

Fabrication of phosphor-converted white OLEDs With internal & external light extraction techniques

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Organic light emitting diodes (OLEDs) have been considered as next generation lighting source for their high efficiency, environment-friendly and high CRI. There are several methods for making high CRI white OLEDs. The first approach is using multi-doped single emissive layer [1]. The second approach is using tandem structure (multi emissive layer) [2]. But both methods have disadvantages like difficulty in color tuning and color stability, complex fabrication process. The last approach is using blue OLEDs and phosphor for color conversion [3]. This method is relatively easy to fabricate and have been widely studied in inorganic LEDs. But we need more efficient blue OLEDs to make highly efficient white OLEDs.

In this study, we used several light extraction technique to make high efficient bottom emitting blue OLEDs. Before experiment, OLEDs simulation was performed to select appropriate extraction method. We coated scattering layer between ITO anode and substrate to extract light trapped in ITO. Scattering layer was consist with PMMA (host polymer), TiO₂ particle [4]. And color conversion layer (CCL) was used to extract light trapped in substrate and convert color (blue to white). We used YAG:Ce phosphor layer for color conversion layer.

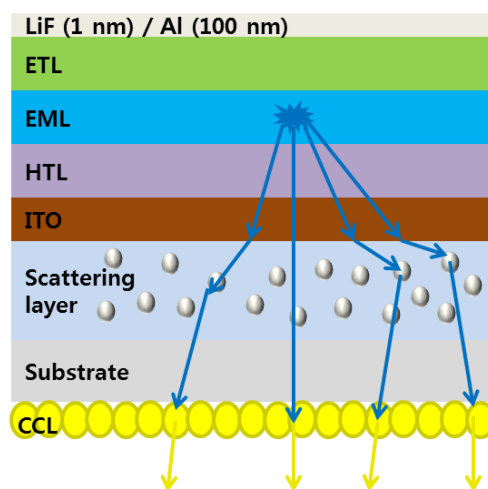


Fig. 1. Structure of OLED

References

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