

# **Structural and Optical Characteristics of Rare Earth Doped Calcium Oxide Phosphor Material.**

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## **Abstract**

Understanding and examining the influence of rare earth elements on structural and optical properties of phosphors has become tremendous topic of interest. Despite a large number of research on the phenomenon the mechanism of the persistent luminescence of CaO: Eu<sup>2+</sup>, Eu<sup>3+</sup>, Nd<sup>3+</sup>, Dy<sup>3+</sup> has not been well presented. A proper understanding of the exact luminescence mechanisms or locations in long phosphorescent materials is required for their use in areas such as detection of radiation, sensors for cracks in buildings, fracture of materials and temperature among others. In this work the effects of different rare earth ions Eu<sup>3+</sup>, Eu<sup>2+</sup>Nd<sup>3+</sup>, Ce<sup>3+</sup> and Dy<sup>3+</sup> doping on the CaO phosphor structure and its luminescent properties will be investigated. The correlation between structural and optical properties in presence of the different rare earths is to be established. This is done with the aim of identifying new phosphor materials that are more efficient than existing phosphors and modifying existing ones to have more desirable properties.

Also in this research an overview of luminescent materials has been given. Based on the optical properties and rare earth ions, fundamental aspects and classical applications of luminescent materials applied in fluorescent lamps and displays are discussed. The application potential of rare earth phosphors with regard to new developments such as phosphors for LEDs and phosphor materials with large quantum yield is also discussed.