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## **Kyma Technologies Selected for Funding under US Department of Energy's Solid State Lighting Core Technologies Program**

Raleigh, NC / August 22, 2006 - Kyma Technologies, Inc. is pleased to announce that its team has been selected for funding under the US Department of Energy's Solid State Lighting Core Technologies Program.

The winning proposal is entitled "High Performance Green LEDs by Homoepitaxial MOVPE," and was co-led by Professors Christian Wetzel and E. Fred Schubert of Rensselaer Polytechnic Institute.

Professor Wetzel is Rensselaer's Wellfleet Career Development Constellation Professor of the Future Chips Constellation and Professor Schubert is Rensselaer's Wellfleet Senior Distinguished Professor of the Future Chips Constellation. Kyma's Principal Investigator on the effort is Dr. Drew Hanser, company co-founder and Chief Technology Officer.

The proposing team plans to fill the so-called "green gap" in current semiconductor light emitting diode (LED) technology by developing improved materials and processes for making green LEDs based on the III-nitride materials family. Key materials improvements are expected to arise from use of Kyma's low defect density native gallium nitride (GaN) substrates. Such materials and process improvements must be realized to fully capitalize on the solid state lighting market opportunity, which is generally considered to be the largest nitride semiconductor device market opportunity. According to Strategies Unlimited, the worldwide commercial market for nitride semiconductor devices reached \$3.2 billion in 2004 and is expected to grow to \$7.2 billion in 2009.

Under the program, Kyma will continue to develop their patented native crystalline GaN materials manufacturing technology and will also provide both polar and non-polar native GaN substrates to the Rensselaer researchers for epitaxial growth, device fabrication and device performance testing. The addition of native non-polar GaN substrates to Kyma's product line was announced earlier this year and represents the highest quality non-polar GaN that is commercially available today.

Many experts in the field of nitride semiconductor materials and devices, including UCSB Professor Shuji Nakamura, have touted the potential of non-polar GaN to enable commercially important LED performance improvements; however, the efficiency of initial devices made from non-polar GaN-based materials has been limited by the presence of defects which result from a non-native fabrication approach. Use of Kyma's native GaN substrates should enable reduction of such defects by a factor of over 10,000 compared to such non-native approaches.

Hanser commented, “While much progress has been made in developing blue and green LEDs on sapphire and silicon carbide substrates, much more progress is required, especially in the green, before nitride LEDs can begin to realize their full commercialization potential. We believe that Kyma’s native GaN substrates have the potential to enable the development of green LEDs with the kind of price point and operating characteristics that fulfill the promise of solid state lighting for general illumination.”

Kyma president and CEO Dr. Keith Evans added, “We are pleased to work with Rensselaer Professors Christian Wetzel and Fred Schubert on this exciting program. Both Fred and Christian are world renown for their expertise in LED materials and device technology. We are thankful to the US Department of Energy for the opportunity to work with this great team and to apply what we believe is a very promising materials approach to accelerate the rate of development of commercially viable green LED based solid state lighting sources.”

### **About Kyma Technologies**

Based in Raleigh, North Carolina, Kyma Technologies, Inc. was co-founded in 1998 by researchers at North Carolina State University (NCSSU). Kyma supplies high quality bulk GaN-based substrates and epiwafers to device manufacturers in both electronic and optical markets, and its mission is to become the preferred supplier of native nitride substrate based materials and device solutions. Kyma has developed a strong IP portfolio including exclusively licensed NCSSU patents and its own patented and patent-pending technologies.

For more information about Kyma Technologies, please visit our website [www.kymatech.com](http://www.kymatech.com), send us e-mail at [info@kymatech.com](mailto:info@kymatech.com), or call the company directly at 919.789.8880.

### **About Solid State Lighting**

Dramatic changes are unfolding in lighting technology. Semiconductor light-emitting diodes (LEDs), until recently used mainly as simple indicator lamps in electronics and toys, have become as bright and efficient as incandescent bulbs. They have already begun to replace incandescent bulbs in many applications, particularly those requiring durability, compactness, cool operation and/or directionality (e.g., traffic, automotive, display, and architectural directed-area lighting). Moreover, further major improvements are believed achievable. Electrical-to-optical energy conversion efficiencies over 50% have been achieved in infrared light emitting devices. If similar efficiencies were achieved in visible light emitting devices, the result would be a 150-200 lm/W white light source two times more efficient than fluorescent lamps, and ten times more efficient than incandescent lamps.

The US Department of Energy has published and gathered much information on the history of lighting and the future of solid state lighting at <http://www.netl.doe.gov/ssl/> and <http://lighting.sandia.gov/index.htm>.