

Influence Of Crystal Structures And Traps Depths On The Luminescence Of (Ca, Sr, Ba) Al₂O₄-Based Phosphors Synthesized By Combustion Method

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Abstract

Alkaline-earth aluminates are excellent luminescent materials, especially for persistent luminescence, when doped with rare- earth or transition metal ions. MAI₂O₄:Eu²⁺, Nd³⁺ (M = Ca, Sr, Ba) phosphors can light up for a long time in the darkness after irradiation with sunlight or artificial light. It is generally agreed that the phosphorescence of Eu²⁺ in most of hosts is believed to be caused by the 4f -----5d transition. Eu, Nd co-doped MAI₂O₄:Eu²⁺,Nd³⁺ (M = Ca, Sr, Ba) phosphors were prepared at an initiating combustion temperature of 500 °C using urea as an organic fuel. Combustion method is cheap, easy and very efficient. The crystallinity of the phosphors was investigated by using x-ray diffraction (XRD) and the morphology was determined by scanning electron microscope (SEM). Synthesis of phosphors, the effect of lanthanide concentrations on light emission intensity and duration investigated by using photoluminescence measurements. Investigated the effects of radiation on the severity of the trap depths of these structures.

Key words: Phosphorescence, combustion, lanthanides, trap depths, luminescent materials.