

Introduction to the Issue on Organic Light-Emitting Diodes

THE PURPOSE of this special issue is to highlight progress in the development of organic light-emitting diodes (OLEDs) and the application of OLEDs to displays, lighting, and organic optoelectronics. Since the last special issue of this journal on this topic in 1998, there has been tremendous progress in OLED technology, primarily driven by applications such as flat panel displays. This excitement is reflected in the large surge in industrial research and continued push to find viable technical solutions that could lead to the commercialization of OLED displays. Academic research coupled with the extraordinary amount of industrial research and development aimed at solving critical technical challenges, including the need for new electroluminescent materials and packaging solutions, have resulted in much progress toward rapid commercialization of this technology. These efforts coupled with the synthesis of new organic/polymeric materials and fabrication processes is leading many to believe that OLED displays could become commercially successful within the next few years.

OLED technology is starting to mature rapidly and is at the verge of rapid takeoff. This accelerated time to market has benefited from strong science and technology advances in all areas of OLED technology including materials, devices, and process engineering. Whereas flat panel displays present a large market opportunity for OLEDs, solid-state lighting and imaging offer equally significant high-volume applications. Another area with potentially far-reaching impact is the integration of organic optoelectronics with organic electronics. Advances in OLED materials is providing a significant boost to

the growth of organic electronics. Organic electronics is rapidly emerging as an important topic with wide-ranging applications in distributed electronics and sensors. Further advances could provide critical applications for the true integration of electronics and optoelectronic circuits.

This issue is our attempt to provide a snapshot of the current research, and is by no means complete. The fifteen papers cover a broad range of topics ranging from flexible substrates and substrate engineering, to advances in new organic electroluminescent materials and driver circuits for OLED displays. Even though the issue contains a selected subset of topics, it does provide a snapshot of the current status of this technology and guides the scientist and engineer to primary sources of literature for further reading.

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Dr. Chalamala has chaired two MRS symposia: Flat Panel Displays and Sensors in Spring 1999 and Flexible Electronics at Spring 2003, and was the Organizing Chair of the 1st IEEE Workshop

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