Semiconductors

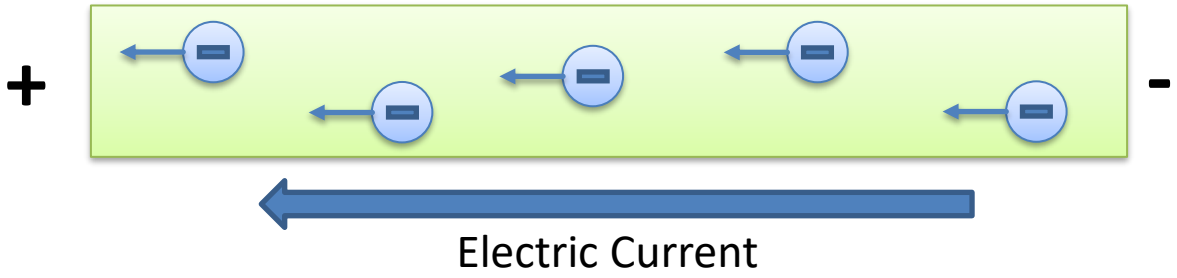
Networks and Embedded Software

First Grade Level

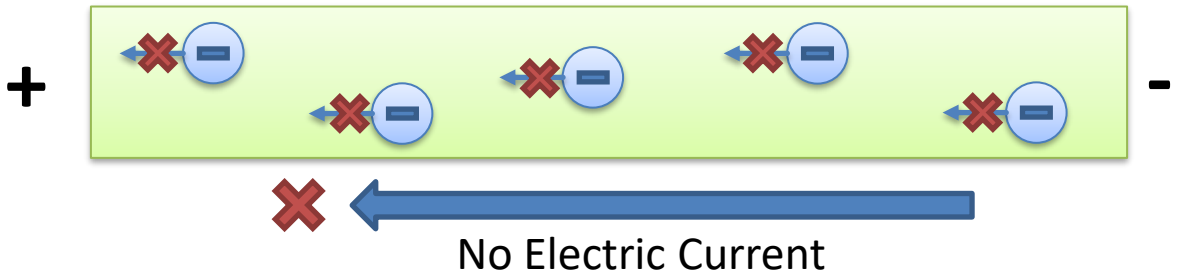
by Wolfgang Neff

Semiconductors (1)

