

## OZONE PRODUCTION BY PULSED POWER IN DRY AIR

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### Abstract

Experimental investigations of high voltage short pulsed streamer discharges in dry air-fed ozonizer under various operating conditions are reported. Ozone concentration, energy input and ozone production yield were measured at various voltages (14 to 37 kV), pulse repetition rates (25 to 400 pulses per second, pps), fixed flow rates (1.5 to 3.0 l/min) and different gap spacings (10 to 20 mm) at a pressure of  $1.01 \times 10^5$  Pa in dry air. A spiral wire made to a cylindrical configuration in concentric coaxial electrodes of varying dimensions was employed. A magnetic pulse compressor provided the voltage and current pulses. Higher voltage and higher repetition rates yielded higher concentrations of ozone at a fixed flow rate. Additionally the present investigations were extended to assess the performance of pulsed ozone generators using dry air under industrial conditions, where both the concentration of ozone (in parts per million, ppm) and its yield (in g/kWh) were maintained at high levels.

[5]. A pulsed streamer discharge has been shown to be very effective for this purpose. The streamer discharge energized by a fast rising pulse voltage can produce an intense plasma to generate ozone effectively at room temperature and atmospheric pressure. This is because the electrons are accelerated to a high level and due to the short duration of the applied voltage pulse it does not lead to a spark breakdown [2]. In general, the concentration of ozone (in parts per million, ppm) and the yield (in g/kWh) are the most important figures of merit for evaluation of the ozonizer performance. These two parameters were examined as functions of the pulse voltage (14 to 37 kV), pulse repetition rate (25 to 400 pps), gas flow rate (1.5 to 3.0 l/min) and gap spacing (10 to 20 mm) at a pressure of  $1.01 \times 10^5$  Pa of dry air.

## II. EXPERIMENTAL TECHNIQUES

A schematic diagram of the apparatus to generate ozone is shown in figure 1. The ozonizer constituted a discharge tube which contained a spiral copper wire of 1 mm in