

P4.3008 Current-Voltage analysis in SDBD plasma discharge

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See the full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.3008.pdf>

The aim of this project is to study the current-voltage properties in a Surface Dielectric Barrier Discharge (SDBD) plasma. Our plasma device is made by a 3 mm thickness dielectric barrier in Teflon and two 12 cm long conductive electrodes applied on the opposite side with 2 cm overlapping. One of the electrode is feed to the high voltage (HV) and is buried, while the other is conneted to the ground. We apply a radiofrequency (RF) power between 20-40 W. The multiplicative factor from the RF generator to HV transformer goes from a minimum of 450 to a maximum of 650 depending on the applied voltage.

We used an homemade Rogowski coil to collect the current associated to the plasma. Our probe is such that the displacement current is not detectable so the current is due to only the plasma contribution. We collected the temporal series of the plasma current by varying the RF generator voltage in the range between 7 to 14 V with 1 V step. We defined the region of HV phase in which current spike are concentrated. Subsequently we studied the statistical properties of the current spike, such as maximum intensity, time duration, charge collection and HV phase position.

This work is preparatory for the study of the VOC abatement to find a link between plasma current properties and the noxious molecules depletion.

References

- [1] I.Biganzoli, R.Barni, and C.Riccardi, Review of Scientific Instruments, 84, 1 (2013), 10.1063/1.4773233
- [2] I.Biganzoli, Ph.D. Thesis, Characterization of Atmospheric Pressure Plasmas for Aerodynamic Applications

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Presenter: PIFERI, C. (EPS 2019)

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