

Electronics

Diodes, physics aspects

Problem 1.-

- a) What is the origin of the surface leak current in diodes and what kind of carriers are associated with this current? Holes or electrons?
- b) Why are no LEDs made of silicon?
- c) Why is silicon more common than germanium in electronic devices?

Solution:

- a) The surface leak current is due to the dangling bonds at the surface. Silicon atoms located at the surface of the semiconductor do not have neighbors, so they will have incomplete orbitals (holes).
- b) Silicon has an indirect gap and not enough energy to produce visible light in a transition.
- c) Silicon has a larger gap than germanium and it can grow a protecting layer of SiO_2 on its surface.