

Universal Display First to Achieve 30 Lumens Per Watt White OLED

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Universal Display Corporation announced the demonstration of a white OLED lighting panel with a record power efficiency of 30 lumens per watt (lm/W) using the Company's PHOLED phosphorescent OLED technology at The International Society for Optical Engineering (SPIE) Symposia and Exhibition held in San Diego, CA.

The Company's record-breaking white OLED performance is based on a novel panel design that consists of an array of red, green and blue colored stripes. Adjusting the intensity of each primary color generates infinite shades of white color, typically characterized by color temperature and color rendering index. Power efficiencies of this 6" x 6" prototype panel were measured at color temperatures between 2,900 and 5,700 degrees Kelvin (K). The record 30 lm/W white OLED power efficiency was achieved at a color temperature of 4,000 K, which is comparable to the color temperature and power efficiency of a cool fluorescent lamp. By comparison, typical incandescent light bulbs emit light at around 15-20 lm/W with a color temperature of 2,900 K. This panel can also operate very brightly. For example, this 6" x 6" panel produced 150 lumens of optical power, at an efficiency of 15 lm/W and 3,700 K color temperature. The record performance of this novel OLED panel is also based on the Company's proprietary PHOLED technology which enables very high efficiency of the constituent red, green and blue stripes. In addition, the color rendering index was >80 across the measured color temperatures because of the broad spectral output of the combined colors.

Lighting consumes ~765 trillion Watt-hours (TWh) of electricity each year in the United States, or nearly 30% of all electricity produced for buildings. This translates into a cost of almost \$58 billion per year for consumers to light their homes, offices, streets, and factories, according to the U.S. Department of Energy. Increasing the efficiency of

lighting by a small amount has the potential to generate tremendous savings in both cost and energy use. The development of this white-emitting OLED lighting panel is an important step in this direction.

This advance was reported in a paper, entitled "Phosphorescent organic light-emitting devices for solid-state lighting," presented at the SPIE Optics and Photonics 2005 Symposia, on Monday, August 1st, by Dr. Brian D'Andrade, Senior Scientist at Universal Display, at the San Diego Convention Center. This work was partially funded by a U.S. Department of Energy Small Business Innovation Research (SBIR) grant.

"By harnessing the efficient nature of our proprietary phosphorescent OLED technology in a novel device architecture, we have been able to demonstrate record-breaking power efficiencies in white OLED devices," stated Steven V. Abramson, President and Chief Operating Officer of Universal Display. "This advance is an important milestone toward the future adoption of white OLEDs for lighting applications such as those envisioned under our U.S. Department of Energy research contracts."

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