**MODIFICATION OF the corona electrode in THE SuRFACE DIELECTRIC BARRIER DISCHARGE**

Lazukin A.V., Selivonin I.V., 1Moralev I.A. and Krivov S.A.

Moscow Power Engineering Institute, Moscow, Russia, lazukin\_av@mail.ru
1Joint Institute for High Temperatures, Russian Academy of Sciences, Moscow, Russia,
 morler@mail.ru

The effect of the discharge exposure characteristics of the surface dielectric barrier discharge was studied. The experiments were carried out for the discharge cells with ceramic insulator (1 mm thick alumina ceramics); 20 μm thick copper and aluminum foils were used as electrodes. The discharge was powered by a sinusoidal voltage with the frequency 25 and 100 kHz. The discharge was operated at intervals of 2–8 hours during 96 hours in a vented volume filled with at normal conditions. It was shown that the modification of the exposed electrode edge as a result of the discharge operation has a significant impact on the dynamics of micro-discharges and discharge power. A different dynamics of micro-discharges (MD) was observed on the aluminum and copper electrodes. At medium amplitude of the supply voltage (3–3.5 kV) on the copper electrodes the position of microdischarge was stable for many periods of the supply voltage. On aluminum electrode the localization of the electrode spot is non-stable due to rapid formation of an oxide film after MD quenching.

Using various microscopy techniques (laser confocal microscope Olympus Lext OLS4000, optical microscope MBR-9) the structure of the electrode edge was studied. In all cases, loss of the electrode thickness was relatively weak even after prolonged exposure, electrode shape was mainly altered by oxide deposition. For both materials in the vicinity of the electrode edge intensive formation of the dendrite-like and a sponge-like structures was found. Different morphology of the oxide formations was observed for copper and aluminum as a result of different MD dynamics. In the case of the aluminum electrode dendrite formations is observed at a distance of several hundred microns from the edge of the electrode; in the case of copper oxide is deposited as a porous structure directly at the electrode edge. Formation of a nonconductive layer on the copper electrode edge significantly reduces the discharge power and increases discharge ignition voltage. It is shown that ozone generation has a significant impact on the dynamics of the discharge power via the oxidation of the copper electrode. Results obtained in the present work can be used in the design of SDBD- based electro-technological devices and plasma actuators.