Contribution ID: **282** Type: **Poster Presentation**

Characterization and XPS information of commercially Y₂O₂S:Eu³⁺ powder phosphor

Tuesday, 10 July 2012 17:30 (2 hours)

Abstract content
   (Max 300 words)

Trivalent-europium doped yttrium oxysulphide phosphor (band gap ˜ 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, Y₂O₂S:Eu³⁺. 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 Y₂O₂S. 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 Eu3+ 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 Eu³⁺ ions have been effectively distributed into the Y₂O₂S matrix. The elementary state of the surface was also determined with X-ray photo electron spectroscopy (XPS). XPS peaks for the Y₂O₂S:Eu³⁺ 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.

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Yes

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Session Classification: Poster Session

Track Classification: Track A - Division for Condensed Matter Physics and Materials