

## The Effect of Yb<sup>3+</sup> Concentration on Spectroscopic properties of Strontium Cerate Doped with Tm<sup>3+</sup> and Yb<sup>3+</sup>

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**Abstract :** Recently, the UC phosphors have attracted much attention owing to their wide applicability in areas such as biological fluorescence labeling, three-dimensional color displays, temperature sensor, solar cells, white light emitting diodes (WLEDs), fiber optic communication, anti-counterfeiting and other areas. The UC efficiency is mainly dependent on the host lattice and the interaction between the host lattice and doped ions. Up to date, various host matrices, such as oxides, fluorides, vanadates and phosphates, have been investigated as efficient UC luminescent hosts. Recently, oxide materials with low phonon energy have been investigated as the host matrices of UC materials due to their high chemical durability and physical stability. A series of Sr<sub>2</sub>CeO<sub>4</sub>: Tm<sup>3+</sup>/Yb<sup>3+</sup> phosphors with different concentrations of Yb<sup>3+</sup> ions have been successfully prepared using the high-energy ball milling method. In this study, we reported the UC luminescent properties of Tm<sup>3+</sup>/Yb<sup>3+</sup> ions co-doped Sr<sub>2</sub>CeO<sub>4</sub> phosphors under an excitation wavelength of 975 nm. Furthermore, the structural and morphological characteristics, as well as the UC luminescence mechanism were investigated in detail. The X-ray diffraction patterns confirmed their orthorhombic structure. Under 975 nm excitation, the emission peaks were observed at 478 nm (blue) and 652 nm (red), corresponding to the 1G<sub>4</sub> → 3H<sub>6</sub> and 1G<sub>4</sub> → 3F<sub>4</sub> transitions of Tm<sup>3+</sup>, respectively. The optimized doping concentration of Yb<sup>3+</sup> ion was 10 mol%.

**Keywords :** Strontium Cerate, up-conversion, luminescence, Tm<sup>3+</sup>, Yb<sup>3+</sup>

**Conference Title :** ICNST 2017 : International Conference on Neurorobotic Systems and Technologies

**Conference Location :** Osaka, Japan

**Conference Dates :** October 09-10, 2017