

CPPP 49 P THE OCCURRENCE OF THE CLASSIC SIZE EFFECT IN SINGLE CRYSTAL BISMUTH FILMS

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We publish the results of the studying the galvanomagnetic and thermoelectric properties of monocrystalline bismuth films, produced by the method of floating-zone refining under cover on mica base (substrate).

The method is developed for reception of monocrystal films of bismuth zone recrystallization under a covering.; the essence of this method consists in the following: on a substrate evaporation a film of bismuth of a necessary configuration, then it becomes covered by a vacuum dusting by a protective layer from soluble substance in water. Thus, the bismuth film appears as though in the container. The turned out preparation is located in installation for zone recrystallization of films where there is a cultivation of a film monocrystal.

The sheeting first of all prevents tightening of the fused film in drops. It is its basic function. The protective layer should keep the integrity in the course of recrystallization, not decrepitate. Besides, the covering should have structure which would not promote occurrence of the centres of crystallisation from a protective layer surface. As a sheeting have been tested NaCl, BaCl₂, KCl, KBr. The best results are received with use of a covering from KBr. Zone recrystallization of films of bismuth was made in the environment of argon.

The results received for mobility of carriers of a charge in monocrystal films, provide possibility of division of contributions of a surface and defects of structure in restriction of mobility of carriers of a charge in texturing of polycrystalline, not subjected zone recrystallization bismuth films.

The regularities of occurrence of the classic size effect in monocrystalline films are developed. The contribution of the surface on limiting electrons' and holes' mobilities in the studied bismuth films is determined.

The developed approach to research of the phenomena of carrying over in monocrystal and texturing of bismuth films can be applied and to films on the basis of other metals and semiconductors. Owing to more perfect structure and higher values of mobility of carriers of a charge monocrystal films possess a number of advantages at their practical application.