III-V Nitride Device Structures on Patterned Substrates
Tech ID: 23498 / UC Case 2007-773-0

BRIEF DESCRIPTION

Novel device structures for use in LEDs grown on patterned substrates.

BACKGROUND

The usefulness of III-V nitride materials has been well established for fabrication of visible and ultraviolet optoelectronic devices and high-power electronic devices. One important method for increasing the light extraction efficiency in these devices is to use a patterned substrate on which the device is subsequently grown. Using a standard LED structure (normally used with non-patterned substrates) on patterned substrates, however, has exhibited detrimental performance in output power. There is a need for LED device structures that allow for the realization of high output power LEDs grown on patterned substrates.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed novel device structures for use in LEDs grown on patterned substrates. By incorporating nitride interlayers, these devices minimize the deleterious effect present in the conventional device structures of LEDs deposited on patterned substrates. In doing so, they enhance the output power of LEDs and increase the light extraction efficiency.

ADVANTAGES

- Enhanced power output
- Increased extraction efficiency

APPLICATIONS

- LEDs grown on patterned substrates

PATENT STATUS

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CATEGORIZED AS

- Engineering
- Energy
  - Lighting
  - Other
- Semiconductors
  - Design and Fabrication

RELATED CASES

2007-773-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Method for Improved Surface of (Ga,Al,In,B)N Films on Nonpolar or Semipolar Substrates
- Enhanced Optical Polarization of Nitride LEDs by Increased Indium Incorporation
- Lateral Growth Method for Defect Reduction of Semipolar Nitride Films

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OTHER INFORMATION

KEYWORDS

LED, patterned substrate, indssl, indled, cenIEE

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LED Device Structures with Minimized Light Re-Absorption
Growth of Planar Semi-Polar Gallium Nitride
Nonpolar (Al, B, In, Ga)N Quantum Well Design
UV Optoelectronic Devices Based on Nonpolar and Semi-polar AlInN and AlInGaN Alloys
Defect Reduction of Non-Polar and Semi-Polar III-Nitrides
III-Nitride Based VCSEL with Curved Mirror on P-Side of the Aperture
Enhancing Growth of Semipolar (Al,In,Ga,B)N Films via MOCVD