Micro-LED Full Color Micro-display Technology

Application

- Application for wearable/portable electronics such like smartphone, smart watch, VR and AR.
- Global market for microLED displays expected to grow to 15.5 million units in 2026 due to declines in manufacturing costs making the emerging technology suitable for mass market according to the 2019 IHS Markit Micro LED Display Technology & Market report.

Technology

- An active matrix monolithic micro-LED full-color microdisplay combining GaN-on-Si epilayers and Quantum Dots photoresist (QDs-PR) color conversion technology. Based on dual wavelength LED structure, a micro-LEDs array can be monolithically fabricated.
- To realize full-color LED micro-display, every 3 sub-pixels will be utilized to form a unit with red, green, blue pixels.

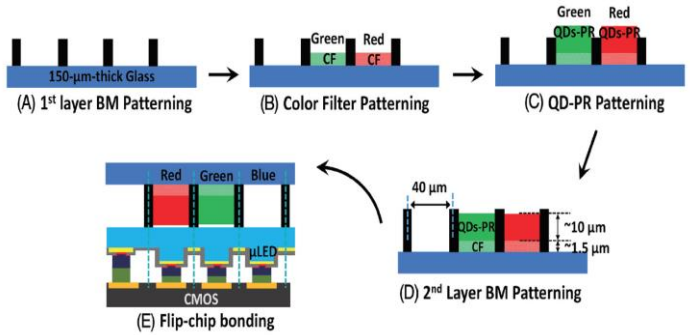

Fig 1. Process flow of the color conversion layer using quantum dots photoresist (QDs-PR)

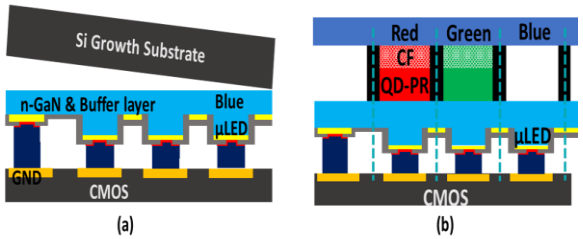

Fig 2. Schematic of (a) the blue GaN micro-LED array integrated with the CMOS backplane, and (b) the full-color micro-display with QDs-based color conversion layer

Advantages

- Micro-LED array monolithically fabricated
- Fabrication process of the display panel greatly simplified
- Higher yield
- Increased throughput
- Lower cost

- A demonstration of an active matrix monolithic micro-LED full-color micro-display with a pixel density of 317 ppi.
- A monolithic 64 × 36 blue micro-LED arrays fabricated and then transformed to a 32 x 18 full-color micro-displays by applying a photo-patternable color conversion layer.

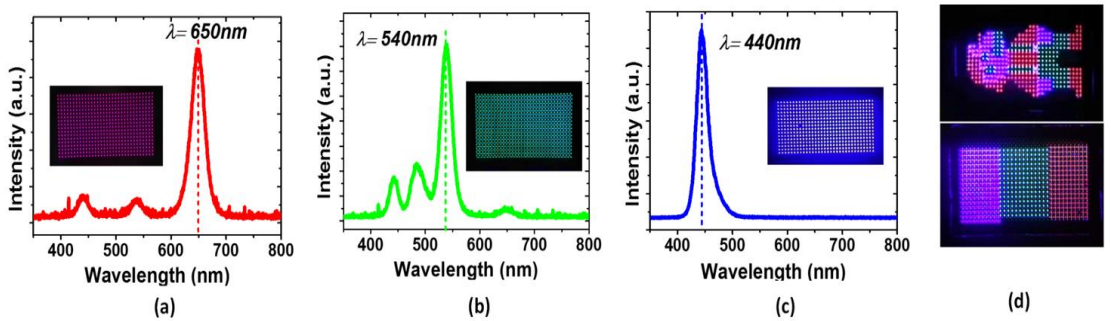

Fig 3. Electroluminescence spectra when only (a) red, (b) green and (c) blue sub-pixels are powered on, independently. (d) full-color images.

Talk to Us

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Intellectual Properties

- US Patent Appl. No. US16/408501