Influence of a real surface on physical-mechanical properties of polycrystalline β-rhombohedral boron. / M. Darchiashvili , O. Tsagareishvili , I. Kurashvili , A. Sichinava , I. Tabatadze, L. Chkhartishvili, G. Darsavelidze. / Nano Studies. – 2015. – # 12.– pp. 105-114.– eng.

The microstructure, dynamic Vickers microhardness and indentation modulus,temperature dependences of electrical resistivity, thermal expansion and shear modulus of β-rhombohedral boron obtained by melting in boron nitride crucibles have been investigated. In the boron microstructure, the coarse-crystalline state with a wide range of the grains sizes (0.5 – 500 μm) has been revealed. In internal structure of grains the swirl-defects, individual growing twins and accumulation of thin twins have been found. Tendency to increase dynamic microhardness and indentation modulus with improve polishing degree of the sample surface has been revealed as well. It is shown that, dynamic shear modulus measured by torsion oscillations frequencies registration method practically doesn't depend on the polishing degree. The deviation from linear temperature dependence of resistivity, relative elongation, and dynamical shear modulus in temperature interval of 200 – 600 °C with heating rates 1 – 5 °C / min have been detected. Contributions of various superficial and volume defects and local distortions of interatomic bonds in physical-mechanical properties of boron crystals are discussed. Fig. 7, Tab. 2, Ref. 17.

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