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THERMAL STABILITY OF THE STRUCTURAL-PHASE STATE OF THE MODIFIED LAYER OF HYPEREUTECTIC SILUMIN SPECIMEN

E.A. PETRIKOVA, YU.F. IVANOV, A.D. TERESOV, M.E. RYGINA

Institute of High Current Electronics SB RAS, Tomsk, Russia

The aim of the work is to develop methods and approaches to significantly improve the strength (microhardness) and tribological (wear rate and friction coefficient) characteristics of hypereutectic silumin (Al-22-24% Si) by creating hardened surface layers as a result of irradiation with a pulsed electron beam of the “film (ZrTiCu) / (hypereutectic silumin) substrate".

The thermal stability of the structural-phase state of a modified specimens layer of a hypereutectic silumin by a pulsed electron beam was studied under annealing conditions (200^0C and 400^0C for 2 and 4 hours) in an argon atmosphere at a residual pressure of 0.1 Pa.

It has been established that exposure of hypereutectic specimens, treated by a pulsed electron beam (25 J/cm^2, 200 μs, 3 pulses), at a temperature of 200^0C for 2 and 4 hours, does not lead to the destruction of the high-speed cellular crystallization structure and intensive decomposition of the solid solution based on aluminum with the formation of silicon and intermetallic compounds nanosized particles.

Exposure of silumin specimens irradiated with a pulsed electron beam (25 J/cm^2, 200 μs, 3 pulses) at a temperature of 400^0C for 4 hours led to partial destruction of the structure of cellular crystallization and growth of cells, as well as an increase in the size of particles of the second phase located at the boundaries of the cells.