INVESTIGATION OF PLASMA INTERACTION WITH SOIL

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Research of influence of various plasma discharges on soil properties is interesting from a point of view of modeling linear lightning and tropospheric plasma effects on different soil covers and seeds. To investigate the effect of plasma impact, we used the plasma of the capillary plasma generator.

Experiments have been carried out on the interaction of the plasma jet of a capillary plasma generator with soil and soil-like objects of various compositions, the value of the inputted energy is of the order of 190 J, the duration of the action is 10 ms. Plasma parameters are determined under which its effect on the soil is possible. Model studies of typical chernozem, clay and sand have been carried out and changes in electrical conductivity and other soil properties have been revealed. The scheme of the experimental device is shown in Fig.1.

**Fig.1.** Capillary plasma generator: 1,4 - electrodes, 2 - dielectric plate with capillary (discharge chamber), 3 - plexiglas frame of plasma generator

As a result of the experiment, changes in the value of the electrical conductivity of the treated samples as compared to the control were found from 1.2 to 7 times, depending on the time of action of the plasma jet on the soil. The longer plasma was in contact with the samples surface, the greater was the electrical conductivity. It was also found that the effect of increasing electrical conductivity is more pronounced as a result of the interaction of air-dry samples with a plasma jet, while the increase in electrical conductivity ranged from 194 to 676 mS / cm.

The study of the magnetic characteristics by means of a vibration magnetometer also showed a change in the magnetization curve for samples exposed to plasma, in comparison with the control samples.

Thus, it is possible to simulate the effect of linear lightning and tropospheric plasma flows on the soil by treating by a plasma jet of the capillary plasma generator. This treatment also makes it possible to study soil samples of the same type, but with different values ​​of electrical conductivity and magnetic properties.