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Characterization and XPS information of commercially $Y_2O_2S:Eu^{3+}$ powder phosphor

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Abstract :

Trivalent-europium doped yttrium oxysulphide phosphor (band gap $\sim 4.2 - 4.8$ eV) is an important phosphor system extensively applied in colour televisions, high resolution displays, memory devices, after glow phosphors and so on. We report on characterization of a red long-lasting phosphorescent material, $Y_2O_2S:Eu^{3+}$. The morphology and optical properties of the powder phosphor were characterized, the morphologies thereof shows that the particles differ in terms of sizes and shapes. Energy Dispersive X-ray analysis (EDX) confirms all the elements on the surface. X-ray diffraction (XRD) investigation showed a pure hexagonal phase of Y_2O_2S . All peaks have been perfectly indexed as the pure hexagonal phase and they are in good agreement with the standard file of JCPDS #24-1424. From the Photoluminescence (PL) spectrum, the main emission peak is ascribed to Eu^{3+} ion transition from $5DJ (J=0, 1, 2)$ to $7FJ (J=0, 1, 2, 3, 4)$. After irradiation with a wavelength of 320 nm, the phosphor emitted red long-lasting phosphorescence. From this emission spectrum it is clearly indicated that the Eu^{3+} ions have been effectively distributed into the Y_2O_2S matrix. The elementary state of the surface was also determined with X-ray photo electron spectroscopy (XPS). XPS peaks for the $Y_2O_2S:Eu^{3+}$ have been observed for Y 3d at 156 and 158 eV, Y 3p at 298.5 and 310.5 eV, S 3p at 164.5 eV and S 2s at 228 eV, respectively.

Award :

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