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THE PECULIARITIES OF THERMODYNAMIC FUNCTIONS AND T-PHASE

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Purpose. Study was to determine the mechanism of formation, physical properties and thermodynamic functions cubicboroncarbideiron $Fe_{23}(CB)_6$[1-3].

Methodology. The study was performed on samples containing carbon 1.0-4.0% (wt.) and boron 2.0-4.5% (wt.), otheriron. In the work we use differential thermal, metallographic, chemical and X-ray spectroscopic analyses.

Findings. For alloys in the Fe-B-C containing carbon 1.0-4.0% (wt.) and boron 2.0-4.5% (wt.), other iron cubic boron carbide $Fe_{23}(CB)_6$, it should be perform pre-processing of the alloy, such as annealing at 1170 K, further heated to a temperature of 30 K above liquidus and then cooled at a speed of 10-100 K/s to room temperature.

It is for the first time that using a model which takes into account the contributions of the first high-level approximation of the cubic expansion of the cubic boron carbide $Fe_{23}(CB)_6$ thermodynamic depending entropy, enthalpy and heat capacity Cp temperature were obtained.

Keywords: boride Fe_2B, eutectics, cubic boron carbide $Fe_{23}(CB)_6$ and Fe-B-Csystemalloy, Gibbs energy, entropy, enthalpy and heat capacity

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THE INVESTIGATION OF AUSTENITE TRANSFORMATION KINETICS OF ENHANCED WEAR RESISTANCE WHEEL STEEL

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Purpose. The purpose of the work was to determine the critical points and to investigate the kinetics of the decomposition of supercooled austenite with the continuous cooling of low-alloy steels for wheels with chromium, nickel and microalloyed with vanadium and molybdenum, for the purposeful development of heat treatment regimes that would increase their durability.

Methodology. The studies were carried out through analyzing experimental and laboratory data.

Findings. In the operation of the wheels in each of their elements there is a complex system of compression and tension strain, which varies rapidly in time. A significant part of the failure of the railway wheels occurs not as a result of their destruction, but as a result of wear and fatigue failure of friction surfaces, which requires substantial material costs for their repair and replacement.

Depending on the operating conditions, steel is used for the manufacture of wheels with different contents of chemical elements abroad. For light conditions of braking and high loads, heat-treated wheels with high wear resistance (class D according to the standard AAR M-107 / M-208) are made of steel from 0.67-0.77% C; 0.60-0.90% Mn (% by weight).

However, as the analysis of previously obtained industrial results shows, it is impossible to achieve the required plasticity level ($\delta \geq 14\%$), without additional doping with such elements as nickel, chromium, molybdenum and vanadium. For pre-laboratory studies, ingots weighing up to 10 kg of test chemical composition (% by weight) were made: C = 0.69-0.71; Si = 0.36-0.57; Mn = 0.72-0.83; Cr = 0.21-0.90; Mo = 0.09-0.15; Ni = 0.21-0.70; V = 0.06-0.11.