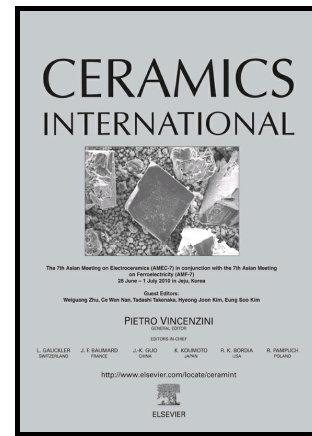


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Sol-gel synthesis and luminescence properties of $\text{Ba}_2\text{SiO}_4:\text{Sm}^{3+}$

nanostructured phosphors

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Abstract

$\text{Ba}_2\text{SiO}_4:\text{Sm}^{3+}$ nanostructure phosphors have been synthesized by a simple sol-gel method. Phase evaluation, structural characteristics and photoluminescence properties of the synthesized $\text{Ba}_2\text{SiO}_4:\text{Sm}^{3+}$ powders were studied using field emission scanning electron microscopy (FESEM), X-ray diffraction (XRD), thermogravimetric and differential thermal analysis (TG-DTA), Fourier transform infrared spectroscopy (FTIR), and photoluminescence spectroscopy (PL). X-ray diffraction results showed that all synthesized samples were single-phase barium silicate (Ba_2SiO_4) and samarium (Sm) ions were incorporated into the lattice of Ba_2SiO_4 . Adding samarium to barium silicate changed the microstructure from vermicular to spherical structures. The Photoluminescence spectrum of $\text{Ba}_2\text{SiO}_4:\text{Sm}^{3+}$ phosphors exhibited characteristic emission peaks at 562 nm which is due to the $^4\text{G}_{5/2} \rightarrow ^6\text{H}_{7/2}$ transition of samarium ions and corresponds to the orange region. The results showed that the barium silicate activated with 0.08 mol samarium exhibited the highest PL intensity.

Keywords: Barium silicate; Sol-gel synthesis; Samarium; Luminescence.

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