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Improvement of luminescence properties of $LaSrAl_3O_7:Eu^{3+}$ phosphor

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Abstract

A red phosphor $LaSrAl_3O_7:Eu^{3+}$ were synthesized by the solution combustion technique. Their structural and luminescent properties were investigated. The Eu^{3+} doped $LaSrAl_3O_7$ phosphors were excited by n-UV light and exhibited a prominent red emission which is due to the D →F transitions. The incorporation of Li^+, Na^+, and K^+ ions as compensator charge, the luminescence intensity of $LaSrAl_3O_7:Eu^{3+}$ greatly enhanced. Addition of Li^+ ions in the phosphor shows strongest emission among used charge compensators. The CIE chromaticity (x, y) of $LaSrAl_3O_7:Eu^{3+}$, Li^+ sample were obtained (0.68, 0.31) and it is close to the standard red chromaticity of NTSC. $LaSrAl_3O_7:Eu^{3+}$, Li^+ is a good candidate phosphor for red light emitting diodes.

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2023, Ceramics International

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2022, Chemical Physics Letters

> *Citation Excerpt :*
>
> …First, it can produce white light in conjunction with green luminescent materials excited by blue chips, or to produce white light in conjunction with green and blue luminescent materials excited by near-ultraviolet chips; second, it is used to compensate for the lack of red in the white light produced by the yellow luminescent material excited by the blue chip, thereby increasing the color rendering index or reduce the color temperature. Because of their excellent fluorescence properties such as high-power efficiency, luminous brightness, low applied voltage and long lifetime [14,15], phosphors activated by rare earth (Re) ions are widely used in people's daily life. Eu3+ is an important activating ion for high-efficiency red phosphors.…

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A review study on the structural and photoluminescence properties of rare earth doped lanthanate ALa<inf>2</inf>ZnO<inf>5</inf> (A = Ca, Sr or Ba) phosphors

2021, Materialia

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> …This is due to the enhanced photoluminescent features in phosphors arising from 4f electrons of the doped rare earth ions. Inorganic compounds (host) doped with rare earths ions forms an important class of phosphors and these activated phosphors play a unique role [3] in the lighting field because of their high refractive index, enhanced lumen intensity, eco-friendly and more stability towards moisture, chemicals etc [4]. In the past, various sulphide based phosphors such as

> ZnCdS:Cu:Al, ZnS:Cu:Al, Y2O2S:Eu, Gd2O2S:Tb, etc. were commercially used, but these phosphors were not so eco-friendly in nature and the life of the devices was also small because the deposition of sulphate and oxide on the screen during electron pelting.…

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Systematic studies on Ca<inf>19</inf>M<inf>2</inf>(PO<inf>4</inf>)<inf>14</inf>:Eu³⁺ (M = Mg, Zn) phosphors: Effects of M cation on photoluminescence

2020, Journal of Alloys and Compounds

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> …The rare earth ions activated phosphates display excellent photoluminescence properties, such as Na3Sc2(PO4)3:Eu3+ [31], Na3Sc2(PO4)3:Ce3+,Tb3+ [32], and M8MgSc(PO4)7:Dy3+ [33], etc. As one of important and efficient rare earth ion, Eu3+ embodies important application in phosphors owing to their 5D0→7FJ (J = 1–4) transitions [34–37]. Herein, the luminescence properties of Eu3+-doped CMPO and CZPO phosphors are evaluated in this study.…

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