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Short Notes

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Anisotropy of Thermomagnetic Effects in $\text{Pb}_{1-x}\text{Sn}_x\text{Te}$

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According to the current band model of PbTe and its alloys with SnTe (1), the absolute extrema of conduction and valence bands at low and intermediate temperatures are localized at L points of the Brillouin zone. The isoenergetic surfaces corresponding to these extrema present figures of revolution close to ellipsoids prolate along the [111] directions. As it has been stated in (2) the complexity of the energy spectrum of charge carriers in alloys under consideration in the general case may lead to the appearance of a considerable anisotropy of transport phenomena.

The results on the anisotropy of thermomagnetic effects in magnetic fields up to 3 T for a series of p-type samples with $x = 0.18$ ($p = 10^{17}$ to 10^{18} cm^{-3}) at temperatures from 100 to 116 °K are presented below. The angular diagram for the transverse magnetic field, the longitudinal-transverse diagrams and magnetic field dependences were studied along the general crystallographic directions.

The angular diagrams of the transverse magneto-thermo-e.m.f. and transverse Nernst-Ettingshausen effect (TNEE) ($\nabla_{\vec{r}} T \parallel [100]$, $\vec{B} \perp [100]$) are shown in Fig. 1 for different values of the magnetic field. As it is clear from the figure, according to the symmetry requirements (2), the period of variations is equal to 90° . The angular diagrams for the case when the temperature gradient is directed along the [100] axis with the magnetic field rotating in the (001) plane (longitudinal-transverse diagrams) are presented in Fig. 2. It is seen that in this case only the 180° period is well pronounced.