol %). This glass will be referred, in this article, as TZNBL: Er^{3+} glass. The spectroscopic properties of the above glass are investigated based on the Judd-Ofelt and McCumber theories. The calculated intensity parameters ($\Omega_{2,4,6}$) are compared to those obtained for Er^{3+} in other glasses. The radiative emission rate has been calculated for the different Er^{3+}emitting levels. The high values of Ω_4 and Ω_6 confirm the results of the DSC experiment concerning the rigidity of the studied glass. Absorption, emission and gain cross section of the $^4I_{13/2}$ â†'$^4I_{15/2}$ (Er^{3+}) transition in the studied glass are reported and the results are compared to those of other glasses. The $^4I_{13/2}$ $^4I_{15/2}$ (Er^{3+}) absorption and emission cross sections derived by the application of the Mc Cumber's theory corroborate the Judd-Ofelt results. The whole of results demonstrate that the new composition leads to good thermal and mechanical properties as well efficient Er^{3+} absorption, emission cross sections, which make this glass as a promising candidate for laser action and amplification