Thermally Stable, Laser-Driven White Lighting Device

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OTHER INFORMATION

KEYWORDS

indssl, indLED, solid state lighting, white lighting, phosphors, cenIEE

CATEGORIZED AS

- **Energy**
  - Lighting

RELATED CASES

2013-951-0

BRIEF DESCRIPTION

A high power, laser driven white light source that maintains efficiency and color stability at high temperatures.

BACKGROUND

Light emitting diodes (LEDs) are advantageous over incandescent and fluorescent light sources due to their energy efficiency and longer lifetimes, and efforts are continually being made to increase the efficiency of LED devices. When operating, an LED’s temperature will inevitably increase and result in decreased efficiency of the light emitting phosphor particles, as well as color instability. These factors have made high powered, white lighting devices unattainable using current LEDs as the excitation source.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed a high power, laser driven white light source that maintains efficiency and color stability at high temperatures. By using a laser diode light source, as well as one or more phosphors deposited on a thermally conductive substrate that is either transparent or reflective and placed at a remote distance from the laser source, this technology works to eliminate the temperature dependence of the device. Depending on the final application this thermally conductive substrate can be transparent or reflective and is used remotely at a close range or at a relatively far distance. This technology offers a stable, energy efficient, high power solid state white light that eliminates many of the loss mechanisms that lead to decreased efficiency in LED-based white lighting devices.

ADVANTAGES

- Remote capabilities
- Improved efficiency and color stability
- High potential for new applications

APPLICATIONS

- Solid state lighting devices
- Laser diodes

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,927,076	03/27/2018	2013-951
United States Of America	Issued Patent	9,574,728	02/21/2017	2013-951

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Vertical Cavity Surface-Emitting Lasers with Continuous Wave Operation
- Eliminating Misfit Dislocations with In-Situ Compliant Substrate Formation
- Enhanced Light Extraction LED with a Tunnel Junction Contact Wafer Bonded to a Conductive Oxide
- Methods to Produce and Recycle Substates for III-Nitride Materials with Electrochemical Etching
- Stand-Alone Ceramic Phosphor Composites for Laser-Excited Solid-State White Lighting
- III-Nitride Tunnel Junction with Modified Interface
- Improved Reliability & Enhanced Performance of III-Nitride Tunnel Junction Optoelectronic Devices
- (In,Ga,Al)N Optoelectronic Devices with Thicker Active Layers for Improved Performance
- III-Nitride Tunnel Junction LED with High Wall Plug Efficiency
- A Method To Lift-Off Nitride Materials With Electrochemical Etch
- Activation of P-Type Layers of Tunnel Junctions in Micro-LEDs
- High-Intensity Solid State White Laser Diode
- Nitride Based Ultraviolet LED with an Ultraviolet Transparent Contact
- Epitaxial Light Control Features in Light Emitting Diodes
- High-Efficiency Vertical Cavity Surface Emitting Laser Fabrication
- A Wafer-Scale, Low Defect Density Strain Relaxed Template for III-Nitride-Based High Efficiency and High-Power Devices

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