The influence of the corona electrode material on its modification processes in a barrier discharge in air

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Dielectric Barrier discharge (DBD) is a low-current high-pressure discharge initiated in an electrode system with a dielectric barrier. Long-term operation of the discharge leads to modification of the corona electrode. Changes in the morphology of the electrode edge affect the uniformity of the DBD and its electrical characteristics. Electrode modification occurs as a result of competing mechanisms of erosive cleaning in the cathode layer and the formation of oxides on electrode edge [1].

The aim of this work is to study the effect of the corona electrode material on the modification processes. A comparison was made of the structure and dynamics of the discharge power during continuous operation for 200 min on electrodes made of Cu, Ni, Mo and Al. Discharge on Cu and Ni electrodes has a high degree of heterogeneity along the electrode span. In the case of electrodes made of Al and Mo, the discharge looks like a diffuse glow region. When modifying electrodes made of Cu and Mo, there is a noticeable increase in the power dissipated in the discharge, while in the case of electrodes made of Ni and Al, there is a decrease. The reason for the different behavior of the electrodes during modification in the discharge is the binding energy of the oxides and their electrical conductivity.

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