physics

Two-phase oxynitride phosphor with enhanced and prolonged luminescence



About the solution

The invention relates to a two-phase oxynitride phosphor with enhanced and prolonged luminescence, and to a method of its preparation.

The material, composed of two crystalline phases – trigonal $SrSi_2O_2N_2:Eu^{2+}$ and hexagonal $Sr_3Si_6O_9N_4:Eu^{2+}$ – exhibits exceptionally high quantum efficiency (above 65%) and strong green light emission (maximum at 535–545 nm), persisting for several tens of minutes after excitation ceases.

The phosphor shows stable, long-lasting emission independent of excitation wavelength (250–450 nm), enabling its use in modern LED light sources.

The developed synthesis method allows precise control of oxygen content and crystal structure, ensuring reproducible optical properties and increased material durability.

IP Protection

The invention is protected by the Polish Patent Office under the following number: **Pat.238800**

Technology readiness level

TRL 4 - Technology validated in laboratory conditions.

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Applications

- Green phosphors for white LED light sources,
  Materials for displays, optical sensors and photoluminescent protective coatings,
- Components of lighting systems with improved durability and energy efficiency.

Cooperation opportunities

- Technology licensing and joint industrial implementation,
- Development of LED light source prototypes using the phosphor,
- pplied research with optoelectronics and materials companies.

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