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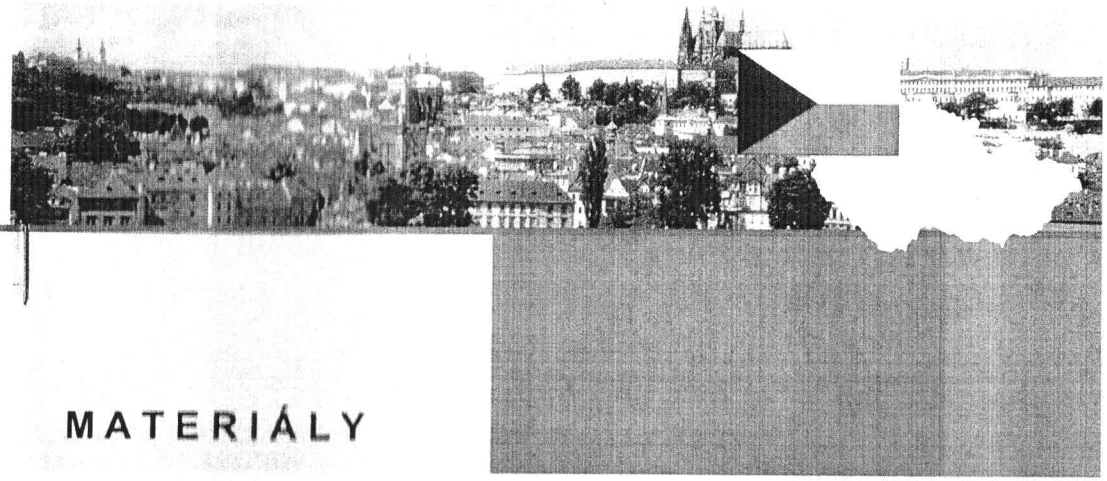

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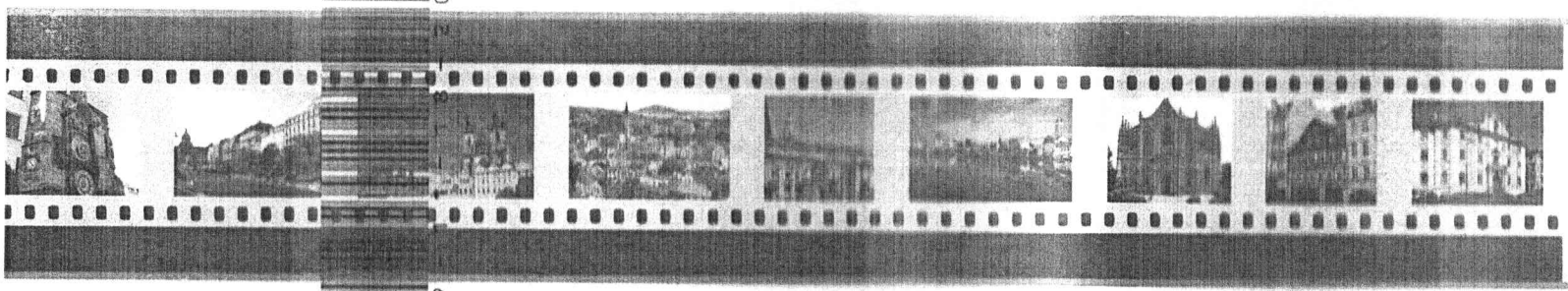

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THE THERMITE CASTING STAINLESS STEELS

Introduction. Now using in industry the chromium-nickel steels content a low nickel for the manufacture of products resistant to corrosion are used. Examples of such steels are the most common industrial grades "X22H5T", "X21H5T", "X21H6M2T", "H18H2Г8T", etc. We know that the phase ratio in steels of the dual austenitic-ferritic class depends on the chemical composition of the steel, on the heat treatment conditions, on the temperature pouring in the mold and can fluctuate in significant limits.

The metallothermic methods are developed for the synthesis of materials, which differ from industrial methods, first of all, by a number of advantages when applied in specialized conditions show many works [1-3]. This is give possibility to synthesize materials by high speed and productivity of the process, simplicity of technological introduction into industrial production of a certain chemical composition in the absence of powerful electric power sources, complex foundry equipment (furnaces and ladles) and apparatuses for chemical synthesis (autoclaves).

The purpose of the work. The main possibility of synthesis materials by metallothermic methods of stainless steels of austenitic-ferritic class, to reveal the features of their properties for subsequent use in the production of castings is established.

Materials and methods of conducting experiments. The essence of the metallothermic reactions consists in the reduction from the oxide of a metal with a higher chemical activity of a metal with less activity. Exothermic interaction of elements occurs in the case when as a result of the reaction oxides with higher thermodynamic stability are formed. The aluminothermic reduction of metals and alloys is significantly affected by the properties of the components contained in the metallothermic charge, their aggregate state, the relationship between the components,

the ignition circuits, etc. The mechanism of the aluminothermic interaction is mainly described in [1, 3].

Experimental research. The feature of the thermite steels of the double austenitic-ferritic class is the high value of the yield strength and strength, while maintaining plasticity and resistance to impact by impact. These termite steels can successfully replace industrial stainless high-alloy steels "X18H9T", "X18H10T", "X17H13M2T". This research is comparative of the corrosion resistance of thermite and industrial corrosion steels is shown in fig. 1.

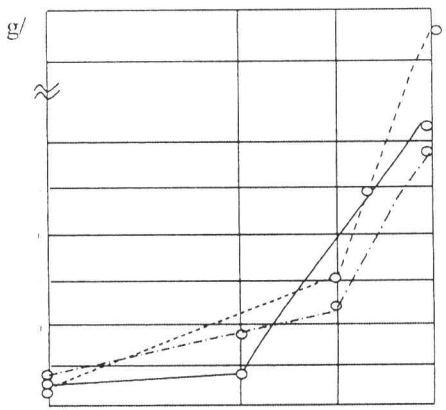

Fig. 1. Dependence of corrosion of termite steels on the action of nitric acid heated to 60°C during testing for 100 hours for a thermite analogue: 1 - "X18H9T"; 2 - "X22H5T", 3 - "X21H5T"

The stability was achieved by mechanical properties of thermite biphasic steels only with a clear observance of the chemical composition, because in them even deviations that are unimportant for steels of other classes lead to a significant change in the phase composition. This influence is especially felt when the content of alloying elements such as *Ni* and *Ti* changes in steel. The experimental work was conducted on the study of thermite two-phase stainless steels of austenitic-ferritic grade, their tendency to embrittlement at 350 to 700°C was observed.

These thermal stainless steels improved their technological properties in direct proportion to the temperature of steel heating during plastic deformation, which is

associated with an increase in the ferrite content in the structure to 90% (by volume) at 800°C (for example, for the thermite steel "X18Г8H2T"). This is improvement in technological properties is limited by the possibility of structural changes in steel. In addition, high temperatures lead to an increase in the grain score and, as a consequence, to a decrease in plasticity in the range of 350-700°C.

Conclusions. 1. Authors has been established that the metallothermic method can be successfully used for the production of thermite two-phase stainless steels of austenitic-ferritic grade. 2. The research has revealed mechanical properties of thermit steels, analogs of industrial grades "X22H5T", "X21H5T", "H18H2Г8T", namely, an, $\sigma_в$, $\sigma_{0,2}$, δ, have been revealed and their variation has been studied depending on the nickel content in the alloy. 3. The increased in the nickel content leads to an increase in the toughness of the alloy, and this is most likely due not only to an increase in the content of doped ferrite and austenite, but also to an increase in the volume of the doped austenite phase.

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