

Abstract Submitted  
for the DPP12 Meeting of  
The American Physical Society

**Characteristics of dielectric barrier discharge plasmas in atmospheric humid air** Y. FUKUDA, K. FUKUI, R. IWAMI, Y. MATSUOKA, Y. KIKUCHI, N. FUKUMOTO, M. NAGATA, University of Hyogo — Atmospheric pressure plasmas have a great advantage for industrial applications such as surface modifications, sterilization and film preparation. In particular, reactive plasmas including OH radicals can be generated in humid air. On the other hand, it is known that dielectric barrier discharge (DBD) plasmas in air are strongly affected by humidity. In this study, a twisted pair sample is used as a DBD electrode. The twisted pair consists of two enameled wires, and it is installed in a climate chamber to control ambient temperature and humidity. Repetitive impulse voltage pulses were applied to the twisted pair to produce DBD plasmas. Light emission, electromagnetic wave and current pulses were used to detect discharge activities. The discharge inception voltage (DIV) is basically determined by Paschen curve in air, however, the DIV was decreased by increasing the humidity. In addition, it was found that there were largely scattered data of DIV at the low humidity condition. After the pre-discharges, the DIV reached to the steady state value. On the other hand, there was no scattering of the observed DIV at the high humidity condition. Measurements of surface potential of the sample after the discharge show these behaviors could be explained by surface charge accumulation on the enameled wire. It is noted that there was no fluctuation in the DIV data in the case of unipolar voltage pulse.

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Date submitted: 13 Jul 2012

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