

Luminescent properties of $\text{SrAl}_2\text{O}_4\text{:Bi}_2\text{O}_4$ phosphor

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Scientific interest in the luminescence of bismuth based materials has maintained a steady increase especially pronounced in the last four years [1]. Bismuth has an electronic configuration of $[\text{Xe}]4f^{14}5d^{10}6s^26p^3$ yielding 5 valence electrons. The outer orbitals responsible for luminescence are unshielded and strongly influenced by the surrounding environment, so that their energies are host dependent, similarly to the case of the f-d transitions of Ce^{3+} and Eu^{2+} ions, which vary according to the host. This makes it possible for bismuth based materials to emit over a wide range of wavelengths. In previous studies [2, 3] for bismuth-dopant phosphors was noted luminescence from the ultraviolet to the infrared with a single rather narrow emission peak. We carried out a series of solid-phase syntheses of phosphors based on bismuth-doped strontium aluminate. Unlike the previously described methods, we used as a source of bismuth not Bi^{3+} , as usual, but the compound Bi_2O_4 . Synthesized phosphor has full spectral multi-peak luminescence, which is highly promising for solid state luminescence, especially for single-source white light-emitting diodes [4].

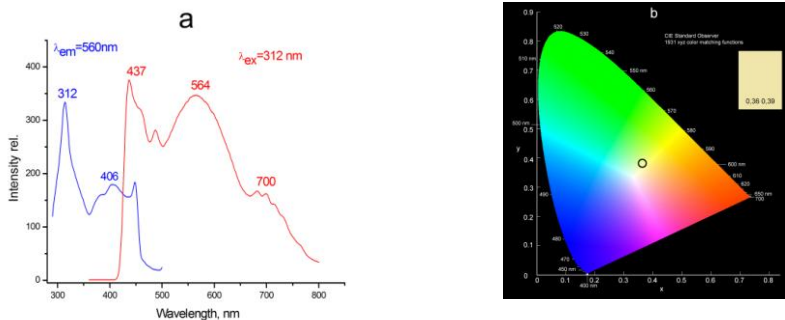


Fig. Excitation and emission spectra of phosphor $\text{SrAl}_2\text{O}_4\text{:Bi}_2\text{O}_4$ (a);
CIE chromaticity coordinates diagram of $\text{SrAl}_2\text{O}_4\text{:Bi}_2\text{O}_4$ luminescence (b)

References

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