Thermally Stable, Laser-Driven White Lighting Device
Tech ID: 24050 / UC Case 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
<table>
<thead>
<tr>
<th>Country</th>
<th>Type</th>
<th>Number</th>
<th>Dated</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States Of America</td>
<td>Issued Patent</td>
<td>9,927,076</td>
<td>03/27/2018</td>
<td>2013-951</td>
</tr>
<tr>
<td>United States Of America</td>
<td>Issued Patent</td>
<td>9,574,728</td>
<td>02/21/2017</td>
<td>2013-951</td>
</tr>
</tbody>
</table>

RELATED CASES
2013-951-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS
▶ Method for Improved Surface of (Ga,Al,In,B)N Films on Nonpolar or Semipolar Substrates
Defect Reduction of Non-Polar and Semi-Polar III-Nitrides

Enhancing Growth of Semipolar (Al,In,Ga,B)N Films via MOCVD