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Ozone Production Using Cylindrical Reactors With and Without Solid Dielectric Layers in Dry Air

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Abstract

An investigation into ozone production in dry air-fed ozonizers under different operating gas discharge conditions at a pressure of 1.01×10^5 Pa using a spiral wire made to a cylindrical configuration is reported. A magnetic pulse compressor provided voltage and current pulses with a repetition rate of up to 500 pulses per second (pps). A cylindrical configuration with ceramic and polyvinyl chloride (PVC) on the outer electrode and without solid dielectric were used. High production yields were obtained of ozone of about 122, 60 and 57 g/kWh by the ceramic, PVC and without dielectric layers, respectively for 15.7-cm length reactor. The length of the cylindrical reactors was varied from 15.7 cm to 1 m. The flow rate of the gas was varied from 1.5 to 3.0 l/min. The dependence of the concentration and the production yield of ozone on different pulse voltages (17 to 63 kV) and varying pulse repetition rate (25 to 400 pps) with and without solid dielectric layer is reported. This investigation has industrial applications for construction of advanced ozone generators.