

A study of electrical properties of degenerate GaAs

We have studied a degenerate GaAs sample grown by MBE, in order to understand some of its important electrical properties. The sample was prepared at the Department of physics, Chalmers University, Sweden. Our primary objectives were to determine the lifetime, mobility of the carriers and the position of the Fermi energy level of the material. In addition, measurements on conductivity type, doping concentration and resistivity variation of temperature in the measurements were carried out using *Van Der Pauw* method

It was found that resistivity increased with temperature. The relaxation time due to ionized impurity scattering and hall-mobility were found to be 3.24×10^{-13} s and $2.20 \times 10^3 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$, respectively. The estimated position of the Fermi level above the bottom of the conduction band was found to be 76 meV. All these experimental observations lead to the conclusion that degenerate GaAs material shows metallic behaviour in its electrical properties.