

# A New Inspection Method of PDP Electrode Pattern Defects

Taehong Kim\*, Sunkyu Yang\*, Tak Eun\*, Sehwa Park\*\*, Ilhong Suh\*\*\*

\* Microinspection, Inc., Ansan Technopark Supporting Center of Hanyang University

(Tel : 82-31-407-2047 Fax : 82-31-407-3047 )

\*\* Semi & Medical device Development Team, KIITECH, Chonan, Korea

\*\*\*School of Electrical and Computer Engineering , Hanyang U., Ansan, Korea

## Abstract

The display module of PDP consists of a pair of fine electrode patterned panels. For example, in case of 42" PDP, thousands of electrode patterns should be placed on panel, where length, width, and height of each pattern are one meter,  $50\mu\text{m}$ , and  $30\mu\text{m}$  respectively. And pitch between patterns is around  $200\mu\text{m}$ . Electrode patterns are frequently damaged during the production process, and thus might be broken. These breakage will result in open-circuited electrical characteristic of a pattern and/or short-circuited electrical characteristic between patterns. Therefore, inspection of pattern defects is the inevitable process to improve production yield rate of the panel.

In this paper, we first review several types of PDP pattern defects which affects yield-rate of PDP. And, problems of inspecting such pattern defects by a typical inspection method is addressed. Then, a novel inspection method is proposed to overcome the difficulties, where some new components and the algorithm to detect the electrode defects are explored.

## 1. Introduction

PDP is working under the principle that if VUV (Vacuum Ultra Violet) layer from plasma radiation excites the phosphor on the rear panel, the visible light is generated from the phosphor. Fig. 1 is a sectional diagram of PDP which shows the operating principle and architecture of PDP.

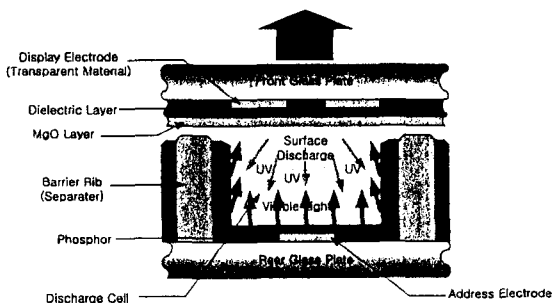


Fig. 1 Operating principle of the PDP

PDP has several problems of low brightness, low luminescence, high operation voltage and high power consumption. Nevertheless it is considered as a promising wall TV because it can be made relatively large, and will not require back-light owing to self-luminescence. Also, light weight and thin construction are possibly made as well as full colors for RGB phosphor.

However, PDP is still too expensive to be popular. One of the factors of expensive PDP results from low production yield rate of panel of the display module. PDP needs a pair of electrode patterned panel for plasma radiation. Display panel consists of thousands of electrode lines of 1~2 meter length. And pattern pitch and width are usually tens of micrometer according to size and resolution of PDP. For example, in case of 42" PDP, its pattern has about 1 meter length,  $50\mu\text{m}$  pattern width,  $30\mu\text{m}$  height and  $200\mu\text{m}$  pattern pitch. In this way, the electrode pattern is so fine that open-circuited and/or short-circuited patterns are frequently met. The yield rate of panel has an effect on the manufacturing cost of PDP because the manufacturing cost of panel corresponds up to 40% of PDP manufacturing cost. Therefore, to maximize yield rate by sorting out the panels with the electrode pattern defects, the inspection of the electrode pattern defects is an inevitable process in the production process of PDP.

In this paper, we first review several types of PDP pattern defects which affects yield-rate of PDP. And, problems of inspecting such pattern defects by a typical inspection method is addressed. Then, a novel inspection method is proposed to overcome the difficulties, where some new components and the algorithm to detect the electrode defects are explored.

## 2. Defects of PDP electrode pattern

Fig.2 shows several types of electrode pattern defects. Among such pattern defects, defects called "disconnect" cause electrode lines to be open-circuited and defects called "bridge" cause electrode lines to be short-circuited.

If there are "disconnect" and/or "bridge" types of pattern defects, entire line of screen with those types