- Conductor

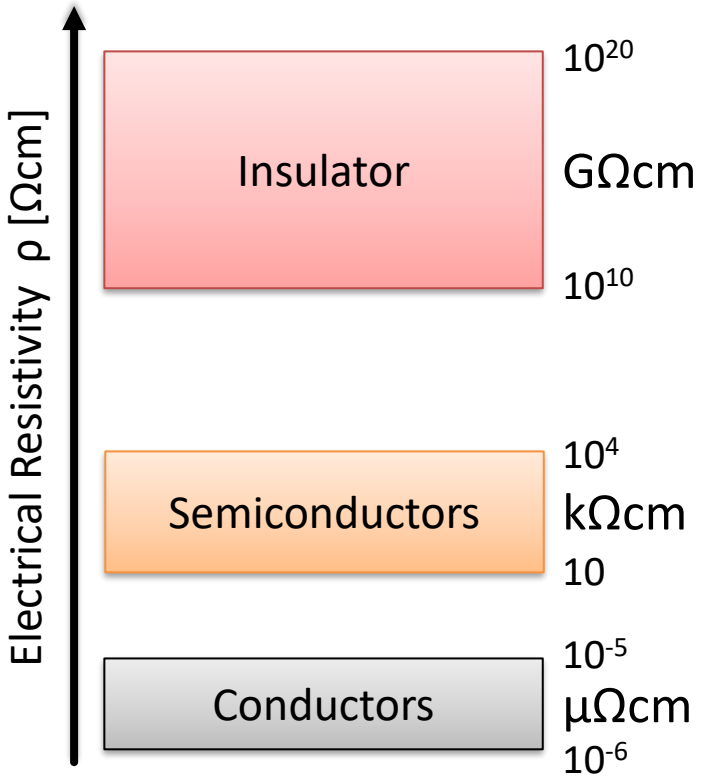


- Insulator



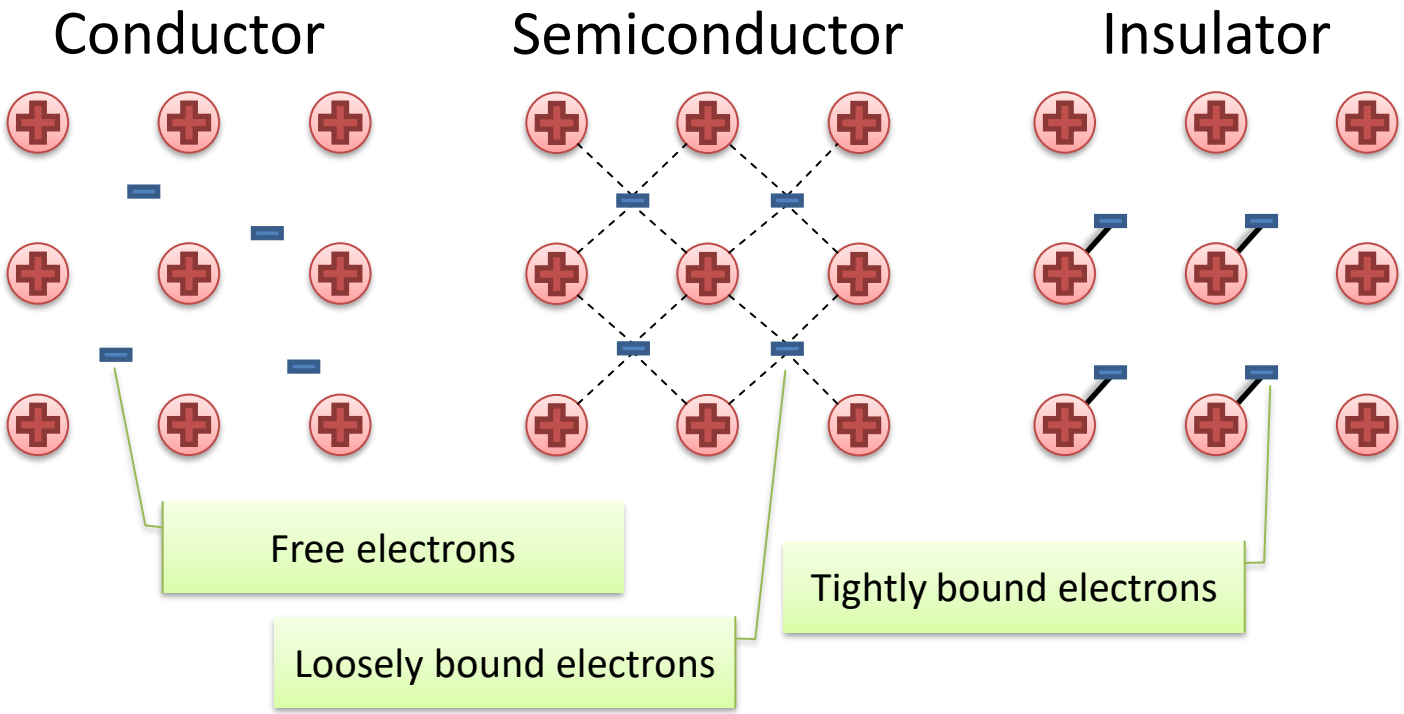
Semiconductors (2)

- Classification
  - Conductor
    - Silver, copper
    - High conductivity
  - Insulator
    - Porcelain, plastics
    - High resistivity
  - Semiconductor
    - Silicon, germanium



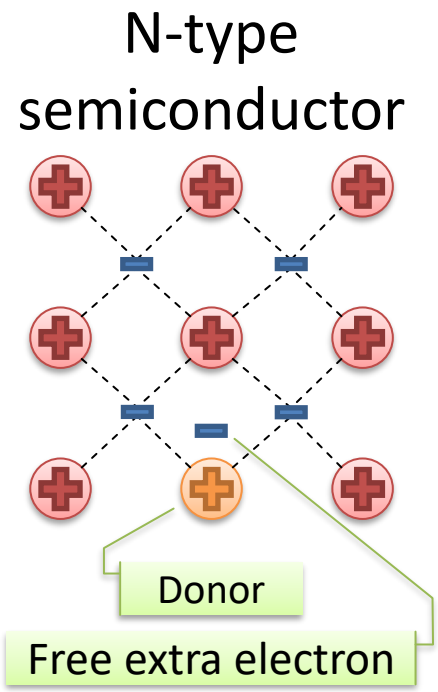
Semiconductors (3)

- Conductivity



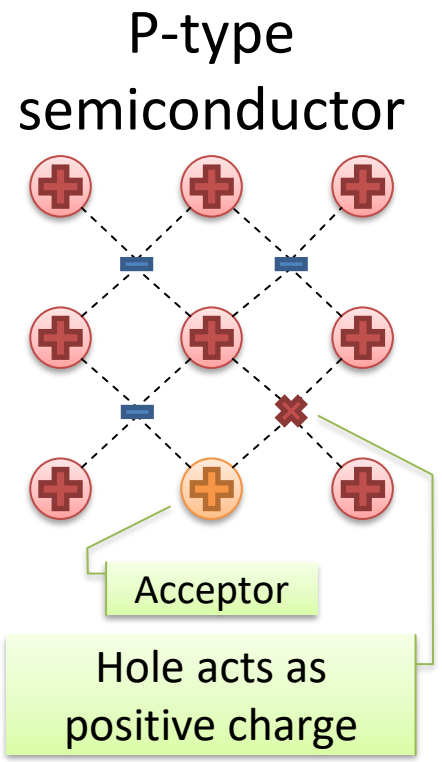
Semiconductors (4)

