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Since the introduction of organic light-emitting diode (OLED) displays for smart phones by Samsung three years ago, the use of OLED displays for mobile devices has taken off. Today, active-matrix OLED (AMOLED) displays are widely used in many smart phones as well as tablet devices. This year, Samsung and LG have demonstrated their 55-in. OLED televisions, and both companies announced that these products will be commercialized later this year. Since then, there has been a lot of excitement generated and several other display companies have made similar announcements regarding the OLED TV product roadmaps. While OLED TVs are being commercialized, there are still many fundamental issues that need to be addressed, such as the stability of blue OLEDs and light extraction. If the commercialization of OLEDs for flat-panel displays is considered as the first wave of organic electronics, the second wave will naturally be OLEDs for solid-state lighting. In order to take OLEDs to the next level, further development in OLED materials and devices is needed. Efficient phosphorescent emitters, stable and high-bandgap host materials, and efficient carrier transport materials are critical to the development of OLED materials. In the area of devices, further understanding of loss mechanisms and device degradation mechanisms is also very important. For lighting applications, almost 75% of the photons generated are lost, and novel approaches to enhance light extraction are vital.

In this special section, papers related to these topics are assembled. These papers are based partially on talks and posters given at the conference on Organic Light-Emitting Diodes XV at the SPIE Optics + Photonics meeting held in San Diego in August 2011. We believe that readers will find this volume especially interesting.

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