

**Semiconductors**

It has been observed that certain materials like germanium, silicon etc. have resistivity between good conductors like copper and insulators like glass. These materials are known as semiconductors. A material which has resistivity between conductors and insulators is known as semiconductor. The resistivity of a semiconductor lie approximately between  $10^{-2}$  and  $10^4 \Omega \text{ m}$  at room temperature. The resistance of a semiconductor decreases with increase in temperature over a particular temperature range. This behaviour is contrary to that of a metallic conductor for which the resistance increases with increase in temperature.

The elements that are classified as semiconductors are Si, Ge, In, etc. Germanium and silicon are most widely used as semiconductors.

| Insulator                         | Semiconductor                          | Conductor                       |
|-----------------------------------|--|---------------------------------|
| $10^{12} \Omega\text{-cm}$ (mica) | $50\Omega\text{-cm}$ (Ge)              | $10^{-6} \Omega\text{-cm}$ (Cu) |
|                                   | $50 \times 10^3 \Omega\text{-cm}$ (Si) |                                 |

Typical resistivity values

**Semiconductor Types**