

## Photoluminescence Spectroscopy to Probe Mixed Valence State in Eu-Doped Nanocrystalline Glass-Ceramics

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**Abstract :** Mixed valence Eu-doped nanocrystalline NaAlSiO<sub>4</sub>/NaY<sub>9</sub>Si<sub>6</sub>O<sub>26</sub> glass-ceramics have been prepared by controlled crystallization of melt quenched bulk glasses. XRD and SEM techniques were employed to characterize the crystallization process of the precursor glass and their resultant glass-ceramics. Photoluminescence spectroscopy was used to analyze the formation of divalent europium (Eu<sup>2+</sup>) from Eu<sup>3+</sup> ions during high temperature synthesis under ambient atmosphere and is explained on the basis of optical basicity model. The observed luminescence properties of Eu: NaY<sub>9</sub>Si<sub>6</sub>O<sub>26</sub> are compared with that of well explored Eu: β-PbF<sub>2</sub> nanocrystals and their marked differences are discussed.

**Keywords :** rare earth, oxyfluoride glasses, nano-crystalline glass-ceramics, photoluminescence spectroscopy

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