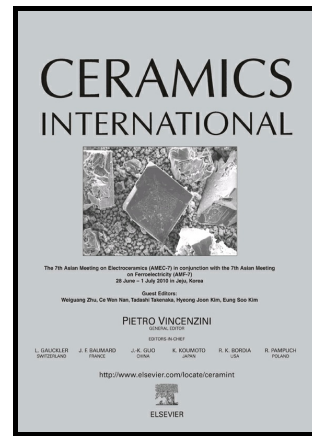


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**Photoluminescence,  $\gamma$ -irradiation and X-ray induced luminescence studies of  $\text{Sm}^{3+}$ -doped oxyfluorosilicate glasses and glass-ceramics****C.S. Dwaraka Viswanath and C.K. Jayasankar\****Department of Physics, Sri Venkateswara University, Tirupati-517 502, India**\*Corresponding author: ckjaya@yahoo.com***Abstract:**

$\text{Sm}^{3+}$ -doped oxyfluorosilicate glasses were fabricated through traditional melt quenching technique. After the heat treatment of the prepared glass, transparent  $\text{SrF}_2$  nanocrystalline glass-ceramics (GC) were obtained. The amorphous nature of the prepared glasses and crystalline phase ( $\text{SrF}_2$ ) of the GC were confirmed by XRD analysis. Abbe number was calculated for all the prepared glasses by measuring refractive index at different wavelengths. In the framework of Judd-Ofelt (JO) theory, the JO intensity parameters were obtained from the absorption spectra of 1.0 mol %  $\text{Sm}_2\text{O}_3$ -doped glass. The photoluminescence spectrum was recorded with 401 nm excitation. From the analysis of optical spectra and JO parameters, the radiative properties like radiative transition probabilities, branching ratios and radiative lifetimes for the fluorescent levels of  $\text{Sm}^{3+}$  ions were determined. The effect of  $\gamma$ -irradiation on luminescence properties and X-ray induced luminescence properties were also studied. The emission intensity was increased for GC where as it decreases with increase of  $\gamma$ -irradiation dosages. There are no noticeable changes in the position as well as intensity in photoluminescence and X-ray induced luminescence spectra for GC sample but after the  $\gamma$ -irradiation, the emission intensity was decreased moderately. The luminescence decay profiles for  $^4\text{G}_{5/2}$  level were recorded and it is changed from exponential to non-exponential nature for higher  $\text{Sm}^{3+}$  ion concentrations. The decay profiles which exhibit non-exponential nature are well fitted to the Inokuti-Hirayama model and determined the energy transfer parameters. By using the integrating sphere, the quantum yield values were obtained for all the prepared glasses. The detailed study of the present

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