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# Dysprosium doped niobium zinc fluorosilicate glasses: Interesting materials for white light emitting devices

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## Abstract

Trivalent dysprosium doped niobium zinc fluorosilicate glasses modified with different Nb<sub>2</sub>O<sub>5</sub>/ZnF<sub>2</sub> molar ratios have been fabricated by the traditional melt-quenching technique and derived their structural, photoluminescence and decay properties using spectroscopic techniques. Induced structural modifications have been observed upon increasing content of Nb<sub>2</sub>O<sub>5</sub>. Maximum phonon energy of the glass matrix is found to be 1010 cm<sup>-1</sup> from the Raman analysis. The emission spectra of these glasses exhibit two intense bands at 480 and 570 nm besides a weak red emission at 650 nm. The decay profiles of Dy<sup>3+</sup> ion for the <sup>4</sup>F<sub>9/2</sub> level exhibit a non-exponential behavior for all the glasses. The intrinsic lifetimes for the <sup>4</sup>F<sub>9/2</sub> level of Dy<sup>3+</sup> ion have been determined by using the Inokuti-Hirayama model and are found to be 409, 366 and 325 μs for the glasses with Nb<sub>2</sub>O<sub>5</sub>/ZnF<sub>2</sub>:10/30, 20/20 and 30/10 molar ratios, respectively. The color coordinates have been evaluated from the emission spectra of the glasses and found that the glass with Nb<sub>2</sub>O<sub>5</sub>/ZnF<sub>2</sub>:30/10 molar ratio appears near to the equal energy point. The correlated color

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