Figure Captions

Chapter 2

Figure 2-1 TDS of the plastic substrate……………………36
Figure 2-2 picture of the different sample immersed in acetone.37
Figure 2-3 Comparison of weight loss among PES substrates with/without SiN hardcoating, after different thermal annealing (at 150oC and 200oC)………………..38
Figure 2-4 SiN Hard Coating Layer……………………………….39
Figure 2-5 samples with different thickness of hard coating…..40
Figure 2-6 Comparison of Transmittance……………………………..41
Figure 2-7 picture of the plastic with high-K dielectric hard coating……………………………………………………..42
Figure 2-8 picture of the device fabricated on the Al2O3 hard coating………………………………………………………43

Chapter 3

Figure 3-1 Schematic cross sectional view of the simple FET…44 device
Figure 3-2 the transfer characteristic and the output characteristic of the amorphous TFT with SiH4/H2 ratio is 1/10………………………………………………………45
Figure 3-3 The transfer characteristic and the output characteristic of the amorphous TFT with SiH4/H2 ratio is 1/49………………………………………………………46
Figure 3-4 FTIR absorption spectra for SiON film………………47
Figure 3-5 I-V measurement for the SiON film…………………47
Figure 3-6 C-V measurement for TiO2 film……………………48
Figure 3-7 I-V measurement for TiO2 film………………………48
Figure 3-8 C-V measurement for Al2O3 film………………….49
Figure 3-9 I-V measurement for Al2O3 film……………………49
Figure 3-10 Schematic cross sectional view of devices with conventional bottom gate structure…………………50
Figure 3-11 TFT device was fabricated on the different kinds of substrate………………………………………………………51
Figure 3-12 depicts the output ($I_D-V_D$) characteristics and the transfer ($I_D-V_G$) characteristics of the TFT which was fabricated on the silicon substrate…………..52

Figure 3-13 I-V characteristics of TFT devices with SiON gate dielectric on the SiCN coated plastic substrate.

(W/L=50 $\mu$m/50 $\mu$m)……………………………………53

Figure 3-14 I-V characteristics of TFT devices with SiON gate dielectric on the SiCN coated plastic substrate.

(W/L=50 $\mu$m/10 $\mu$m)……………………………………54

Figure 3-15 I-V characteristics of TFT devices with SiON gate dielectric on the SiCN/SiN coated plastic substrate.

(W/L=50 $\mu$m/50 $\mu$m)……………………………………55

Figure 3-16 I-V characteristics of TFT devices with SiON gate dielectric on the SiCN/SiN coated plastic substrate.

(W/L=50 $\mu$m/10 $\mu$m)……………………………………56

Figure 3-17 I-V characteristics of TFT devices with SiON gate dielectric fabricated on the TiO2 (800A) hard coating on the plastic substrate

(W/L=50 $\mu$m/50 $\mu$m)……………………………………57

Figure 3-18 I-V characteristics of TFT devices with SiON gate dielectric fabricated on the TiO2 (800A) hard coating on the plastic substrate

(W/L=50 $\mu$m/10 $\mu$m)……………………………………58

Figure 3-19 picture of the TFT device with the TiO2 and thin SiON being the gate dielectric………………………………59

Chapter 4

Figure 4-1 Cross section of different structure……………………60

Figure 4-2 The performance of the P3HT film under different kinds of treatment…………………………………60
Figure 4-3 The performance of the P3HT film under different kinds of treatment (HMDS, OTS and TMS)…………………………..61
Figure 4-4 I-V characteristics of OTFT devices with bottom contact structure (no treatment)........................................62
Figure 4-5 I-V characteristics of OTFT devices with bottom contact structure (the simple cleaning treatment).................63
Figure 4-6 I-V characteristics of OTFT devices with bottom contact structure (the oxygen plasma treatment).................64
Figure 4-7 I-V characteristics of OTFT devices with bottom contact structure (the HMDS plasma treatment and P3HT spin)..............................................................................65
Figure 4-8 I-V characteristics of OTFT devices with bottom contact structure (the OTS plasma treatment and P3HT spin)..............................................................................66
Figure 4-9 I-V characteristics of OTFT devices with bottom contact structure (the OTS plasma treatment and P3HT casting).........................................................................................67
Figure 4-10 I-V characteristics of OTFT devices with bottom contact structure (the TMS plasma treatment and P3HT spin).........................................................................................68
Figure 4-11 I-V characteristics of OTFT devices with bottom contact structure (the TMS plasma treatment and P3HT casting).........................................................................................69
Figure 4-12 I-V characteristics of OTFT devices with Top contact structure (the HMDS plasma treatment and P3HT spin).........................................................................................70
Figure 4-13 I-V characteristics of OTFT devices with Top contact structure (the HMDS plasma treatment and P3HT casting).........................................................................................71
Figure 4-14 I-V characteristics of OTFT devices with Top contact structure (the OTS plasma treatment and P3HT casting).........................................................................................72