Flexible Display Development Trend : Patterning Methods for Organic Thin Film Transistors

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The increase of off current level of OTFTs can be resulted from the following reasons: 1) the leakage current through the gate insulator (vertical leakage) and 2) the leakage current through the active channel (peripheral leakage).

Patterning of the active layer is problematic, however, since TFT characteristics tend to degrade significantly when the organic film is exposed to solvents such as those commonly used in photolithographic processes.

To protect a device degradation during pentacene patterning aforementioned, poly(vinyl alcohol) (PVA) has often been widely used as a channel blocking layer with a UV curing agent (e.g. ammonium dichromate) like photoresist. The organic channel area without PVA blocking (after develop process) is normally plasma etched by utilizing an oxygen gas (O_2 plasma). However, the on current drop has inevitably occurred in this procedure due to a plasma exposure. Therefore, many researchers are still trying to find other patterning methodology to decrease the off current level with no mobility drop.

In this report, we will introduce some patterning methods to improve the performance of the OTFTs.