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FEATURES OF FORMING OF ELECTRICAL ENGINEERINGS PROPERTIES OF COMPOSITION MATERIALS ON BASIS OF CARBON

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There are considered and conformities to law of change for specific electric resistance experimentally set from content of components in double-base and three-component composition materials on the basis of carbon. The areas of linear and nonlinear change of specific electric resistance are certain from content of copper, carbon and phenol formaldehyde connective in the composites.

Keywords: composition materials, powders of copper and graphite, specific electric resistance, linearness and non-linearity of properties

Introduction. Electrical engineering's materials on the basis of carbon are widely used at the production of brushes for electric machines, lighting coals, welding electrodes, interrupting and sliding electric contacts, insertions of electro-receivers of electro transport and other knots and elements of the electrical engineering.

Substituting of connective thermoplastic type by phenol formaldehyde thermoses' allows to promote mechanical durability and hardness of pin insertions of electrotrolleies of electric transport on 20-30 %. Further perfection of structural composition of conducting pin wares is related to introduction of microparticless of pyrolytic and natural graphite. Enhanceable requirements to the size of conductivity and wear of current receivers of trolleybuses stipulated introduction to the structure of composition material of additions of lead, tin and copper.

Perfection of pin insertions of electrotrolleies of trolleybuses is realized by making of double-layer construction. The under stratum of insertion is executed on the basis of powders of graphite, metals and phenol formaldehyde resin, epiphyses - on the basis of powders of electrode graphite, phenol formaldehyde novolac and Urotropinum.

Raising of task. The purpose of work is an estimation of influence for separate components of composition materials on specific electric resistance of insertions of electrotrolleies and brushes of electric machines.

Basic part of research. As components of copper-graphite composition materials of the electrical engineering setting used powders of copper of PMS-1, artificial graphite and phenol formaldehyde resin of резольного type of LBS-20.

Powder of PMS-1 was dried out and thermally processed at the temperature of 500-600 °C in the environment of carbon monooxide. Artificial graphite was ground in a ball ceramic mill and took away factions, with the size of particles no more than

60 mcm. Viscidity of resin of LBS-20 was led to 70-80 cut on VZ-246 by additions of the rectified ethyl spirit.

At making of first party of samples on the basis of PMS-1 powders and artificial graphite of hinge-plate of the indicated materials was mixed up in a ceramic mixer in a flow 60 mines and exposed to the bilateral pressing at specific pressure 220 MPa. The got moulding sinter at the temperature of 720 ± 10 °C during 120 min.

The considerable decline of specific electric resistance is observed at the increase of content of copper to 20 %. At the subsequent increase of content of this component specific electric resistance of composition material goes down from 11.0 to 0.94 mcOm·m. The increase of content for powder of graphite stipulates growth of specific electric resistance to the size of 69.5 mcOm·m, here the increase of specific electric resistance has linear character to maintenance of graphite 70 %. Nonlinear growth of specific electric resistance takes place At the further increase of its content.

The second party of samples with the use of connective ЛБС-20 was made by interfusion of powders of PMS-1 and graphite in a ceramic mixer with subsequent combination with the set amount (viscidity – 70-80 s on VZ-246); the got mixture was mixed to even distribution of LBS-20. Press-mass was heated to the temperature of 55 ± 5 °C and maintained during 60 min. Remaining content of organic solvent (ethyl spirit) does not exceed 4.0 %. Further dried out mass was exposed to pressing at pressure 220 MPa and heat treatment in the environment of rare gas (argon) and carbon filing up.

It is set that influence of content of LBS-20 on specific electric resistance of composites has nonlinear character and influence of content of copper - extreme character substantially. The maximal value of specific electric resistance makes a 19 mcOm·m at content of copper powder within the limits of 48-50 %.

Conclusions. The analysis of basic directions of perfection of structure and functional properties of composition materials is executed on the basis of carbon for the electrical engineering setting. Influence of content of components is set on specific electric resistance of composition materials. The limits of linear and nonlinear change of values of specific electric resistance are experimentally set.