

[P-25]

Influence of data voltage on sustaining discharge and luminous efficiency in AC plasma display panels

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Alternating current plasma display panel (AC-PDP) which uses a gas discharge is a display device with a inherent memory. The memory characteristics is that a cell experienced a gas discharge is easily fired by very low sustain voltage below a certain threshold voltage. In the widely-used surface discharged AC-PDP with three electrodes, the sustaining discharge occurs between the parallel-sustaining electrodes of X and Y on the front glass. But the wall charge is formed on the dielectric layer covering with X and Y electrode, and also formed on dielectric layer with data electrode Z on rear glass plate. Therefore the sustain discharge is affected by both the gas species and the quantity of wall charge on rear dielectrics. Under a certain wall charge configuration, the luminance efficiency is reduced because the wall charge prevents the normal sustaining discharge. In this experiments, we have adjusted the quantity of wall charge on rear glass plate by applying the data voltage on address electrode during the sustaining period. And we have investigated the influence of data voltage on the discharge characteristics and luminance efficiency for the surface discharged of AC-PDPs. As a results it is found that the wall charge on the rear dielectrics has not been formed when the applied data voltage during the sustaining discharge period is reached to be about 50 % of sustaining discharge voltage, where the highest luminance efficiency in AC-PDP could be achieved in this experiment.