

Strong Down-Conversion Emission of Sm³⁺ Doped Borotellurite Glass under the 480nm Excitation Wavelength

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Abstract : Studies on Samarium doped glasses possess lot of interest due to their potential applications for high-density optical memory, optical communication device, the design of laser and color display etc. Sm³⁺ doped borotellurite glasses of the system (70-x) TeO₂-20B₂O₃-10ZnO-xSm₂O₃ (where x = 0.0, 0.5, 1.0, 1.5, 2.0 and 2.5 mol%) have been prepared using melt-quenching method. Their physical properties such as density, molar volume and oxygen packing density as well as the optical measurements by mean of their absorption and emission characteristic have been carried out at room temperature using UV/VIS and photoluminescence spectrophotometer. The results of physical properties are found to vary with respect to Sm³⁺ ions content. Meanwhile, three strong absorption peaks are observed and are well resolved in the ultra violet and visible regions due to transitions between the ground state and various excited state of Sm³⁺ ions. Thus, the photoluminescence spectra exhibit four emission bands from the initial state, which correspond to the 4G_{5/2} → 6H_{5/2}, 4G_{5/2} → 6H_{7/2}, 4G_{5/2} → 6H_{9/2} and 4G_{5/2} → 6H_{11/2} fluorescence transitions at 562 nm, 599 nm, 645 nm and 706 nm respectively.

Keywords : absorption, borotellurite, down-conversion, emission

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