

## Answer on Question #47220, Physics, Atomic Physics

### Task:

What is the difference between an intrinsic and extrinsic semiconductor material? What is doping?

### Answer:

Intrinsic semiconductor is an un-doped semiconductor, in which there is no impurities added where as extrinsic semiconductor is a doped semiconductor, which has impurities in it.

Doping is a process, involving adding dopant atoms to the intrinsic semiconductor, thereby gives different electrical characteristics.

Intrinsic semiconductors:

- Intrinsic semiconductors are the crystals of pure elements like germanium and silicon.
- 2. In intrinsic semiconductor, the number density of electrons is equal to the number density of holes. i.e.,  $n_e = n_h$ .
- The electrical conductivity of intrinsic semiconductors is low.
- The electrical conductivity of intrinsic semiconductors mainly depends on their temperatures.

Extrinsic semiconductors:

- When some impurity is added in the intrinsic semiconductor, we get an extrinsic semiconductors.
- In extrinsic semiconductor, the number density of electrons is not equal to the number density of holes. i.e.,  $n_e$  is not equal to  $n_h$ .
- 3. The electrical conductivity of extrinsic semiconductors is high.
- 4. The electrical conductivity of extrinsic semiconductors depends on the temperature as well as the amount of impurity added in them.