

國立交通大學
顯示科技研究所
碩士論文

電漿束配向技術於光學補償彎曲式液晶顯示器之研究

**Investigation on Plasma Beam Alignment Technique
for OCB Mode Liquid Crystal Display**

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中華民國九十六年六月

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中文摘要

陽極層電漿源早期為俄羅斯使用於太空衛星推進器，近幾年此原理才開始被應用於液晶配向技術。此電漿束產生方式為利用直流電漿系統產生一電漿源，利用其正電極所產生的正偏壓強電場，使得電漿中的離子群被推動並對配向膜產生表面處理，藉以提升配向膜品質。傳統的定向刷磨方式所造成的塵屑污染、靜電殘留、刷痕產生等問題，對於大型化高解析度液晶顯示器面臨許多的瓶頸。電漿束配向法屬於非接觸式配向法，沒有上述定向刷磨的缺點，為目前最有潛力取代傳統刷磨之一。

光學補償彎曲式液晶顯示器具有廣視角以及快速的反應速度之特性，對於色序型顯示器有著良好的應用。然而一般的配向法仍以定向刷磨為主，對於非接觸之配向則較少琢磨。因此，本論文主要在探討經由電漿束配向後其光學補償彎曲式液晶盒之光電特性、液晶之預傾角與配向膜之表面形貌，並與傳統之刷磨法作為比較。

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Abstract

ALT (Anode Layer thruster), originally used for the satellite propulsion in Russia, was modified to be the plasma source for the application of LC alignment technique. The ALT source consists of outer and inner cathode and anode. Permanent magnet is necessary to generate magnet pole at outer cathode. The plasma flux is generated by cross electric field (E) and magnetic field (H) immediately. In contrast to current rubbing manufacturing process, the plasma alignment has fewer problems of electrostatic charge and debris and is the potential candidate to replace conventional rubbing process for the next generation large display.

The OCB (Optically Compensated Bend) mode LC is known for its fast response time and wide viewing angle. Rubbing process is still the main method for preparation of OCB. In addition, the electro-optical characteristics, pretilt angle of OCB cells and surface morphology of alignment layer after plasma treatment were investigated. The influence of OCB cells between these two alignments was also be discussed. Fast response time (3.3ms) was revealed and has the potential for OCB mode LCD to replace conventional rubbing process.

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