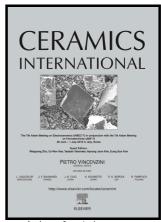
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ACCEPTED MANUSCRIPT

Photoluminescence of terbium doped oxyfluoro-titania-phosphate glasses for green light devices

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Abstract:

Terbium (Tb³⁺) doped oxyfluoro-titania-phosphate glasses of chemical composition (in mol%), (60 - x) $P_2O_5 - 15$ Ba $F_2 - 20$ Ca $F_2 - 5$ Ti $O_2 - x$ Tb₄O₇, x = 0.05, 0.1 and 0.1 were fabricated by usual melt-quenching technique. Photoluminescence (PL) properties of the samples have been investigated by excitation, emission and decay profiles. Upon excitation at 377 nm, the PL spectra exhibit an intense band at 541 nm which corresponds to the ${}^5D_4 \rightarrow {}^7F_5$ transition. The intensity ratio of green-to-blue (I_G/I_B) was found to be 9.2 for 0.1 mol% of Tb³⁺-doped glass. High-energy absorption bands were not resolved in the absorption spectrum but disclosed in the photoluminescence excitation spectrum. Decay curves were unveiled non-exponential and mono-exponential behaviours for the 5D_3 and 5D_4 levels, respectively. Lifetime of the 5D_3 and 5D_4 levels was decreased up to 0.1 mol%, and thereafter it was increased with the increase of Tb³⁺ ion concentration upon 377 nm excitation. The CIE chromaticity coordinates were supported that the green emission was predominant in Tb³⁺-doped oxyfluro-titania-phosphate glasses.

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