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Efficiency of pulse-mode dielectric barrier discharge excimer lamp in constant duty cycle HARUAKI AKASHI, Dept. Appl. Phys., National Defense Academy, Japan, AKINORI ODA, NIT, YOSUKE SAKAI, Hokkaido Univ. — Efficiency of pulse-mode dielectric barrier discharge (DBD) excimer lamp under constant duty cycle with increasing applied voltage has been simulated using two dimensional fluid model[1]. Xe gas with 300Torr pressure is assumed. And the simulated region considered in this model is 1cm(gap length)x3cm(radial length). Periodical boundary conditions are assumed for the radial direction boundaries. The both electrodes are covered with dielectrics and their thickness is 0.2cm. 5∼8kV trapezoid shape voltage is applied with the same voltage rising ratio and 50% duty ratio waveform with 200x10^3pps repetition rate. The discharge occurs at the rising edge and tailing edge of applied voltage. 172nm VUV intensity obtained from first discharge is higher than second one in lower applied voltage (<6kV) case. And in higher voltage case, the intensity from second discharge becomes higher. This is explained by shortening of interval time between the discharges. The short interval time makes higher initial electron density for second discharge. As a results, the input and 172nm VUV output power increases with increasing applied voltage, but the efficiency decreases. Because of inefficient surface discharge [1]H. Akashi et al, IEEE Trans. Plasma Science, Vol.33,No.2(2005,4)pp.308-309

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