

## PERSPECTIVE MATERIALS AND TECHNOLOGIES FOR INDUSTRY

Creation of alloys on the basis of combined processes makes it possible to synthesize cast alloys, which are being obtained now by other technologies. The investigation of the properties and structures of such alloys is a primary task that will allow detecting strictly the field of their application. At the same time non-ordinary method of obtaining the alloys leads to creation of materials with features different from obtained by industrial methods.

The given thesis is denoted the development scientific bases shaping phase and structured condition of cast alloys with improved official and technological characteristics and development on their base of competitive technologies of their syntheses by way dedicated to investigating of alloys synthesized by metallothermy and by selfpropagating high-temperature synthesis (SHS); to making up of theoretical principles of synthesis, to establishing of connection between the structure of fluid state of cast iron with the characteristics of metallothermic burden and to putting of synthesized materials into practice of cast industry.

Theoretical calculations of burden compositions are founded on establishing the dependence between component activities in systems from the third while using Hillert equation [1]. The usage of Screinemaker coordinates instead of ordinary coordinates for geometric interpretation of the equations gives a unique possibility to simplify and solve them with the reduction of quantity of approximations only to two, both of which are being fully confirmed in most of the cases in concrete examples of calculating of  $Fe-C-Si$  and  $Fe-C-S$  systems.

Different carbon iron thermite alloys the analogues of industrial alloys, their mechanical and service features, chemical composition are investigated in the article, and the composition of metallothermic burden and the regimes of heat treatment are optimized. Synthesized thermite steels (carbon, spring, stainless, scale and high-manganese and bearing), special cast irons (white and grey, high-temperature thermite and high-duty) where under investigation, besides synthesized tool materials has been investigated: tool thermite carbon steels, high-speed steels, alloyed hard wolfram-cobalt alloys and carbide steels. Microstructures of above mentioned alloys have been analysed, mechanical, and technological and service features [2-4].

The investigations allowed detecting the peculiarities of these materials, in the first turn, heightened viscosity (connected, obviously, with deoxidization by aluminium which is in the composition of the burden), as well as fine-grained structure.

While using high-overheated alloys for heating of metallothermic addition of large cast iron mouldings and high-alloy steels in serial and mass production improved method of burden calculating has been proposed. Synthesized high-overheated iron-carbon alloys are fit to thermite welding of blanks and instrumental alloys-for metallurgic welding together of instrumental plates to the base of the tool.

Colour thermite metals (bronze and brass) are also investigated in the theses, the usage of thermite color alloys for improvement of feeding of bronze mouldings on fluid metal. Experimental investigations on layout in strengthening of cast iron mouldings by exothermic doping mixtures as well as the results of modifying within the inner cavity of the form have been analysed [1].

Foundry thermite alloys are used limitedly in machine-building though the given method may due to some preferences give an essential economical and technical effect in solving of separate tasks in heavy branches of techniques. First of all it is high speed of burning process and simultaneously of technological melding the absence of necessity of complex technological equipment (foundry furnaces, autoclave with temperature control, pressure and composition of medium); the absence of necessity of huge courses of electrical energy (thermite methods of melding demand energy only for initiating of the reaction), universality of the method. Besides, the given methods permit to use waste materials of metallurgical thermic and metal cutting industries (iron scale, grist of aluminium and manganese chip, grist of waste materials of graphite electrodes, riddling of alloying composition, modifiers, dust out of the filters in metallurgical industry, etc). It's worth noting that this methods become economically useful while it is necessary: to obtain cast blanks of spare parts urgently under conditions for away from industrial centres, making of blanks of conditions of experimental production; besides exothermic mixtures made for methods mentioned above may be applied for technology of exothermic founding editions of high temperature gradient which allow not only to economize fluid metal but to improve metal properties of subadditional zone (in the first turn mechanical) and to improve microstructure with modifiers the help of microdoping by aluminium and alloying composition.

#### **Literature**

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### **ОСОБЛИВОСТІ РЕГІОНАЛЬНОЇ ЛОГІСТИКИ**

В період реформування економіки України та економічних відносин держави з країнами сусідніх держав важливим кроком є налагодження



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