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Photoluminescence properties of rare-earths and manganese doped strontium aluminate phosphors prepared by combustion method.

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Abstract content
 (Max 300 words)

Alkaline earth aluminate hosts have attracted a lot interest, due to their stable crystal structure, high physical and chemical stability. Strontium Aluminate (SrAl₂O₄) host material have been proven to be efficient with a wide band gap, which offers the possibility of generating broad band emission. In this study SrAl₂O₄ doped with Eu²⁺, Dy³⁺ and Mn²⁺ phosphor powders were prepared by combustion method at 600°C. The X-ray diffraction (XRD) patterns of the samples were performed using a Bruker AXS D8 advanced automatic diffractometer with Cu-K α radiation ($\lambda = 1.5418$ A), operating at 40 kV and 30 mA. The photoluminescence (PL) and photoluminescence excitation (PLE) spectra were measured at room temperature using a Spex Fluorolog-3 spectrofluorometer (Instruments S.A., N.J., U.S.A) equipped with a 450 W Xe light source and double excitation monochromators.

The PL emission spectra of SrAl₂O₄ doped with Eu²⁺ and Dy³⁺ shows the influence of excitation wavelength on the emission spectra of the sample. The broad and sharp emission bands observed are typical transitions of Eu²⁺ and Eu³⁺ respectively. The broad emission bands from these spectra are attributed to the typical transitions from the lowest ²D level of the excited 4f⁶5d¹ configuration to the ground ⁸S_{7/2} level of the 4f⁷ configuration of Eu²⁺ ion. The sharp emission lines can be attributed to the (⁵D₀-⁷F₁₋₅) electronic transition of Eu³⁺ ions present in the host matrix. The particle morphologies of the powders were investigated using Zeiss High resolution SEM.

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