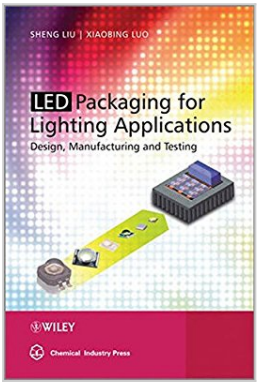

LED Packaging for Lighting Applications: Design, Manufacturing, and Testing

By Sheng Liu, Xiaobing Luo

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Since the first light-emitting diode (LED) was invented by Holonyak and Bevacqua in 1962, LEDs have made remarkable progress in the past few decades with the rapid development of epitaxy growth, chip design and manufacture, packaging structure, processes, and packaging materials. LEDs have superior characteristics such as high efficiency, small size, long life, low power consumption, and high reliability. The market for white LED is growing rapidly in various applications. It has been widely accepted that white LEDs will be the fourth illumination source to substitute the incandescent, fluorescent, and high-pressure sodium lamps. With the development of LED chip and packaging technologies, the efficiency of high power white LED will broaden the application markets of LEDs while changing the lighting concepts of our lives.

In *LED Packaging for Lighting Applications*, Professors Liu and Luo cover the full spectrum of design, manufacturing, and testing. Many concepts are proposed for the first time, and readers will benefit from the concurrent engineering and co-design approaches to advanced engineering design of LED products.

- One of the only books to cover LEDs from package design to manufacturing to testing
- Focuses on the design of LED packaging and its applications such as road lights
- Includes design methods and experiences necessary for LED engineers, especially optical and thermal design
- Introduces novel LED packaging structures and manufacturing processes, such as ASLP
- Covers reliability considerations, the most challenging problem for the LED industry
- Provides measurement and testing standards, which are critical for LED development, for both LED and LED fixtures
- Codes and demonstrations available from the book’s Companion Website

This book is ideal for practicing engineers working in design or packaging at LED companies and graduate students preparing for work in industry. This book also provides a helpful introduction for advanced undergraduates, graduates,

researchers, lighting designers, and product managers interested in the fundamentals of LED design and production.

Color version of selected figures can be found at www.wiley.com/go/liu/led

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Editorial Review

Review
"The book will be useful as a resource for engineers in LED design or packaging, and as an introduction to the field for advanced students, researchers, lighting designers, and product managers." (Book News, 1 October 2011)

From the Back Cover
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Sheng Liu is a ChangJiang Professor of Mechanical Engineering at Huazhong University of Science and Technology. He holds a dual appointment at Wuhan National Laboratory for Optoelectronics, and has served as tenured faculty at Wayne State University. He has over 14 years experience in LED/MEMS/IC packaging and extensive experience in consulting with many leading multi-national and Chinese companies. Liu was

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