UDC 620.22:669.017

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FEATURES OF TERMITE STEELS, ALLOYED BY NICKEL AND CHROME

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There are investigated the termite chromium-nickel steel. There are build isothermal sections of the ternary Fe-Ni-Cr termite steels in the temperature range 500-1100 °C. There are features the chemical composition, structure and mechanical properties of the termite steel. By a separate investigation it is determinates the dependence of the mechanical properties of termite steel from temperature. Realized work has allowed to establish the composition of the charge for the synthesis of termite chromium nickel steel is developed a method for the preparation of metallothermic mixture and synthesis of the alloy, as well as to reveal the influence of alloying elements, such as chromium and nickel, at the composition of synthesized alloy.

Key words: metallothermy, synthesis, termite steels, properties, structure, alloyed steels.

Thermite steels, what alloyed by a nickel and chrome, distributions find more in different sectors of industry, first of all, in connection with the special properties, namely by high corrosive durability and dross durability, by satisfactory durability and plasticity, increased mechanical properties at a high temperature and satisfactory welding. In combination with advantages of metallothermic method the considerable prospects of the use of the high-overheated fusion for technologies of thermite synthesis appear.

Metallothermic methods allow to get fusion in default of sources of electric power, difficult equipment for the traditional melting of alloy and its pouring, without application of vacuum devices for realization of process of synthesis, providing a high productivity and speed of technological cycle.

The complex of tasks for cosummation perpuse of work consists of exposure by means of isothermal cuts of structure of thermite steel, alloyed by a nickel and chrome, establishment of influence of temperature on phase distribution and structure of triple Fe-Cr-Ni thermite alloy, research of mechanical properties and exposure of influence of temperature on mechanical properties of thermite alloy.

A powder-like charge for a synthesis was dried out at temperatures 150-180 °C, was mixed, and after it placed and made more compact in a metallothermic reactor [10] with diameter 80.0 mm with different percent correlation of components in mixture. For determination of mass of metallic bar and output of alloy from a charge, micromelting was executed. Initiation of process of burning was executed by the special igniter, made from titanic powder.

After a synthesis an alloy dissociated from a slag, estimating the structure of slag, and carried out control weighing and determined the sizes of output of alloy from a charge, and also investigated the synthesized bar.

With the increase of content of nickel in thermite steel there is diminishing of its marked inclihation to tempering together with diminishing of intensity of martensite transformations. Increase of content of nickel to 10-13 % results in creation in the

structure of stregth austenite. For all thermite alloys a microstructure which consists of monophase areas or mixed sosoloids α+γ. However in the separate areas of diagram Fe-Cr-Ni, except for the phases of ferrit and austenite, meets and it is educed σ-phase. Its especially considerable content is looked in thermite steels as X18H9 and X18H10T.

The increase of content of carbon in thermite steels gives to them greater durability ($\sigma_в$) and conditional boundary of fluidity at admittance on plastic deformation 0.2 % ($\sigma_{0,2}$). At the same time with the increase of content of carbon there is an increase of hardness and diminishing of shock viscidity of $\alpha_н$.

Heat treatment as normalization with heating to the temperature 1100 °C and cooling on air stabilizes a homogeneous austenite and gives to thermite steel of additional plasticity and increases corrosive durability

In future establishment of influence of nickel and chrome on position of martensite point in thermite steel it is set as research result. On the measure of increase of content of nickel in thermite steel the temperature of martensite point, as well as expected, diminishes. The increase of content of chrome similarly results in the substantial decline of point of beginning of martensite transformation.

It is marked, that in thermite steel X18H10 molybdenum by a quantity to 3 % not considerably diminishes corrosive durability in the aggressive environment of nitric acid. Decrease of content of carbon in thermite steel of the noted brand gives to it greater corrosive durability, assisting the increase of resistance to intercrystalline corrosion as a result of removal from the structure of carbidic and carbonitric connections, and increases plasticity and improves welding.

Research of influence of nickel and chrome on the structure of thermite steel allowed to show out formulas for the calculation of indemnification of the noted elements due to other alloying elements. Yes, for indemnification of alloying elements of nickel and chrome it is set, that their influence can be recover accordingly on the equivalents of nickel E_{Ni} and chrome E_{Cr}