Photonic Structures for Efficient Light Extraction and Conversion in Multi-Color LEDs

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OTHER INFORMATION
KEYWORDS
indssl, indled, LED, cenIEE, indfeat

CATEGORIZED AS
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▶ Energy
▶ Lighting
▶ Optics and Photonics
▶ All Optics and Photonics
▶ Semiconductors
▶ Design and Fabrication

RELATED CASES
2005-534-0
BRIEF DESCRIPTION

Multiple-light source LEDs that provide increased light extraction and conversion efficiencies, as well as increased brightness, while retaining planar structures.

BACKGROUND

The green-yellow portion of the visible spectrum is still lacking efficiency, while the combination of different colors on a single substrate is very limited with state-of-the-art semiconductors grown by conventional methods. Alternative materials should be used, and phosphors can offer good solutions. There is a need in the art for improving the far-field patterns of the different components of emission that make the color rendering angle-dependent without significantly increasing the size of the device.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed multiple-light source LEDs that provide increased light extraction and conversion efficiencies, as well as increased brightness, while retaining planar structures. The LEDs contain several emitting species, each providing light emission in a range of wavelengths. Photonic crystals, acting as diffraction gratings, ensure efficient light extraction, efficient excitation of the optically-pumped species, and provide a means for modifying the far-field emission pattern for optimal shape.

ADVANTAGES

▶ Increased brightness
▶ Increased light extraction and conversion efficiencies

APPLICATIONS

▶ Multi-color LEDs

This technology is available for a non-exclusive license. See below for a selection of the patents and patent applications related to this invention. Please inquire for full patent portfolio status.

PATENT STATUS

<table>
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<tr>
<th>Country</th>
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<td>United States Of America</td>
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