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EDITORIAL

A special issue on *Light-Emitting Diodes*

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As an emerging and energy efficient lighting technology, light-emitting diode (LED) based solid state lighting is expected to significantly reduce global energy consumption and green-house emission for its extraordinary characteristics compared with traditional light sources, including high luminous efficiency, small size, potentially high device and system reliability, long lifetime, etc. Since the LEDs are unable to be applied before being packaged, the packaging technologies are critically needed in terms of materials selection, process development, co-design with multi-physics consideration, integrated consideration of chip and packaging design. Packaging is therefore essential in enhancing the desired long-term reliability and realizing the full potentials of optical performance of LED devices, which still needs us to conduct more fundamental research. Over the decades, many novel packaging technologies have been proposed and some of them have been commercially applied, yet some of them are still under development.

To further improve the optical performance and reliability of the LED packages from the view of manufacturing, cost and application, the efforts are made in the whole LED packaging processes from the chip level to the application level. Any progress of LED packaging technologies will benefit the manufacturers, researchers, and of course the final users. Therefore, it is our intention to bring the research community's attention to these particular research areas. In this "Special Issue on *Light-Emitting Diodes*", 1 review article and 5 research articles focusing on relevant subjects by internationally active groups in the field are specially presented.

More specifically, Prof. Lee of Hong Kong University of Science and Technology reviewed the advanced LED wafer level packaging technologies and covered some key packaging processes. Prof. Kim from Korea Institute of Ceramic Engineering and Technology suggested a new design and material processing technology to realize price and performance advantageous LED packaging solution. Prof. Rao from University of Electronic Science and Technology of China proposed a self-adaptive phosphor coating technology to further improve the quality of phosphor coating layer on the LED chips. Prof. Jang from Yeungnam University demonstrated the high-performance and current crowding-free InGaN/GaN LEDs using an electrically-reverse-connected Schottky diode and an Mg-delta doped layer. Prof. Luo from Huazhong University of Science and Technology studied the phosphor coating process by calculating the optical constants of phosphor layer and by investigating the effects of phosphor surface geometry on the optical performance of LEDs, respectively.

Overall, articles in this special issue exhibit the good achievements of LED, particularly in the interests about the LED packaging technologies for better optical performance, better manufacturing processes and better applications. We hope they are helpful to the LED industry and researchers.

Finally, we would like to give our acknowledgements to authors to present their work and to reviewers for their valuable comments.

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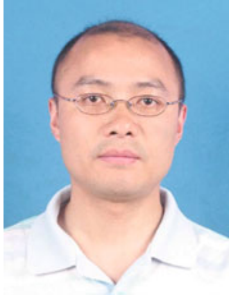

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