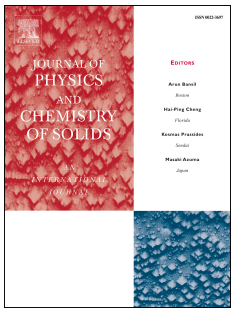
# Accepted Manuscript




Tunable emission in $Ln^{3+}$ ($Ce^{3+}$/$Dy^{3+}$, $Ce^{3+}$ /$Tb^{3+}$) doped $KNa_3Al_4Si_4O_{16}$ phosphor for w-LEDs synthesized by combustion method

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# Tunable emission in $Ln^{3+}$ ($Ce^{3+}$/$Dy^{3+}$, $Ce^{3+}$/$Tb^{3+}$) doped $KNa_3Al_4Si_4O_{16}$ phosphor for w-LEDs synthesized by combustion method

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**Abstract**

$Ln^{3+}$ (Ln = $Ce^{3+}$/$Dy^{3+}$, $Ce^{3+}$/$Tb^{3+}$) doped $KNa_3Al_4Si_4O_{16}$ phosphor has been synthesized by Combustion Synthesis (CS) at $550^0$ C successfully. $Ln^{3+}$ (Ln = $Ce^{3+}$, $Dy^{3+}$, $Tb^{3+}$) ions when doped in $KNa_3Al_4Si_4O_{16}$ host lattice, it shows blue and green emission band under the near Ultraviolet (NUV) excitation wavelength. The Photoluminescence excitation (PLE) and emission spectra are observed due to f-f and d-f transition of rare earth ions. Also, an effective energy transfer (ET) study from $Ce^{3+} \rightarrow Dy^{3+}$ and $Ce^{3+} \rightarrow Tb^{3+}$ ions have been studied and confirmed on the basis of Dexter-Foster theory. Further synthesized phosphor is well characterized by XRD, SEM, TEM and decay time measurement. However, the analysis of crystallite size, lattice strain has been studied by using theoretical as well as experimental techniques. Hence, the observed tunable emission in $Ln^{3+}$ doped $KNa_3Al_4Si_4O_{16}$ phosphor may be application for solid state lighting technology.

**Keywords:**

Phosphor

Materials and methods

Crystallite Size

Nanomaterials

Energy transfer

Decay time

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