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High efficacy plasma display utilizing opposite electrode discharge cell structure with long electrodes gap JUN HEO, SE HUN PARK, DONG HYUN KIM, HAE-JUNE LEE, HO JUN LEE, MIN TAE KIM, Pusan National University — Recently, applications of plasma display to the large public display and transparent display gain much attention. With this background, we report characteristics of opposite electrodes discharge cell with long electrode gap in comparison with conventional co-planar surface discharge. The cell size of test panel is 2950 μm $\times$ 840 μm, which corresponds to that of the display having diagonal size of 130" with XGA resolution. Electrode gap of co-planar and opposite electrode structure are 240 μm and 500 μm respectively. These gap dimensions provide similar driving voltage windows. Experimental results show that opposite discharge provides approximately four fold higher luminous efficacy compared with that of the surface discharge. Resulting efficacy is found to be higher than 20 lm/W in green phosphor with 10 KHz continuous pulse operation. Spatio-temporally resolved, three-dimensional ICCD image using prism side wall reveal that high efficacy is correlated with positive column formation. Simulation study based on the drift diffusion approximation show that improvement on the electron heating efficiency and excitation efficiency related with low electron energy is responsible for high efficacy nature of the proposed cell structure.

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