

INVESTIGATION OF EROSION PROTOTYPES ELECTRICAL CONTACT - DETAILS ON THE BASIS SILVER AND COPPER

A. Mrachkovskyy

Electric metal corrosion described in the writings of many famous scientists, such as its mechanism of its development, the impact properties of electrical contacts on the value erosion. Repeatedly considered resistance to erosion contact details. But the need to improve the stability of spark new composite materials relevant today.

The purpose of research - on the mechanism of mass transfer patterns of erosion and destruction of prototypes composite contact materials based on silver and copper on the results of theoretical and experimental studies.

Materials and methods of research. Using the known and developed deterministic and probabilistic mathematical and physical models of the contact details of switching devices were set patterns of change controllable parameters of electric erosion contact details.

Experimental studies conducted in the laboratory on a special stand with climatic chamber.

Analysis of thermal processes at the contact details held by solving nonlinear heat conduction problem napivneskinchenoho body based energy costs. Tests conducted in experimental samples contact details relay type HRC-2204 of JSC NPO "ETAL" Ukraine. The study was conducted in the range of sizes 1-10 A DC for active - inductive load.

Results. Research-contact parts are made by powder metallurgy from silver oxide supplements when administered in an amount of Y_2O_3 1mas. %. Refractory metal and Zr in an amount of 3 wt. %.

For current 2 A mass transfer occurs from the cathode to the anode because of the energy of positive ions gases and vapors metals transmitted cathode working surface. This cathode material melts, evaporates and

condenses on the surface of a cold anode as electron energy is much lower than the energy of positive ions.

By increasing the current more than 2 A change in mass of the cathode decreases. This is because the increased emission of electrons from the cathode, anode material is heated past, steam is partially deposited on the surface of the cathode and thereby negate the mass transfer from the cathode.

Increased electron emission is achieved by the introduction of yttrium oxide Y_2O_3 in the cathode material.

The test results for the current change from 2 to 10 and allowed to determine the inversion zone, which is in the range 5.5-6.5 A. The current load

In a more powerful arc (7 A and above) are shown under the underlying effects of fast electrons, created by local overheating cell anode material, which melts and evaporates and partially deposited on the surface of the cathode.

Introduction zirconium composite dispersion strengthening silver matrix because its hardness six times the hardness of silver. Also zirconium absorbs oxygen from molten silver.

Introduction of additional silver in insoluble matrix phase type oxides and refractory metal mass transfer allows you to adjust for contact details and increase electrical resistance as a whole.

Introduction graphite contact material enhanced the resistance welding due to low mechanical adhesion of the particles of graphite and silver.

Carbon dioxide and carbon monoxide blown electric arc from the working surface and reduce the time of burning due to withdrawal of oxygen from the arc, which increases the electrical resistance of the contact details.

Composite contact material matrix structure based alloys produced by powder metallurgy such values ingredients: 84 wt% Cu + 12 wt% Mo + 2 wt% MoO₃ + 1 wt% C + 1 wt% Ni.

Tests of the material on switching durability show that the law electrical contact parts wear line. Since amperage 8 A factor intensity electrical wear the research material is slightly reduced compared to the serial. This is achieved through the formation of molybdate copper surface layers under the influence of an electric arc which causes electrical resistance of the material.

For current load 8-10 reduced the burning arc through the formation of renewable gas CO, CO₂, generated by the interaction of graphite and oxygen under the influence of energy arc.

Conclusions

Evaluation spark resistance and contact reliability of new materials carried by grounding ingredient content with the desired physical and mechanical properties and studies arc length and patterns of change in microstructure. Electro stability of new composite materials based on silver series resistance than materials in 2,2-2,7 times.

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