- Doping: donors
  - Some atoms are replaced by donors
  - Extra electrons
  - Better conductivity
  - N-type doping



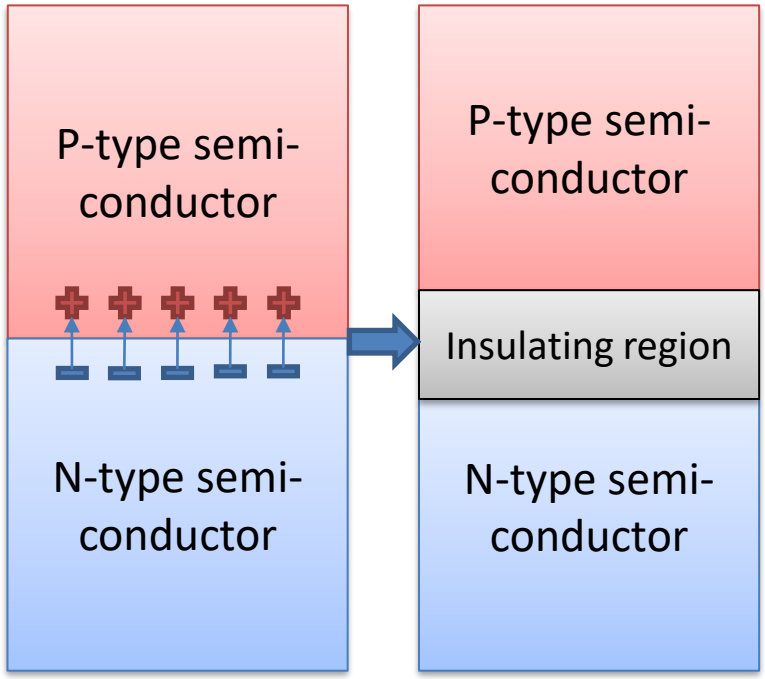
Semiconductors (5)

- Doping: acceptors
  - Some atoms are replaced by acceptors
  - Lack of electrons
  - Better conductivity
  - P-type doping



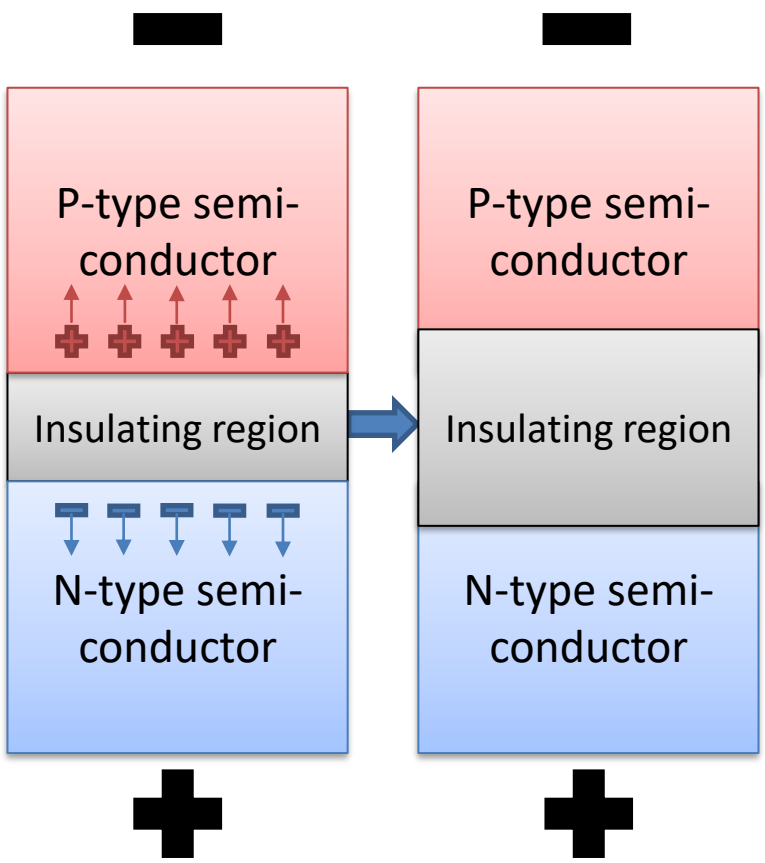
Semiconductors (6)

- P–n junction
  - Electrons jump into the holes
  - There are no longer free charges
  - There is an insulating region



Semiconductors (7)

- P–n junction (continued)
- Power supply
  - P-type side: –
  - N-type side: +
- Insulating region gets even larger



Semiconductors (8)

- P–n junction (finished)
- Power supply
  - P-type side: +
  - N-type side: -
- Insulating region gets smaller