effect OF the PROPERTIES OF THE DIELECTRIC BARRIER AND PARAMETERS OF PULSEd VOLTAGE ON THE STRUCTURE OF SURFACE DIELECTRIC BARRIER DISCHARGE IN AIR

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The aim of the present work was an experimental investigation of the influence of barrier permittivity and voltage parameters on electric characteristics and on the structure of surface dielectric barrier discharge (SDBD) in air

Data showing [1, 2] the significant effect of the dielectric permittivity of the barrier on the surface discharge structure and the length of the microdischarge channels. In addition, in [2], it is assumed that the rise rate of the impulse supply voltage also plays a significant role in the formation and propagation pattern of a surface discharge.

In the present work, the discharge patterns and simultaneously obtained oscillograms of current pulses of microdischarges from the edges of a copper electrode 1–3 mm wide, located on the surface of a dielectric barrier made of various ceramics, were analyzed using the dust figure method (Fig. 1). For the formation of the discharge, single unipolar pulses of high-voltage with an amplitude up to 9 kV with a variable voltage rise rate from 40 to 300 V/ns were used. The discharge current was measured with current probe (D2-31 attenuator) (Fig. 2), and the discharge ignition voltage was determined from the instant at which the current pulse appeared. Dust figure method was used to determine the dependence of the width of the discharge zone on the voltage parameters and the properties of the dielectric barrier.

It has been experimentally shown that with an increase in the rate of rise of a voltage pulse, there is a significant increase in the width of the discharge zone, the amplitude of the surface discharge current, and the energy introduced into the discharge. A comparison is made of the dependence of the width of the discharge zone on the dielectric permittivity of the barrier for different values of the voltage rise rate and the calculated dependences given in [2].

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| Electrode2  Fig. 1. Electrode configuration | F:\Рабочая папка\Google Диск\= Статьи и конференции наши\Тезисы в Звенигород 2019\Scheme.emf  Fig. 2. Electric circuit |

References

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