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Analysis of varying Tb3+ concentrations on the structural and optical properties of mixed phases of CaAl2O4/Ca1.02Sr1.98Al2O4/SrAl2O4/SrO/Al2O3:x%Tb3+ (0 ≤ x ≤ 2) prepared by sol-gel method.

Thursday, 29 July 2021 12:00 (15 minutes)

Mixed phases of Tb3+ doped CaAl2O4/Ca1.02Sr1.98Al2O4/SrAl2O4/SrO/Al2O3 (CCSSA:x%Tb3+ ($0 \le x \le 2$)) nanophosphors were successfully prepared using sol-gel method. X-ray diffraction (XRD) patterns revealed that all the annealed samples resembled the mixed phases of monoclinic (CaAl2O4 and SrAl2O4), cubic (Ca1.02Sr1.98Al2O4 and SrO) and hexagonal (Al2O3) crystal structures, which were not influenced by variation the Tb3+ concentration. Scanning electron microscopy (SEM) images showed that the morphological features of the prepared nanophosphors were influenced by the Tb3+ concentration. Transmission electron microscopy (TEM) confirmed that the prepared materials were on the nanoscale region. Ultraviolet–visible (UV–vis) diffuse reflection spectroscopy showed that the band gap energy can be tuned in the range 4.90- 5.35 eV. Photoluminescence (PL) results showed four emission peaks located at around 490, 544, 583 and 622 nm and they were respectively ascribed to 5D4 \rightarrow 7F6, 5D4 \rightarrow 7F5 and 5D4 \rightarrow 7F3 transitions of Tb3+ ions.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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