

1. **R.K. Mysik, S.V. Brusnitsyn, A.V. Sulitsin, I.A. Sokolov, I.A. Gruzdeva, A.A. Grechuk, V.V. Morgunov, G.Yu. Savin.** Study of cast and deformed workpieces from low alloyed alloys of the Cu-Sn system

The effect of tin and copper content on the hardness and strength characteristics of alloys is investigated. It was found that an increase in the tin content in copper leads to an increase in the hardness of both cast and deformed billets. It is shown that when the content of tin in the alloy is 0.2...0.4 wt. % provides the highest values of strength characteristics for a deformed billet with a diameter of 20 mm and low-alloy tin bronzes can be used to produce a contact wire for electrified railways.

Keywords: Tin, copper, bronze, contact wire, hardness, strength

2. **I.Yu. Mukhina, V.A. Duyunova, B.L. Bobryshev, A.A. Leonov, A.S. Rostovtseva.** High purity foundry magnesium alloys and modern casting technology from them

The development of new technological processes of flux-free melting is aimed at improving the quality of cast magnesium alloys, improving their purity and corrosion resistance; application of the Resol-CO2 process and additive technologies for the manufacture of molds from HTS. The article considers the properties of corrosion-resistant cast magnesium alloys and possible ways to increase their purity. Smelted using new technologies, VML18 alloy surpasses all existing magnesium-based alloys in corrosion resistance, including the AZ91M alloy and is recommended for working in all climatic conditions. The use of alloy in products will reduce the content of liquidation non-metallic inclusions, increase reliability and service life by increasing the specific strength and corrosion resistance.

Keywords: magnesium alloys, microstructure, impurities, corrosion resistance, XTS molds

3. **E.S. Gayntseva, A.S. Goryukhin, A.O. Demyonok, R.R. Ganiev, B.A. Kulakov.** Calculation and determination of sedimentation properties of the rod compositions used in the molding of GTE blades.

The paper discusses the main defects of ceramic rods used for casting GTE blades, occurring during the pressing process, and after roasting the rods due to the low sedimentation stability of the core composition. Also, a methodology for assessing the sedimentation properties of rod compositions was considered, based on which a method was developed for calculating and constructing a theoretical sedimentation curve. An experiment has been conducted to determine the change in the fractional composition of the core mixture in the core machine tank over time, confirming the theoretical characteristics obtained using the computer program.

Keywords: ceramic core, ceramic core mixture, sedimentation, sedimentation rate, theoretical sedimentation curve, drag coefficient, monodisperse system, polydisperse system, Stokes law, fraction.

4. **Yu.N. Loginov, G.V. Shimov, S.I. Stepanov, A.S. Khvalko.** Hardness heterogeneity of copper wire obtained by the UPCAST method.

Microstructure and microhardness of the copper wire obtained by the UPCAST method were studied. The microhardness distribution was investigated on longitudinal and transverse sections of wire rods with a diameter of 16 and 8 mm. It was revealed that the production of cast wire can be accompanied by plastic deformation of the surface layers. The surface layers of the cast wire rod have higher hardnesses than the central ones. The difference in microhardness of 17% was revealed for a cast wire rod with a diameter of 16 mm. The revealed hardening of the surface layers can cause a decrease in elongation.

Keywords: copper wire casting, microhardness, metallography, anisotropy.

5. **M.M. Scriabina, D.A. Boldyrev.** CHVG for medium-loaded housing car parts

For parts «carter of the rear axle gearbox» and «rear axle differential bearing cover», type CVG40, a chemical composition has been developed for, requirements for mechanical properties and microstructure: the chemical composition is proposed on the basis of the base (furnace) chemical composition of VCh50 cast iron, requirements for temporary resistance and the relative elongations are similar to the ChVG40 grade, to the Brinell hardness of the VCh50 grade, new requirements are developed to the microstructure.

Keywords: cast iron with vermicular graphite, malleable cast iron, carter of the rear axle gearbox, rear axle differential bearing cover, mechanical properties.

6. **K.G. Semenov.** Based alloys on the basis copper

Modern engineering technologies provide for the development of copper-based alloys that combine highthermophysical and mechanical properties. Low-alloycopper-based alloys are the most important materialsfor creating products of modern technology. The work analyzes the ultimate solubility of alloying elements in copper. It is noted that low-alloy alloys of copper and iron are a promising alloy.

Keywords: technologies, solubility, alloying, standards,copper, iron, phosphorus, electrical conductivity, thermalconductivity.