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OZONE SYNTHESIS IN A CYLINDRICAL DRY AIR-FED OZONIZER BY NON THERMA

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Abstract

Ozone is increasingly being used as an alternative oxidant to chlorination processes in various industrial applications without any objectionable by products to the environment and requiring less energy for its production. Therefore, it is necessary to investigate the effects of various parameters on the production of ozone both experimentally and theoretically. A theoretical study focused on numerical simulation was performed to investigate the validity of the dependence of the ozone concentration on various parameters measured experimentally and to better understand the discharge phenomenon employing very short pulsed streamer discharges in the ozonizer at a room temperature and atmospheric pressure. The generation and decay of different particle species subjected to pulsed discharges were simulated as a function of time using both a single pulse and multiple pulses. The rate coefficients of various plasma chemical reactions including electron impact dissociation of the principal gaseous components, namely oxygen and nitrogen in dry air, occurring in the streamer corona discharge depending upon the electric field to particle density ratio (E/N) and the gas temperature were taken into account. The trend showing the dependence of the concentration of ozone in dry air on the parameters studied generally agreed with the experimental results and with the published literature thus confirming the validity of the simulation model.