Project name: Development of technology for obtaining Bi-HTSC ceramics with high critical parameters

Relevance: Due to their unique electrophysical properties (conductive, diamagnetic, etc.), high-temperature superconductors are one of the most promising materials used in advanced areas of science and technology - energy, electronics, medicine, communications, instrumentation and many others. Also,others and the scope are expanding. They are widely used in high-current technology. In the leading industrially developed countries (USA, Japan, European Union countries, etc.), intensive research is being carried out in the field of creating high-current equipment for ground and autonomous energy, advanced transport and aerospace systems, etc. Although HTSC materials are already used in various fields, problems widespread use are limited with its cost, the complexity of technological performance and the values of critical parameters. The relevance of this work lies in the development of an effective technology for producing ceramics with high critical parameters (Tc, Jc).

Purpose: Development of technology and optimization of the modes of obtaining Bi-HTSC ceramics with a high critical temperature and with an increased critical current density.

Expected and achieved results: The technology of obtaining highly active amorphous source materials-precursors of $Bi_{1.7}Pb_{0.3}Sr_2Ca_{n-1}Cu_nO_y$ (n = 2, 3) compounds will be developed for use as a raw material for the production of raw materials. There will be synthesized high-textured models with increased density of Bi-HTSC with nanodisperse inclusions. Bi-HTSC materials will be synthesized (with the addition of dimensional materials-precursors) and with pinning centers with the content of vaporizing and magnetic nanodisperse phases, leading to an increase in critical current. There will be developed and optimized technological modes of synthesis of ceramic samples Bi-HTSC with increased critical current density. Developed devices and technologies for the output of precursors of HTSC. Synthesized HTSC connections and studied the kinetics and dynamics of HTSCphase formation. Synthesized HTSC ceramics with nanodisperse inclusions.

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Information for potential users: Target consumers can be: enterprises engaged in the production of electrical appliances and products based on HTSC. The results can be used also for the synthesis of oxide materials with special electrical properties for different purposes - ferroelectrics, piezoelectrics, superconductors, thermocouples, ferromagnets, tver. with advanced electrophysical properties, which are widely used in various fields of industry, science and technology.