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IFLUENCE OF OUTER ELECTRODE MATERIAL ON OZONE PRODUCTION IN COAXIAL NEGATIVE CORONA DISCHARGE FED BY OXYGEN

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Abstract. The "electric odour", observed by Van Marum when oxygen was passing trough electric spark in 1785, has been later (1839), identified by Ch. F. Schönbeim as a new chemical compound named ozone (Stolarski 1999). Almost from those times ozone is widely used chemical compound.

The effect of outer electrode material on the ozone production in negative corona discharge have been studied. Two electrodes with the same dimensions were used in the experiment. One was made of stainless steel other one of brass. First the outer electrode was mechanically cleaned to remove the layer of oxides. The reactor have been filled by pure oxygen and closed. Then the measurement (1 hour measurement of discharge current at the constant voltage and time dependence of ozone concentration in the reactor) was repeated 5 times without cleaning the surface to see the ageing effects. Especially the influence of electrode oxidation on ozone concentration was studied. The experiments have been carried out at atmospheric pressure and ambient temperature. The ozone concentration was measured by UV spectroscopy method directly in the discharge reactor.

As one can expect the brass surface was oxidizing faster. After five measurements the electrode surface was covered by layer of greenish oxides. On the other hand the steel electrode surface had no visible oxides layer. The oxidation of the outer electrode had little systematic effect on the ozone concentration but in case of brass electrode the results were scattered in the range from 8000 ppm to 15000 ppm of ozone. It seems that the more oxides are created on the surface the less ozone is produced or the faster the ozone decomposition processes are (see Fig. 1). On the other hand in case of stainless steel electrode the ozone concentrations were comparable in all 5 measurements. Overall ozone concentration was higher in steel electrode.

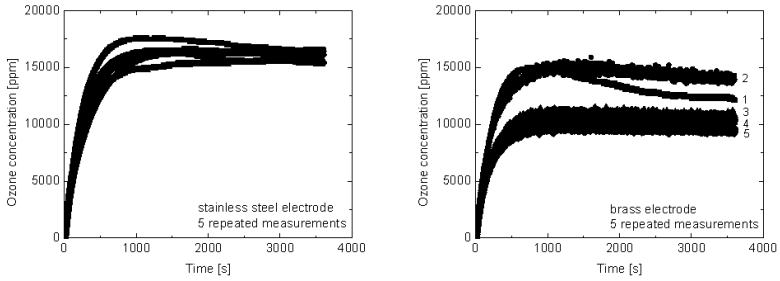

Figure 1: Time dependence of ozone concentration.

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