

## Fabrication of AMOLED Panel on Fabric Substrates

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Electronic textiles are attracting much attention due to the potential applications to wearable electronics [1]. The rough surface and surface energy of fabric substrate are challenges for the thin film electronic devices to be fabricated on the fabric substrate. Especially, the displays on fabric are much more vulnerable to the surface conditions due to the large area.

In this paper we present the fabrication processes of AMOLED panel driven by OTFTs on fabric substrate. The AMOLED panel consists of 32 x 32 pixel array, and a pixel consists of 2 OTFTs and 1 capacitor and 1 OLED. TIPS-pentacene was used as the semiconductor of OTFTs and phosphorescence OLEDs were adopted to produce the brighter light. The rough surface of fabric substrate was smoothed by coating poly urethane (PU) layer, reducing the surface roughness to 0.59  $\mu\text{m}$  from 10  $\mu\text{m}$ . To enhance the adhesion of substrate to the subsequent thin films photo acryle (PA) was additionally coated on the PU layer. First, the scan bus lines and the gate electrodes of OTFTs and the anode of OLED were evaporated with Au and followed by lift-off patterning process. Subsequently, another PA layer was coated on the gate electrode as the gate dielectric, and the window for OLED was patterned in the PA layer by UV lithography. The data lines and S/D electrodes of OTFTs were fabricated by evaporating Au. And the bank structures were formed on the channel area and TIPS-pentacene ink was jetted and crystallized in the banks. Finally, the layers of OLED were continuously evaporated in the OLED layers.

The phosphorescence OLED exhibited the intensity of 15,000  $\text{cd}/\text{m}^2$  at 6.5 V, and TIPS-pentacene OTFTs produced the mobility of 0.23  $\text{cm}^2/\text{V}\cdot\text{sec}$  on fabric. The AMOLED panel successfully worked as shown in the figure.

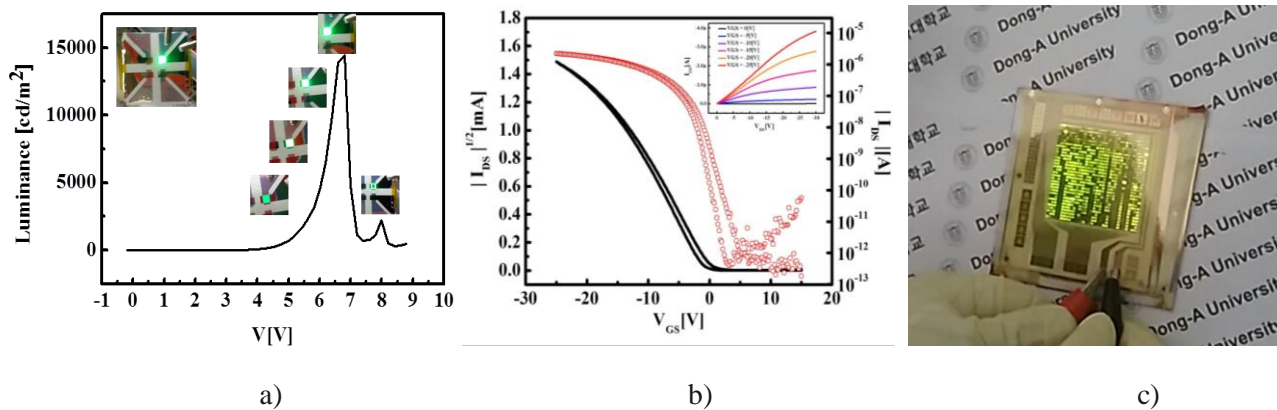


Figure 1 a) The picture of a unit OLED device and the graph of intensity vs. voltage, b) the transfer and output curve of TIPS-pentacene OTFTs on fabric, c) the AMOLED panel on fabric substrate.

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