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Structural investigation of enhanced optical characteristics of rare earth doped calcium zirconate perovskites

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The perovskites activated with rare earth impurities show drastic enhancement of their optical, electrical and magnetic characteristics. With enhanced optical properties, Calcium zirconate (CZO) perovskites are emerging as an interesting realm for future research. This investigation reports the enhanced optical characteristics of Eu_{3+} doped and Tb_{3+} codoped CZO perovskites. Samples with Eu_{3+} 1 mole% and Tb_{3+} (0.5-2 mole %) are synthesized by Solid State Synthesis route, the phosphors report crystalline nature with orthorhombic structure and crystallite size of 28.36 nm and spherical morphology. The SEM micrographs show an average grain size of 80 nm. The functional group analysis is carried out by studying FTIR spectra. In the Photoluminescent spectroscopic studies the phosphor gives intense orange emission at 617nm on subjecting with 305 nm excitation, corresponding to hypersensitive electric dipole transition of 5D0- 7F2 of Eu_{3+} ions. An imperative investigation of structural and optical characteristics of synthesized phosphor is done for future display device applications.

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