

MASON'S EQUATION APPLICATION FOR PREDICTION OF VOLTAGE OF OIL SHALE TREEING BREAKDOWN

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Electrical treeing is observed in the low conductive materials. Partial discharges and treeing can occur in carbonaceous rocks, such as oil shale. They lead there to the breakdown of large inter-electrode distances at a relatively low voltage. This effect can be used for breakdown and underground heating of solid fuels formation in technologies of in situ processing. However, this need to know the voltage required for the breakdown of a given inter-electrode distance. The Mason's formula describes the field at the tip of the electrode in the tip-plane electrode system. Use of this equation can help to determine the field on the tips of the dendrites. According to this formula the field on the tip is dependent on the radius of tip, inter-electrode distance and the voltage on the electrodes. If the tip field has critical value, which is correspond to the partial discharge activity, then this equation can express treeing breakdown voltage as a function of distance between electrodes. The tip radius is the radius of dendrite head. It was defined due to microscopy. We experimentally obtained the dependence of treeing breakdown voltage for oil shale on inter-electrode distance in the range 0.03–0.5 m. This dependence was approximated by Mason's equation and the critical field was defined due to approximation. The average error of approximation relative to the experimental data is less than 1 %. The compliance of the model on a large inter-electrode distances should be checked in the field conditions.

Keywords: *Mason's equation, treeing breakdown, oil shale.*