

SYNERGETIC MECHANISM OF THERMAL DESTRUCTION OF TWO-PHASE CONTACT MATERIALS

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One of the poorly studied factors of the electrical contacts degradation is the spatial inhomogeneity of the Joule heat release. The mechanism of the appearance of a kind of thermal structure when the topological defects of the structure and impurities contained in the metal become centers of intensive heat release is considered in work [1]. This paper reports on investigation of the possibility of synergetic mechanism of thermal cracks occurrence and growth in two-phase contact and resistive materials. To calculate the spatial distribution of Joule heat $q(x,y)$, a system containing weakly conducting circular inclusions and rectangular nonconductive cracks was considered [2].

The analysis of $q(x,y)$ and the values of effective conductivity σ_{ef} at varied values of crack length, conductivity σ_i and the concentration C_i of inclusions allow us to conclude that at a certain point on the surface of the inclusion under the considered conditions the peak of heat release more than 5 times higher than the average value for the sample is formed, which leads to a concentration of thermal stresses.

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 2. Kuanishev V.T., Sachkov I. N., Sorogin I. G., Sorogina T. I. // The concentration parameter thermal microstresses as the thermophysical characteristics of two-phase materials // Journal of Physics: Conf. Series. 2017. V. 891.