

Insight into Solid State Lighting and Functional Materials for Optoelectronic Devices

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Optoelectronic devices based on group III nitrides (i.e., LEDs) provided a completely new technology in the lighting sector, the solid state lighting. There has been an incredible development in the recent more than 20 years: LEDs for illumination and projectors in mobile devices were just a vision for a far away future. Meanwhile, such devices are commodity based on the significant increase in their efficiency. This has been the driving force for about one decade. However this development has not fully accomplished yet. The recent improvements of the device design and in doping strategies yielded efficiencies close to the fundamental limit reaching internal quantum efficiencies of more than 90 % and corresponding wall-plug efficiencies well above 70%.

Nowadays, it is recognized that LED offer a big variety of opportunities beyond efficient lighting. There are many applications that could only be addressed by the unique characteristics of semiconductor LED light sources. Thus, it is much more than cost cutting triggering further research on group III nitride optoelectronics.

A brief introduction to SSL developments along with an overview to OSRAM Opto Semiconductors' numerous activities in research and development of materials for LED applications such as activities on **FunctionaL Inorganic layers for Next Generation Optical devices (FLINGO)**. Examples of technology and products for various application fields will illustrate the claimed technology leadership that is based on the close interplay of material development, thorough understanding of scientific background and of technological solutions yielding.