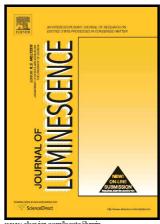
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Structural and optical studies of Rare earth-free Bismuth Silicate

glasses for white light generation

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Abstract:

We report here rare-earth free bismuth silicate based oxyfluoride glasses (70-x) Bi₂O₃ 30SiO₂

xMF (where M= Li, Na &K) with x=5, 20 & 30 mol % that realizes white light. Bismuth silicate

glasses are prepared by melt quenching method and characterized by Raman, Fourier transform

infrared (FTIR), UV-VIS absorption and emission techniques. From the structural analysis,

Raman and FTIR, we are able to find presence of BiO₆ structural unit in the samples. Optical

band gap values of present glass systems that are obtained from absorption spectra vary from

2.91eV to 3.21eV. Optical band gap values shows a correlation with theoretically calculated

optical basicity values. Urbach energy calculated from absorption spectra gives a measure of

disorder of present glass system. Quantitative description of Bi³⁺ ion interaction with silicate host

lattice has been explored through Huang Rhys factor(S). The quality of white light emission is

evaluated by CIE color matching function, color purity (CP) and correlated color temperature

(CCT).

Keywords: Oxyfluoride glasses, Bismuth glasses, Raman, FTIR, Luminescence, white light,

and Decay time

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