

### What, where, when, who, to whom, how many, what for?

1. **B.L. Bobryshev, V.S. Moiseev, A.P. Bevz, D.V. Popkov, O.V. Koshelev, D.B. Bobryshev.** Energy-saving technology for casting of large-dimensional magnesium castings in cogil

The possibility of creating an automated installation for the controlled heating of molds of chill molds during the casting of large-size, long-length castings of magnesium alloys has been studied. The advantage of using infrared burners, which provide a given temperature gradient along the height of the chill mold, while reducing gas consumption for heating and improving working conditions in the foundry, is shown.

**Keywords:** chill mold, controlled heating, temperature gradient, flare burners, infrared burners, combustion mode.

2. **F.G. Lovshenko, I.A. Lozikov, A.E. Lipski** Production, structure and properties of mechanically alloyed heat-resistant aluminum materials based on the system «aluminum—boron»

The work presents the production process, composition, structure and properties of mechanically alloyed heat-resistant composite materials based on the aluminum-boron system, which have a low density and a high value of the effective thermal neutron capture cross-section.

**Keywords:** production technology, "aluminum-boron" system, heat-resistant aluminum materials

3. **V.A. Kukareko, A.N. Grigorich, E.I. Marukovich, I.O. Sazonenko, V.A. Kharkov** Production of small-cast copper alloys casting

The structure and properties of copper — iron and copper — tin — phosphorus alloys are investigated. It was shown that bronze alloyed with Sn and P is characterized by a relatively high hardness and yield compression.

**Keywords:** Structure, bronze, copper, tin, iron. strength in comparison with bronze Cu—Fe. Keywords: structure, bronze, copper, tin, iron.

4. **V.G. Shcherbakov** Microhardness testing of diffusively-alloyed copper-zinc alloys

The work reveals the results of microhardness testing of diffusion zinc layers formed on a copper fiber using a diffusion method in a movable saturating powder medium.

**Keywords:** sherardizing, copper fiber, microhardness.

5. **V.Yu. Stetsenko, K.N. Baranov, A.P. Gutev** Use of jet crystallizer vibration to improve the quality of silumin castings

The influence of jet crystallizer vibration to the quality of castings from silumin AK18 is investigated. It is shown that the vibration of the jet crystallizer in the horizontal plane allows to eliminate the gas-shrink porosity, grind the microstructure and significantly improve the quality of the outer surface of the castings.

**Keywords:** jet crystallizer, vibration, silumin, microstructure, casting, modification.

6. **B.M. Nemenenok, A.G. Slutsky, V.A. Sheinert, I.B. Salenko** Investigation of options for the use of vanadium-containing waste for alloying iron-carbon alloys

Expansion of production volumes of qualitative castings from iron-carbon alloys is actual nowadays. The alloying process is widely used for these purposes practically, which allow due to the impact on the microstructure of the alloy to significantly improve the mechanical and operational characteristics of the material. The alloying additives are commonly used in various ferro-alloys and alloys supplied to Belarus via imports. Promising is the use of waste containing alloying elements. Their use makes it possible to carry out economical alloying of cast alloys, as well as to dispose of waste. The purpose of this research is to study the options for the use of vanadium-containing waste in the production of alloyed iron-carbon casting alloys. Б.М. Немененок, А.Г. Слущкий, В.А. Шейнерт, И.Б. Саленко Белорусский национальный технический университет, Беларусь Исследование вариантов применения ванадийсодержащих отходов для легирования железоуглеродистых сплавов Waste in the form of slag metal fraction and shot cleaning of heating surfaces of boilers of thermal power plants of the Republic of Belarus were chosen as the object of study. Studies have shown that these wastes contain vanadium in the oxide phase and for its extraction it is necessary to conduct a reduction melting. On the basis of thermodynamic analysis it was found that the most basic option of extracting vanadium from waste is the recovery aluminothermic smelting alloys and alloying through the slag phase.

**Keywords:** vanadium-containing wastes, chemical composition, thermodynamic analysis, recovery options, lab cast iron smelts.

7. **L.V. Tribushevskiy, B.M. Nemenenok, G.A. Rumiantseva** Fluxless melting of aluminum waste — the way to nonwaste technology

The influence of technology of aluminum waste melting in a short-rotary furnace (SRF) on the amount and composition of dust and gas emissions is analyzed. Based on the results of the chemical analysis of dust, a solution was adopted for the fluxless melting of aluminum waste. In this case, the proportion of chlorine-containing compounds is 1.4% at 75% of aluminum oxides, which makes it possible to use the formed dust to produce a deoxidizing mixture or thinner of refiner slag. On the basis of balance meltings it is shown that with fluxless melting of aluminum waste, a waste-free processing technology is realized, ensuring ecological and economic effects.

**Keywords:** aluminum waste, dust, aluminum oxide, nonwaste technology.

8. **V.A. Kalinichenko, A.A. Andrushevich** Technological approaches for creation of copper based cast composite materials

The paper presents the technological approaches to the development of cast composite materials with macroheterogeneous structure for operation for heavy operating conditions. A number of features of the process of formation of a solution — diffusion compound from a solid — liquid phase are considered. The importance of studying the features of the formation of the structure of the phase interface surface, its dependence on the processes of phase interaction and solidification to control the process of obtaining composite materials with specified properties is indicated. The paper analyzes the vertical and horizontal forms for the synthesis of cast composite materials, and the production of nonwaste casting of composite materials based on bronze КМЦ3-1 with reinforcing component cast iron shot. Estimated occupancy rates of different types of forms and methods to reduce scrap when the casting composites.

**Keywords:** composite materials, copper-based alloys, macro heterogeneous structure, wear resistance

**Illarionov Ilya Egorovich (to the 80th anniversary of birth)**