1. **D.A. Boldyrev, S.V. Davydov, L.I. Popova, S.G. Prasolov** Hybrid cast iron with spherical and vermicular graphite for medium-loaded car parts

Analysis of theoretical and experimental information shows that ductile iron with spheroidal and vermicular graphite in its mechanical properties takes a place between compacted graphite iron and ductile iron. In terms of strength properties, high-strength cast iron with spheroidal and vermicular graphite corresponds to cast iron with vermicular graphite, and in terms of plastic properties — ductile iron. A wider range of mechanical properties of ductile and vermicular graphite iron can be obtained by varying the microstructure of the ratio of pearlite and ferrite and nodular and vermicular graphite.

Keywords: malleable cast iron, nodular and vermicular graphite cast iron, mechanical properties.

2. **V.I. Nikitin, K.V. Nikitin** On the development of the phenomenon of structural heredity in alloys

For the first time, the analysis of works in the field of the Phenomenon of Structural Heredity (PhSH) and Genetic Engineering Technologies (GET), presented in the materials of seminars and conferences in the period of 1980—2018 years was carried out. The main achievements in the development of PhSH and GET are presented. It is shown, that the work in this direction should be attributed to the category of high («smart») technologies of the XXI century.

Keywords: aluminum alloys, the phenomenon of structural heredity, genetic engineering technologies, the results of research in the field of PhSH and GET.

3. **A.A. Kharchenko, V.F. Shevyakov, V.A. Korovin, K.A. Maslov, S.V. Belyaev** Improving the technologyfor producing steel mills

The molds are necessary to obtain ingots. High requirements are applied to the ladders as to the cast metal mold. It must withstand high temperature, pressure, pressure transformations on the part of the ingot and a large number of fillings. This paper presents a method for producing ladles made of steel with additional processing in a bucket.

Keywords: melting point, steel, mold

4. **O.A. Rusevich, S.L. Rovin** Investigation of the eff ect of vacuum on the curing of mixtures on a silicate binder

The article presents the results of a study of the effect of vacuuming on the curing processes of liquid-glass mixtures. The method of conducting experiments using an original laboratory vacuum installation and the mechanisms of curing a liquid-glass mixture with various hardening methods are described. Studies have shown that vacuuming can significantly accelerate the curing and increase the strength of the mixture while reducing the content of the silicate binder. This, in turn, facilitates the knockability of liquid-glass mixtures and expands the prospects for using these environmental friendly mixtures in foundry as an alternative to sands based on organic binders.

Keywords: liquid-glass binder, vacuum, curing, strength, knockability, molding and core sand.

5. **M.A. Ivanov, M.D. Popov, N.E. Beleninov** Crack resistance of T-shaped samples when casting steel

The work is devoted to the study of the formation of hot cracks for various structures of T-shaped samples under conditions of rigid fixing of the edges of the casting. In this case, shrinkage of the long

cold edges of the piece increases the deformation rate in its center. The article presents calculations of crack resistance of samples according to the methodology developed by the authors, which are in good agreement with the experiment results. It is shown that the temperature difference in the casting cross-section, which depends on its configuration and dimensions, has a significant influence. The temperature difference between the center of the T-shaped sample and its edges was more significant due to the casting configuration. In these cases detected hot cracks. In this sample, negative factors are both an increase in the cross-section in the middle part and a decrease in the crosssection of long casting elements, which increase the localization of deformation. It is recommended to compare several variants of casting technology and casting design when using the technique. Also, when assessing the crack resistance of the casting area, the shrinkage shape should be evaluated. The presence of shrinkage in the crack propagation path contributes to its growth.

Keywords: crack resistance, steel, T-shaped sample, shrinkage.

6. **V.S. Bukhtienko** Integrated solutions in the fi eld of high-pressure casting YIZUMI PRECISION MACHINERY for the Russian market

The article provides a brief history of the development of Yizumi Precision Machinery Co. Ltd and currently manufacturing modern injection molding machines. For the full-fledged work of the Russian representative office, two spare parts warehouses are in the process of being formed in the city of Yegoryevsk, Moscow region and in the city of Naberezhnye Chelny.

Keywords: injection molding, pressing chamber, locking force.

7. **P.A. Vitiaz, N.A. Svidunovich, D.V. Kuis, Yu. A. Nikalaichyk, S.L. Rovin** Ullerenes and prospects of their use in foundry and metallurgical production

The article is devoted to a special nanostructured form of carbon — fullerenes, the discovery of which became one of the most important events in the field of physics in the 80s of the last century. The article discusses the issues of obtaining and using fullerenes and other nanostructured materials, including hybrid ones, in foundry and metallurgical production: for modifying casting alloys, binders and auxiliary molding materials, for obtaining ceramic and hybrid nanocomposites, and for other purposes. It also provides information on the creation and operation of the world's leading research centers specializing in the synthesis and application of nanomaterials in metallurgy and foundry.

Keywords: fullerenes, nanomaterials, foundry alloys, composites, modification, hybrid materials.