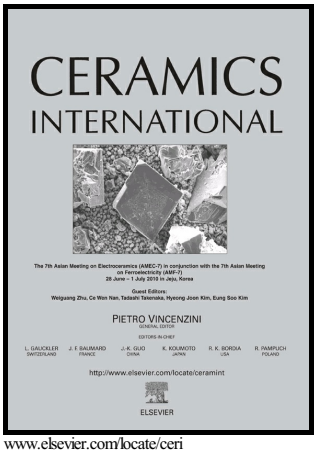

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Abstract

We report on the structure, dielectric, ferroelectric, and photoluminescent properties of Sm^{3+}-doped $Bi_4Ti_3O_{12}$ thin films which were prepared on fused silica and Pt/Ti/SiO_2/Si substrates by sol-gel method. The X-ray diffraction analysis confirmed that the $Bi_{4-x}Sm_xTi_3O_{12}$ (BSmT) thin films were well crystallized in layered perovskite structure without any secondary phase. Raman spectra indicated that the structure of BSmT thin films was significantly distorted because of the Sm^{3+} doping. An appropriate doping amount of Sm^{3+} ions leads to obvious enhancement in ferroelectric and dielectric properties of BSmT thin films due to structure distortion and reduction in defects. In addition, the BSmT thin films also show orange-red color emission at 601 nm and long florescence lifetime (> 0.6 ms). This study indicated that lead-free BSmT thin films, which are featuring good electrical and photoluminescent properties, may have potential applications in integrated optoelectronic devices.

Keywords: BSmT thin film; dielectric; ferroelectric; photoluminescence; lifetime

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