T F T - L C D　製 程 現 場 靜 電 評 估 與 防 制

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摘　　要

本文主要以現場評估及量測方式，評估液晶顯示器製程的靜電問題，探討現有製程的靜電防制成效。針對液晶顯示器製程運用靜電評估模式，評估各製程可能產生靜電之作業步驟，發現製程中主要潛在靜電問題的作業步驟。陣列製程中主要潛在靜電問題，包括機械手臂吸取與放置玻璃基材、玻璃基材在滾輪上移動等作業步驟，其中洗淨作業區域之機械手臂吸取放置玻璃基材的作業步驟，玻璃基材表面靜電壓最高，約為-18.5KV。液晶製程中主要潛在靜電問題，包括機械手臂吸取與放置玻璃基材、玻璃基材在滾輪上移動、去離子水清洗玻璃基材、切割與壓片、人員拿取玻璃面板、真空吸引玻璃面板、偏光板貼合等作業步驟，其中配向作業區域之去離子水清洗玻璃基材的作業步驟，玻璃基材表面靜電壓最高，約為-8.4KV。組裝製程中主要潛在靜電問題，包括保護膜剝離、面板組裝、維修作業時偏光片剝離等作業步驟，其中組裝作業區域之面板保護膜剝離的作業步驟，面板表面靜電壓最高，約為-3.1KV。探討現有製程靜電防制結果，發現多數作業步驟潛在靜電危害問題，採用靜電消除器利用離子中和的方法，消除玻璃基材的靜電問題，有助於降低製程中潛在靜電問題，進而提高製程良率。

Electrostatic Problems Evaluate and Control in TFT-LCD Production

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ABSTRACT

The purpose of this article was to discuss the electrostatic evaluation model and the prevention of static by the approaches at electrostatic discharge (ESD) assessment and ESD measures in Thin Film Transistor -Liquid Crystal Display (TFT-LCD) production. By applying the electrostatic evaluation model in TFT-LCD production, the major operations causing potential electrostatic problems were identified. In array process, the findings were while robot arms put substrates into the cassette and when substrates were transferred by roller. The highest voltage of static in array process was -18.5KV which was generated when robot arms put substrates into the cassette in cleaning area. In cell process, the findings were when robot arms put substrates into the cassette, when substrates were transferred by rollers, when substrates were rinsed by deionized water, when substrates were scribed and broke, when substrates were handled by operator, when substrates were removed from vacuum chuck on stage, and polarizer film was stick on panel. The highest voltage of static in cell process was -8.4KV which was generated when substrates were rinsed by deionized water in rubbing area. In module process, the findings were when protection film was removed from panel, and when panel was assembled. The highest voltage of static in module process was –3.1KV which was generated when protection film was removed from panel in assembly area. As a result from studying the prevention of static, it was found that the method of ionizer is able to reduce the electrostatic problems of substrates and is helpful to improve the process yield.

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