

Electrical conduction of Semiconductor

Experiments

- Experiment: Experimental setup for studying electrical conduction in semiconductors and determination of band-gap energy of germanium.

Technical Specifications:

- The setup is designed to demonstrate temperature-dependent electrical conductivity of semiconductor material and determination of the energy band gap of germanium. The setup includes undoped/pure germanium semiconductor specimen mounted on a suitable printed circuit board (PCB).
- The semiconductor specimen permits measurement of its electrical conductivity/resistance as a function of temperature.
- The setup includes a Hall-effect basic apparatus / semiconductor measurement unit suitable for mounting and electrical connection of the germanium specimen.
- A transformer with integrated rectifier is provided, having selectable output voltages of approximately 3 V, 6 V, 9 V and 12 V DC/AC, with output current capability of approximately 3 A. The system is suitable for operation from 230 V AC, 50/60 Hz mains supply. A digital multimeter is supplied for measurement of voltage/current/resistance as required for the experiment.
- The multimeter is suitable for laboratory measurement of the electrical parameters of the semiconductor specimen.
- The system includes a suitable weighted/base support for stable mounting of the experimental apparatus.
- Suitable safety experiment leads, approximately 75 cm length, is supplied for making electrical connections.
- The supplied leads include appropriately colour-coded leads, including red/blue safety leads. The apparatus permits measurement of the voltage drop across the germanium specimen at controlled/constant current while varying temperature.
- The system allows determination of the temperature dependence of conductivity of intrinsic/undoped germanium.
- The experimental data enables determination of the energy gap/band separation between the valence and conduction bands of germanium.
- The setup is supplied as a complete working experimental system, including all basic components, accessories, interconnecting leads and necessary hardware required to perform the stated experiment.