Abstract: In this paper, recombination rate of charge in low density polyethylene (LDPE) film was figured out by measuring the photon released from the film when the film was short-circuit discharge after been set to high voltage of direct current (HVDC) for certain duration. Under a series of designed condition including changing the polarity of HVDC, the value of applied field and the time duration of applied field, the number of photon was measured to calculate the charges' combination rate. The result showed that the recombination rate was sensitive to the applied filed but insensitive to the applying duration, and when the field was higher than 80MV/m, the number of released photon increased slowly. With the usage of date obtained both from our experiment and other papers, the luminous efficiency of LDPE film was calculated out with the result of 5.9×10^{-6}, and the charges' recombination rate during 0.2 second at the beginning stage of short-circuit is around 2.8%.