

Analysis of Bright Spots caused by PI coating defect for Fringe Field Switching Liquid Crystal Display

Haiyun Lin, Yuekai Gao, Jingpeng Li, Xingxun Song, Zhenyu Xie, TAEYUP Min, Xuezhi Zhang
Beijing BOE Optoelectronics Technology Co. Ltd., Beijing 100176, China

Tel.: 86-010-67855688-6627, E-mail: linhaiyun@boe.com.cn

(2 line spacing)

Thin film transistor liquid crystal displays (TFT-LCDs) with high resolution have been widely used in every aspect of our daily life. With the improvement of quality requirement, some new materials are used accompanied by some defect happened. In the LCD production line, PI coating is one of the most important cell processes. As the PI coating defect occurs during this process. To find a effective approach to reduce the PI coating defects, we investigated the correlations of PI coating with different PI ink and APR Plate, CF overcoat surface condition. Clean process condition tuning were also investigated in this study.

In this paper, we concluded the bright spots at CF by PI coating were mainly caused by the following aspects. At first, we investigated the influence of the new materials, there is PI ink and APR Plate. As a result, Lower viscosity and lower molecule weight PI ink did not occurred. we analyzed that in the case of a kind of PI ink using different APR Plate, CF overcoat difference UV intensity, Cleaning and PI coater Process parameter tuning. Optimize conditions, it can improve bright spots caused by PI coating defect for fringe field switching liquid crystal display. Afterwards, we researched the effects of different kinds of conditions. In order to verify this test result, further experiment was carried out. Optimized parameters are studied in this paper.

In production, it is found that bright spots caused by PI coating defect often occurs in high resolution panels. The phenomena of bright spots was carefully observed as shown in Fig.1. In order to verify this test result, further experiment was carried out. And the result is shown in Tab.1.

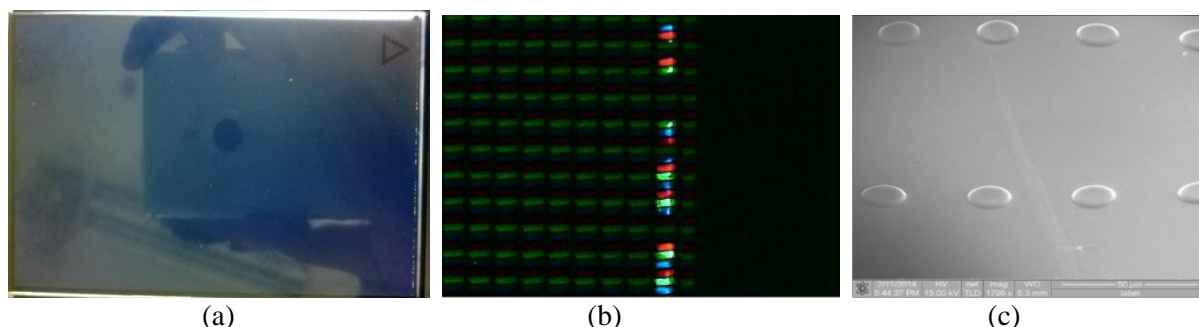


Fig.1 Bright Spots phenomenon : (a) macroscopic (b) microcosmic (C) FIB Result
 (1line spacing)

Table.1 Split details of verifying bright spots

Split	PI ink molecule weight		APR Line number		CF UV intensity		Clean Process Transfer Speed	
	lower	higher	lower	higher	lower	higher	faster	lower
Condition	lower	higher	lower	higher	lower	higher	faster	lower
Result	best	worse	worse	better	worse	better	worse	better

The result shown that bright spots defect happened when use higher viscosity PI. There is no significant improvement by PI Coater dispenser pressure(N, N+100, N+200Kpa) and Printing pressure tuning at the same PI coater condition. The result is shown in Tab 1. Based on our analysis, it is suggested that PI materials with lower solid content should be prior used. Higher line number APR should be used. Although the increasement of UV intensity and lower cleaning speed can reduce the defect, but the production capacity would decrease and it is not recommended.

Acknowledgment

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References

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