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Abstract:

**“Formation the gradient structure and selected properties in high  
-chromium cast iron”**

The subject of the doctoral dissertation are theoretical considerations, laboratory and industrial research related to the technology of producing high-chromium cast iron. The investigation focus on the crystallization process of high-chromium cast iron with different chemical composition and evaluation of its mechanical, technological and special properties. The aim of the work was to optimize the manufacturing process and inoculation of high-chromium cast iron. The work presents the method of crystallization of high-chromium cast iron. Research has been carried out on the possibilities of controlling the type of crystallization through the selection of optimal pouring temperature and the different method of inoculation. Many different inoculators, which were developed as part of the work, have been tested. The modern EBSD method (Electron Backscatter Diffraction Analysis) was used to assess the mechanism of crystallization, identification of primary grains and primary structure formation in high-chromium cast iron. The study of mechanical properties concerned in particular on assessment of filling the mold, bending strength, hardness, impact resistance, resistance to hot cracking, abrasion resistance. An important element of the thesis was research related to the design and shaping of the surface layer in the castings with an increased resistance to abrasive wear.