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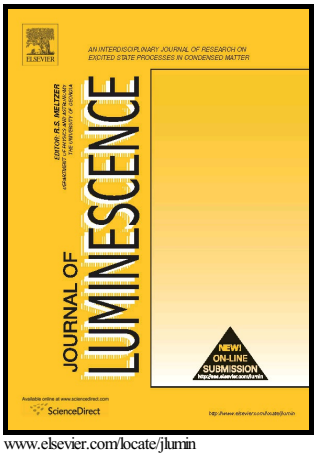

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LUMINESCENCE PROPERTIES OF 100 MeV W^{8+} ION IRRADIATED $GdCa_4O(BO_3)_3:Eu^{3+}$ AND $GdCa_4O(BO_3)_3:Tb^{3+}$ PHOSPHORS

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Abstract

Present study is about the optical properties of 100 MeV W^{8+} ion irradiated europium and terbium doped gadolinium oxyborate phosphors namely $Gd_{0.9}Ca_4O(BO_3)_3:Eu_{0.1}$ and $Gd_{0.9}Ca_4O(BO_3)_3:Tb_{0.1}$. These phosphors were synthesized through solid state reaction technique. The powder X-ray diffraction spectra confirm the formation of monoclinic phase. Bright radioluminescence have been observed during ion irradiation from these phosphors. The radioluminescence become intense initially and started reducing with irradiation time. The Raman spectra of pristine and ion irradiated phosphors have been recorded and analyzed. The photoluminescence spectral intensity show enhancement for low fluence ($1x10^{11}$ ions/ cm^2) irradiated phosphors compared to that of pristine. The $Gd_{0.9}Ca_4O(BO_3)_3:Eu_{0.1}$ phosphor samples emitted red light when 325 nm laser strikes them, but $Gd_{0.9}Ca_4O(BO_3)_3:Tb_{0.1}$ samples exhibited bright white light emission. This unusual white light emission has been analysed using photoluminescence spectra. The surface morphological changes of the phosphors due to 100 MeV W^{8+} ion beam have been studied using field emission scanning electron microscope. The elemental composition of the phosphors has been confirmed using EDX spectra. Thermoluminescence spectra have been recorded and their kinetic parameters were calculated.

Keywords: Borate phosphor; Ion irradiation; Radioluminescence; Photoluminescence; Thermoluminescence

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