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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 (SrAl_2O_4) 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 SrAl_2O_4 doped with Eu^{2+} , Dy^{3+} and Mn^{2+} 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 $\text{Cu-K}\alpha$ radiation ($\lambda = 1.5418 \text{ \AA}$), 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 SrAl_2O_4 doped with Eu^{2+} and Dy^{3+} shows the influence of excitation wavelength on the emission spectra of the sample. The broad and sharp emission bands observed are typical transitions of Eu^{2+} and Eu^{3+} respectively. The broad emission bands from these spectra are attributed to the typical transitions from the lowest ^2D level of the excited $4f^65d^1$ configuration to the ground $^8\text{S}_{7/2}$ level of the $4f^7$ configuration of Eu^{2+} ion. The sharp emission lines can be attributed to the ($^5\text{D}_0 - ^7\text{F}_{1-5}$) electronic transition of Eu^{3+} ions present in the host matrix. The particle morphologies of the powders were investigated using Zeiss High resolution SEM.

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