Oxyfluoride Phosphors for Use in White Light LEDs

Tech ID: 23416 / UC Case 2009-704-0

BRIEF DESCRIPTION

A novel Ce3+-doped oxyfluoride phosphor material for solid-state lighting applications.

BACKGROUND

White light generation for most commercial light emitting diode (LED) lamps employ yellow Ce3+ phosphors excited by blue InGaN diodes due to their unsurpassed efficiency. However, the Ce3+ phosphors have relatively weak emissions in the red region. Moreover, the color output from these phosphors is strongly dependent on temperature and current, creating problems for high power LEDs.

DESCRIPTION

Researchers at the University of California, Santa Barbara have invented a novel Ce3+-doped oxyfluoride phosphor material for solid-state lighting applications. This invention produces much higher photoluminescence intensities than commercial Ce3+, allowing for tunability of emission color and excitation band, resulting better light quality with high efficiency. Moreover, this material can be used for white light generation with a number of phosphor combinations (near UV light with red, green-orange or yellow phosphors) and allows for greater color rendering.

ADVANTAGES

- High efficiency
- Good color rendering properties

CONTACT

University of California, Santa Barbara Office of Technology & Industry Alliances
padilla@tia.ucsb.edu
tel: 805-893-2073.

INVENTORS

- DenBaars, Steven P.
- Im, Won Bin
- Seshadri, Ram

OTHER INFORMATION

KEYWORDS

phosphor, white light, LED, indphosphor, indssl, cenIEE, oxyfluoride, indfeat, indadvmat

CATEGORIZED AS

- **Energy**
  - Lighting
  - Other
- **Materials & Chemicals**
  - Other

RELATED CASES

2009-704-0, 2010-022-0

- Variety of applications

APPLICATIONS

- LEDs
- Liquid Crystal Displays

This technology is available for licensing. Click here to request more information.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,344,611	01/01/2013	2009-704

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Vertical Cavity Surface-Emitting Lasers with Continuous Wave Operation
- Eliminating Misfit Dislocations with In-Situ Compliant Substrate Formation
- Aluminum-cladding-free Nonpolar III-Nitride LEDs and LDs
- Low-Cost Zinc Oxide for High-Power-Output, GaN-Based LEDs (UC Case 2010-183)
- Defect Reduction in GaN films using in-situ SiNx Nanomask
- Enhanced Light Extraction LED with a Tunnel Junction Contact Wafer Bonded to a Conductive Oxide
- Low Temperature Deposition of Magnesium Doped Nitride Films
- Transparent Mirrorless (TML) LEDs
- Optimization of Laser Bar Orientation for Nonpolar Laser Diodes
- Stand-Alone Ceramic Phosphor Composites for Laser-Excited Solid-State White Lighting
- Method for Enhancing Growth of Semipolar Nitride Devices
- Ultraviolet Laser Diode on Nano-Porous AlGaN template
- Improved Reliability & Enhanced Performance of III-Nitride Tunnel Junction Optoelectronic Devices
- Improved Fabrication of Nonpolar InGaN Thin Films, Heterostructures, and Devices
- Growth of High-Quality, Thick, Non-Polar M-Plane GaN Films
- High-Efficiency, Mirrorless Non-Polar and Semi-Polar Light Emitting Devices
- Technique for the Nitride Growth of Semipolar Thin Films, Heterostructures, and Semiconductor Devices
- (In,Ga,Al)N Optoelectronic Devices with Thicker Active Layers for Improved Performance
- Thermally Stable, Laser-Driven White Lighting Device
- MOCVD Growth of Planar Non-Polar M-Plane Gallium Nitride
- Methods for Fabricating III-Nitride Tunnel Junction Devices
- Low-Droop LED Structure on GaN Semi-polar Substrates
- Contact Architectures for Tunnel Junction Devices
- Semi-polar LED/LD Devices on Relaxed Template with Misfit Dislocation at Hetero-interface
- Semipolar-Based Yellow, Green, Blue LEDs with Improved Performance

- III-Nitride-Based Devices Grown On Thin Template On Thermally Decomposed Material
- Growth of Semipolar III-V Nitride Films with Lower Defect Density
- III-Nitride Tunnel Junction LED with High Wall Plug Efficiency
- Tunable White Light Based on Polarization-Sensitive LEDs
- Cleaved Facet Edge-Emitting Laser Diodes Grown on Semipolar GaN
- Growth of High-Performance M-plane GaN Optical Devices
- Packaging Technique for the Fabrication of Polarized Light Emitting Diodes
- Improved Anisotropic Strain Control in Semipolar Nitride Devices
- III-V Nitride Device Structures on Patterned Substrates
- Method for Increasing GaN Substrate Area in Nitride Devices
- High-Intensity Solid State White Laser Diode
- Nitride Based Ultraviolet LED with an Ultraviolet Transparent Contact
- GaN-Based Thermoelectric Device for Micro-Power Generation
- Limiting Strain-Relaxation in III-Nitride Heterostructures by Substrate Patterning
- LED Device Structures with Minimized Light Re-Absorption
- Growth of Planar Semi-Polar Gallium Nitride
- UV Optoelectronic Devices Based on Nonpolar and Semi-polar AlInN and AlInGaN Alloys
- Defect Reduction of Non-Polar and Semi-Polar III-Nitrides
- Enhancing Growth of Semipolar (Al,In,Ga,B)N Films via MOCVD

University of California, Santa Barbara
Office of Technology & Industry Alliances
342 Lagoon Road, ,Santa Barbara,CA 93106-2055 |
www.tia.ucsb.edu
Tel: 805-893-2073 | Fax: 805.893.5236 | padilla@tia.ucsb.edu

© 2013 - 2017, The Regents of the University of California
Terms of use
Privacy Notice