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Spectroscopy study of tellurite-germane-tungsten-zinc glasses codoped with Er^{3+} and Pr^{3+}

RICALDI, José Yitzhak Aarón Chacaliaza; CALDERÓN, Gaston Lozano; HUAMAN, José Luis Clabel; RIVERA, Victor Anthony Garcia; MESSADDEQ, Younes; MAREGA JUNIOR, Euclides

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Tellurite glasses doped with rare earth ions have been the focus of research in recent years due to their applications in optical telecommunication (1-2) and the improvement of optical properties with Pr^{3+} ions doping. (3). In the present work, the glassy system $(74-x)\text{TeO}_2 - 10\text{ZnO} - 10\text{WO}_3 - 10\text{Ge}_2\text{O}_3 - 1\text{Er}_2\text{O}_3 - x\text{Pr}_2\text{O}_3$, where ($x = 0, 0.1, 0.5, 1.0$ and 1.5 mol%) was studied. The amorphous behavior of the samples was confirmed by means of X-ray diffraction, and the glass transition and crystallization temperatures were obtained by Differential Scanning Calorimetry, then the rotational and vibrational states and the phonon energy were studied by Fourier Transform Infrared and Raman spectroscopy. The effect of co-doping Er^{3+} and Pr^{3+} to improve Near Infrared (NIR) emission properties was analyzed by photoluminescence spectroscopy, in addition, the optical characterization was also carried out by UV-Vis-NIR Absorption, and the bandgaps and the Urbach energies were calculated, as well as the polarizability, these results indicated the degree of influence of the Pr^{3+} ions within the structure of the host matrix.

Palavras-chave: Glass. Rare earth ions. Physical spectroscopy.

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