



Stand-Alone Ceramic Phosphor Composites for Laser-Excited Solid-State White Lighting

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BRIEF DESCRIPTION

A method for generating a stand-alone ceramic phosphor composite for use in solid state white light generating devices that successfully reduces the operating temperature of the phosphor material by 50%, increases lumen output, reduces cost of materials, and decreases preparation time.

BACKGROUND

Current phosphor encapsulation schemes involve a resin or glass component that caps the maximum operating temperature of the device to avoid thermal instability. Therefore, while organic resins and glasses are appropriate for light emitting diodes that operate at low temperatures, they are not suitable for the higher flux imposed by high power LEDs or laser diodes (LDs). The realization of encapsulation-free phosphor ceramics is required for the next generation of laser-based white lighting due to the temperature limitations of resins.

DESCRIPTION

Researchers at the University of California, Santa Barbara have created a method for generating a stand-alone ceramic phosphor composite for use in solid state white light generating devices that successfully reduces the operating temperature of the phosphor material by 50%, increases lumen output, reduces cost of materials, and decreases preparation time. The compound consists of a phosphor material and a filler oxide. The phosphor material is a UV and blue absorbing inorganic phosphor that efficiently converts blue light to yellow. The method uses spark plasma sintering (SPS) material preparation that promotes densification in less than 30 minutes, resulting in very dense and robust samples.

ADVANTAGES

- ▶ Drastically lower operating temperatures
- ▶ Increased light output
- ▶ Reduced manufacturing costs and time
- ▶ Decreased preparation time

APPLICATIONS

- ▶ Light Emitting Diodes (LEDs)
- ▶ Laser Diodes (LDs)

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OTHER INFORMATION

KEYWORDS

indfeat, Solid state white light,
Phosphor, indadvmat

CATEGORIZED AS

- ▶ **Energy**
 - ▶ Lighting
- ▶ **Engineering**
 - ▶ Engineering

RELATED CASES

2016-99P-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,286,419	03/29/2022	2016-99P

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- [Oxyfluoride Phosphors for Use in White Light LEDs](#)
- [Thermally Stable, Laser-Driven White Lighting Device](#)

