بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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CORONA AND BREAKDOWN

ACROSS INSULATING SURFACES

A THESIS

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BY

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In the name of Allah,

the merciful and compassionate

To the memory of my father,

My mother,

My husband Prof. Morsy

and my childern

Aiat, Mohammed and Abdel Rahman

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SUMMARY

Investigation have been carried out into the effect of excess negative ions on the surface corona produced by an impulse voltage, and subsequence surface flashover.

The experiments, have been carried out in a closed, light-tight container. The electrodes were coaxial, the outer electrode having a diameter of 35 mm. and the inner of 1.8 mm. The space between the electrodes was occupied by a plane disc shaped insulator, of cycloaliphatic polyurethane, with dolomite filler, 2 mm. thick. Negative ions from an auxiliary d.c corona have been drawn by air flow on the insulator surface.

A parallel set of experiments was carried out in air with identical electrode arrangement but without the insulator, for the purpose of comparison .

Flashover tests were performed using standard techniques with lightning and switching impulses. The values of the 50 percent flashover voltage (U_{50}) were not changed significantly when the ambient air surrounding the insulator was enriched with negative ions. But, when the insulator was absent the values of U_{50} were increased in air.

Measurements were made on the amount of the surface charge injected and the amplitude of corona current pulses. Simultaneous photography and charge measurements allowed correlation between the radius of corona and the injected charge have been made. From the inception time of the corona pulses, the geometric fields at these times have been calculated at inner and outer electrode radii and also at the corona radius.

The presence of excess negative ions prior to the application of impulse voltage increases the charge deposited by corona, the corresponding corona radius and the sum of current magnitude of corona pulses across the insulator surface. Also, corona extended a larger distance to regions of lower field. The opposite trend occurred in air where corona size was rduced by the presence of excess negative ions.

The effect of different inner electrode radii upon the discharge process across the insulator surface was studied.

CONTENTS