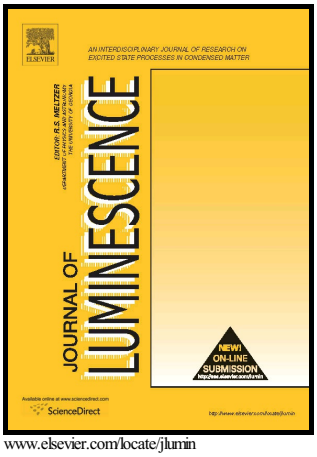


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# Concentration dependent luminescence and cross-relaxation energy transfers in $Tb^{3+}$ doped fluoroborate glasses

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**Abstract**

Recently, mixed-former glasses have attracted a large attention due to the appropriate combinations of the chemical, physical and optical properties of each glass former. In this scenario, the optical properties of fluoroborate glasses doped with rare earth ions is of importance due to their good transparency window from ultra-violet to near-infrared region, good rare-earth solubility, long excited state lifetime of such ions, and high mechanical strength. In this work, we had studied the optical properties of the $Tb^{3+}$ doped fluoroborate glasses, focusing on the concentration dependent behavior of luminescence dynamics of $^5D_3$ and $^5D_4$ exited states of this ion. The blue-to-green intensity ratio, lifetime of the emitting levels under various excitation wavelengths, cross-relaxation rate, ion-ion critical distance and emission gain bandwidth are calculated.

**Keywords:** $Tb^{3+}$ ions, luminescence studies, cross-relaxation, excited state lifetime, concentration dependent