CHARACTERISTICS OF HIGH EFFICACY PLASMA DISPLAY PANEL UTILIZING DIAGONAL DISCHARGE CELL STRUCTURE

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Plasma display with large cell size is gaining attention for the application of large outdoor public and transparent display. In the previous work, it has been shown that the efficacy of opposite discharge reaches to 18 lm/W, while that of surface discharge is about 5 lm/W.[1,2] As a follow-up research, discharge properties of PDP cell having diagonally opposite electrode have been investigated in terms of driving voltage, frequency, Xe partial pressure and barrier rib height. The efficacy and sustaining voltage range of proposed discharge cells are 9 to 20 lm/w and 230 to 300 V respectively. For the 8% Xe and 500um barrier rib height, it is approximately equal to the gap length between the electrodes, the sustaining voltage decreases with increasing driving frequency up to 100 KHz. When the driving frequency increases higher than 200 kHz the sustaining voltage decreases again. The increase in sustaining voltage may be due to reduction of wall voltage at the pulse period shorter than the ion transit time. For the low Xe case (8 %), the efficacy increases with rib height from 300 to 500 um. In case of high Xe panel (15%), on the other hand, the efficacy is saturated at 400 um rib height. ICCD images taken from front side shows an asymmetric discharge evolution profile, which comes from different secondary electron emission coefficient of MgO and phosphor layer. Side-view images obtained using prism barrier ribs reveal that the discharge path is formed along the diagonal direction of the cell.