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Influence of voltage pulse repetition rate on the effectiveness of ozone synthesis in air in a dielectric barrier discharge

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At atmospheric pressure in air influence of repetition rate and shape of high-voltage pulses on the productivity by ozone of a plane-parallel dielectric barrier discharge (DBD) cell is studied. For various frequencies current-voltage characteristics, as well as dependence of synthesized ozone concentration on effective voltage value are analyzed. In addition, the ozone productivity largely depends on the duration and amplitude of periodic high-voltage voltage pulses on the electrodes. So, with short sequences of high-voltage pulses (in the experiment the peak value equal to 20 kV) with duration 70 ns and following with frequency equal to 400 Hz, the ozone productivity is the same as when using AC voltage with an effective value equal to 5.3 kV and period with duration 1/400 s. In the first case, active power consumed by the discharge cell is significantly less than in the second case.

Keywords: dielectric barrier discharge, ozone synthesis, low-temperature plasma, current-voltage characteristic, active power consumption.

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