SUMMARY

The study of Physical properties of amorphous semiconductors has become an active field in solid state Physics over the last decade. In perticular, the nature of electronic transport in these materials has attracted much attention during recent year.

When low electric field is applied to multicomponent chalcogenide glasses, the current is ohmic and material is in an almost nonconductive state. The resistivity of the material lies typically in the range $10^8 - 10^{10}\Omega cm$ at room temperature. It is found that samples, Se-Te-Sb and Sb-Se-Cu resistivity lies in the same range as stated above at room temperature. In these series the study of I-V curves are symmetric in nature. Both the samples Se-Te-Sb and Sb-Se-Cu are highly resistive materials because current obtained in these series in (μA) in nature.

The dc conductivity of most of these glasses near room temperature obeys the relation σ= C exp.(-E/KT). Figure (3.11) and (3.26) shows some typical plots of lnσ against 1/T for chalcogenides with E_{σ}^{*} varying from about 0.3 eV to more than 1 eV.

The variation of C and E_{σ}^{*} in various ternary systems as a function of composition are of interest.

Because of the difficulty of measuring the electric conductivity of selenium over a wide temperature range, it is difficult to determine E_{σ}^{*} and C in this and other high resistivity materials with any confidence.

In the first series Se-Te-Sb the electrical conductivity increases with increasing Sb concentration up to 7% but in the $Se_{70} Te_{21} Sb_{9}$, the conductivity decreases. This type of behaviour may be due to phase transition of material.

However, in the second series Sb-Se-Cu it is observed that electrical conductivity decreases with increasing concentration of copper.

The thermoelectric powers of chalcogenide glasses are normaly positive, with values consistent with the idea of a Fermi-energy near the centre of the gap but nearer to the mobility edge in the valence band. In those materials for which measurements have been made as a function of temperature. The difference in activation energy, calculated from the conductivity and thermo-electric power measurement, i.e. $E_Q = 0.1$ eV. This is in good agreement with the reported values by Overhof and Beyer, for chalcogenide glasses.

There must be some structural differances between the same material prepared by different methods and care is obviously necessary in any comparison of properties.