Nanocomposites and nanomaterials

Phosphor coating based on nanostructured yttrium-aluminum garnet and low-melting glass

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The creation of highly effective luminescent converters of energy is actual for LED illuminants in the form of the thick-film composites on an inorganic basis applied on transparent glass substrates. For creation of luminescent powder of yttrium-aluminum garnet doped with cerium, is used a thermo-chemical synthesis (combustion). The method of obtaining of spherical nanopowders is demonstrated high yield of useful product (90%), the possibility of easily dispersible in liquid media and the molten glass. Glass of Bi_2O_3–B_2O_3–BaO, characterized by lower temperatures and spreading of high refractive index selected as the optimal glass for the manufacture of light-converting coating.

The phosphor coatings were based on nanostructured powder yttrium aluminum garnet doped with cerium. As a basis for the phosphor compositions used low-melting glass composition of composition BaO-Bi_2O_3-B_2O_3-K_2O-SiO_2 having a softening point of not more than 600 ° C. In some experiments powder of quartz glass as the diffusion disseminating component improving lighting characteristics was entered into structure of composition [1].

The luminescent composition is prepared by mixing of components with isopropanol, further the slip was cast on a glass substrate and was dried up. The glass substrate with a covering was located in the muffle furnace on a ceramic support and gradually was heated up to temperature of 600 °C and was maintained within 30-60 minutes, then slowly was cooled with the furnace to room temperature. The glasses with smooth and corrugated surface were used as substrates. On the base grooved substrate coated with a phosphor layer the photo luminescent transducer was constructed.

1. *Uretskaya O.V., Drobyshevskaya N.E., Grishkova E.I., Poddenezhny E.N., Bobkov N.M., Trusova E.E.* Formation of phosphor coatings for solar cells LED // Materials. Technology. Tools. - 2012. - **17**, N 1.-P. 75-78.