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Synthesis and characterization of BiCa2VO6 doped Sm3+.

Nowadays, vanadate-based materials have been a topic of studying due to their interesting structures and electronics, optics, and magnetic properties. In most cases, the structural characteristics are convenient to be impurified with trivalent lanthanide and/or transition metals, which opens the possibility of applications in deep-red LEDs, W-LED, among others [1]. Moreover, the vanadate intrinsic photoluminescence can serve to sensitize the lanthanide and transition metal emission, which in some cases suffers from an inefficient direct excitation, related to [VO4]-3. Based on these facts, the present work aims to study the photoluminescence properties of Sm3+-doped BiCa2VO6, which has not been studied. The vanadates mixed with Bi3+ promote chains of cations highly polarized or ions of mobile oxides [2-3]. Besides, it facilitates the incorporation of lanthanides by substitution of ions of Bi3+. The synthesis of the phosphors Bi1-x Ca2VO6: xSm3+ (x=0.0 to 0.1) was carried out by the high-temperature solid-state method. The crystalline structure was analyzed from X-ray diffraction patterns. The vibrational modes were studied by Raman spectroscopy, showing their principal vibration modes [4-6]. The emission spectra, under 350 and 406 nm excitations, display four characteristic bands to Sm3+: 4G5/2⟶6H5/2, 4G5/2⟶6H7/2, 4G5/2⟶6H9/2 and 4G5/2⟶6H11/2 transitions, which enhances intensity with the doping content.

Keywords

vanadate, sm3+, high luminescence, solid-state reaction, orange light.

Reference

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Author approval

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