

ABSTRACT

The work contains 93 p., 32 fig., 11 tabl., 62 references.

The object of research in work is the influence of physical and technological processes on the improvement of the structure of composite diamond-containing materials, which contribute to increasing their physical and mechanical properties and wear resistance of the rock-cutting tool, the creation of new technologies for the production of composite materials and products based on them.

The purpose of the work is to create a polycrystalline composite material of high hardness and high thermal stability with a hybrid diamond base in the form of breeding elements, on the basis of which a new breed cutting tool of cutting type will be developed, wear resistance which will be increased in 1,5-2,0 times in comparison with existing types tool for drilling wells in rocks of moderate dynamic strength.

Research methods and equipment: the study of the structure of composite material with a diamond basis by means of physical research methods (ultrasound, Raman and I spectroscopy, electron microscopy, etc.), determination of its physical and mechanical properties (hardness, crack resistance, thermal stability).

The experimental batches of high-hardness polycrystalline composite material and high thermostability with a hybrid diamond base for the equipment of a rock-cutting tool and conducting of examinations of its various structures during drilling of temperate rocks

The research of about the development of optimal regimes for the manufacture of rock-cutting elements and the instrument was carried out. Investigation of physical and mechanical properties of matrix materials on the basis of polycomponent powder mixtures impregnated with a metal bond. Development of the design of drill crowns for the production of experimental batches of the rock-cutting tool, conducting experimental studies of its wear resistance and industrial testing of its efficiency of use.

Keywords: HIGH-TEMPERATURE ALLOYS, ZONE MELTING,
MICROSTRUCTURE, PHASE COMPOSITION, MICROHARDNESS,
FRACTURE TOUGHNESS, CREEP SPEED, RESISTANCE TO OXIDATION.