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The effect of Sm3+ concentration on the structure, morphology and photoluminescence properties of co-doped CaAl2O4:0.1%Tb3+, x%Sm3+ (”0 ≤ x ≤ 2 ”) nanophosphor prepared by the citrate sol gel technique.

CaAl2O4:0.1%Tb3+, x% Sm3+ (0<x<2) nano-powders have been successfully prepared via sol-gel technique. Annealing temperature and time were kept constant at 900 oC and 2 hours (h), respectively for all samples. X-ray diffraction (XRD) analysis showed that all powder samples have a monoclinic structure without any impurities. Energy dispersive X-ray spectroscopy (EDS) results confirmed the presence of all expected elements and the EDS map showed that the elements were distributed homogeneously on the surface. Scanning electron microscopy (SEM) results revealed that the prepared powder morphology was influenced by doping. The ultraviolet-visible (UV-vis) spectra showed that doping with Tb3+ and varying the Sm3+ concentration influenced the effective band gap (Eg) of the host material. The photoluminescence (PL) results showed the emissions peaks at 430, 485, 548 and 601 nm attributed to the intrinsic defects within the host. The Tb3+ doped samples showed four emission peaks at 485, 546, 585 and 620 nm attributed to 5D4⟶7F3, 5D4⟶7F4, 5D4⟶7F5 and 5D4⟶7F6 transitions of Tb3+, respectively. The Sm3+ doped samples showed three emission peaks centered at 562, 600 and 647 nm attributed to 4G5/2⟶6H5/2, 4G5/2⟶6H7/2, 4G5/2⟶6H9/2 transitions of Sm3+, respectively.

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

No

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