

ELECTRICAL PROPERTIES OF In_2Se_3
INTERCALATED LAYERED CRYSTALS

*V.B. Boledzyuk, A.V. Zasloukin, Z.D. Kovalyuk,
M.M. Pyrlyta*

Institute of Problems of Materials Science,
Nat. Acad. of Sci. of Ukraine, Chernivtsi Division
(5, I. Vil'de Str., Chernivtsi 58001, Ukraine;
e-mail: chimsp@ukrpost.ua)

S u m m a r y

The anisotropy and the electrical properties of In_2Se_3 layered crystals and their lithium and hydrogen intercalates are studied in the temperature range 80÷400 K. It is established that, with increase in the temperature, the electrical conduction and the mobility along layers decrease, whereas the free electron concentration remains practically invariable. The obtained temperature dependence of the electron mobility is explained by the interaction of electrons with homopolar optical phonons. A change of the electrical conduction of hydrogenated In_2Se_3 crystals depending on the annealing time is due to the formation of new levels in the forbidden band and the effect of intercalated hydrogen on the deformation potential of a crystal. The established decrease of the anisotropy for the $\text{Li}_{1.5}\text{In}_2\text{Se}_3$ intercalate as compared with that of In_2Se_3 in the temperature interval 250÷400 K is caused by the prevailing reduction of the electrical conduction normally to layers over a slight decrease of the conduction in parallel to them.