Discharge characteristics of Shadow Mask PDP

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Abstract

Shadow mask PDP (SMPDP) is one promising structure for high definition and large screen PDP. The cheap shadow mask is used instead of the complex dielectric barrier ribs in SMPDP. This makes the cost reduced about 30% and the yield increased greatly. In addition the discharge performance is improved by the use of metal barrier ribs.

Both simulation and experiment study have been done in order to investigate the discharge characteristics of this novel SMPDP in detail. A closed macro-cell of SMPDP has been made and the manufacture process is almost same as that of the real panel except the electrodes. The electrodes are put on the out surface of the macro-cell. The infrared image (828nm+823nm) and 640nm image at different time during discharge process have been taken with an ICCD and narrow band filters. The time evolution of the discharge is studied. Results show that the discharge process of the SMPDP is quite similar to that of opposite discharge and it's a kind of non uniform field opposite discharge. It combines the advantage of both three electrodes coplanar PDP and matrix PDP.

The difference between infrared image and 640nm image has been shown clearly. There are striations on the anode for infrared image and for 640 nm image no striation phenomena exists, as the energy of electron there is not high enough to excite the Neon. A fluid model is used to calculate the discharge process of SMPDP. The influence of some parameters of SMPDP, for example, frequency, voltage and width of electrode, pressure and content of Xenon, etc., on the discharge process and discharge efficiency has been measured and calculated. Compared the results of experimental measurement to simulation, they matched with each other quite well.

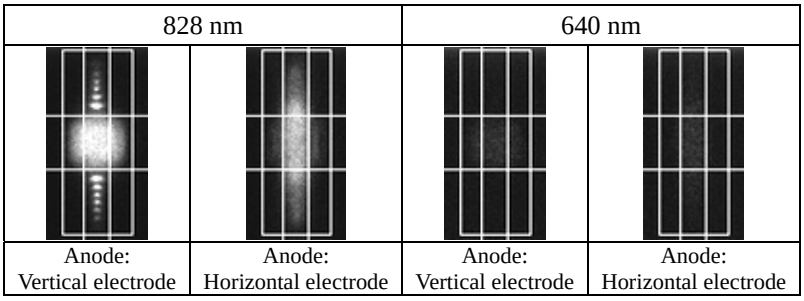

Figure 1 Infrared image (828nm+823nm) and 640nm image