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Different Back-exposure Condition for Self-alignment Organic Thin-Film Transistor

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Nowadays, organic thin-film transistors (OTFTs) are widely used as the driving elements for displays and logic circuits because of their envisioned applications in flexible, large-area, low-cost, and lightweight organic electronics [1-2]. Several studies on OTFTs have been conducted to improve the device performance through improvements in the device structure and fabrication techniques [3]. In this study, self-aligned organic TFT were fabricated and the effect of different back exposure time was investigated. As shown in Fig. 1 the devices were fabricated by using a cleaned glass substrate on which, 50-nm-thick tantalum as a gate electrode was sputtered. Following the patterning of gate electrode 180-nm-thick tantalum oxide (Ta_2O_5) as a gate insulator were deposited the contact hole is patterned using reactive ion etching. After that the photoresist is spin-coated, and back surface exposure is carried out, in which the gate electrode is used as the photo mask and the pattern of the photoresist is formed on the upper part of the gate electrode. Next, the S/D electrode is evaporated and a lift-off process is carried out. Finally, the source/drain electrodes are patterned and 40-nm-thick pentacene was thermally evaporated. SEM is used to check the back exposure condation from which its revealed that the long exposure is best condation as shown in Fig 2.

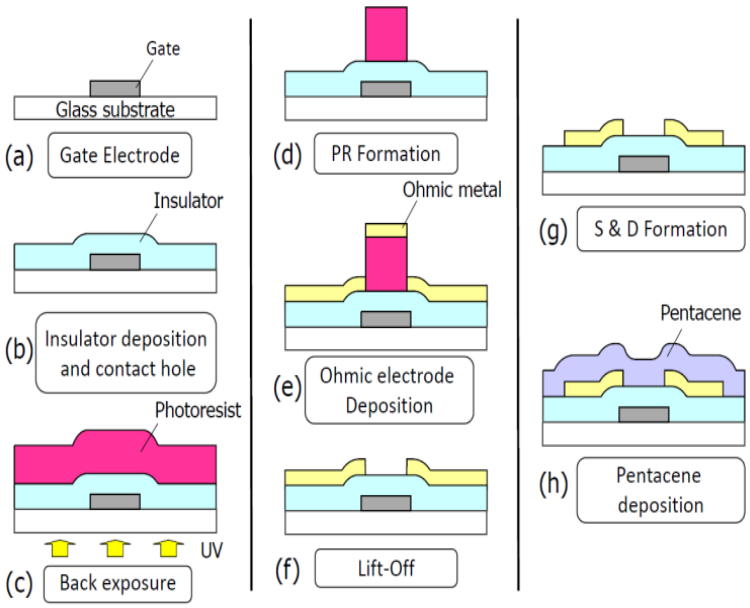

Figure 1.

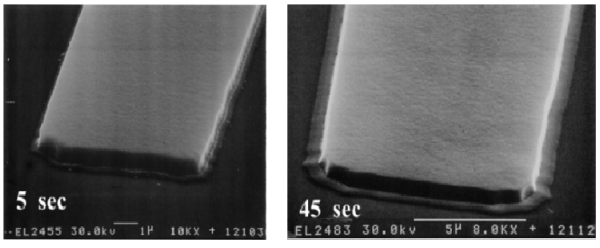

Figure 2

Ref.

1. Bao et al: Adv. Mater. **12** (2000) 227.
2. Liu at al: Chem. Rev. **254** (2010) 1101.
3. Takeda et al: Jpn. J. Appl. Phys. **51** (2012) 021604.

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