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Nano-structures enabling sunlight- and candlelight-style OLEDs

Nano structures enable organic light-emitting diode (OLED) devices to be fabricated with relatively high efficiency and brightness, opening up a new era for high quality displays and lighting. Along with the incorporation of nano-scale carrier-modulation-interlayer(s) in between emission layers containing sunlight emission complementary dyes, sunlight-style OLED can be obtained with color or color temperature mimicking that of the sun throughout the entire daytime. We are also able to fabricate blue hazard free, low color temperature candlelight-style OLED by employing candlelight complementary emitters, namely orange-red, yellow, green, and sky-blue. The resultant candlelight OLED, that exhibits a 1,900 K color temperature exactly like that of candles or oil lamps, is friendly to human eyes, physiologies, ecosystems, artifacts, and night-skies. Specifically, it is at least 10 times safer from retina protection perspective or 5 times better for melatonin to naturally occur after dusk, as comparing with the blue light-enriched white OLED, LED and CFL counterparts. We will hence present the device structure, physics and engineering behind the serendipity of the first sunlight-style OLED, how the nano-interlayer modulates the injection of carriers and their recombination, and why and how tremendous efforts have then after been moved to the development of a 'good light' that is blue hazard free, high in light-quality and energy-saving. The presentation will also cover global attention and development progress of the candlelight OLED.

Biography

Jwo-huei Jou completed his PhD in 1986 from University of Michigan, Ann Arbor, Michigan, USA, and worked as a Postdoctoral Visiting Scientist at IBM-Almden Research Center, San Jose, CA, USA from 1986 to 1988, before joining National Tsing Hua University. He has published more than 140 papers in reputed journals and been granted more than 60 patents from USA, China and Taiwan.

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