

利用奈米粒子提升 Pi-cells 轉態速率之研究

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摘要

近年來，平面顯示器產業技術(LCD、OLED、PDP、FED等)已趨成熟，在市場蓬勃發展的帶動之下，很多公司及研究單位紛紛投入下一代顯示器的開發。然而在大尺寸應用上，動態表現因受限於扭轉型液晶較慢的反應速度，無法提升影像品質。因此具有快速應答速度的光學補償彎曲型液晶模式顯示器則備受矚目。



然而，光學補償彎曲型液晶顯示器受限於其在操作前需要一段較長時間的熱機時間使得液晶分子能由斜展態轉換到真正進行操作的彎曲態。針對這項缺點，目前已有許多研究探討過這個問題，但目前的改善方式依然會犧牲掉光學特性。因此，本篇論文使用奈米結構來形成轉態核心，進而可以加快轉態速度。而因為尺寸為奈米等級，也不會造成光學特性的損失。

Nanostructure Effect on Transition in Pi-cells

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Abstract

The pi-cells are nematic liquid crystal devices in which the molecular director bends symmetrically by 180° through the cell. It has attracted much interest due to their fast response time and wide-viewing-angle characteristics. It is well known that the operating state (bend state) of a pi-cell must be nucleated then uniformly spread the bend orientation in splay state before operation. In this study, the random distribution of silicon oxide nano-particles was investigated for decreasing the time of splay-to-bend transition in pi-cells. Under the optimum conditions, the 50% reduction of splay-to-bend transition time was found in nanostructure structure treated surfaces.

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