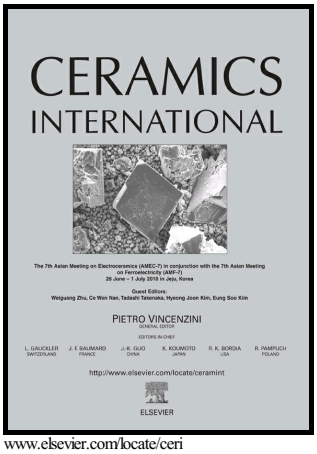

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Thermoluminescence response of 120 MeV Ag^{9+} and γ-ray exposed $LiMgBO_3:Dy^{3+}$ nanophosphors for dosimetry

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Abstract

Thermoluminescence(TL) response of $LiMgBO_3:Dy^{3+}$ nanophosphor synthesized by combustion method was examined using γ-ray and 120 MeV Ag^{9+} swift heavy ion (SHI) irradiation.The $LiMgBO_3:Dy^{3+}$ samples were exposed to 0.01 kGy - 5 kGy γ-rays while for the different fluences the samples were irradiated with 120 MeV Ag^{9+} SHI over the range 1×10^{11} ions cm^{-2} to 1×10^{13} ions cm^{-2}. The prominent TL glow curve peaks appeared at 396 K and 390 K for the γ-ray and 120 MeV Ag^{9+} SHI irradiated samples. The glow curves for the SHI iradiated samples were more complex than those of the γ-ray exposed samples. The effect of different heating rates on the TL response was also determined. The trapping parameters (i.e. activation energy, frequency factor, order of kinetic) of all the individual peaks of the glow curves have been analysed by using Chen's formulae. The TL response curve against γ-ray exposure illustrated a good linear response upto 3 kGy and after that the response was sublinear. For the 120 MeV Ag^{9+} ion irradiated samples, the material exhibited a sublinear dependence against ion irradiation for the studied fluence. The good TL response against γ-ray irradiation suggested that the material can be explored for a possible application in dosimetry.

Keywords:-Thermoluminescence; Swift Heavy Ions; Borates, Dosimetry

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