

液晶与显示 2014, 29(1) 55-59 ISSN: CN:

本期目录 | 下期目录 | 过刊浏览 | 高级检索

[打印本页] [关闭]

器件物理及器件制备技术

TFT-LCD器件氧化铟锡层无退火工艺研究

张家祥, 卢凯, 郭建, 姜晓辉, 崔玉琳, 王亮, 阎长江, 曲连杰, 陈旭, 闵泰焯, 苏顺康

北京京东方光电科技有限公司, 北京 100176

摘要：对TFT-LCD器件氧化铟锡（ITO）层无退火新工艺进行了深入研究，通过将氧化铟锡相变与聚酰亚胺（PI）膜固化过程同步进行，简化了工艺过程，节约了生产成本。采用无退火工艺氧化铟锡膜层的平均电阻值和膜层透过率与传统高温退火工艺下基本相同，可以实现低的电阻值和高的透过率。无退火工艺下PI膜表面平整均匀，氧化铟锡膜与PI膜界面结合良好，无鼓包、麻点等，也没有反应产物生成；经过TFT特性测试发现，无退火工艺比高温退火工艺条件下，无论暗态还是光照状态，开电流没有明显区别，漏电流可降低44%；通过无退火工艺和传统高温退火工艺制备的液晶显示屏的V-T特性相同。

关键词：无退火工艺 透过率 氧化铟锡层 TFT特性

## Anneal skip of ITO layer in TFT-LCD

ZHANG Jia-xiang, LU Kai, GUO Jian, JIANG Xiao-hui, CUI Yu-lin, WANG Liang, YAN Chang-jiang, QU Lian-jie, CHEN Xu, MIN Tai-ye, SU Shun-kang

Beijing BOE Optoelectronics Technology Co., Ltd., Beijing 100176, China

Abstract: This paper makes a deep research on the new technology of anneal skip process for the TFT-LCD device. The anneal skip process can simplify the process and decrease the cost of production by the synchronization of ITO transformation and PI film curing. Using the anneal skip process, the average resistance of ITO layer and the transmittance of the film were the same as that of the traditional high temperature anneal process. A low resistance and a high transmittance could be realized. The surface of PI film was smooth. There was a good interface between the ITO layer and the PI film; no drum kit, pits and reaction products appeared. At dark or photo state,  $I_{on}$  of TFT using the anneal skip process was the same as that using the high temperature process, but  $I_{off}$  had a decrease by 44%. The V-T characteristic of panel using the anneal skip process and the high temperature anneal process were the same.

Keywords: anneal skip transmittance ITO layer TFT characteristic

收稿日期 2013-02-21 修回日期 2013-03-22 网络版发布日期

基金项目:

通讯作者: 张家祥, E-mail: zhangjiaxiang@boe.com.cn

作者简介: 张家祥(1985-), 男, 北京人, 硕士, 工程师, 主要从事液晶显示器相关的技术研发工作。E-mail: zhangjiaxiang@boe.com.cn

作者Email: zhangjiaxiang@boe.com.cn

## 参考文献:

- [1] 王玉如. 液晶显示技术的最新进展[J]. 现代电子技术, 2004, 27(22):85-87. Wang Y R. The latest development of liquid crystal display[J]. Modern Electronics Technique, 2004, 27(22):85-87. [2] 孙杨, 张永栋, 朱燕林. 单层ITO多点电容触摸屏的设计[J]. 液晶与显示, 2010, 25(4): 551-553. Sun Y, Zhang Y D, Zhu Y L. Single ITO design in multi touch capacitive panel[J]. Chinese Journal of Liquid Crystals and Displays, 2010, 25(4): 551-553. (in Chinese) [3] Gruner G. Carbon nanotube films for transparent and plastic electronics[J]. J Mater Chem, 2006, 16: 3533-3539. [4] 李田生, 谢振宇, 张文余, 等. 钝化层沉积工艺对过孔尺寸减小的研究[J]. 液晶与显示, 2012, 27(4):493-498. Li T S, Xie Z Y, Zhang W Y. The study in passivation layer deposition process of hole size reduction[J]. Chinese Journal of Liquid Crystals and Displays, 2012, 27(4):493-498. (in Chinese) [5] 宴峰, 张自立. 高分辨率LCD控制板的设计与实现[J]. 计算机与数字工程, 2002, 4(30):24-28. Yan F, Zhang Z L. Design and implementation of a high resolution LCD control board[J]. Computer and Digital Engineering, 2002, 4(30):24-28. (in Chinese) [6] 刘翔, 薛建设, 周伟峰, 等. 改善沉积氮化硅薄膜对FFS-TFT透明电极ITO影响的研究[J]. 真空科学与技术学报, 2012, 32(1):36-38. Liu X, Xue J S, Zhou W F. Study on the effect of improving the deposition of silicon nitride films on ITO [J]. Vacuum Science and Technology, 2012, 32(1):36-38. (in Chinese) [7] Lewis B G, Paine D C. Applications and processing of transparent conducting oxides[J]. Mrs Bull, 2000, 25:22-27. [8] Wu Z C, Chen Z H, Logan J M. Transparent, conductive carbon nanotube films[J]. Science, 2004, 305:1273-1276. [9] Leterrier Y, Medico L, Manson J. Mechanical integrity of transparent conductive oxide films for flexible polymer-based displays[J]. Thin Solid Films, 2004, 460: 156-166. [10] 王文文, 王峥, 郝维昌. 离子注入对ITO薄膜电学特性的影响[J]. 液晶与显示, 2009, 24(2):187-192. Wang W W, Wang Z, Hao W C. Effect of ion implantation on the electrical properties of ITO film[J]. Chinese Journal of Liquid Crystals and Displays, 2009, 24(2):187-192. (in Chinese)

本刊中的类似文章

1. 李婧, 张金中, 谢振宇, 阎长江, 陈旭, 闵泰焯.  $\text{SiN}_x$ : H薄膜沉积条件变更对TFT特性的影响[J]. 液晶与显示, 2013, 28(4): 547-551
2. 曲连杰, 陈旭, 郭建, 闵泰焯, 谢振宇, 张文余. 氮化硅在触摸屏中的应用分析[J]. 液晶与显示, 2012, 27(2): 466-470
3. 鹿岛美纪, 赵秀婷, 曹晖, 杨槐. 交联剂对PDLC膜电-光性能的影响[J]. 液晶与显示, 2010, 25(4): 531-533
4. 刘波; 赵小如; 冯娴娴; 刘凯; 赵亮. 掺杂氧化锌薄膜的最新进展[J]. 液晶与显示, 2009, 24(04): 522-527
5. 李婧, 张金中, 谢振宇, 阎长江, 陈旭, 闵泰焯.  $\text{SiN}_x$ : H薄膜沉积条件变更对TFT特性的影响[J]. 液晶与显示, 2013, 28(4): 547-551

