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ELECTRIC FIELD AND CURRENT DENSITY DISTRIBUTION NEAR WATER INCLUSIONS OF POLYMER INSULATION OF HIGH-VOLTAGE CABLES IN VIEW OF ITS NONLINEAR PROPERTIES

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Abstract

The mathematical model and the analysis of inhomogeneous electric field and total current density distribution in micro-volumes of crosslinked polyethylene (XLPE) insulation on ultrahigh voltage near water micro-inclusions extracted along the field have been made. The analysis was made considering a nonlinear conductivity dependence on the electric field. The multi-physical character of possible degradation processes of solid polymer insulation of ultra high voltage cables in the appearance of conducting ellipsoidal inclusions and branched water dendrites has been specified. The studies were made with taking into account the calculation *results of electric field macro-inhomogeneity distribution along the cross-section of XLPE insulation of ultra high voltage cables.* References 17, figures 4.

Key words: electric field, polyethylene insulation, non-linear properties, inhomogeneity, micro-inclusions

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