



Synthesis, crystal structure, and luminescence properties of RbCaF₃:Eu³⁺ orange-red emitting phosphors for white light emitting diodes

Arumugam Raja^a, G. Annadurai^b, V. Sivasubramani^c, K. Ramachandran^d, R. Kamesh^e, V. Govindan^f, P. Vijayakumar^g, V. Siva^g, P. Ramasamy^e

^a CNR-SPIN, c/o University of Salerno I, 84084, Fisciano, Salerno, Italy

^b College of Physics and Optoelectronics, Taiyuan University of Technology, Taiyuan, 030024, PR China

^c Department of Physics, School of Engineering and Technology, Dhanalakshmi Srinivasan University, Samayapuram, Tiruchirappalli, 621112, Tamil Nadu, India

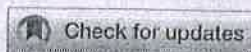
^d Department of Physics, SSM Institute of Engineering and Technology, Dindigul, 624002, India

^e SSN Research Centre, Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam, Tamil Nadu, 603110, India

^f Centre for Excellence, Functional Materials Technology Group, Ensemble³, Warsaw, 01-919, Poland

^g Department of Physics, Karpagam Academy of Higher Education, Coimbatore, 641021, India

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Abstract

A series of novel orange-red emitting RbCaF₃:0.05Eu³⁺ phosphors were synthesized by solid-state reaction technique. Phase formation and crystal structure of RbCaF₃ were investigated through powder X-ray diffraction patterns and Rietveld refinement. Through X-ray photoemission spectroscopy, their composition and nature of oxidation states were determined. These fluoroperovskite phosphors are efficiently excited by near ultraviolet (n-UV-394 nm) and a corresponding sharp emission peak is exhibited at 590nm. This peak can be attributed to the ⁵D₀→⁷F₁ transition of the magnetic dipole. A concentration quenching effect can be observed with increasing Eu³⁺ ion concentration. The Commission Internationale de l'Eclairage (CIE) chromaticity coordinates (x=0.5764, y=0.4277) of the RbCaF₃: 0.05Eu³⁺ phosphors excited at 394nm.