

Influence of Surface and Plate-Gap Discharges on Panel-Aging Characteristics in AC Plasma Display Panel

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Abstract

Recently, to lower the panel fabrication cost, the PDP industry is focused on reducing the panel-aging process time in AC-PDPs, particularly for full-high definition (FHD) PDPs with very small discharge cells. The initial surface states of the MgO thin film after deposition by the ion-plating method are very non-uniform. As such, the panel-aging process is required to obtain the uniform MgO surface morphologies on both the ITO and bus electrodes.

Accordingly, this paper examines the changes in the surface morphology of the MgO layer on the ITO and bus electrodes under the surface and plate-gap discharge during the panel-aging process. The used test panels are a 50-in. FHD AC-PDP with an He (35 %) – Xe (11 %) – Ne gas compositions and box-type barrier under a pressure of 430 Torr.

Figs. 1 (a) and (b) show the schematic diagram for surface and plate-gap discharges during the panel-aging process in an ac-PDP cell. In Fig. 1 (a), the surface discharge is produced by applying +150 and -150 V to the X and Y electrodes of the test panel, respectively, whereas in Fig. 1 (b), the plate-gap discharge is produced by applying -150 and +150 V to the X, Y and A electrodes of the test panel, respectively. The duty ratio and frequency for the sustain period were 40% and 25 kHz, respectively. As shown in Fig. 1, the gap between the two ITO electrodes is short, whereas the gap between the bus electrodes is longer. The surface discharge gap between the ITO electrodes in Fig. 1 (a) is 70 μm , whereas the plate discharge gap between the sustain (ITO) and address electrodes in Fig. 1 (b) is 135 μm .

In summary, the SEM images [not shown here] illustrates that the surface mixed with plate-gap discharges contribute to shortening the panel-aging process time, implying that the uniform MgO surface on both ITO and bus electrodes for stable discharge was able to be obtained within fast process time in cases of adopting the surface mixed with plate-gap discharges during the aging-discharge process. The SEM images, discharge characteristics, and more detailed mechanism relative to the surface and plate-gap discharges during the panel-aging process are under study and will be discussed in detail.

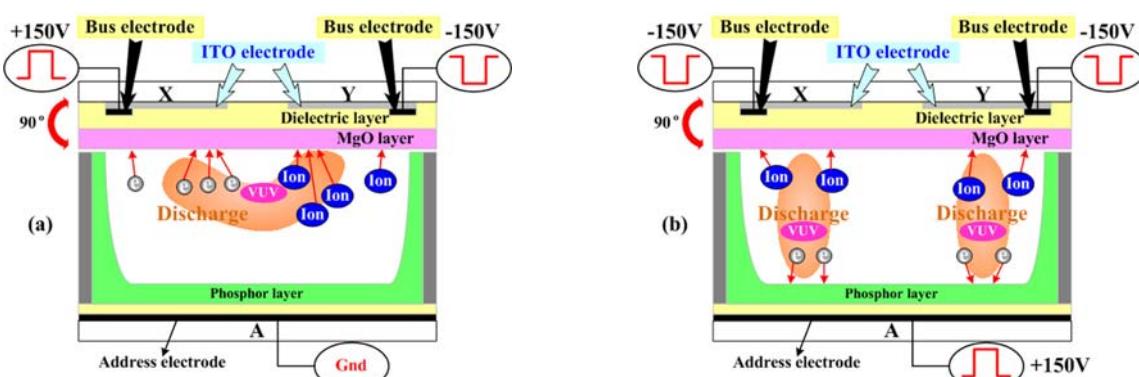


Fig. 1. Comparison of (a) surface and (b) plate-gap discharges during panel-aging process in ac-PDP cell.

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