

以馬賽克疊接改善液晶顯示器面板之顯示不均研究

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摘要

目前液晶顯示器逐漸朝向大型化及高精細化發展，在液晶顯示面板往大尺寸增大的同時，仍有不少的技術瓶頸需克服。大型化的液晶顯示器在製作上需要利用到接縫式的曝光方法，然而在接縫區會因為對位誤差，而產生顯示不均(Shot Mura)的現象，影響液晶顯示器的顯示品質。

本論文主要在探討馬賽克(Mosaic)圖案對顯示不均的影響，實驗方法是採用馬賽克式光罩接合曝光方式，包括：1. 陣列(Array)側馬賽克圖案疊接方式，2. 陣列與彩色濾光片(Color Filter)面板分割線相對關係，3. 對位精度對顯示不均之影響。經過實驗我們得到的結論是：1. 陣列側第一道光罩到第五道光罩採用不同的馬賽克圖案，2. 彩色濾光片與陣列分割線須重疊，3. 對位精度控制在 $1.5\mu\text{m}$ 以內等三種方法將能有效的改善顯示不均的現象，並且讓液晶顯示器能有更好的顯示品質。

Improvements on the non-uniform display of the TFT-LCD panel's stitching zone by mosaic pattern

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Abstract

The development of the Liquid Crystal Display (LCD) is moving toward larger dimension and higher resolution. While the LCD increases its size, there remains many technical obstacles remained to be solved. For example, stitching line between exposures, alignment errors will cause non-uniform display (Shot Mura) and influence the quality of TFT-LCD display.

The aim of the thesis is to study the influence of the shot mura by mosaic pattern design. We adopt the mosaic pattern at stitching exposure zone, namely:

1. Array side mosaic pattern arrangement,
2. Relation of array and color filter stitching line
3. Influence of the shot mura of alignment precision.

From the experiment results, we obtain the conclusion as follows:

1. Different mosaic pattern for each mask
2. Color filter and the array stitching line must overlap
3. Alignment precision shouldn't be over 1.5 μm . That will achieve better LCD display quality than conventional stitching exposure.