

Structural and luminescent diversities of Eu³⁺ activated Gd₂O₃ nanophosphors

ABSTRACT

In this work we investigated both structural and optical characteristic of erbium doped ternary TeO₂-TiO₂-Bi₂O₃ tellurite oxide based glasses, synthesized via melt-quench method. The X-ray diffraction (XRD) and differential scanning calorimetry (DSC) confirmed its glassy nature and stability. Raman analysis revealed the presence of various coordination state TeO₂ network consisting stretching/bending vibrations of Te-O bonds in the [TeO₄] trigonal bipyramid units and fraction of [TeO₃, TeO₃₊₁] trigonal pyramids. From optical absorption measurement both optical band gap and Judd-Ofelt analysis (intensity parameters Ω_t (t=2, 4, 6), transition probabilities, and radiative lifetimes of the Er³⁺ ions) have been performed for both host and doped glasses respectively. Photoluminescence studies for upconversion and near-infrared emissions analysis (under 980 nm excitation at room temperature. Both optical transition mechanism which involved nonradiative energy transfer between Er³⁺ ions through cross-relaxation and energy migration were also explained in detailed.

Keyword: Photoluminescent; Hydrothermal synthesis and nanowires