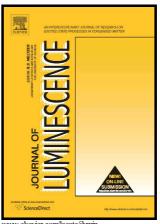
## Author's Accepted Manuscript

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### **ACCEPTED MANUSCRIPT**

Synthesis and enhancement of photoluminescent properties in spherical shaped Sm<sup>3+</sup>/Eu<sup>3+</sup> co-doped NaCaPO<sub>4</sub> phosphor particles for w-LEDs

Mukesh K. Sahu<sup>1</sup>, M. Jayasimhadri\*, Kaushal Jha<sup>1</sup>, B. Sivaiah<sup>1,2</sup>, A.S. Rao<sup>1</sup>, D. Haranath<sup>2</sup>

<sup>1</sup>Luminescent Materials Research Lab, Department of Applied Physics, Delhi Technological
University, Delhi 110 042, India

<sup>2</sup>CSIR-National Physical Laboratory, Dr. K.S. Krishnan Road, New Delhi 110 012, India

\*Corresponding author: Tel: +91- 9013553360. jayaphysics@yahoo.com (M. Jayasimhadri)

#### **Abstract**

A series of Sm<sup>3+</sup> doped and Sm<sup>3+</sup>/Eu<sup>3+</sup>co-doped NaCaPO<sub>4</sub> phosphors have been successfully synthesized via molten salt method. The structural, morphological, optical, photoluminescence and decay properties of the synthesized phosphors were investigated. Sm<sup>3+</sup> doped phosphor exhibits excellent emission properties in the orangish-red region under n-UV excitation (403 nm), and the optimized doping concentration of Sm<sup>3+</sup> was found to be 1.0 mol%. The excitation spectrum confirms that Sm<sup>3+</sup>/Eu<sup>3+</sup> co-doped NaCaPO<sub>4</sub> phosphors can be efficiently excited by both n-UV and blue LED chips. In the co-doped NaCaPO<sub>4</sub>:Sm<sup>3+</sup>/Eu<sup>3+</sup> phosphors, the intensity of main characteristic emission peaks of Sm<sup>3+</sup> decreased and Eu<sup>3+</sup> increased with increasing Eu<sup>3+</sup> ion concentration. The energy transfer (ET) from Sm<sup>3+</sup> to Eu<sup>3+</sup> was demonstrated to be quadrupole-quadrupole in nature by applying Dexter's ET formula and Reisfeld's approximation. Commission Internationale de l'Eclairage (CIE) chromaticity coordinates for codoped samples lie in the red region. The decay time for the <sup>4</sup>G<sub>5/2</sub> level of Sm<sup>3+</sup> to Eu<sup>3+</sup>. These

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