Chapter 6

Conclusions and Future work

6.1 Conclusions

The emi-flective display without intermediate glass is fabricated and feasible for active matrix displays with one circuitry plane. The contrast ratio in the reflective mode with cross linear polarizers is about 3.5. The contrast ratio in the emission mode suffers from washout effect to drop from 1531.82 to 3.21. By using segment recorder, the contrast ratio with low surface reflectance is evaluated and compared to previous one.

The requirement of the pixel circuit for the demonstrated emi-flective display is to drive both R-LCD and OLED on only one circuitry plane. With the deviated electrical characteristics of the measurement results, non-uniform electrical characteristics of top emission OLED spatially results in non-uniformity of images. Moreover, the electrical characteristics of poly-Si TFTs, such as threshold voltage variation during fabrication process and re-crystallization process, also lead to non-uniformity of images. After taking these factors into consideration, we propose the pixel circuit to drive both R-LCD and OLED and compensate these unideal effects. In addition, the ion charge effect encountered by the previous work is solved by this pixel circuit [23]. The simulation results of the proposed pixel circuit show the uniformity of 98.2% and 99.1% in the emissive mode for threshold voltage variation and turn-on voltage shift respectively.

6.2 Future work

The future work of the emi-flective display is to apply MTN R-LCD to enhance the optical performance. The mirror-type reflector limits the viewing angle and contrast ratio, but the nano-particle film and light control film can be employed to enhance these characteristics. Since the thin film encapsulation and OLED is feasible for flexible displays, the substrates can be substituted by plastic substrates to achieve flexible emi-flective displays.