

Contribution ID: 175

Type: Oral

## AN INVESTIGATION OF PULSED FILAMENT CURRENTS IN DIELECTRIC BARRIER DISCHARGES WITH MESHED ELECTRODES

Tuesday 20 June 2017 10:15 (15 minutes)

It is known that the properties of pulsed current filaments can affect the efficiency of ozone generation[1]. In this paper, a statistical analysis was made to investigate the properties of the current filaments observed in dielectric barrier discharges with meshed electrodes. Two stainless-steel sheets with 0.96 mm apertures were used as the meshed electrodes. A 5 kHz smart power supply was used to energize the dielectric barrier discharge reactor, filled with high purity oxygen. Discharges were found to be volumetric, with milliamp-level pulsed filament currents. Multiple filaments were observed to develop simultaneously and the discharge zone expanded with increasing applied voltage.

The average peak current and the peak current distribution were investigated under various applied voltages, gas pressures and wire diameters. With an increase of the applied voltage from 4.5 kV to 6.5 kV, the average peak current increased dramatically from 2.0 mA to 22.3 mA and the width of the current distribution became much wider. By increasing the gas pressure from 1 bar to 2 bar absolute, the average peak current decreased and the width of the current distribution was narrower. The average peak current increased by three times when the aperture size was increased from 0.96 mm to 1.7 mm. The ozone efficiency was investigated under different conditions, and it was found that the maximum ozone efficiency achieved by manipulating the discharge current was 334 g/kWh.

[1] Y. Zhou et al., "Optimization of Ozone Generation by Investigation of Filament Current Characteristics Under Dielectric Barrier Discharge," in IEEE Transactions on Plasma Science, vol. 44, no. 10, pp. 2129-2136, Oct. 2016.

doi: 10.1109/TPS.2016.2579167

Authors: Dr WANG, Tao; ZHOU, Yingjia (University of Strathclyde)

**Co-authors:** Dr GIVEN, Martin; Prof. MACGREGOR, Scott; TIMOSHKIN, Igor (University of Strathclyde); WIL-SON, Mark (University of Strathclyde)

Presenter: Dr WANG, Tao

**Session Classification:** Oral session 8 - Industrial and Commercial Applications - Session Chair : Guus Pemen

Track Classification: Pulsed Power Industrial and Bio-Medical Applications